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Challenges of Small Virtual Teams in ERP implementations

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Technology grants employees a virtual environment to collaborate and work far away from each other, but how should team members and managers handle their physical separation? One should think twice before applying the same rules and processes of face-to-face teams to virtual teams. Enterprise resource planning (ERP) implementations are more likely to succeed when all participants understand the differences and are provided with the tools needed.

Ad hoc virtual teams represent both opportunities and threats, and companies struggle to understand how to minimize the negative effects that a virtual environment may cause in team effectiveness. Organizations try to support virtual teams through different kinds of technology solutions, however, studies show mixed results depending on the specific characteristics of the team and tasks.

The study explored small virtual teams efficiency during ERP implementations carried out in different projects around Germany and Spain, and made recommendations to improve virtual team performance.

The conceptual framework of this thesis was built on literature about virtual teams and ERP implementations. This thesis analysed qualitative data obtained through attended meetings and open interviews performed to small virtual team members responsible for system implementations.

Results show that although both technology and processes are necessary variables to work in a virtual environment, they are not enough to guarantee a successful implementation. This study facilitates best practices to members who, for the first time, need to work in a virtual project to implement an ERP solution.

Keywords	Virtual teams, ERP implementations

Acknowledgements

When I started this thesis I had an overall idea about the topic I wanted to research about, and little by little this idea took shape with the help and support of many people.
First of all I would like to thank Finland and the Helsinki Metropolia University of Applied Sciences for the opportunity that they have given to me. During these two years I have learnt so many things and enjoyed the experience of working together with people from different cultures, countries, and backgrounds enriching the results and giving to me the possibility of analysing things from a different point of view. Furthermore, within the Metropolia University I would like to thank my thesis supervisor for giving structure to my thoughts and for his flexibility to support my personal circumstances.
Secondly, thanks to my colleagues and all the interviewees for their honest feedback, useful tips and for sharing with me their personal experiences because without them this thesis would have not been possible.
Last, but not least, I would like to thank my family, friends, and overall my partner for always being there when I needed them.

Contents

1 Introduction

1.1 Overview

Companies need up to date information in order to make the best decisions. Nowadays, the increasing level of competitors and the markets situation push companies to take advantage of any opportunity in their production and operational organization to be able to survive and thrive. Enterprise Resource Planning (ERP) systems allow companies to access last-minute information from all departments (marketing, finance, logistics, human resources, etc.) centralized in just one source. No matter which country a person is working in, just pushing a button he or she can find out, for example, how much stock there is left in their central storage.

1.2 Business Challenge

Given the current technological advances, companies tend to rely increasingly on virtual teams to implement ERP systems. This way, they can guarantee that the best people are working on the implementation without paying prohibitive travel costs.
Thus, during ERP implementations, a company's employees from different areas of expertise, external, and internal consultants have to work very closely to implement the best possible solution. People involved in the project have the knowledge in their area of expertise, but they may have not worked previously in any virtual team so they are not aware about the mistakes that can seriously affect the final result of the implementation. In these cases people learn by trial and error, but ERP implementations usually have very tight schedules. They would save time and effort knowing beforehand the main challenges they face and how could they efficiently address them.
An ERP implementation is a major project which involves several complex tasks – such as firm's processes analysis and design, system configuration, data conversion, integration, testing and users training - to best meet firms' needs. ERP implementations are normally accomplished by a consultancy company who use to have very tight deadlines in order to meet the specific industrial context upon which processes have been designed. In case this strategic scenario does not exist any more by the time the system has been implemented into the firm, the success of the implementation could be at serious risk. Therefore, to keep deadlines and budget under control, leaders should

understand and manage ERP implementation challenges together with virtual team challenges to complete the ERP implementation successfully.

1.3 Business Context and Case Company Background

Techtronic Industries (TTI) is based in Hong Kong and it was founded in 1985 by Horst Pudwill and Roy Chung. The company was originally focused on producing rechargeable battery packs for power tools. However, since TTI was founded, the company has grown to become a market leader in two segments: power equipment (79.1% of sales reported in 2015), and floor care and appliances (20.9% of sales reported in 2015). Company's culture and strategy focus on powerful brands, innovative products, operational excellence and exceptional people.

TTI's brands include ”Milwaukee”, ”AEG”, ”Ryobi”, ”Homelite”, ”Empire”, ”Stiletto”, and ”Hart” between its power tools segment, and ”Hoover”, ”Dirt Devil”, ”Vax”, and ”Oreck” between the floor care equipment. During 2015 revenue increased by 10% to US$2.5 billion, being one of the most successful the ”Milwaukee” tool business with a sales increase of 24.4%. As shown below, the company has demonstrated an outstanding performance during last years driven by new product innovations and growth in all geographic regions.

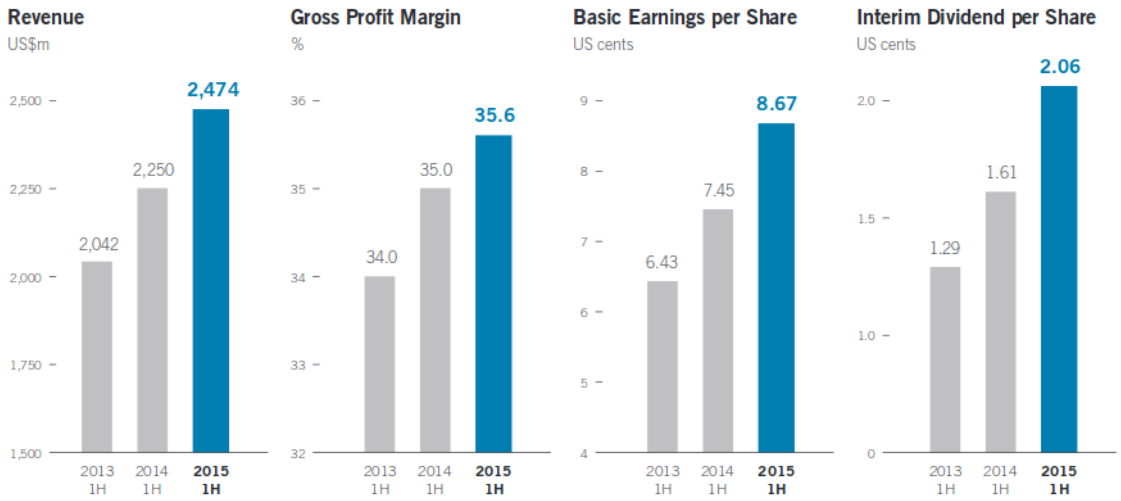

Figure 1. Financial Highlights (Source: TTI Financial Reporting, 2015)

Most of TTI's production factories are placed in China, with some of them also in U.S., Mexico and the Czech Republic. Since 2007, the company has shut down several production centers in the U.S. and Germany, to relocate them in China with the objective of decreasing its production costs.

TTI employs more than 20,000 people in Hong Kong and overseas (North America, Europe the Middle East, Africa, etc). Company's sales are mainly in North America as shown in the figure below. TTI sells its products to professional and industrial users in the home improvement, repair and construction sectors.

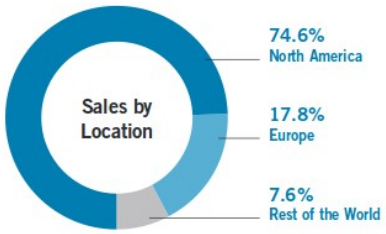

Figure 2. Sales by location (Source: TTI Financial Reporting 2015)

The market is growing between 6-7% annually with future expected growth to be driven by Latin America and developing economies as China and India. The following table shows the main brands of TTI and their major end-users and competitors.

Taulukko 1. Table 1. Brands (Source: Sun Hung Kai Financial Institutional Research, "Techtronic Industries", 2013)

Market segment	Brand	Products	End-Users	Main Competitors
TTI Power Tool Brands	Milwaukee	Cordless saws, power drills, hammers	Mechanical, electrical, plumbing, remodeling and maintenance repair professionals	Stanley Black & Decker, Bosch, Makita, Hitachi, Koki, Emerson, Snap-On
	AEG	Rotary hammers, power drills, grinders	Professional tradesman, contractors	Stanley Black & Decker, Bosch, Makita, Hitachi, Koki, Emerson, Snap-On
	Ryobi	Drills, saws, grinders, planers, trimmers, mowers	Do-it-yourselfers and Cost-concious professionals	Stanley Black & Decker, Bosch, Makita, Hitachi, Koki, Emerson, Snap-On
Floor Care Brands	Hoover	Vacuums, carpet cleaners, hard floor cleaners, steam cleaners	Homeowners and premium cleaning enthusiasts, cleaning businesses, industry and trades	Electrolux, Dyson, Bissell, Miele
	Dirt Devil	Upright vacuums, hand vacuums, stick vacuums, canister vacuums, steam cleaners	Homeowners and premium cleaning enthusiasts	Electrolux, Bissell, Miele
	Vax	Upright vacuums, hand vacuums, stick vacuums, canister vacuums, steam cleaners	Mass market of domestic cleaners	Electrolux, Dyson, Bissell, Miele

TTI has invested significantly in R&D, marketing programs and in their geographic expansion to increase their distribution reach. Their fast development process is one of the company's main competitive advantage.

To continue with its expansion and better track customers behaviour, the company decided to implement a CRM (Customer Relationship Management) tool, creating for that purpose a small project team whose members work from different locations the most of the time. Team members included external consultants, freelance, and company's employees with different specializations, backgrounds and cultures. This thesis is based on the challenges reported by team members during the project implementation.

The team created to implement the CRM solution within the company was an ad-hoc team that existed during a limited period of time, and integrated by companies' employees as well as external consultants:

A project leader who normally works in Germany

The business owner who use to travel constantly around the world

An external consultant in charge of the system development who normally works in Germany but from a different location.

A freelance in charge of the data migration who uses to work from different locations.

A CRM specialist who works in Germany.

Therefore, people working for different companies as well as freelances had to work together to accomplish the implementation.

The CRM system implementation goal is to integrate company's business processes to control all areas in one database and make information available to everyone regardless of the place they are working from. Through the implementation of the ERP solution, the firm tries to improve their business performance, increases their competitive advantage, and enhances customer satisfaction (Somers & Nelson, 2002). However, risks should be addressed to complete the implementation succesfully. A study carried out by Panorama Consulting Group during 2015 shows some alarming resutls: of the projects studied, 58% exceeded their planned budgets, 65% of implementations took longer than expected, and 53% of the organizations analysed perceived the benefits to be less than the half of the expected results.

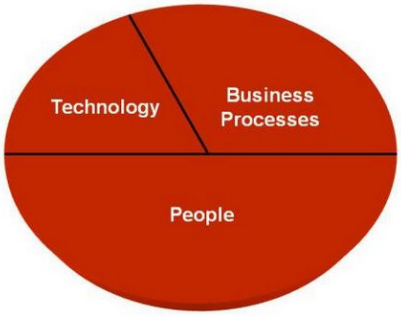

Figure 3. Components of a business solution (Brett, 2010)

ERP implementation projects struggle to improve these numbers, but to do so, it is needed to understand that the ERP project success depends more on people than on information technology (Brett, 2010) - as shown in the figure above (Figure 3).

1.4 Objective and Scope

Literature has studied virtual teams extensively, offering a valuable theoretical background. However, there is a need for specialized practical reasearch on virtual teams referring to a specific task. For this reason, the objective of this thesis is to explore the challenges of creating and maintaining a small virtual team with the common goal of implementing an ERP system in the company. Based on the findings of ten interviews, recommendations are given to facilitate the implementation process in a virtual environment.

1.5 Thesis Outline

In this thesis it is first explained the method of research, secondly, it is covered the basics of virtual teams such as the definition of virtual teams, the variables to recognize when evaluating a virtual team, team processes, and virtual team's life cycle in order to get a better understanding of the basics. Finally, the last section addresses the challenges that teams use to face when working virtually as well as a set of best practices to consider as recommendations extracted from virtual team members' experiences and literature review.

2 Method of Research

2.1 Research Design

The research of this thesis followed the action research method, although due to the short length of the implementation project, the recommendations could not be implemented. During a period of time of eight months (March 2015 – October 2015) the action research was done following the empirical method in action research projects: (1) planning action, (2) taking action, (3) evaluating action, and (4) constructing (Coghlan, D., Brannick, T., 2010). During this period of time, data was collected and analysed to learn about the main challenges that small virtual teams face when implementing an ERP solution within a company. After this first stage, a second research was done during the following three months with the purpose of learning more about other consultants' experiences and insights. For this purpose, additional interviews were done to consultants who normally work in small virtual teams to implement an ERP system in other companies. The research allowed the researcher to study and compare patterns, collects and analyse data with the objective of finding out patterns of behaviours that help the good rhythm of the virtual team as well as getting another point of view additionally to the existent literature. With the results of the data collected through observations, interviews and literature, a set of recommendations was built for each challenge identified.

The structure of research of this thesis is presented in the figure below following and adapting to this thesis the structure of research and data collection done by Ruuska (2015).

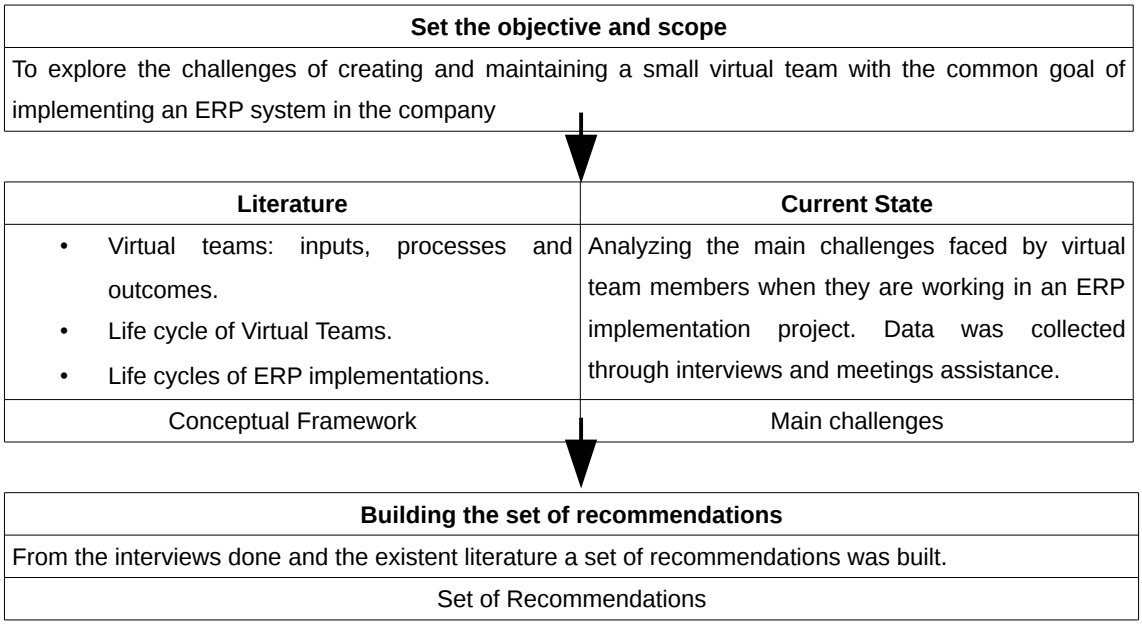

Figure 4. Summary of the research design of this thesis (Based on Ruuska, 2015)

2.2 Research Approach

The study was conducted during the period March 2015 to January 2016 paying interchangeably attention to interviewing and building an understanding of the challenges facing small virtual teams (from four to seven team members), focusing on the theoretical framework to build the findings and draw conclusions.

The research work was done in three different phases. During the first stage, empirical material was collected over a period of three months, attending twelve regular project meetings and several ad hoc meetings held to deal with unexpected issues that had arisen. Throughout this phase, the focus was on identifying some of the virtual team challenges as well as to analyse the nature of project member interaction. During the next stage, semi-structured interviews with ten members of different small virtual teams involved in ERP implementations were performed. Each interview lasted on average 65 minutes. In the final phase, quotes from the interviews where selected and grouped by topic as indicators of the main challenges faced by the virtual team members. Finally, findings were compared to current theories to formulate a set of recommendations.

2.3 Data collection and Analysis

Regarding data analysis, the method of research is qualitative analysis. Data was collected by individual semi-structured interviews with companies' virtual team members. Separate one-hour interviews were conducted either via Skype or in person depending on interviewees' locations.

Data was collected by interviewing ten people who worked on projects geographically distributed in a variety of organizations. Interviewees were asked questions regarding their experience in participating in such teams. The use of open-ended questions facilitate the dialogue and the emergence of interesting topics, and using an informal environment helped the interviewees to relax while answering the questions.

Interview questions were sent beforehand via e-mail so the interviewees could read the questions some time before the interview and think about their experiences and challenges working in virtual teams. It also benefited the communication and avoided misunderstandings talking in English as a common language, because none of the participants was a native-English speaker.

Team members had different professional backgrounds and working experience ranging from middle positions to managerial levels. All subjects were asked about the way they usually work in virtual teams and were encouraged to provide their personal experiences in regard to the success of their specific geographically distributed team project.

Sample virtual team member interview questions include:

- Describe the special challenges you have encountered working virtually.
- Did these challenges change over time?
- If so, could you please describe the different challenges you faced?
- What specific behaviors have you or any member of your virtual team demonstrated that particularly help the functioning of the virtual team?
- For the next virtual project teams you will may be involved, what would you improve or change in order to increase performance effectiveness at each stage of the team development?
- What would you recommend to a person that is working in a virtual environment for the first time?

The interviews were recorded with the consent of all the team members. To process the data the steps followed were: (1) the interviews were listened to and typed, (2) the main challenges and recommendations were extracted manifesting either agreement or disagreement between the interviewees, (3) when differences in virutal team

challenges were found, the techniques used for each of them were extracted to analyze them in more detail and contrast them with extant theory to define a set of best practices extracted from the lessons learned by interviewees' experiences and the review of extant literature.

2.4 Validity and Reliability

To check this thesis validity and reliability, there are different aspects to consider. First of all, to assess the validity of this study it is needed to refer to the different types of validity (Cook and Campbell, 1979): (1) statistical conclusion validity, (2) internal validity, (3) construct validity, and (4) external validity. Statistical conclusion validity focus on the existence of a relationship between two variables (Cook and Campbell, 1979). The second type, internal validity, tries to find out if there is any reason that may cause a confusion of the study findings. Construct validity indicates how well the author converted or decipher the ideas or behaviours into a functioning reality (Trochim, 2006). The last type, the external validity, refers to how generalisable are the conclusions and relationships between different factors to other people with different environments and characteristics (Cook and Campbell, 1979).

This study's nature is observational and data has been obtained through a qualitative study. For this reason, there are not causal variables, and it is not based on statistics but in people's experiences. Therefore, the statistical conclusion validity and internal validity are not relevant for the purpose of this thesis.

Referring to construct validity, the researcher has read and analysed extant literature to learn about how to conduct in-depth interviews and ensure the quality of the study.

Furthermore, the validity of this research is also based on external validity, as it has been performed additional interviews with consultants and business leaders working within a virtual team in different companies and environments to implement an ERP solution, with the objective of contrasting challenges, insights, know-how and experiences.

Additionally, reliability refers to the process of analyzing whether the outcomes of the study are probable to produce the same kind of results if the research is performed again by another authors. Although the environment and of a company and team specific characteristics normally changes over time, to assess the quality of the findings, in this study all the interviews have been recorded and taped to help the process of anayzing the data, and the different phases of data gathering have been noted to facilitate a posterior review of the conclusions.

3 Theoretical Background

Every team is different and has its intrinsic characteristics that define it. Managers should be able to distinguish teams' special features in order to get the most of them. But, for this to happen, leaders of virtual teams need to recognize and be aware of such differences. For this reason, in this section it is explained what is a virtual team, and what are its main characteristics, to finally describe virtual teams' evolution over time.

3.1 Defining Virtual Teams

Virtual teams have received increased attention during the last years as a way of understanding external factors and team characterisitics that could affect their efficiency. Most definitions of virtual teams mention that they are comprised by physically dispersed members who communicate through technology (phone, audioconference, videoconference, e-mail, etc.) in order to cross space, time, and / or organizational separations. Powell et al. (2004) defined virtual teams ”as groups of geographically, organizationally and / or time dispersed workers brought together by information technologies to accomplish one or more organization tasks”.

Depending on the characteristics of the task performed and the extent of technology interaction instead of face-to-face communication, the technology support they employ may differ. Therefore, according to Bell and Kozlowski (2002) “Virtual teams performing less complex tasks are expected to be able to effectively manage their information and collaboration requirements with asynchronous communication media. As virtual teams perform more complex, dynamic, and challenging tasks, however, they are expected to be more likely to adopt synchronous, or tightly linked, communication media to facilitate collaboration, information richness, and group decision making.” As Griffith and Neale (1999) point out: “the more time team members spend apart, the greater their use of communication technologies.”

Virtual team members have a vast amount of technologies available to support their interactions. ERP implementations have very tight timeframes, meaning that time is an important source of money for every implementation. Thus, between the several options available, an important variable to consider is if the tools selected allow team members to communicate in a synchronous way or not (Riopelle et al., 2003). Synchronous technologies, such as videoconferencing, speeds up communication and

collaboration between the team members as it grants that both members are connected at the same time, therefore saving time.

3.2 Configuration of a Virtual Team: Input variables

When talking about the configuration of virtual teams, authors have analysed their different attributes trying to achieve a better understanding about which specific characteristics could influence in the group overall performance. From this point of view, the main aspects to consider when creating a virtual team are: (1) size of the virtual team, (2) existing talent, (3) the type of technology used, (4) virtual team's task, and (5) people.

- **Size** of the virtual team. The amount of members who collaborate within a distributed team could make a difference in the degree of members participation and effectiveness. Studies indicates that small teams complete tasks faster than big groups (Thompson, 2000). The author considers that an optimal size would be between five and seven members. In this sense, groups of twelve or more people are considered too big, lowering group performance due to the following reasons:
  - Responsibility is so dispersed that some members may feel that their contribution is not being considered nor measured by others so they do not work as much as they would do it if they work alone.
  - When groups are too big, not everybody participate during the meetings, affecting to the generation of ideas and following up with the emergence of collateral effects such as: either the whole team may end up being dominated by a few members, or the creation of smaller subgroups within the team increasing the time needed to reach a decision.
- **Existing talent**. One of the more important benefits of creating a virtual team is that it allows to the organization to have the best people working together in a common task. In other words, no matter where team members are located physically they have the best know-how needed to achieve team specific goals. Furthermore, although technical skills of team members are important predictors of virtual team performance, it is also important to consider their interpersonal skills. Between the competences needed to be effective, good people skills play an important role to understand, communicate and support other virtual team members. Experts that are the best in their respective fields may be

useless in a virtual team if they can not listen and understand others. (Robbins, P., Judge, T. A., 2012).

- **Type of technology** used. Virtual teams are characterized by their reliance on communication technology to mediate their interactions. Virtual communication may reduce visual cues, such as body language or tone of voice that frequently facilitate a better understanding of the current situation, leading to difficulties to get all the information virtual members need in order to make the best decisions (Hinds, P. J., Weisband, S. P., 2003). Technologies that allow members to see each other while talking at the same time (audio with video) may benefit the process of building trust between team members and increase the quality of the decisions reached by virtual teams when the task at hand needs more collaborative efforts (Baker, 2002).
- **Type of task**. Managers should consider two main questions: How complex is the task? What is the level of interdependence between team members? Depending on the kind of task, the team will need to use one type of technology or another to interact and share information. Simple tasks are those considered as routine where there is normally little interdependence between team members, whereas complex tasks are new endeavours with high levels of uncertainty and more information to process where people require to actively collaborate between each other and reach to decisions together, thus increasing the degree of interdependence within the team (Thompson, 2000). The more complex the task, the more efficient the communication needs to be. For this reason, while working in a complex task, managers should select tools that increase the effectiveness of communication and information-sharing processes, and reduce misunderstandings and / or conflicts between team members.

  Although over time the differences between face-to-face and distributed teams tend to decrease, Straus and McGrath (1994) found that, in terms of the time needed to complete a task, when the task to finish requires high levels of coordination between members, face-to-face groups perform better than virtual teams. This difference may be due to the use of asynchronous channels and consequently increasing the amount of time needed to coordinate team efforts and actions.
- **People**. Organizations are formed by individuals with personal characteristics that makes all of them different from each other. But, at the same time, some employees will have one or more aspect in common, as for example, they started working for the company at the same time, they have the same age, educa-

tional level, sex, language, religion, etc. On one hand, teams where members have some common experiences may result in a better understanding between each other. For instance, people who use a second language to communicate with other team members via email or chat will need more time to answer or they will make mistakes that could be interpreted by the receiver as rude initiating a misunderstanding. On the other hand, these common experiences may decrease the amount of different sources of information and limit the number of different approaches to address an issue.

Studies show evidence that team members' personalities affect their degree of participation in virtual teams. According to Belbin's team role theory (Belbin, 1993), in a team there are nine possible different behaviours types: (1) the resource investigator, (2) the team worker, (3) the coordinator, (4) the plant, (5) the monitor evaluator, (6) the specialist, (7) the shaper, (8) the implementer, and (9) the completer finisher. This way, each team member feels comfortable playing one or more role types, s/he may accept playing some specific roles if they have to, and other roles that it would be better to avoid for the benefit of the whole group.

The author focuses on identifying the roles that suits better to each team member recognizing his / her strengths and weaknesses. By doing so when creating a team, the author balance team composition so all the roles are covered in one way or another, thus increasing team efficiency.

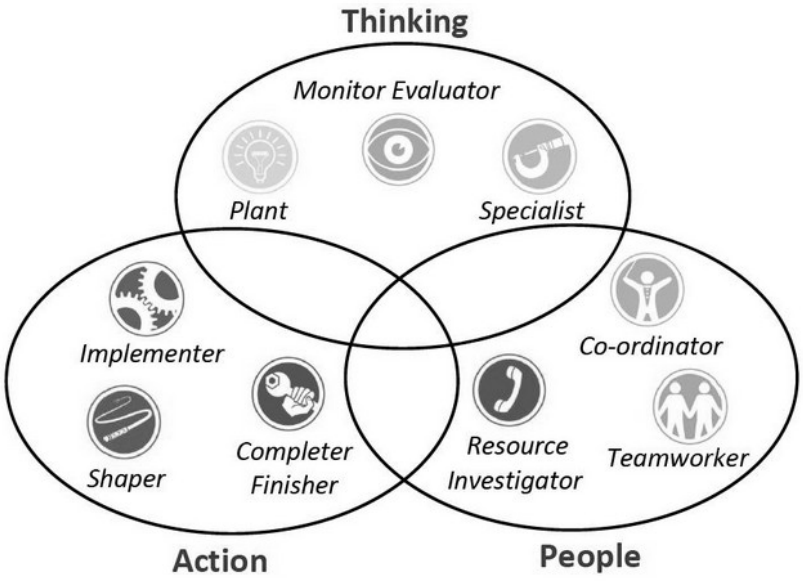

Figure 5. Belbin's team roles (Source: Robins, S. P., Judge, T. A., 2012, *Organizational Behavior*, Prentice Hall)

By creating synergies, an effective team can achieve better results than the sum of each individual outcome. However, creating a team does not mean simply putting together employees in a list and expect from them to complete a job. When coordinated poorly, teams can jeopardize the success of the project because of lack of communication, unclear roles, etc.

3.3 Team processes

The concept of team processes refers to “how teams achieve their outcomes” (Weingart, 1997). Several models have been developed to explain the way groups get results.

Based on the I-P-O model, input-process-outcome – see Figure 6 (McGrath, 1964) –, several authors have defined more adaptive theories to better represent the cyclical and dynamic character of team processes. McGrath, Arrow & Berdahl (2000) CORE model – construction, operations, reconstruction, and external relations – emphasizes that groups are “complex, adaptive, dynamic systems”. For this reason, they argue that groups must be analysed over time considering not just the specific characteristics of the environment where they need to work, but also, their interactions within the group and with its environment.

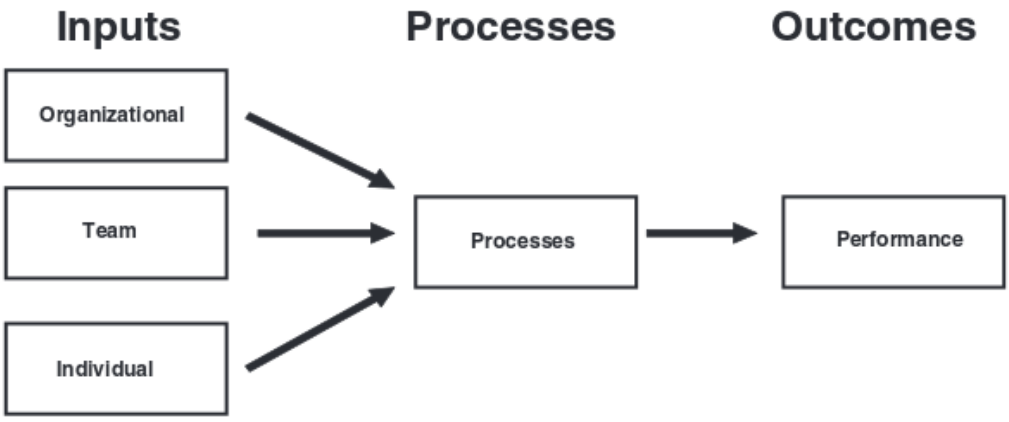

Figure 6. Input – Process – Output (IPO) model (McGrath, 1964)

Similarly, Ilgen et al., (2005) go beyond the I-P-O model developing an alternative model called IMOI (input-mediator-output-input) with the intention to include the cyclical component in teams, where the outputs of a specific team in a given moment can be the inputs of the following task – see Figure 7.

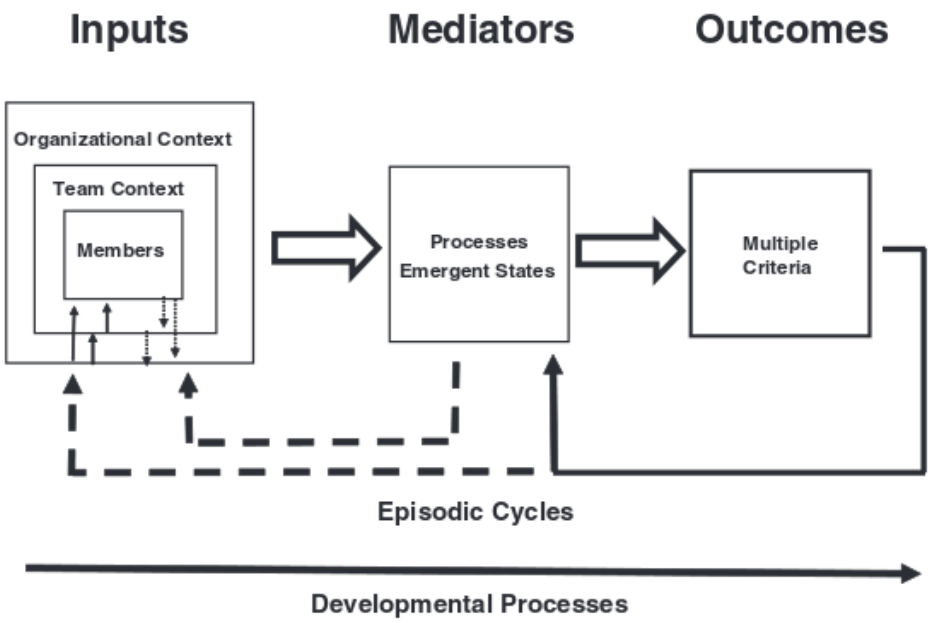

Figure 7. Input – Mediator – Outcome – Input (IMOI) model (Ilgen et al., 2005)

Martins et al. (2004) differentiated three types of team processes: (1) planning, (2) action, and (3) interpersonal processes. Planning processes are focused on setting the goals and strategy of the team. Action processes include all the activities that team members perform in order to achieve the project's task, as for example, coordination, communication, collaboration, participation, etc. Finally, interpersonal processes are those that emerge from people interaction, such as, trust, conflict, tone of interaction, affect, etc.

Thus, to facilitate team processes and get team outcomes as efficiently as possible, it may be a good strategy to relate Belbin's team roles – Figure 5 – with Martins et al. team processes. Accordingly, managers should consider the roles a person is willing to play to match the specific needs of the project. See Figure 8.

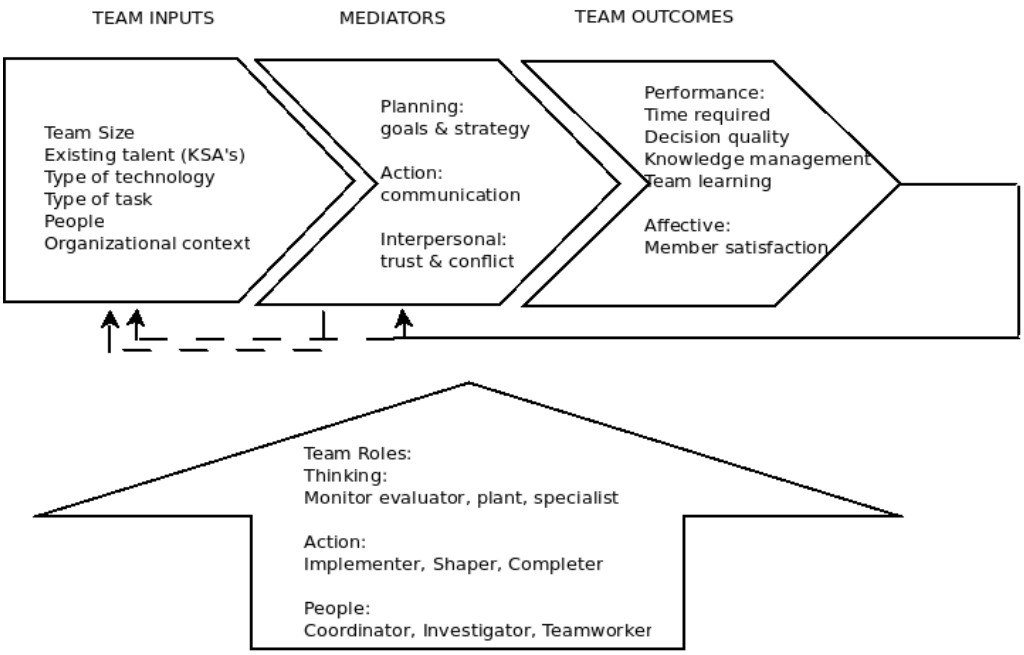

Figure 8. Input – Mediator – Outcome – Input (IMOI) model related with Team Roles.

Planning processes. Although the task of creating a common goal is more difficult in virtual teams than in face-to-face teams, authors argue that setting objectives helps to build commitment and collaboration in distributed teams (Hart and McLeod, 2003). Furthermore, Lurey and Raisinghani (2001) found that it is very important for the posterior development of the team to set team goals and strategy. By observing the interactions between global virtual team members through time, Kayworth, T. R. and Leidner, D. (2000) identified specific challenges for distributed teams such as the delay of receiving the answer, the absence of visual cues to correctly interpret the message received as well as the lack of context. Furthermore, they pointed out that cultural differences and mismatched timetables of virtual team members as impediments to coordinate team efforts. Researchers (e.g. Munter, M., 1993, Ren, H. and Grayhave B., 2009) have identified several issues related with cultural barriers in cross-cultural communications caused by semantics, connotations, tone differences, differences in conflict tolerance and methods for solving them.

An important element to consider when talking about cultural diversity is the degree of individualism in society. Accordingly, depending on which interests prevail in a certain society, individual versus group interests, a society can be identified as individualist or collectivist. “Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after him- or herself and his or her immediate family. Collectivism as its opposite, pertains to societies in which people from birth onward

are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty." (Hofstede, G, Hofstede, G. J., Minkov, M., 2010). The difference between in-groups and out-groups is of particular interest in this sense. When doing business, in collectivist societies, it is considered natural and ethical to treat better friends than others. For this reason, it is essential in a collectivist society to build trust within the group before starting the project. To the collectivist mind, the personal relationship prevails over the task and should be established first, whereas to the individualist mind, the task comes first and predominates to any other personal relationship. These findings suggest that the process of building trust among individualist members of virtual teams will be faster than among collectivist team members (Hofstede, G, Hofstede, G. J., Minkov, M., 2010).

On the other hand, the lack of context may be due to cultural differences. In high-context cultures as East-Asia countries, people give more importance to the social status of the person, his / her hierarchical position and the non-verbal communication interactions than low-context cultures as Europe and North America countries. Members of a cross-cultural virtual team may address at some point or another the following question: how direct should I be?

Action processes studies have focused mainly on analysing the level of communication and presence within a virtual team. The degree to which a specific communication channel is able to handle information will depend, mainly, on the amount of non-verbal cues that the communication channel selected allows, and on the time needed to receive an answer. Based on these two factors, R. L. Daft and R. A. Noe (2001) set up a ranking of communication channels, placing them in one position or another following their individual level of information richness. See Figure 9.

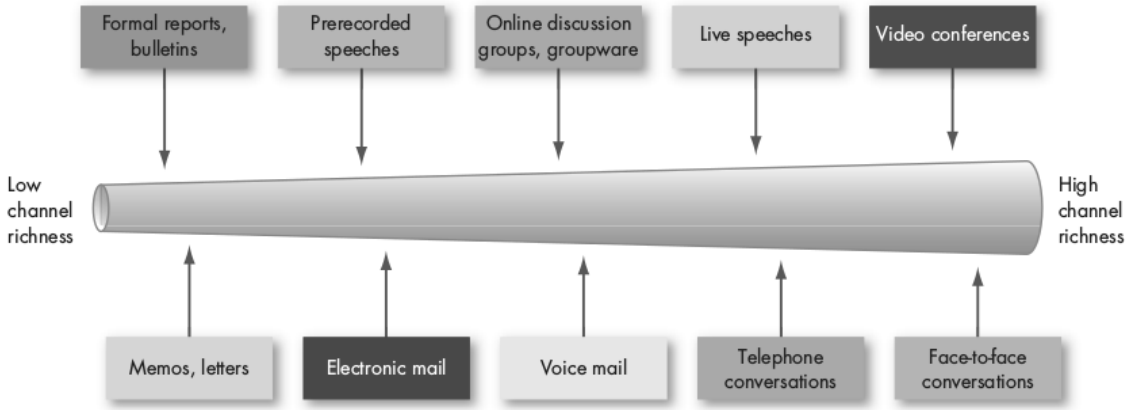

Figure 9. Information richness and communication channels. (Source: Robins, S. P., Judge, T. A., 2012, *Organizational Behavior*, Prentice Hall)

Bikson and Eveland (1990) argue that asynchronous channels of communication, such as email, help to raise virtual team members participation because of two reasons: first is because each member can share his/ her information with others when better fits to his / her time schedule and secondly, the use of an asynchronous channel of communication decrease the status and / or hierarchy gaps (Hollingshead, A. B., 1996). But, on the contrary, the entire process of reaching a final decision takes longer than using face-to-face communication channel.

The selection of channel will depend on the kind of task team members need to complete, simple or complex. For example, if the task to complete could be classified as routine and there is no chance left to mistakes, a low-richness-channel could accomplish its mission without any misunderstanding during the communication process.

Interpersonal Processes. Trust and conflict are the main two topics that have been studied extensively within virtual teams research. As shown in the literature, trust is an important advantage for every team because it encourages the team to take risks, share information, as well as increase team effectiveness and productivity (Detert, J. R. and Burris, E. R., 2007).

Trust is a psychological state that exists when you agree to make yourself vulnerable to another because you have positive expectations about how things are going to turn out (Rousseau, D. M., Sitkin, S. B., Burt, R. S. and Camerer, C. 1998; J. A. Simpson, 2007). The process of trust depends on the degree to which a person is likely to believe that others are trustworthy or not (Mayer, R. C. and Davis, J. H., 1999, Mayer, R. C. and Gavin, M. B., 2005). Team members who ask for having every interaction written in paper or sent via email have low levels of trust propensity. From this point of view, time seems to be the best solution. Team members will trust each other once they start working together if they show each evidence of: (1) integrity, or consistency between what you do and say, (2) benevolence, caring and supportive behaviour, and (3) ability to accomplish the job.

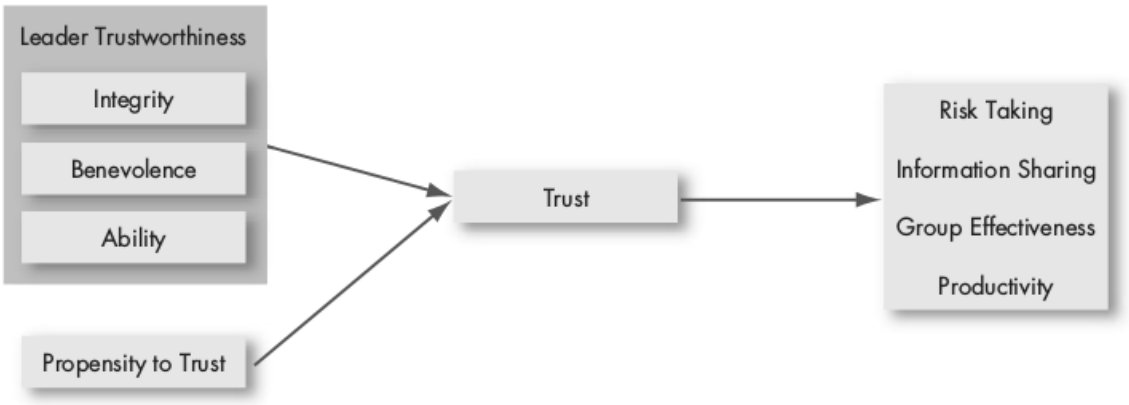

Figure 10. The nature of Trust (Source: Robins, S. P., Judge, T. A., 2012, *Organizational Behavior*, Prentice Hall)

Virtual team diversity and its lack of face-to-face interactions (social cues as warmth or attentiveness) make the process of building trust within the team more difficult and time consuming. In virtual communications, systems of control and coordination such as direct observation and monitoring are not possible. McGrath (1991), in his theory *Time, Interaction and Performance*, argues that there are four types of group activity, and consequently, every team action is involved in at least one of them. These types are: (1) inception, when the group is engaged in a project (2) problem solving, refers to the act of selecting how the team will resolve the problem (3) conflict resolution, pretends to solve conflicts of interests, values or preferences within the team, and (4) execution, where team members focus on achieving team's goal in terms of quality, quantity and speed of production. Additionally, each type of group activity involves tasks to support three main functions: (1) production, (2) well-being, and (3) member support. The theory points out that these four modes of activity can occur in a different order. The model supports that when a virtual team (characterized by technology mediated interactions) is starting working together, it should get involved in all these three functions and production types (inception, problem solving, conflict resolution and execution) to increase team performance.

	Production	Group Well-Being	Member Support
Inception	Production demand and opportunity	Interaction demand and opportunity	Inclusion demand and opportunity
Problem-Solving	Technical problem-solving	Role network definition	Position and status attainments
Conflict Resolution	Policy resolution	Power and payoff distribution	Contribution and payoff distribution
Execution	Performance	Interaction	Participation

Figure 11. Group modes and functions (McGrath, 1991)

Media richness theory (Daft, Lengel, and Trevino, 1987) suggested that computer supported communication inhibits the process of creating trust within team members due to the lack of social cues that people normally exchange when they interact face-to-face. Similarly, Nohria and Eccles (1992) supported that trust can be built only under certain conditions, that involve (1) co-presence, (2) broad bandwidth that handles multiple senses, and (3) interactive communication that allows instant feedback. However, Walther (1995) challenged this theory supporting that although the process of building trust in virtual teams is slower than in face-to-face groups, it can be developed in virtual teams, no matters which communication media is selected.

Scholars (Shapiro, Sheppard, and Charasking, 1992, Luhmann, 1979 and Meyerson et al, 1996) have acknowledged the existence of different ways of building trust: (1) deterrence-based trust, based on the idea that team members act as they said they will because they are afraid of the consequences if they do not do it, (2) knowledge-based trust, where team members' knowledge is the base to build trust between each other as a way to predict their behaviour, (3) identification-based trust, where the group develops a sense of identity based on member commonalities, (4) impersonal-based trust, linked to the existence of rules and values within the group, and (5) swift trust, based on members' expectations of trust according to their role, stereotypes, organizational environment, etc.

Communication processes play a key role in the process of creating trust. Communication has been defined as “the process of transferring information, meaning, and understanding from sender to receiver” (Gibson, 1996). Research suggests that virtual communication impacts negatively on effective communication due to the lack of team members' physical co-presence and may generate misunderstandings and mistakes about the inferences of others' knowledge (Hollingshead, 1998). Studies show that both, sender and receiver, face more difficulties understanding the message and the feedback of a discussion (DeSanctis and Monge, 1999). In a virtual environment, the lack of non verbal communication when talking without seeing each other, slows down the process of building trust. In the following table, Jarvenpaa, S.L., and Leidner, D.E. (1998) explore the communication behaviours and actions that may help to build trust within the group as well as maintain it during the project.

Taulukko 2. Table 2. Behaviours and actions that facilitate trust (Source: Jarvenpaa, S.L., Leidner, D.E., 1998, “*Communication and Trust in Global Virtual Teams*”, Journal of Computer-Mediated Communication, Vol.3, No 4)

Communication Behaviors that facilitated trust early in a group's life	**Communication Behaviors that facilitated trust later in a group's life**
• Social communication • Communication of enthusiasm	• Predictable communication • Substantial and timely responses
Member Actions that facilitated trust early in a group's life-cycle	**Member Actions that facilitated trust later in a group's life-cycle**
• Coping with technical uncertainty • Individual initiative	• Successful transition from social to procedural to task focus • Positive leadership • Unconcerned responses to crises

The process of trust depends on the degree to which a person is likely to believe that others are trustworthy or not (Mayer, R. C. and Davis, J. H., 1999, Mayer, R. C. and Gavin, M. B., 2005). Team members who ask for having every interaction written in paper or sent via email have low levels of trust propensity. From this point of view, time seems to be the best solution. Team members will trust each other once they start working together if they show each other evidences of integrity, ability and kindness (Mayer, R. C. and Gavin, M. B., 2005). Under the time constraints that normally characterize ERP implementations, it is important to consider that trust should be developed

as fast as possible due to the fact that the team will work together just for a limited period of time on a task that is both important and urgent for the company (Alge et al., 2003).

When talking about conflict, research suggests that the lack of communication or silence is a common and problematic issue in virtual teams (Morrison E. W. and Milliken F. J., 2003). When a team member answers with silence, the rest of the team will suffer from lack of information and may cause future misunderstandings. The vision of conflict has evolved over time. Between 1930s and 1940s there was a traditional belief that all conflict is harmful and should be avoided, but a new literary trend argues that a minimal amount of conflict is needed inside the team as a tool to maintain its creativity and self-critical sense (De Dreu C. and Van de Vliert, E. 1997). But how to discern between good and bad conflict? Some authors have analysed the types of conflicts and their effects in the team (Jehn, K. A., 1995, De Dreu, C. and Weingart, L. R., 2003) differentiating between functional and dysfunctional conflict. The distinction between them depends on whether the conflict refers to the process, the task or the relationship. Conflicts related with processes or tasks could be seen as a productive tool as far as it is kept within certain limits. On the contrary, studies show that relationship conflicts are dysfunctional almost without exception (Yang J. and Mossholder, K. W., 2004, Gamero, N., González-Romá, V. and Peiró, J. M., 2008). However, the downside of every kind of conflict is that they take time away from the job the team should be focused on, stress the team, and may reduce trust and cohesion, thus consequently, some task or process conflicts become a relationship disagreement when member feelings are hurt (Peterson, R. S. and Behfar, K. J., 2003, Shaw, J. D., Zhu, J., Duffy, M. K., Scott, K. L., Shih, H. and Susanto, E., 2011).

3.4 Team outcomes

Team outcomes are the results that researchers want to either predict or explain through the analysis of the input variables and the team processes. These effects have been classified in different levels: (1) individual, where several perspectives are measured like the degree of satisfaction, withdrawal attitudes, performance, behaviour, (2) group, in this level the variables analysed are the degree of cohesion and functioning of the team, and (3) at the organizational level, it is evaluated the overall performance of the team and its survival.

Individual level. Employee attitude is an important factor to predict behaviour that influence the company's efficiency. Negative job attitudes, and negative interactions with

co-workers and supervisors can lead to employee's resignation. Task performance is one of the more important variables to consider, and could be measured in different ways depending on the specifications of the task and responsibilities of the job. Additionally, companies also measure the overall behaviour of the employee, including the ones that go beyond the job expectations. Attitudes such as volunteering for extra work, and helping other members in their team are generally considered beneficial and appreciated by organizations.

On the other hand, employee absenteeism can affect team performance, reduce the quality of the results, or even delay the entire project. In general, authors reported a lower level of satisfaction in virtual teams compared to face-to-face teams (Thompson and Coovert, 2002), although member satisfaction seems to depend on other variables such as the type of task and the composition of the team. Considering gender composition, studies have reported higher levels of satisfaction in distributed all-female teams compared to all-male virtual teams (Lind, 1999; Savicki et al., 1996).

Group level. The variables considered in this level are the degree of cohesion of the team that, when high, will result in better quality and overall performance of the outputs. The cohesion of the group depends on other variables like trust and capacity to work together and get results. There are several studies that confirm that team cohesion helps to achieve higher levels of performance (e.g. Casey-Campbell, M. and Martens, M. L., 2008).

Performance on virtual teams has been found to be lower than those that work face-to-face. Some reasons pointed out to explain these results are that the use of asynchronous communication channels, increases the amount of time needed to reach a decision or agree about a certain topic and, in addition, leads to team members multitasking (working on another projects) with the result of loosing focus on the task at hand (Lebie et al., 1996, Straus and McGrath, 1994, Malhotra, Majchrzak, Carman and Lott, 2001).

Organizational level. The main goal of every organization is to survive and grow over time. To achieve this goal the organization needs to keep all its teams as productive as possible. But, in order to survive, companies need to take care also of its relationships and responsibilities with the environment and groups of people that interact with them (shareholders and stakeholders) that can affect the business profitability. Managers need to consider not just the short term but also, the long term when reaching decisions.

Studies have tried to identify the characteristics of effective teams. In the image below there is a summary of the main factors to consider. However, managers need to re-

member that every team is different in form and structure, thus is not possible to apply the same rules and systems to all project teams.

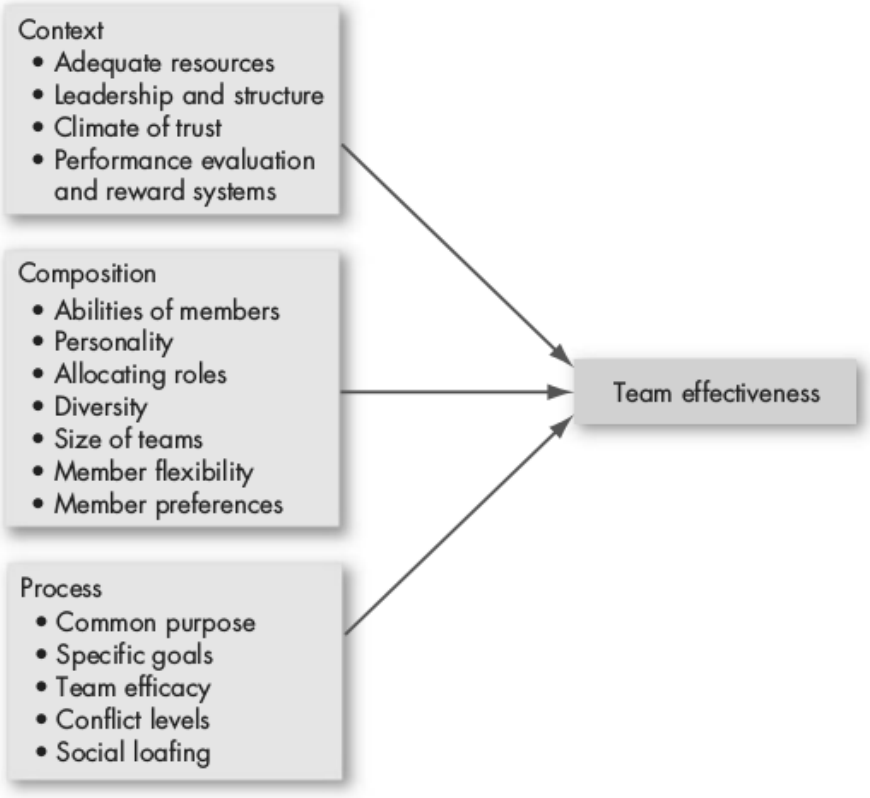

Figure 12. Team effectiveness. (Source: Robins, S. P., Judge, T. A., 2012, *Organizational Behavior*, Prentice Hall)

3.5 The Life Cycle of Virtual Teams

In 1965 Tuckman, B. W. developed a model to describe the evolution of virtual teams. However, nowadays, it is believed that teams do not always follow this fixed cycle. Each team works differently, thus there is no a standardized team behaviour.

Based on the study of groups located in the same place, Tuckman defined a five-stage model labelled as forming, storming, norming, performing and adjourning. During the first phase, **forming**, team members try to learn about each other and stablish team structure, goals and leadership to determine their attitude and behaviour within the team. Ideally, team members will develop trust during this phase. The second stage, **storming**, starts when team members start to think as a group. There are conflicts about who are the leaders of the group, and about the definition of roles and responsibilities. This phase will finish once there is a clear hierarchy within the team. Teams that are able to resolve their conflicts and strength their group identity, will move forward to

the third stage: **norming**. In this step, members discuss how to work together, coordinate with each other, and define the expected team behaviour. When team focus moves from knowing each other to join efforts to accomplish their mission, they are moving to the **performing** stage. During this stage, members work together, cooperatively, towards the end of the project.

For those teams that work together over time, performing is the last stage of team evolution. However, for those teams which their join effort is not needed any more in the organization, that is usually the case of ERP implementations, there is an extra stage called **adjourning**. During this stage the group gets ready for its dissolution. The group's top priority shifts from the team goal to leave every topic closed before leaving. Members' attitude when they face the end of the project may differ depending on the overall experience and team member's personality. Some, feel optimistic whereas others may be depressed when strong bonds emerge within the team (i.e. camaraderie). The following figure – Figure 13 – shows these stages graphically.

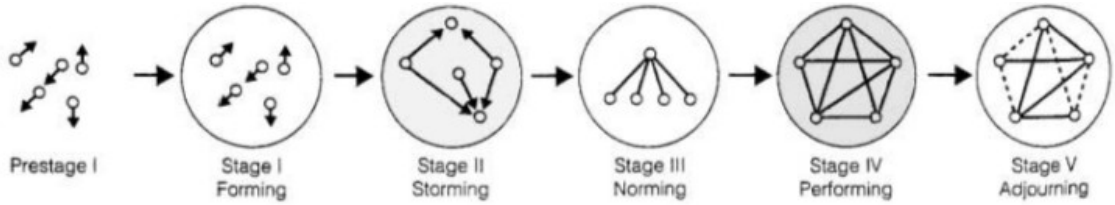

Figure 13. Life cycle of virtual teams. Tuckman (1965). (Source: Thompson, L., Aranda, E., Robbins, S.P., et al. 2000, *Tools for teams. Building effective teams in the workplace*, Craig Swenson)

Nonetheless, not every team performs better through time nor do they strictly follow this sequence. Some teams' performance is higher at the beginning and decrease over time depending on the specific inputs and processes of the team. For this reason, managers should not assume that the team will follow this evolution automatically without any help.

Complementing Tuckman five-stage model, Gersick, C. J. G. (1994) analysed the effects of deadline pressures on the team evolution, creating the Gersick's Punctuated Equilibrium Model. This model suggests that (1) the first meeting defines team direction, (2) the first period of the team (**Phase I**) is a phase of inertia, where the group is locked into a prearranged course of action. During this phase, the team try to coordinate an agenda and set norms; (3) exactly halfway between the first meeting and the task deadline, groups go through a **transition** phase. The transition phase is a midpoint where team members adopt new perspectives when necessary, react to new insights, and check the course of action, setting a new direction if needed. The transition

stage acts, inevitably, as an alarm to team members to warn them about project deadlines; (4) the transition is followed by a second phase of inertia (**Phase II**), where the new course of action defined during the transition phase is followed; (5) and, finally, the last meeting is characterized by a final burst of activities and hustle.
The Punctuated-Equilibrium Model is represented in the Figure 14.

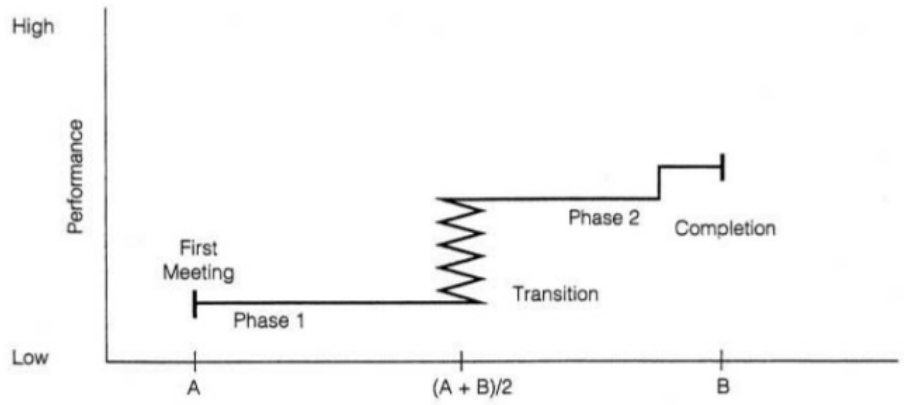

Figure 14. The Punctuated-Equilibrium Model (Gersick, C. J. G. 1994). (Source: Thompson, L., Aranda, E., Robbins, S.P., et al. 2000, *Tools for teams. Building effective teams in the workplace*, Craig Swenson)

Virtual team evolution may differ from Tuckman five-stage model and Gersick Punctuated-Equilibrium model due to asynchronous communication may delay the process of building trust, share information and reach agreements about the course of action to follow. Challenges of virtual teams during the different phases have been summarized in Table 3 (see Appendix 1)

Taulukko 3. Table 3. Phases of Virtual Team Development (Source: Furst, S.A., Reeves, M, Rosen, B., & Blackburn, R.S., 2004 "*Managing the life cycle of virtual teams*". Academy of Management Executive, Vol.18, No 2.)

Stages of Virtual Project Team Development				
Model				
Tuckman:	**Forming** →	**Storming** →	**Norming** →	**Performing**
Gersick:	**Phase I** →		**Transition** →	**Phase II**
Description of team behavior during each stage	Team members get to know each other, exchange information about themselves and the task at hand, establish trust among group members, and clarify group goals and expectations	Similarities and differences are revealed and conflicts surface as the group attempts to identify appropriate roles and responsibilities among the members	Team members recognize and agree on ways of sharing information and working together; relationships are strengthened, and team members agree on member obligations and team strategy	Team members work toward project completion, actively helping and encouraging each other
Challenges to Virtual Teams	Fewer opportunities for informal work- and non-work-related conversations; risk of making erroneous stereotypes in the absence of complete information; trust slower and more difficult to develop	Reliance on less rich communication channels may exacerbate conflicts by provoking misunderstandings; ease of withdrawing behaviors; diversity of work contexts; reliance on an emergent or assigned team leader	Difficulty in developing norms around modes of communication, speed, and frequency of responding, and commitment to use special software	Vulnerability to competing pressures from local assignments, frustrations over free-riding or non-committed teammates, and communication discontinuities due to asynchronous communication

Effective teams move continuously within a spiral of increasing performance and effectiveness. Virtual teams may face more challenges during their evolution due mainly to their reliance on electronic communication. In the following is outlined the main challenges faced by virtual team members differentiated by stage.

Forming.

During the first stage, the team starts working together for the first time and needs to organize and coordinate what is the task to accomplish as well as how they are going to do it. When teams work in the same place, face-to-face interactions accelerates de process of building trust and facilitate formal and informal communication between team members. Nonetheless, when working virtually, teams need more time to create bonds and trust within the group. Members of effective teams trust each other and their leaders (Malhotra, A., Majchrzak, A. and Rosen, B. 2007, Wilson, J. M., Straus, S. S. and McEvily, B., 2006).

It is easy for geographically distributed teams to misunderstand messages when they are not accompanied with non-verbal cues or another kind of context that can help members to correctly interpret the message. In the absence of cues such as tone of voice or facial expression, some members may create stereotypes based on cultural differences (Cramton, C. D. 2000).

Storming

The following stage is a phase of adjustment of task goals and process rules to clarify and adjust expectations. When conflicts emerge within the team, the use of technology to communicate may make longer and more difficult the process of solving them and avoiding misunderstanding will be more difficult.

Norming

Norms should address topics such as modes of communication, tools to share information, work processes and communication content. All members of the virtual team must be kept updated about team decisions, status, etc. However, some members may not be used to the discipline of sharing information agreed during team collaboration norms, and consequently, some members may miss some important information (Kirkman, et al., 2002).

Performing

Team leaders must keep team morale and motivation high in order to meet deadlines and avoid free-ride members. Additional issues due to the fact that members are geographically dispersed could arise. For example, studies done by Dennis (1996), and Stasser and Titus (1985) show that when team members do not share enough information with the rest of participants, it may result in lower quality decisions. The lack of information sharing is more likely to happen in distributed teams because information is dispersed between different locations and because communication frequency in virtual teams is lower than in face-to-face teams.

3.6 Conceptual Framework

In summary, the conceptual framework of this thesis involve four stages: (1) establish virtual team characteristics, (2) create the virtual team, (3) monitor and incentivate team collaboration, and (4) measure and control team performance. Although these stages are cyclical during the whole life of a project team, they do not need to keep always the cited order. For example, virtual teams that have been already created may not go again through the phase (2), create the virtual team, if leaders are not considering the option of changing project team composition.

The first phase of this conceptual framework, consists of defining virtual team basic characteristics such as: team size, team members' skillls, and technology needed to enhance collaboration within the virtual team considering the type of tasks that each member is responsible for (Thompson, 2000; Robbins, P., Judge, T. A., 2012; Baker, 2002). As shown previously, Figure 6 could be used to select the best communication channel(s) considering team needs of information richness (Robins, S. P., Judge, T. A., 2012).

During the next stage, managers should focus on creating the virtual team having in mind the decisions and observations made during the previous phase, and Belbin's team roles (1993) represented by Figure 1 in the point 3.2 of this study.

Once the team has been created, the following step includes Tuckman's five-stage model (1965) and Gersick's Punctuated-Equilibrium model (1994) to, first of all, identify in which stage the team is at one specific moment of time, and based on the findings, take the specific actions to develop norms, as well as monitor and facilitate the processes of communication and building trust through all team's life cycle.

The final stage of this iterative framework consists in measuring team's performance at three different levels: individual, group and organizational as seen in Figure 9 (Robins, S. P., Judge, T. A., 2012).

Each of the phases explained in the conceptua framework of this section is strongly linked to the stages of an ERP implementation project that will be explained in the following point to analyze the main challenges faced by small virtual teams during ERP implementations.

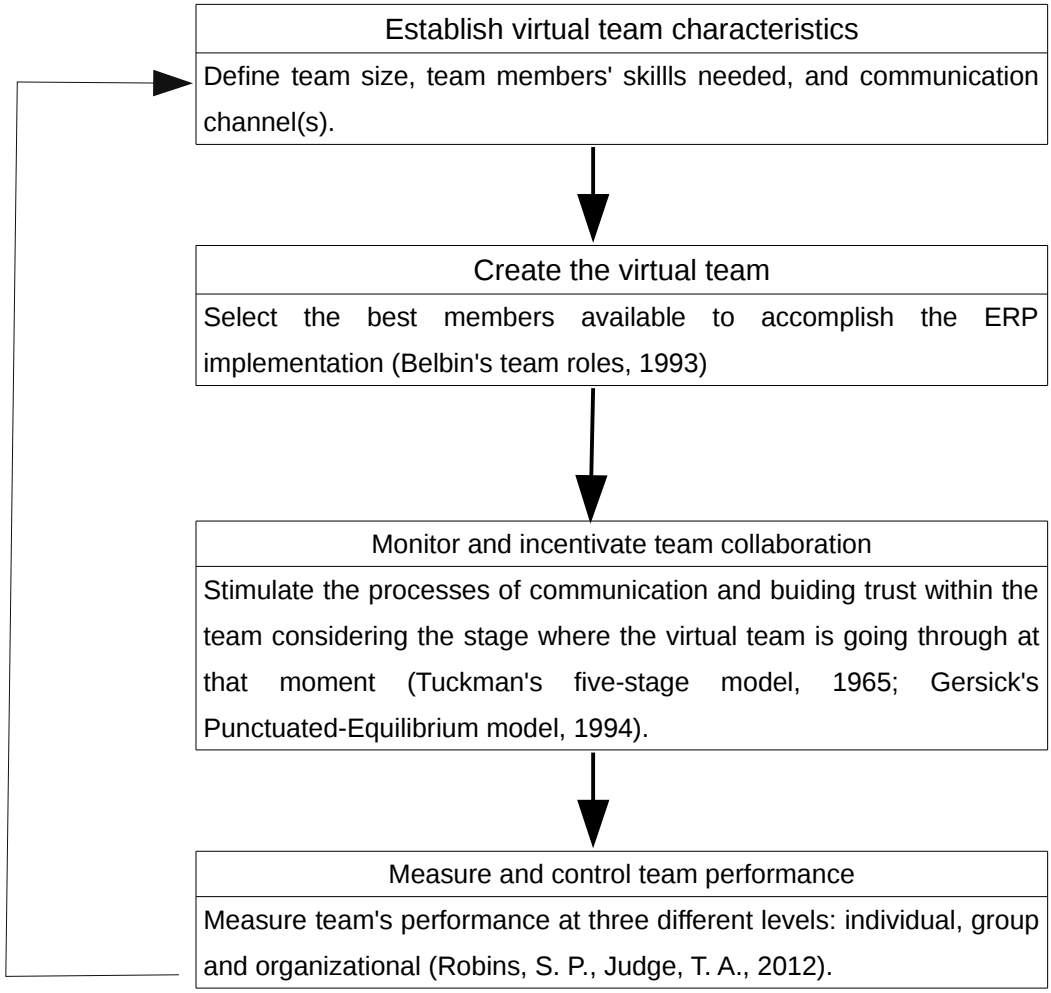

Figure 15. Conceptual Framework

4 Challenges and Recommendations

ERP companies operate in a highly volatile industry characterized by rapid technological change, evolving technology standards, short product life cycles and continually changing customer demand patterns. Future success depends in part on companies' ability to anticipate and respond to these market trends and to design, develop, introduce, deliver or obtain new innovative products, services and software on a timely and

cost-effective basis using new delivery models. Organizations need to continuously innovate, as anything can be copied or adopted by rivals. The information technology is going through a major transition, driven by the trends of cloud, mobility, big data, social computing and increasing cyber security threats. Nowadays, ERP big software companies like SAP and others, are struggling to keep sales flowing, as business software moves to mobile and cloud-based applications.

To face the challenge of increasing competition, markets are moving more and more to a collaborative model where the organization needs to share information with other members of the supply chain in order to improve their own business and practices. Thus, the success of companies is dependent upon its ability to generate and communicate timely and accurate information. For this reason, companies are implementing ERP (enterprise resource planning) solutions.

The goal of the team projects analysed was the implementation of SAP CRM solution. In these kind of projects, each project member represent different competences. Thus, their educational backgrounds as well as their working experience was quite varied. While some members had many years of experience working in the company, others were newly employed or consultants hired specifically for the particular project.

All the interviewees are part of small virtual teams responsible for either the implementation or the maintenance of SAP. Furthermore, the teams studied are characterized by working geographically dispersed. Consequently, they need to rely on technology-mediated communication to interact between each other.

As shown below, the people interviewed were at different positions, in different teams and companies, and working from different locations.

Taulukko 4. Table 4. Interviewees

Interviewees	Position	Location
Marco	IT Team leader	Germany
Angela	Data migration expert (freelance)	Germany
Raj	CRM Business Analyst	Germany
Eva	Senior SAP Business Intelligence consultant	Spain
Mercedes	Senior SAP Customer Relationship Management consultant	Spain
Caterina	Project manager	Spain
Jose Maria	Senior SAP technical engineer	Spain
Noemí	Senior SAP Materials Management consultant	Spain
Susana	Senior SAP technical engineer	Spain
Mónica	Senior SAP Process Integration consultant	Spain

Each project team is different, as well as its evolution over time. Consequently, the level of satisfaction during the virtual project varied between the members depending on the degree and ways of communication as well as the whole experience including face to face first contact, technology used to share information, project meetings evolution, technology used to help communication within the team, and project tracking methods used.

To understand the challenges of virtual teams when implementing an ERP solution, the following section explains the main steps and tasks performed in order to get a better understanding of the type of tasks that these kind of virtual teams are dealing with. Afterwards, the main challenges will be analysed in more detail, and recommendations will be given to build enabling conditions that support virtual teams' success.

In this thesis, the current state analysis is integrated within the ERP implementation phases to better explain the environment main features that affect to teams' evolution over time.

4.1 Phases of an ERP implementation

During an ERP implementation, team members go through different phases that have been defined as an iterative four-phase model (Robertson, et. al., 1996). These phases are:

- Agenda formation
- Design
- Implementation
- Appropriation

Within the team there are several activities and tight deadlines to accomplish. According to the specific requirements of each project, team members work in different types of tasks that involve: system configuration, system integration, testing, data conversion, training and roll out. Thus, to implement SAP in a company, it is essential to have a close collaboration and involvement of all the team members (project manager, project team members from business units and functional areas, internal IT, specialists and consultants).

An ERP implementation is considered ”as a socio-technical challenge where group and organization dynamics and technological advancement continuously and mutually shape and reshape each other” (Coakes, Willis, & Lloyd-Jones, 2000).

4.1.1 Agenda formation

Once the challenge of implementing an ERP is accepted by the company, the organization starts with the preparation tasks, such as selecting and forming the project team, that needs to be comprised by people with different backgrounds and levels of expertise. When team members start working together, they need to develop a common understanding and share their knowledge between each other. To help that happen, the group should create strong bonds and share a common goal (Granovetter, 1973). For this reason, in this phase the team should be focused on developing strong ties and trust, creating this way a closed network that identifies members as a team (Coleman, 1988). By sharing knowledge within the team, members are creating a common knowledge (Nonaka, 1994) that is vital to facilitate future understanding.

Normally, ERP implementations are initiated by organising a first meeting called the kick-off meeting. Prior to this meeting, and even afterwards in some cases, team members do not know each other. Additionally, during the interviews, all members agreed on that it would be very useful to have an opportunity to meet each other face-to-face at least one time at the beginning of the project as a way to start creating bonds between team members. The project manager of a virtual project team mentioned the following:

> For me, as a German, is not as important to have personal relations and after work activities, when I go to work I try to focus as much as possible on the work...also due to pressure. But I have to admit that having this face-to-face time makes easier to reduce cultural differences...or not only cultural but also personal differences.
>
> You can clearly feel that when people are working on the same site, there are some bonds between the team members, they will have some private discussions. You have the options of after work activities. If it's only virtual, this part is only reduced to, let's say, work related topics which is an issue at the beginning for sure.
>
> For me what was important as well was to bring the team together physically, because the virtual teams are working but it's still good to have face-to-face contact from time to time to also allow having dinner and after work activities which is a different dynamic that just having a phone call every couple of days and the rest is done via tools or emails.

Accordingly, more comments made by the consultants and project managers interviewed, show the importance of having at least one first meeting at the beginning of the project where all team members can present themselves to the rest of the team, pointing out their areas of expertise and responsibilities within the project.

As a result, following the recommendations and suggestions for improvements given by all the interviewees, one best practice to note during the agenda formation phase would be to organise a kick-off meeting where all project members assist as well as the managers that have to be involved in the ERP implementation. During this meeting, the project is presented as well as its main goal, and the team members. This first step it is seen as an important point that facilitates the creation of a common knowledge and bonds between team members. In other words, as the project manager of a SAP implementation points out,

> We knew each other at the beginning of the project because the company organised a kick-off meeting and all the bosses where there with the team members. In this meeting, our boss in France gave us a presentation of the project, and afterwards all team members were presented one by one.

In other cases, consultants were not part of the team from the beginning of the project, so they started working within the team straight away without having the opportunity to meet them in person. When that happened, interview results show that they try to find a way to know the people they are working with face-to-face. Although it may be a longer process because, once the project has started everybody is busy trying to keep deadlines, and it may be not possible to meet all of them at the same time in one place. A

consultant who started working virtually without meeting the rest of team members previously mentions,

> It is always better when the communication is one to one, which is face-to-face. There is always something missing when you are talking virtually because the conversation is not complete. In fact, we have several different minds but when we are in a meeting we are just aware of one of them. […] and another thing is that you don't have any idea of who is talking to you because you haven't met them before.

During the agenda formation phase, it is important to develop strong ties to support members integration and knowledge sharing during the ERP implementation. Smooth communication within the team is very important for the success of the implementation, but in virtual teams ii is also considered one of the biggest challenges due to the lack of social context cues (Sproull & Kiesler, 1986) and the reliance on technology-communication media (Daft & Lengel, 1984). Some studies argue that these two reasons explain why in virtual teams, the amount of communication is lower than in face-to-face teams (Bhappu et al., 1997; Hiltz et al., 1986; Hollingshead, 1996; Straus, 1996). The project manager refers to this issue as follows,

> We had four teams in different places, one team based in Lyon, one in Paris, one in Barcelona and one in Madrid. So we used to talk either in French or English. Normally, in our meetings participated many people because sometimes in Madrid there were just two people, but in Barcelona there were ten people and in Lyon eight. Then, during the virtual meetings, the challenge was to listen what others were saying. Because, people start talking about a topic without realizing that they are too far away from the speakers, so we couldn't hear what they were saying. We were trying to understand another team member who is talking too far away from the technology we used and who was talking in another language...because at least in your native language you can try to fill the gaps of the conversation that are missed..but in another language it was very hard to follow the topic. So we asked the person to repeat again but closer to the speakers because we couldn't hear what he was saying, but then the person just say a quarter of what he said the first time…
>
> The communication is not the same, but in these kind of projects the budget is very limited and you need to keep deadlines.

Another consultant confirms the challenge of communication via technology,

> Most of the times there is a connection problem, sometimes new participants have problems entering into the process of joining the meeting...when we send the link to join the meeting they have problems to connect. For example via Lynk. Secondly because of internet connection failure. Sometimes the connection is good from my side but from the other side is not...things like that.
>
> […] One major problem is that when we are in a virtual meeting we have to repeat what we were saying over and over again. This happens when

> somebody is not listening or when is not clear the audio. When you for example ask for an opinion, you need to ask again and again: please repeat, please repeat.

Additionally, studies found that the lack of social context cues in virtual communication is one of the main reasons that explain why virtual teams need more time to reach a decision, cannot foresee others' answers and are less accurate when drawing conclusions about other members' knowledge (e.g., Cramton, 2002; Hollingshead, 1998; Sproull & Kiesler, 1986). On a related note, a freelance consultant stated,

> Another important point, is that it's much easier to talk with people when you have met with them at least once. This is what I've learned. When I was in UK for the data migration, it was very important that people understood what I meant exactly. So sometimes I asked stupid questions. If you meet the person before, and then you use Lynk or Skype is much easier.
>
> Furthermore, that could happen, I know a lot of people who refused to talk because they have to talk in another language that is not German. So if they have to talk in German is not a problem, but if you need to talk in another language it's a problem. French, for example they are not usually very good at talking in English, it's also a lot of trouble because you can even hear them sweating! Then you ask their opinion, and they say “Oui…” That causes a lot of trouble because you can't see their eyes and you can't have a feeling if they understood the information or not.

The first phase of an ERP implementation project involves the challenge of creating a common understanding within the team in order to facilitate the process of sharing knowledge in future stages. During this phase, the team develops a common understanding about how the company intends to run the ERP and define the business requirements through validation workshops with business users, that will be the base to create the business blueprint. This space of common understanding is vital for the future development of the project because in ERP implementation projects each member has different areas of expertise, backgrounds, understandings of organizational practices and opinions about how the ERP should be implemented. As a member of a virtual team explains,

> At the beginning, in my opinion, all the creative designing stuff and there is a lot of foundations to be done to set the project, defining some rules, from my point of view, doing this virtually from different remote locations is nearly not possible. You need to bring the team together to define the blueprint, and all the creative things. Initially you need a couple of days or even two or three weeks to have face-to-face time to build and define the processes and blueprint and also to build this bond. Later on, the tracking and realization, even testing could be done remotely. But you need face-to-face time at the beginning because if not we would be facing a big challenge.

Finally, it is also important to notice that in virtual teams, the richer the media we use to communicate the better results in performance and trust we get. So, for example, tools that allow team members to interact through video conference improve the quality of team's decisions (Baker, 2002; Burgoon, Bonito, Ramirez, Dunbar, Kam and Fischer, 2002). The project manager of a virtual team noted the importance of video resources:

> Most of the times we are using Lynk only via voice, sometimes seeing each other not necessarily face-to-face but seeing each other via screen helps already to improve communication.

4.1.2 Design

The second stage of an ERP implementation have two main objectives: first, understand the ERP and the organizational processes, and second, make both of them fit within each other.

The purpose of this phase is to configure, develop, test and document the solution based on the requirements of the business blueprint.

During the design phase, the consultants that are going to implement the ERP solution need to know all the information available about those processes that have to be supported by the system. Furthermore, they will also need to identify the legal requirements that are linked to those processes. Once they have all that information they can design the best solution, having in mind the characteristics and limitations of the tool selected (SAP). This is also an adaptation process where some company's processes need to be redesigned in order to agree with SAP requirements and sometimes, new developments will be required in the system to match the specific way the company use to work. For this reason, it is very important to know in detail, on one hand, the organization and the processes to change, and on the other hand SAP to match the technical solution with the internal processes of the company. However, all this knowledge is not inside just one person, but spread between people located in different places and with different areas of expertise. Sometimes the knowledge is within a routine carried out by different people (Blackler, 1995; Tsoukas, 1996). In the opinion of a project manager,

> In my company, there was an additional challenge, that is to know what kind of system the adquired company were using before SAP, because otherwise, you won't be able to transfer all the information to SAP. And in that moment it's very important that people from the finance department is involved in the project, because you can know a lot of SAP and a lot of tables, but if you don't understand the meaning of a finance process it doesn't work.

> It's important to have a functional profile to link finance with the technical part to know how to connect the information. Otherwise, you loose a lot of time during the tests, that's the moment where users see that nothing works because, normally, they don't understand the changes they are asking for till they see them in the system.

For this knowledge to be useful, it needs to be shared, integrated and synthesized. This process involves “mapping existing organizational processes, identifying the processes that are embedded in the ERP software, and defining new organizational processes that fit both the software and the organization” (Soh et al,. 2000).

To share information within the team, all members need to have the discipline to follow team agreements about what tools to use to share information, update documentation and which channel to use to keep people up-to-date about the last minute information. A book of rules need to be created by the project manager to create the habits within the group of sharing critical information using the chosen platform. As stated by one virtual team member, it is important to have the right tools to share knowledge within the virtual team. Otherwise the team would end up loosing track of the changes or loosing important documents,

> It was beneficial to include a tool to share documents. Before it was done via email going back and forward, so consequently some information was lost or not sent to the whole audience possible. If you could not reach one of the persons involved in the virtual team you start searching in your Inbox which was not good. So we have set up a common platform and we are using common tools: Sharepoint is an option.

The challenge of creating and sharing knowledge when the team members do not know each other face-to-face is recalled by some of the interviewees. The project team need to interact between each other to create a network of knowledge. In this case, the SAP Business Intelligence consultant talks about her experience,

> I worked with a team from Barcelona and first of all I went there to meet them, but unfortunately not everybody was at the office that day. I was lucky because the Junior consultant I worked with was very communicative and we could talk about every issue easily by phone or company's messenger. We shared our weaknesses and strengths to do the job together. A little bit later two new members, with a higher position in the company, join us in the project: one of them was a very good consultant and I met him in person when I went to Barcelona to meet my colleagues there. We used a tool called “Teamviewer” to share information. With this tool you can see the screen of the other person although you are not physically with him. So we didn't notice the distance thanks to this tool.

> But I couldn't meet the other new team member when I was in Barcelona because he was not at the office that day. I think because of that, the communication was not so fluent. For example, when I had a question, I called the guy I've met before without thinking about it, but when he was not there and I had to contact the one that I hadn't met in person before, I always thought twice about doing it or not.
>
> For this reason I think it's very important a first contact face-to-face.

On the other hand, culture is an important factor to consider when sharing information in a virtual team. Culture could be analysed from the point of view of different scales: international, national, regional, business, and organizational. Researchers have defined culture as “the collective programming of the mind which distinguishes the members of one group or category of people from another” (Hofstede, G.H., Hofstede, G. J., Minkov, M., 2010). During the interviews, the freelance consultant pointed out having clear rules to manage situations when people from different countries are working together,

> Clear rules. It helps me when I know who is responsible for what. Maybe because I'm like this. Without meeting some people, it's often more difficult to go beyond the limits of responsibilities. Sometimes you think ohhh this person is very rude, or s/he is very nice...For example, British people use to ask how are you? But they are not interested in your reply, it's just to be polite. But, as a German, I do answer.

Interestingly, all the consultants interviewed recognized that they use e-mail to ask about final requirements to the customer, developments details between the technical engineer and the consultant and other important information that they would need to have it written in case there is any problem in the future. They also recognized that at the beginning, when they do not know each other, they ask for all the information written. As they work together, they start building collaborative relationships: negotiating roles and levels of involvement. As the SAP CRM consultant reports from her experience working with a technical engineer remotely,

> At the beginning I had to send everything by email to the technical engineer. Furthermore, he always used to reply two or three times with a question always via email. Every communication with him was written. Over time, and after helped him looking with some information he needed, he started to relax that rule with me and we started to talk by phone too, which make things much easier and efficient because we could understand each other faster than just using e-mail.

Studies show that culturally diverse groups show lower levels of cohesion (W.E. Watson, K. Kumar, 1992) due to the lack of common programs in the mind. That is to say it is more difficult to understand people whose lives have been completely different and have little in common with our lives. The reasons why diversity groups may fail in reaching a common understanding, could be grouped in six categories: false expectation of similarity, problems to understand non verbal cues, stereotypes, the habit to classify, and high levels of anxiety (Barna, 1985). Cultural diverse teams that rely on technology to interact, have been found to have lower issues of stereotyping other members, contributing to increase the quality of the decision process and the decision itself (W.N. Anderson, 2000; L. Chidambaram, J.A. Kautz, 1993). Furthermore, studies have revealed that culturally diverse groups that used technology to support their decision process, over-performed in number of ideas and final level of members' satisfaction, compare to more homogeneous groups (S. Paul, P. Seetharaman, I. Samarah, P.P. Mykytyn, 2004).

Furthermore, to improve the quality of the decision making process, Riopelle et al, (2003) found that when the size of the virtual team increases, it becomes more efficient to use tools that enable video conferencing (instead of audio-conference). This is also supported by one of the interviewees,

> I've been in audio conferencing meetings where I was not able to say my opinion because every time I tried to interrupt to make a comment, others were speaking and they didn't notice I was trying to give my point of view. That's frustrating. The situation improved when the team started using video conference tools so we could see each other and get others' attention more easily.

4.1.3 Implementation

During this phase, the team focuses on completing the cut-over activities, including end user training, and resolving all critical open issues to, finally, move from a pre-preproduction environment to live production operation (Go-live).

Working in an ERP implementation team often means working regularly with colleagues from different areas of expertise, business units, and distributed geographically members.

According to the interviews, distributed teams use to be organized around frequently project meetings. During the project meetings members discussed the agenda, following the main points to discuss and comment, trying to be as much productive as pos-

sible, as it is the only arena where all team members meet together. The most of the teams interviewed had one project meeting per week by default, and, in case of urgency they scheduled additional ad-hoc meetings. In these meetings, every area reported their current status as well as the main difficulties they are facing (if any) to adhere to the deadlines of the project. Referring to the organization of meetings, one of the interviewees noted that even though it is important to keep the team updated and focused on the project, it is inefficient to have meetings without any content just because it is scheduled once a week,

> Normally people was focused on the meetings, but I think that it's also very important, because it has happened to me and makes me feel very angry, don't fill up employees' time with a lot of pointless meetings. If there is nothing to talk about in a meeting, then leave the people that were invited free because they have a lot of things to do. It has no sense to have a meeting once a week just because it's scheduled. When everybody knows that there is nothing to talk in the meeting in a specific week. If, for any reason, one week there is nothing to talk about, because there are not new topics, then ask the rest of the people invited to the meeting if they have any suggestion or topic to talk about in the meeting. If everybody agrees, then the meeting is postponed to the next week.

In ERP implementations, it is important to differentiate between the meetings to follow-up the status of the project, where all team members should be present and participate actively, from those ad-hoc meetings created to solve more specific issues where the presence of all the project team members is not needed. As commented by a manager, keeping the team focused can be a challenge,

> Afterwards, it's more the challenge of keeping the team focused. Because if you are virtually spread and working from different locations the danger I thought would be, let's take a project example, people are nominated to a project to most of the time no full-time, so this virtual project team has one goal that is delivering a project task and if you are working virtually, the team is not necessarily 100% focus on this project and from time to time they are being distracted by their daily work by other interferences, your line manager is giving you other tasks. That's a challenge if you are in a virtual project organization.

New technologies have changed the business environment, allowing people to be always connected. Nowadays, everybody expects others to be connected all the time. Given the growing expectation to instant feedback, the pressure of being always connected increases. Consequently, many employees use multi-tasking as a technique to keep things moving around the business. They have so many things to do that they feel they can not be focused on just one thing at a time. Multitasking in meetings mean paying attention to something that is not related to the meeting discussion or agenda (email, documents, phone, etc.). Consequently, not all the participants in the meeting

are paying full attention to the issues of the project, therefore, members are not engaged in meeting's agenda. Additionally, during ERP implementations, the number of meetings will increase, consuming a large part of their working day. The empirical study carried out during the first three months of this thesis research corroborates that people tend to multi-task when they feel overwhelmed, and results in loosing both focus and presence during meetings. Based on the empirical material collected during the first stage of the research, the author recounts the following,

> The participants responsible for a CRM implementation were discussing about a technical issue with the rest of the team members during an ad hoc meeting. A team member was not paying attention to the topic that was being discussed in the meeting and after talking about the pros and cons of the different options to resolve the issue, the project team decided for a specific configuration of the tool at that moment. As a result of multitasking, he did not understand the implications that this decision would have on the daily job of the sales team. One month later, although the discussion was already closed and the project team had already started working on the development of the previously agreed solution, the issue was opened again by the person who was not paying full attention to the meeting as a result of multitasking. For this reason, the project team had to undo what it was done already, and check with the team member all the information again to find a solution that could satisfy everyone.

When meeting participants engage in several activities at the same time (email, Lynk, phone calls, etc), they are not focused on the meeting agenda. Participants may be present physically in the meeting, but they are either distracted or not mentally engaged.

4.1.4 Appropriation

The Appropriation phase starts once the Go-Live of the system has been done and users start working with the ERP. The process of appropriation means that end users incorporate the new processes and system as part of their new routine.
Once the implementation of the system is complete, the virtual team starts the activities of training of the team that is going to be in charge of the maintenance of the system. However, it is in the companies' interest to keep improving and updating the system to meet market changes and opportunities. In particular, as a project manager explained during the interviews,

> In a project organization and as soon as the project is over, there is still this challenge when you have introduced some new tools, new processes, new functionalities that leads to new business behavior, which are now spread

> across different teams as well as virtual teams. To keep these teams functioning after the delivery of the project, that's clearly a challenge which to be honest we are struggling at the moment. We try after the project to keep this community up although they are focusing now on day to day jobs so their time commitment to the project is not there anymore. The challenge is to convince them to still speak in this virtual community, exchange knowledge and share success and fails and test from time to time is one of the challenges now.
>
> Keep these communities up (key users community, super user communities, specialists, experts...or whatever you call it) you need after the delivery some time from them and maintain the project team alive and keep an official time commitment from the community.
>
> In my opinion this needs to be changed because it needs to be some dedication to speak to virtual teams, specially if the organization focus is more and more European and not any more so country-focused. This is a challenge we need to face.

A virtual team created to implement an ERP generates a wide-ranging network of knowledge, tasks and interactions that once the project has finished should be maintained establishing formal or informal opportunities to keep employees engaged and updated.

4.2 Four Challenges of Small Virtual Teams

From the interviews with ten virtual team members, the main challenges associated with the agenda formation, design, adoption and appropriation phases of the ERP project are summarized in the following table. For each of the challenges the lessons learned from the virtual team members' experiences are extracted, and then given some recommendations that should help other ERP implementations using virtual teams. In the following table the four challenges are summarized considering the different phases of an ERP implementation project.

Taulukko 5. Table 5. Challenges of Small Virtual Teams in ERP implementations

Stages of the ERP implementation	Main characteristics	Challenges	Key quotes
Agenda formation	When the decision of implementing the ERP solution has been taken, the first activities are performed to facilitate the posterior processes	People with different backgrounds, cultures and expertise need to build trust within the team to facilitate the process of sharing information and knowledge during all the phases of the project.	”creating bonds between the team members” ”you don't have any idea of who is talkgin to you because you haven't met the before” ”the communication is not the same” ”it's much easier to talk with people when you have met with them at least once” ”seeing each other via screen helps already to improve communication”
Design	Refers to the process of understanding and learning TTI's processes and the ERP solution characteristics to adapt one to each other	The team should have the correct tools to share information and communicate with each other. Team members need to expand their network to other company's departments to learn about their processes and important information.	”information was lost or not sent” ”Clear rules. It helps me when I know who is responsible for what” talking about audio conference tools...”Ii was not able to say my opinion because every time I tried to give my opinion the rest of participants didn't notice it” ”At the begining I had to send everyting via email”
Implementation	System configuration, data migration and adapting company's processes when it is needed	Meetings use to be hold virtually and supported with different technologies. Sometimes team members engage in multitasking.	”keeping the team focused” ”don't fill up employees' time with a lot of pointless meetings”
Appropriation	End users are already working with the CRM solution. Both, processes and the new system need to be integrated in the daily routine of the employees	Motivate team members and end users to continue sharing CRM system related insights, experiences and problems	”keep with the communities up”

4.2.1 Challenge 1: Trusting people

4.2.1.1 The challenge: ”Creating bonds between team members”

Trust has been demonstrated to be an important factor to influence team performance because it is related with goal achievement, quality, timeliness and flexibility (Zaheer, McEvily, and Perrone, 1998). Additionally, trust decreases conflicts (Zaheer, McEvily, and Perrone, 1998) and increases confidence in relationships as well as help members to share information within the team (Earley, 1986).

As seen in Table 3, during the interviews, team members have referred to the process of building trust in different ways like the need of “creating bonds between team members”, “virtual communication is not the same”, “you don't have any idea of who is talking to you because you haven't met them before”, “it's much easier to talk with people when you have met with them at least once”, and “seeing each other via screen helps already to improve communication”. Although none of the interviewees said the word “trust”, all of them referred to it as a challenge they need to overcome. Hence, all these topics are, in one way or another, related to the process of building trust among team members.

4.2.1.2 Recommendations

ERP implementations projects are characterized by being temporary groups where members with different skills join efforts to complete a highly complex task under extreme time pressure and with a few formal structures for coordination. These features prevent the process of building trust through interpersonal or impersonal forms because of the short period of time the team is going to be working together. Furthermore, time pressures make it difficult the process of socialization.

Authors (Walther, 1996, and Lea and Spears, 1992) suggest that in virtual teams where people start working together for the first time, members rely on past team, organizational or cultural experiences to build an initial impression of team trustworthiness. The swift trust model (Meyerson, et. al., 1996) maintain that in an early stage of the team, trust begins by a transference process through the use of stereotypes. Later on, due to the time-pressure of the ERP implementation project, team members will need to learn about other's knowledge, behaviour and abilities. This way, Jarvenpaa and Shaw (1998), suggest that over time, as the project team works more and more time ensemble, the team relies less on previous experiences and stereotypes.

Based on their studies, Jarvenpaa, S.L., and Leidner, D.E. (1998) agree with Meyerson et. al., (1996) in the emphasis of initiatives such as volunteering to complete tasks tend to strengthen and unify virtual teams. Furthermore, authors emphasize the importance of the response within technology-mediated groups. A response means that another team member is interpreting and giving feedback to the sender. According to Pearce (1974) a trusting response is linked to involvement.

Scholars have suggested different communication techniques to overcome virtual barriers: (1) active listening (Morgan and Baker, 1985 and Gibson 1996), is a strategy consisting about asking for more details and specifications whenever is needed, (2) listening for ideas (Morgan and Baker, 1985), this technique is needed when people from collectivist and individualist cultures are working together in the same team. In these cases, members from individualist cultures (explicit communicators) may be facing problems to decode the meaning of the collectivist-member message (implicit communicators). Being aware of these cultural differences help to be more careful when interpreting the meaning of the messages, (3) framing technique (Hammer, 1989, Gudykunst and Kim, 1984), that implies the action of building messages with rich contextual information and emotional context to facilitate the process of understanding, and (4) following up technique (Jarvenpaa and Leidner, 1999), which consists of answering others' messages as fast as possible to maintain a fluent communication and shorten the time to build interdependence and trust.

At the organizational level, technology is changing the way people used to communicate. More and more, team members interact through technology instead of face-to-face. Studies suggest that empathy is an important factor to consider in the process of building virtual trust. **Empathy** is defined as the ability to accurately infer another person's feelings and responses with benevolence (Ickes et.al., 1993). Author's study supports that the willingness to build a positive relationship among team members contribute to accurately infer others' thoughts and feelings. Accordingly, Klein, et. al., (2002) argues that users interact longer with a system that frustrates them when they interact with an empathic-support agent. Feng, J., Lazar, J., Preece, J. (2004) found that empathy is strongest among team members who share experiences and identify similarities.

Scholars have studied the relationship between trust and **control**. Literature suggests that “control is a key source of confidence in partner cooperation” (Das and Teng, 1998). According to Merchant (1984) “Good control means that an informed person can be reasonably confident that no major, unpleasant surprises will occur”. Through proper control systems the output of a task may be easier to predict, however, because it is

impossible to control every action in a project, team members need also to trust each other. Thus, control and trust are linked to partner's confidence.

From this point of view, many scholars have suggested that trust and control are different ways of achieving confidence, thus they substitute each other. However, trust and control also complement each other, because the more a person trusts another, the less s/he needs to control him / her (Leifer and Mills, 1996).

Das and Teng (1998) suggest that the system chosen to control may differ depending on the type of project (task, performance, etc). Therefore, a mismatch between control system and project may result in a decrease of trust and / or control. The project manager interviewed referred to this relationship between trust and control in ERP implementation projects,

> You have to control the project. It has to be in a subtle way, making questions to know in which phase is each team. For example, if they have to create 1000 suppliers in the system – ask them questions as: how many suppliers have you already created? Have you sent the documentation to France? Depending on the answer, you should make suggestions. You are a little bit delayed, you should speed up a little...or if you need us to employ another person to do it just let me know so we can negotiate and plan it in advance. The control must be subtle, but the answer can't be just something like ”ahh, no...yes we are ok”. No. Your are ok, but please tell me, in which phase are you? In our project it was very benefitial to make a graphic to evaluate teams' progress. It was useful to know the degree of progress of each team and the possibility to meet project deadlines.

Project leaders should be aware about the need of keeping team members engaged in the implementation project. In order to do it, they can use different techniques as share the last news with the team, discuss recent issues through instant messaging with team members, etc.

Rousseau, Sitkin, Burt, and Camerer (1998) suggest that in the process of building trust, risk and interdependence are two important factors to consider. **Risk** has been defined as ”the perceived probability of loss”. Trust is needed when the action is linked to a certain level of risk regarding the possibility of others not acting appropriately (Lewis and Weigert, 1985). Risk propensity is another key variable that influences team member's behaviour. Some scholars define risk propensity as the ”tendency that is affected by both personal traits and situations” (Das and Tang, 1997), whereas others define it as a ”personal trait that is stable across situations” (Schneider and Lopes, 1986). Authors argue that the perception of a specific situation as risky or not will depend on individual's risk propensity level (Brockhaus, 1980). Hence, a person with a

high risk propensity level will assign more importance to gains and less importance to losses when undertaking a risky action.

Risk provides space for building trust within team members. Just when some risks are taken, a team member can demonstrate his / her trustworthiness. As the BI consultant explained,

> When I started working in the project, I felt that I had to demonstrate my knowledge in the area. For this reason, with the person I already knew from a previous project I didn't mind to ask, but I didn't dare to ask to the other team member because I didn't know him… I think in these cases it helps to be honest and learn how to express your feelings because they can't see you physically and sometimes they don't understand where is the problem.

As said before, **interdependence** is another important variable to build trust in virtual teams. Interdependence has been defined as “the degree to which one party depends on the actions or information of another in order to accomplish work” (Wageman, 1995). Authors have distinguished four types of interdependence: (1) interdependence in organizations, (2) task interdependence, (3) outcome interdependence, and (4) resource interdependence. Task design and definition implies a level of interdependence among team members. In project tasks where interdependence is high, team members will collaborate more effectively and the process of building trust will be faster (Marshall and Novick, 1995).

In summary, at the organizational level, a set of best initial practices can help the process of creating trust within the virtual team in charge of the ERP implementation. First of all, it is important to adjust the levels of risk and interdependence of the team to facilitate trust. Secondly, structures and processes can assist in the task to keep risk level under control and develop interdependence among team members (Zaheer, McEvily, and Perrone, 1998). Team coordinators should communicate these structures and processes to the rest of the team. Finally, the company needs to ensure that its processes are fair so the team can increase their trustworthiness expectations. Furthermore, from a hierarchical point of view, Hinds and Kiesler (1995) suggest that less hierarchical teams show more effective communication among members.

From team members point of view, the ability to empathize with their colleagues is required to balance the disadvantage that geographically dispersed teams need to address when working virtually due to the lack of social cues. Additionally, researchers (e.g. Gibson, 1996, Morgan and Baker, 1985, Gudykunst and Kim, 1984, Jarvenpaa and Leidner, 1999) have found some specific actions that members should perform to improve virtual communications like: show individual initiative, give rich context inform-

ation in the messages, answer quickly to others to reduce the time needed to discuss a topic, give feedback, and asking for clarification every time is needed. One of the project leaders interviewed recalled the difference between proactive and non-proactive team members,

> In some areas, there is also an issue depending on the individual. A virtual team has individuals that in case they are not being proactive or not the most communicative ones, then in the virtual team you need a person to organize and moderate centrally. It's also a challenge.

Apart from these general recommendations found in the literature about specific ways of building trust, additional best practices have been deduced from the interviews based on the specific needs expressed by team members.

From the interviewees point of view, a challenge observed from the beginning of every project is how to interact virtually when participants have not met face-to-face before. Interviewees expressed their uncertainty when collaborating with others,

> ”There is always something missing when you are talking virtually because the conversation is not complete.”
>
> ”We don't have any idea to whom you are talking to. I don't know how they look like.”
>
> ”It is important to know to whom we are talking to.”
>
> ”It's much easier to talk with people when you have met with them at least once”

From this comments, a best practice for virtual teams working in ERP implementations is to set up a kick off meeting at the very beginning of the project where all the individuals involved in the project, managers included, assist and present themselves. The presence of managers in this meeting is also an important factor to communicate the goals of the project, strategy and show their engagement and relevance of the project.

Once the project starts, it is also important to select tools that allows people to see each other when working virtually. Sometimes just the voice is not enough to communicate effectively an idea or issue. Tools that allow verbal and non-verbal interactions as well as share the screen of the participants, have been very positively valued during the interviews. For this purpose, some technologies recommended by interviewees were GoToMeeting, Join.me, Biba, and NetMeeting to hold a virtual meeting, and TeamViewer to share the screen of team members. Additionally, it has

been added as a recommendation, that every team member should receive a training guide about how to use the selected application to avoid communication problems caused by the technology.

Finally, during the ERP implementation project, a common strategy mentioned is to schedule one project meeting every week to keep updated all team members about the status of things and new topics that could emerge. From this point of view, the team needs to set proper control systems and find an equilibrium point between control and trust so neither the team outcomes nor the trust are damaged during the project.

4.2.2 Challenge 2: Knowledge Management – Sharing Information: procedures and people

4.2.2.1 The challenge: ”Information was lost or not sent”

Virtual teams are characterized by the use of technology to carry out most of their interactions. There are different kind of technologies to collaborate, such as, email, videoconference, audioconference, chat, telephone, etc.

Depending on the type of technology selected, the time needed to reach a decision or to get feedback from the receiver will differ. Asynchronous ways of communication like email tend to be more time consuming and demand more effort (Graetz et. al., 1998) than synchronous tools like telephone conversations or videoconference for example. Hence, people tend to give less details when writing an email than when talking by phone or conference. A study conducted by Straus (1996) supports this theory. The author analysed the number of words exchanged using text-based ways of communication compared to the number of words exchanged verbally. The results show that people exchanged more details when talking verbally (1,702 words) compared to people who used text-based technology to share information (740 words).

Additionally, during the interviews, team members also referred to the difference between communicating face-to-face instead of using videoconference. Due to technology limitations, participants of a video or audio conference are not always able to hear what others are saying. When that happens, receviers usually report the technology issues and ask the sender to repeat the information (which the sender does). However, interviewees noticed that every time that happened, the second time the sender talks, the information shared is reduced by at least half compared to the first

time s/he talked. Particularly, an example of this issue was reported by the project manager,

> During the virtual meetings, the challenge was to listen what others were saying. Because, people start talking about a topic without realizing that they are too far away from the speakers, so we couldn't hear what they were saying. We were trying to understand another team member who is talking too far away from the technology we used and who was talking in another language...because at least in your native language you can try to fill the gaps of the conversation that are missed..but in another language it was very hard to follow the topic. So we asked the person to repeat again but closer to the speakers because we couldn't hear what he was saying, but then the person just say a quarter of what he said the first time…

Another consultant talked about technology issues while using audio conference, emphasizing the communication problems he was facing when working virtually. As also indentified by Cramton (2002) technology failures can cause that important messages fail to reach all team members.

> [...] one major problem is that when we are in a virtual meeting we have to repeat what I was saying over and over again. This happens when somebody is not listening or when is not clear the audio. When you for example ask for your opinion, you need to ask again and again please repeat please repeat.

Virtual interactions differ from face-to-face communication in the range of cues they are able to transmit. This way, people who use text-based technologies to communicate (email, chat, etc) will miss non-verbal information (hesitations, loudness, etc.). For this reason, receivers may ignore or not pay enough attention to key parts of the message (Cramton, 2002). Accordingly, authors found that messages are more accurately interpreted by receivers when non-verbal cues are present in the communication (Apple and Hecht, 1982; Chawla and Krauss, 1994).

In addition, the interpretation of silences has been reported to be more challenging during technology-mediated collaboration than during face-to-face communication (Cramton, 2002). Receivers' silence can be caused by technological constraints or failures, time differences, or signify an answer of disagreement, agreement or indifference. Failures to respond to important queries may result in their partners having to guess the meaning of the silence, making personal attributions and interpretations (Jones and Nisbett, 1972) when the information is not available.

Another vital difference between collocated and virtual teams is that, normally, geographically dispersed teams need to share more information than copresent teams. Furthermore, virtual teams tend to face problems to recognize which pieces of information are important to share with the rest of the team. Team members that work from remote positions tend to think that their local context is the same as the rest of

team members, and consequently, they fail to foresee the specific environmental characteristics that are vital to share with the rest of participants (Cramton 2002) in order to success in the ERP implementation.

Finally, time differences between the dispersed locations, where members are working from, can increase the time needed to reach a decision within the group. Furthermore, depending on the culture, personal reasons and/or organization rules, some people tend to be connected many hours every day of the week, whereas others limit their working hours. These differences may result in some team members being not informed about the latest updates. The team is not synchronized, because whereas some participants interact actively with each other, a sub-group may not be aware of these communications, and therefore they are not aware of team progress.

4.2.2.2 Recommendations

Failures to share important information within the virtual team can lead to poor-quality decisions (Dennis, 1996; Stasser and Titus, 1985). In these situations, leaders should monitor and analyze team's challenges when sharing and exchanging information to propose and facilitate solutions (Zaccaro and Burke, 1998).

To overcome these challenges, Gibson and Cohen (2003) give specific recommendations for leaders. Following the interview results and applying the literature to ERP implementation projects, the recommendations given to overcome this challenge are:

- Create procedures to help effective information sharing among team members. For example, weekly project meetings can be used to share social information at the beginning of the conference; start the meeting with a short period of time where every participant comment about how s/he is. This action facilitate members to know each other and learn about others' situations.

  During the project meetings, a person should be responsible for managing the time, keeping participants focused on the topic, and being sure that everybody understood the new information given.

  Unfortunately, information related with each participant specific context (such as reporting, holidays, measure techniques, the nature of members' jobs, etc.) may be more difficult to manage because people tend to give for granted that other members' context is the same, so they do not use to share this kind of information. For this reaon, they suggest that team members travel to visit the remote locations of their colleagues whenever is possible, so they can be aware

of the similarities and differences between each other's environment. However, when this is not possible, it is recommended to have a person responsible of being familiar with others' remote locations.

- Supply the team with the resources they need to share information efficiently. Frequently, team members lack time, possibilities to travel or technology. During ERP implementations, team members have tight deadlines to achieve so they are normally short of time. For this reason, leaders should give resources to ensure the team is able to communicate, like high quality telephone conferencing and speakerphones, headsets, etc. Riopelle et.al., (2003) suggest that when the team is working on a compex task, synchronous ways of communication will be needed to facilitate collaboration and fast information exchange.

  Apart from the tools needed to facilitate instant interaction via video conference, it is also vital to ensure that the virtual team has enough tools to share information. A common tool used by the interviewees for this purpose is Sharepoint. In addition, depending on the requirements of the project, it may be recommended to set up different roles of access to the project folder. Discerning the roles depending on the type of authorization needed to read documentation, modify, delete and/or create, the team will minimize future risks of loosing important information.

  This challenge is cited by a project leader when talking about his personal experience working in a virtual team,

  > In virtual teams, if you don't have the right tools from the beginning then you have a problem of lack of communication. Because you are not sitted in the same room, you don't have the quick response sometimes and you don't see each other face to face. So setting up common tools, via Lynk, and platforms to share documents were missing...at the beginning it was a challenge itself.
  >
  > It was beneficial to include a tool to share documents. Before it was done via email going back and forward, so consequently some information was lost or not sent to the whole audience possible. If you could not reach one of persons involved in the virtual team you start searching in your inbox which was not good. So we have set up a common platform and we are using common tools: Sharepoint is an option.

  Additionally, another application that is important to keep in mind when managing an ERP implementation is a tool that allows the team to follow up the status of the issues once the testing phase has started. This application should keep the history of changes and comments made by the team to facilitate the

registration and tracking of the issues. For this purpose, interviewees named some tools like Jira and Quality Center.

- Establish rules for communication. Team leaders should set norms to facilitate collaboration among team members. For instance, to replace verbal cues such as loudness, show how to highlight important information in a text-based communication, so every team member can recognize the important information in the message. Questions that need to be addressed by receivers should be marked to grab the attention of readers. Leaders should teach team members not to make inferences or assumptions, but always look for an answer when some information is missing.
- Supervise communication and mediate between team members when misunderstandings and/or problems arise. Leaders should monitor that information is always up-to-date and members are aware of the last changes.

In conclusion, technology contributes positively to virtual collaboration, however, simply because team members have access to the tools does not mean they will communicate effectively. Authors suggest that ”context is important for technology use in at least six ways: physical infrastructure, culture and language, accessibility of information, crossing time zones, team size, and maturity of the technology”. At the moment of selecting the technology, leaders should look closely at the match between task nature and technology, trying to answer three main questions (Riopelle et. al., 2003): (1) What tools need the team when operating in diverse contexts? (2) Having in mind the nature of the tasks to complete, which technology should the team use?, and (3) Over time, will the technology chosen develop the virtual team?.

4.2.3 Challenge 3: Presence and Focus

4.2.3.1 The challenge: ”keeping the team focused”

Normally, virtual teams' meetings take place over distance supported by different kind of technologies such as video conference, teleconference, and another tools. During the interviews, team members cited the challenges they need to face when they use technology to support virtual meetings. Interviewees identified several issues when they were having a meeting.

- Grab the attention of the other participants during a teleconference. The technology used when participating in a teleconference makes it difficult for others to realize when somebody wants to add a comment. (Isaacs & Tang, 1994). As one of the consultants pointed out referring to his experience,

> I was assisting to a meeting remotely via teleconference, and after a while, I noticed that it was really hard for me to stop the conversation fast enough so I could ask the questions I had in mind. I was not able to speak, I wanted to interrupt to ask for some more details, but I was not able to stop the conversation...I'm not sure if I was making any mistake, but I hardly could speak…

Technology makes possible that virtual groups hold effective meetings across geographic distances, but it can also be the source of a problem for the project when it is not managed properly. To avoid these kind of problems, it has been recommended by the interviewees to send short training instructions, for example via email, about how to use the technology prior to the meeting, so every participant has in mind the clear steps they should follow to participate. Furthermore, participants prefer to use tools that allow video conference whenever is possible to improve the communication between the geographically distributed teams.

- Social relationships. During one of the interviews, a senior consultant recommended to be aware of members' personal situation from time to time, as a good practice to keep in mind during virtual meetings to build social relationships and to be able to understand others' behavior.

> Sometimes it's important to know the personal circumstances of your colleagues. For example, I work in a small virtual team integrated by three members. One of them was about to have a baby with his wife and he had to go to the medical revisions from time to time to confirm that everything was OK. When I knew it, I understood that he was focused on being as productive as possible during the working hours and then leave the office at his time to help his wife. On the contrary, my other colleague, is interested in getting a promotion from the company so he is connected almost 24 hours per day and he always replies to emails and phone calls (no matters at what time). I think it's important to know the personal circumstance of each team member to understand them better. […] I'd recommend to every new virtual team member to show his / her human side, weaknesses included, because your colleagues can't see you, and it's more difficult to connect with them otherwise.

Engage participants in informal conversations either before or after the meeting (Olson & Olson, 2000). This practice helps the team to connect with the “hu-

man” side of each team member, as well as to create boundaries between them.

- Multitasking. Meetings are important, first as arenas where project goals are introduced and second as a way to report experiences or issues. Team members that assist to a meeting may have different degrees of engagement, therefore, their level of involvement will differ. In some cases, members will participate in the meeting just to get a global impression of the project status, meanwhile, other participants may be listening passively but will only engage into the meeting when certain topic is addressed. In both cases, it may be possible to accomplish these tasks while multitasking. In other cases, participants are overloaded and they feel they are missing something (Stone, 2006) or they multitask as a way to increase their productivity (Mark, Grudin, & Poltrock, 1999).

  Scholars suggest that multitasking takes place more frequently in teleconferences than during co-presence meetings (Lyons, Kim, Nevo, 2010). This could be due to social concepts as awareness and accountability (Erickson and Kellogg, 2000). Authors define the concept of ”socially translucent systems” referring to technology tools that allow visibility, awareness and accountability between participants. For instance, when a virtual team is holding a meeting via teleconference, if one participant receives a phone call during the meeting, s/he can set their telephone conference to mute mode and answer the mobile. Therefore, s/he is not paying attention to the meeting any more, and the rest of participants are not aware that his / her attention has been shifted away from the meeting. Furthermore, as the participant who answers the phone knows that the rest of the team can not see them, s/he will not feel accountable multitasking. However, if the virtual team uses videoconference instead of teleconference systems, the rest of team members will be aware that the participant is not engaged in the meeting.

  Researches argued that multitasking could be considered either positive or negative. Scholars (González and Mark, 2005) studied workers from two companies who continuously multitask during the day. They spent on average 10.5 minutes in each task before changing to another. People studied reported that multitasking was a useful activity and saw it as a positive ability that should be supported with more technologies. It is also seen positive, as it allows busy executives an opportunity to participate in the meetings (Tang, 2005). However, it is crucial to keep participants engaged during project meetings to avoid the

feeling of ”electronic” silence caused by participants' inattention (Malhorta, A., Majchrzak, A., and Rosen, B., 2007).

4.2.3.2 Recommendations

Some recommendations to increase team presence and focus during virtual meetings are:

- First, the implication of managers prevent people from loosing involvement in the implementation project. The project manager talks about the importance that managers support the project,

  > There must be a manager, to whom the project manager can talk with when the implementation project is not working because the local team is not doing anything. Then, that manager pick up the phone to talk with the person responsible of that area to know the reason, then is when things change.

- Set the meeting agenda and send it to all team members in advance so people can check if they should attend to the meeting or not and have the opportunity to include any topic they would like to discuss during the meeting. This was one of the recommendations supported by a project manager during the interviews,

  > When the project was initiated after the kick-off meeting, the person responsible for the project meetings scheduled a project meeting every week and the appointment was automatically created in our calendar. During the project, he use to send us the agenda of the meeting some days before so we could agree on the topics to discuss and check if there were any other issue to add.

- Limit the amount of meetings, or as a project leader pointed it out ”*Don't fill up employees' time with a lot of pointless meetings*”.

  > Normally people was focused on the meetings, but I think that it's also very important, because it has happened to me and makes me feel very angry, don't fill up employees' time with a lot of pointless meetings. If there is nothing to talk about in a meeting, then leave the people that were invited free because they have a lot of things to do. It has no sense to have a meeting once a week just because it's scheduled. When everybody knows that there is nothing to talk in the meeting in a specific week... If, for any reason, one week there is nothing to talk about, because there are not new topics or because we had three days off for example, then ask the rest of the people invited to the meeting if they have any suggestion or topic to talk about in the meeting. If everybody agrees, then the meeting is postponed to the next week.

Some leaders tend to hold too many meetings, especially if the team is facing issues. When project deadlines are at risk, managers may intuitively schedule more meetings where participants may discuss project status in more detail and leaders can provide micro directions. In this case, project leaders need to trust on team members, even during difficult times. Otherwise, participants may have the feeling that they are assisting to useless meetings, and therefore, they will probably end up multitasking if they feel overload. In these cases, leaders should put some distance and look at themselves critically to know if they are scheduling pointless meetings.

- Restrict the amount of participants to project meetings. Meetings tend to have so many participants. Some of them are there because leaders' lack of confidence. Others because they just want to be seen in the meeting. Managers should ask for the attendance of the people that are really needed in the project. Otherwise the probability of having members multitasking during the meeting will increase and, consequently, it may affect others.
- Use videconference as much as possible. Otherwise, unseen participants may pay little attention to the meeting and work on tasks that are not related with the project. This frequently happens with those members who assist to the meeting because they feel the need to “check the box” that confirms their participation, even though they are not actively involved within it. They are present in the meeting, but other participants can not notice it because they do not have an active presence. In these cases it has been recommended to use video conference tools rather than audio calls, because video conference tend to hold participants attention better than audio conference making more difficult for participants to multitask.

  Some managers keep members engaged through meetings using voting tools and videconference technology. This way, when an important decission needs to be reached, members have to vote to express if they agree with the solution or not. Another option used by team leaders is to use instant messaging tools to check participants engagement.

4.2.4 Challenge 4: Enhancing collaboration after the implementation

4.2.4.1 The challenge: ”Keep the communities up”

Once the system has been implemented, some companies struggle to keep the teams working with the ERP to get the most of it, suggesting ideas for improvement, or reporting issues.

4.2.4.2 Recommendations

Among the best practices observed during the interviews to enhance collaboration on a global basis, are these:

- Create monthly reports that allow managers to control who is using the system properly and who is not. For example, when a team is detected to have low level of prospects created in the system compared to other commercial teams, managers should ask for the reasons to consider the options to solve the situation and facilitate training in case it is needed. This best practice has been cited by one of the project leaders interviewed,

  > Anyway, in the monthly reports managers could see if there was any mistake in the system, because they control everything from France, and they can verify the information if something is wrong,

- To set up a centralized team responsible for the maintenance and support of the end users as well as the updates and improvements needed in the system. Its role would be to provide ERP knowledge combined with the relevant business knowledge. This team should exchange views and business leads regularly, through meetings or trainings. This way, the team would refresh users' knowledge through continuous training pills and they could also use these moments to get feedback from them, registering new ideas and areas to improve. As the project finance manager notes:

  > In my case, we support the system implemented during one month after the Go-Live. Then a team in France was in charge of giving support to all the countries. There was a team in France responsible for the SAP support. Everybody must use the tool because the previous systems was not available any more...it disappeared from our network. We also decided who was going to be responsible for each area so end users could know to whom they should talk in case they have any problem.

The team in charge of giving ERP support, could create and manage an electronic global knowledge-hub to encourage the different teams to share expertise, know-how, and insights related with the new processes implemented and/or the tool. People that work from different locations but doing the same kind of tasks, use to learn by themselves some useful tips about the best way to get information from the ERP, or how to use it more efficiently. It would be very useful for all of them to have access to this knowledge-hub where they could add comments and tips, and check the advises of the rest of team members. By doing so, the knowledge hub would be a very useful tool to develop and spread ERP best practices, and to connect communities creating a collaborative learning network. Furthermore, by documenting all these best practices and tips in the knowledge-hub, the company is creating an organizational memory.

This knowledge-hub should be accessible by all team members that need to work with the ERP. It is not enough to connect team managers, because each member of a team is responsible for different kind of tasks and there is knowledge to be shared at every level. The team in charge of the support of the ERP should be responsible for the maintenance of this knowledge-hub, to avoid time lost, redundancies, rework and to ensure that the knowledge has been incorporated within the network.

However, it is important to notice that, to engage people in the global network following the purposes of the firm, managers play an important role in linking the geographically dispersed communities (Nohria and Ghoshal, 1997), as well as integrating and translating the global frameworks into local sites with a set of rules and/or processes based on the global site's mission. This way, leaders ensure that each location has full input into the processes and systems, giving continuous feedback and influence as the ERP evolves over time.

Summarizing, the full set of recommendations given in this thesis are focused on two main areas: people and companies' procedures. Although technology is a vital factor to allow virtual teams collaboration, it needs to be strongly linked to the right processes and people to success in the ERP implementation. Collaboration emerges within the virtual team as a result of joining the efforts of team members with the correct procedures (set up in time), and the right tools to facilitate synchronous ways of communication. A summary of recommendations can be seen in Table 2 of the Appendix.

5 Conclusions: Implications for theory and research

Technology developments enhance collaboration among geographically dispersed teams. Organizations rely more and more on virtual teams to implement ERP solutions as a way to reach the best expertise available regardless of members' locations. Consequently, companies can reduce ERP implementation time by using virtual teams, because they allow companies to obtain a larger range of expertise and abilities.

However, despite the advantages of virtual teams, geographically dispersed teams need to address more collaboration challenges than collocated teams; messages are more accurately interpreted by receivers when non-verbal cues are present in the communication. Additionally, the process of building trust takes longer than in face-to-face teams, and keeping all members focused and updated in the era of multitasking through different time zones and cultures is also considered an important challenge. Therefore, the use of technology to interact between team members add complexity to the implementation and could impact the ERP implementation effectiveness.

In this thesis, ERP implementation processes and virtual team phases were examined to analyse the challenges faced by team members. A number of key challenges were identified and a series of recommendations were given to address them. The results show that, although there could be important impediments to the implementation process, ERP implementations can success as long as these challenges are properly managed. Virtual teams that need to perform complex tasks need managers able to handle meetings wisely, to provide the team with all the resources needed, and to facilitate the creation of bonds between team members.

The findings of this thesis are limited by the relatively few interviewees that participated in the research. Furthermore, interviewees are not experts in virtual teams and some of them do not work in virtual ERP implementations regularly. However, all the participants were involved in at least one ERP implementation project and all of them are professionals who use virtual environments to communicate with customers and/or to deploy business related tasks. Finally, although the people interviewed are experts from different areas, a larger scale research should be carried out to see how cultural diversity affects virtual team effectiveness in ERP implementations and gain a better understanding of its implications in team effectiveness.

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Phases of Virtual Team Development (Source: Furst, S.A., Reeves, M, Rosen, B., & Blackburn, R.S., 2004 "*Managing the life cycle of virtual teams*". Academy of Management Executive, Vol.18, No 2.)

Table 1
Stages of Virtual Project Team Development

Model						
Tuckman:	**Forming**	→	**Storming**	→	**Norming**	**Performing**
Gersick:	**Phase I**			**Transition**		**Phase II**
Description of team behavior during each stage	Team members get to know each other, exchange information about themselves and the task at hand, establish trust among group members, and clarify group goals and expectations		Similarities and differences are revealed and conflicts surface as the group attempts to identify appropriate roles and responsibilities among the members		Team members recognize and agree on ways of sharing information and working together; relationships are strengthened, and team members agree on member obligations and team strategy	Team members work toward project completion, actively helping and encouraging each other
Challenges to Virtual Teams	Fewer opportunities for informal work- and non-work-related conversations; risk of making erroneous stereotypes in the absence of complete information; trust slower and more difficult to develop		Reliance on less rich communication channels may exacerbate conflicts by provoking misunderstandings; ease of withdrawing behaviors; diversity of work contexts; reliance on an emergent or assigned team leader		Difficulty in developing norms around modes of communication, speed, and frequency of responding, and commitment to use special software	Vulnerability to competing pressures from local assignments, frustrations over free-riding or non-committed teammates, and communication discontinuities due to asynchronous communication

Thesis Recommendations

Table 5. Thesis Recommendations		
Challenge	**Area to Focus**	**Recommendations**
Building trust	People	1. Communication techniques: (a) active listening – ask for more details when it is needed. (b) listening for ideas – be careful when interpreting the messages' meaning when working with different cultures. (c) framing technique – give rich contextual information and emotional context in your messages. (d) following up technique – answer others' messages as fast as possible. 2. Selection process: during the phase of creating the Virtual Team, leaders should consider members that shows empathy with others and people who are not afraid of taking risks when it is needed. 3. Implement a subtle system of control that increases trust within the team. 4. Create interdependences between team members activities when they are working on complex tasks to facilitate collaboration.
Knowledge Management: Sharing information	Procedures & People	1. Meetings: (a) Start with a short period of time to learn about others' personal situations. (b) Manage the time and keep the team focused on agenda's topics. (c) Be sure everybody understood the new information. (d) Name a person responsible for being familiar with others' remote locations. 2. Technology:

		(a) Leaders should provide the team with enough resources to facilitate synchronous communication and tools to share information efficiently. (b) During the testing phase, include a tool to track the issues of the system and their history. 3. Establish rules for communication to avoid misunderstandings, replace verbal cues, and highlight important information. 4. Check that information is alwaus updated and team members are aware of the last changes.
Presence & Focus	People & Processes	1. Ensure managers' implication in the project. 2. Meetings: (a) Avoid holding pointless meetings (b) Set meeting's agenda in advance and send it to the participants (c) Limit the number of participants to those who are really needed (d) Use videoconference as much as possible to ensure everybody is engaged in the meeting.
Enhance Collaboration	People & Processes	1. Check monthly reports to monitor if everything is working properly and users manage the system correctly. 2. Set up a centrilized team responsible for providing and sharing information with the users. 3. Create an electronic knowledge-hub where teams have the opportunity to share their know-how, experiences and insights.