Virtual communication between virtual teams

AR0183 Capita Selecta: Literature study

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Preface

Virtualisation of companies caused by innovative solutions in ICT caught my interests ever since the lecture given by Monique Arkesteijn explaining the DAS-Frame (Design Accommodation Strategy Framework). A part of this framework takes relevant trends into account regarding aspects like economic changes, ways of working and of course ICT. From that moment I knew that this particular part of the frame work I really was interested in.

The way digitalisation had changed society in such a way that physical proximity, or for that matter, the importance and meaning of a place, became the topic of discussion. In a world that revolves around flows on a global dimension, that theoretically can be located anywhere, what is left of the conventional sense of a place, or locality?

When I started with my research proposal for my thesis, I wanted to better understand the ways of working in the future. In my research proposal I narrowed my field of interest towards trends in ICT that will influence future corporate Real Estate Portfolios. Regardless of these trends, I wanted to do more research on collaboration means between colleagues or teams that are geographically dispersed.

This elective course, AR0180 Capita Selecta, has allowed me to investigate restrictions and opportunities of remote collaboration via virtual communication.

I would like to thank my first mentors ir. M.H. (Monique) Arkesteijn and ir. S.A. (Salome) Bentinck for guiding me and this literature study.

Robert Rosa

Delft, April 18, 2013
Contents
Preface .................................................................................................................................................. 3
Readers guide ........................................................................................................................................7
1. Introduction ......................................................................................................................................8
   1.1 Research subject and background ...............................................................................................9
   1.2 Research scope ............................................................................................................................9
   1.3 Research design ...........................................................................................................................9
   1.4 Relevance of study .......................................................................................................................9
   1.5 Hypothesis.....................................................................................................................................9
       Expectation ....................................................................................................................................10
       Demarcation ................................................................................................................................10
   1.6 Research questions ....................................................................................................................10
   1.7 Literature search methodology ...................................................................................................10
2. Background: from natural to virtual communication ........................................................................11
   2.1. Introduction ................................................................................................................................12
   2.2. What is virtual communication? .................................................................................................12
3. Work together apart: Virtual teams .................................................................................................14
   3.1. Introduction: What is a Virtual Team? .......................................................................................15
   3.2. Virtual Teams: Origins and Trends: ........................................................................................17
   3.3. Four types of Virtual Teams: .....................................................................................................18
   3.4. Conclusion..................................................................................................................................19
4. Virtual versus Natural Communication............................................................................................20
   4.1. Introduction ................................................................................................................................21
   4.2. Advantages and disadvantages of natural communication........................................................21
       Advantages of Face-to-Face Communication ..............................................................................21
       Disadvantages of Face-to-Face Communication ........................................................................22
   4.3. Advantages and disadvantages of Virtual Communication .....................................................22
       Advantages of Virtual Communication.......................................................................................22
       Telecommuting ............................................................................................................................23
       Disadvantages of Virtual Communication .................................................................................24
   4.4. Conclusion ..................................................................................................................................25
       Answering research question 1 .................................................................................................25
5. Challenges of Virtual Teams ..............................................................................................................27
   5.1. Introduction ................................................................................................................................28
   5.2. Unique Characteristics & Challenges of Virtual Teams ............................................................28
       Dynamics of Global Virtual Teams .............................................................................................28
   5.3. Culture.......................................................................................................................................29
   5.4. Trust .........................................................................................................................................29
   5.5. Social Media..............................................................................................................................30
   5.5. Conclusion..................................................................................................................................31
Answering research question 2 ................................................................. 31

6. Success factors for virtual teams ............................................................... 33
   6.1. Introduction ....................................................................................... 34
   6.2. Global Virtual Team Effectiveness ..................................................... 34
       Enabling Conditions ........................................................................... 34
   6.3. Conclusion ....................................................................................... 34
       Answering research question 3 ............................................................. 34

7. Virtual communication versus physical real estate ............................. 36
   7.1. Introduction ....................................................................................... 37
   7.2. Office places ...................................................................................... 37
       The central office ............................................................................... 37
       The telework office .......................................................................... 37
       The first, second and third place ....................................................... 38
   7.3. Conclusion ....................................................................................... 38

8. Conclusion .............................................................................................. 40

8.1. Background: from natural to virtual communication ..................... 41
   Work together apart: Virtual teams ......................................................... 41

8.2. Answering the research questions .................................................... 41
   Answering research question 1 ............................................................... 41
   Answering research question 2 ............................................................... 42
   Answering research question 3 ............................................................... 42

8.3. Answering the main research question ............................................ 44

9. Reflection ............................................................................................... 45

Literature .................................................................................................... 46

Appendix: logbook ....................................................................................... 50

   Data acquisition ...................................................................................... 50
   Documentation ....................................................................................... 50

Figures
Figure 1 Timeline of communications tools (source: (Michael and Salter, 2012)) ........................................ 18
Figure 2 Definition: Global Virtual Team (source: Kristof et al. (1995)) ...................................................... 19
Figure 3 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004)) ................................................................. 26
Figure 4 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004)) ................................................................. 26
Figure 5 Virtual Team System of Principles (source: (Lipnack and Stamps, 1997)) ......................................... 32
Figure 6 Focus of early virtual team research (source: (Powell et al., 2004)) ................................................. 35
Figure 7 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004)) ................................................................. 35
Figure 8 Typology of office organisations (Source: Vos et al., 1999) ............................................................ 38
Figure 9 Workplace locations ....................................................................... 39
Figure 10 Virtual Team System of Principles (source: (Lipnack and Stamps, 1997)).......................................................... 43
Figure 11 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004)) .......................................................... 43

Tables
Table 1 Time /Space matrix (Adapted from Bouchard and Cassivi (2004)).......................................................... 13
Table 2 Characterisation of VC, AC, and CMC (adopted from Wainfan and Davis (2004))................................. 13
Table 3 Characteristics of virtual teams and traditional teams (source: Horvath and Tobin (2001)) ........... 15
Table 4 Common criteria of virtual teams (source: (Bal and Teo, 2000)).......................................................... 16
Table 5 Advantages and Disadvantages of Face-to-Face Communication .......................................................... 22
Table 6 Advantages and Disadvantages of Virtual Communication .......................................................... 25
Table 7 Challenges of Virtual Communication ................................................................................................. 29
Readers guide

This report is divided into 9 chapters of which the first three chapters provide background information about the research itself (chapter 1) and the topic (chapter 2 and 3). Chapter 4, 5 and 6 provide answers to the research questions, while chapter 7 elaborates more on the relevant Real Estate factors of this study. However, this study focuses more on virtual teams, while the effects of virtual communication on Real Estate are discussed more thoroughly in my graduation thesis. Chapter 8 provides the overall conclusion of this study ending in a reflection in chapter 9.
1. Introduction
1.1 Research subject and background

The ‘way of working’, in a broader sense ‘office use’, has changed severely since information and communication technology revolutionised the social paradigm. Instant and constant connectivity has allowed the society to transform into a network society, mainly by the developments of information and communication technology (ICT). Companies have been affected significantly by the rising network society, both in their work processes as in their spatial configuration (i.e. the accommodation needs and location choice). These ICT developments have been studied during my graduation thesis understand more about the future demand for office space.

The research subject of this exploratory literature study is virtual communication between virtual teams. Of special interest in this study are the theoretical dynamics and the practical implications of virtual teams that are formed to overcome geographical, temporal separations and to utilise global knowledge and competence. These two concepts form the tension, by which the accommodation and location strategies of companies are affected. It is therefore important to understand the spatial logic of these concepts both separately and combined.

1.2 Research scope

The scope of this research limits itself to virtual communication between virtual teams. Of special interest in this study are the theoretical dynamics and the practical implications of virtual teams that are formed to overcome geographical, temporal separations and to utilise global knowledge and competence. These two concepts form the tension, by which the accommodation and location strategies of companies are affected. It is therefore important to understand the spatial logic of these concepts both separately and combined.

1.3 Research design

For this explorative literature study a research design is made. First the relevance of this study is described. Hereafter the hypothesis is stated, which is supported by the research questions. The research methodology that is used to conduct this explorative literature study is explained followed by the literature findings that provide answers to the research questions. Finally, the conclusion is drawn ending in a reflection on the study.

1.4 Relevance of study

Virtual communication has changed the physical and central office paradigm which is discussed in my graduation thesis. This study contributes to the understanding of virtual communication among virtual team members. These team members will have a different demand for workplaces and locations, which are especially important for corporate real estate managers, real estate developers, and the way organisations do businesses and how that affects the spatial organisation of office workers. This study also relates to project management and leadership, who have less physical overview on projects and teams.

However, project management and leadership are not the same area of interest in my thesis. For my gradation thesis I would like to know to what extent office workers can work location independent by communicating virtually with geographically dispersed team members. This brings us to the second sub question of my graduation thesis:

Graduation thesis

To what extent can ICT replace physical communication between office workers or between office workers and clients?

With this literature study a more elaborate answer will be provided by answering the research questions stated after the hypothesis.

1.5 Hypothesis

The following hypothesis is stated:

If virtual communication is successfully implemented amongst virtual teams, then it is not necessary for team members to physically meet at all.
Expectation

For geographically dispersed teams to collaborate successfully, communication technology is one of the most important factors next to central data storage where all data can be easily accessed, processed and stored. Communication technology should be tending to Face-to-Face Communication as much as possible to communicate as much relevant information as possible to obtain clear understandings and prevent misunderstandings.

It is expected that virtual communication can replace natural inter-team member communication when team members can easily operate the needed ICT and anticipate on possible miss-communication and take differences in culture and time-zones into consideration. In general, seems that team members prefer natural communication over virtual communication, but use virtual communication as an alternative.

Demarcation

Specific communication technology is not mentioned as virtual communication is deeply influenced and transformed by recent developments in ICT (i.e. digitalisation).

If this hypothesis is thru, team members can be globally dispersed making use of satellite offices located anywhere around the world. This study does not imply the willingness of team members to work in satellite offices, but when virtual teams take over traditional teams, organisations need to adjust their real estate portfolio drastically to accommodate their employees for them to perform their activities.

Specific communication technology and the willingness of team members to telework are elaborately discussed in my graduation thesis.

To prove or disprove the hypothesis, this study must give literature based answers to the following research questions.

1.6 Research questions

The research questions that supports the hypothesis is:

To what extent can virtual communication replace natural inter-team member communication?

To answer this main question, three sub-questions will be answered from literature findings.

1. When is virtual communication appropriate to be used instead of natural communication and when not?

2. What are the challenges of virtual teams?

3. What are the success factors for virtual teams?

1.7 Literature search methodology

This research is a theoretical essay in which an overview is offered of significant literature published on virtual communication between virtual teams. Relevant literature is mainly found using the internet website ‘Google Scholar’ to search scientific articles using several key words as stated below. There are many more articles read on this topic and on related topics that have helped this study, though they are not included in this report due to the fact that they are either not directly relevant or relate to a different context.

Used key words:
virtual communication, virtual collaboration, virtual teams, virtualisation, virtual communication, computer-mediated-communication (CMC), video-conferencing.
2. Background: from natural to virtual communication
2.1. Introduction

In recent years, activities in all types of organisations have become increasingly more global. Competition from both foreign and domestic sources has grown dramatically and there has been a continued shift from production to service/knowledge-based work environments (Townsend et al., 1998). Advances in information and communication technology have enabled a faster pace of change than in the past and have created jobs that are increasingly more complex and dynamic (Hunsaker and Hunsaker, 2008). To face this wide and dramatically changing world, organisational structures, communications, strategies, processes, policies, and so on, must turn more flexible. Things must be done differently.

Virtual teaming is an alternative way of managing and organising work that allows people to work together, even though they are geographically separated. People working in virtual teams use technology to communicate with each other rather than working face-to-face or traveling to meetings. Virtual teaming, where people work together from different locations, has been found to be very different from traditional teaming, where people work together in the same physical space. In recent years, companies have increasingly turned to virtual teams as a means of connecting and engaging geographically dispersed workers, lowering the costs associated with global collaboration, and enabling greater speed and adaptability. These teams have shifted the way in which organisations traditionally form, manage and evaluate team performance.

Virtual teams, although offering many benefits, also pose a number of challenges. Developing effective global leaders, keeping remote employees engaged, forming and developing global teams, monitoring and evaluating distance employees, and developing a global mind-set are all areas that companies are working on for a better understanding.

In response to these and other challenges, this report tackles topics of interest to companies that are either currently utilising global virtual teams or considering adoption of virtual teams. But what exactly does ‘virtual’ mean?

2.2. What is virtual communication?

To better understand the term virtual, the definition of dictionaries is stated: virtuality means ‘essence’ or potential existence ‘potentiality’. Linking back to this research, by virtual it can be understood as the direct absence of (a part) of reality concerning human beings or objects. Recent developments in technology have enabled a new medium for communication, known as computer-mediated-communication (CMC), or virtual communication. Specifically, CMC refers to, “…any form of exchange that requires the use of a computer...” (Dietz-Uhler and Bishop-Clark, 2001).

Virtual communication is takes place via email, chat rooms, forums, and other virtual applications. Many people communicate virtually right through their phone. Virtual communication is written for the most part, but there are other forms of virtual communication that are more personal.

Skype is one of many virtual communication programs that allows one to see the person you are communicating with through the use of a webcam while talking or typing to them. Virtual communication in written forms is often broken down into short paragraphs in order to be easier to read. This form of virtual communication is characterised by being able to send messages despite the availability of the recipient. It is also more often written, and it lacks natural emotions, expression and nuances that are evident when someone is in person. However, these emotions are tried to represent a facial expression using punctuation marks, numbers and letters, usually written to express a person’s feelings or mood. Wording, structure of documents, acronyms, and emoticons are aspects of virtual communication.

Virtual communication technology refers to any means of interacting with others in virtual reality. Virtual reality, more commonly
referred to as cyberspace, exists as a product of CMC. There are two types of CMC, namely synchronous CMC, which allows simultaneous communication and asynchronous CMC, which occurs with time constraints (Walther, 1996):

**Synchronous CMC:**
- Synchronous CMC allows for simultaneous communication through incorporating a real-time element where all participants are online at the same time. Common forms of synchronous CMC include videoconferencing and chat rooms.

**Asynchronous CMC:**
- Asynchronous CMC allows participants communicate regardless of the time of day or the distance between users. The most common form of asynchronous CMC is email. Internet forums, where people can post comments publicly or send private messages, represent another common asynchronous CMC.

In Table 1 the same and different spaces needed for Synchronous and asynchronous communication is set out.

In contrary to the prior statement of Dietz-Uhler and Bishop-Clark (2001), Wainfan and Davis (2004) dissociate video- and audio conferencing from CMC while these modes of communication are mostly mediated by computers as well. In Table 2, Wainfan and Davis (2004) set out the characteristics of Videoconference (VC), Audio conference (AC), and Computer-mediated communication (CMC) in simple terms. During a VC, participants face a video image of another member or multiple images of other members. They may also use common graphics, such as a shared briefing or a shared whiteboard. In AC, participants are on the telephone with one or more people. They may also use computer displays to see shared briefings or whiteboards. VC and AC may include subgroups meeting FTF in the same room. CMC is typically text-based, although it increasingly includes drawings, photos, and other images such as happy faces or “emoticons” (Wainfan and Davis, 2004).

To avoid any confusion, this research refers the combination of VC, AC, and CMC to Virtual Communication, which is used to perform Virtual Collaboration.

### Table 1 Time /Space matrix (Adapted from Bouchard and Cassivi (2004))

<table>
<thead>
<tr>
<th>Same space</th>
<th>Different space</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Same time Synchronous</strong></td>
<td>Face-to-face meeting, Brainstorming, Vote, PC and projector Electronic white board, GDSS, Chat</td>
</tr>
<tr>
<td><strong>Different time Asynchronous</strong></td>
<td>Team room, Document management system, Discussion forum, E-mail, Workflow, Project management</td>
</tr>
</tbody>
</table>

### Table 2 Characterisation of VC, AC, and CMC (adopted from Wainfan and Davis (2004))

<table>
<thead>
<tr>
<th>Mode</th>
<th>Defining Characteristics</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video conference (VC)</td>
<td>Useful real-time images and voices of other participants; may include other shared images/text.</td>
<td>Group videoconferencing in dedicated rooms; desktop, videoconferencing.</td>
</tr>
<tr>
<td>Audio conference (AC)</td>
<td>Voice communication, but no useful real-time video images of other participants; may include other shared images, data, and text.</td>
<td>Phone calls, conference calls, or conference calls where people are also sharing views of images or documents.</td>
</tr>
<tr>
<td>Computer-mediated communication (CMC)</td>
<td>Text, images, and other data received via computer, without effective real-time voice or video images of other participants.</td>
<td>E-mail, chat rooms, discussion boards, text messaging, instant messaging, shared databases, application specific groupware.</td>
</tr>
</tbody>
</table>
3. Work together apart: Virtual teams
3.1. Introduction: What is a Virtual Team?

Research suggests that virtual teams have several unique characteristics that distinguish them from conventional, face-to-face teams (Bell and Kozlowski, 2002). Two main characteristics classify virtual teams:

1. physically distributed members
2. communication through a number of synchronous and asynchronous methods.

Traditionally, both the terms “team” and “group” have been used to describe small collections of people at work. While the two terms are often used interchangeably in traditional and virtual team research (Cohen and Bailey, 1997, Langfred, 1998, Sundstrom et al., 1990), this duality in terminology has increasingly been questioned (Fisher et al., 1997, Katzenbach and Smith, 1992).

Several authors suggest that word “team” should be reserved for those groups that display high levels of interdependency and integration among members. “A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationship across organisational boundaries” (Cohen and Bailey, 1997p. 241). This definition is general enough to capture traditional as well as virtual teams while precisely identifying the defining features of a team: its unity of purpose, its identity as a social structure, and its members their shared responsibility for outcomes.

According to Duarte and Snyder (2006), it is easy to characterise virtual teams using the same categories as traditional teams. However virtual teams can be more complex as (a) they cross boundaries related to time, distance (geography) and organisation and (b) they use electronic technological means to communicate and collaborate. Bell and Kozlowski (2002), also, distinguished virtual teams and face to face teams on the basis of spatial distance and communication media. The authors maintained that face to face teams work in close physical proximity and work under the same roof while having face to face interactions. On the other hand, virtual teams are physically separated and rely on numerous technologies such as electronic mail, videoconferencing, electronic-mails, telephones and groupware (hardware and software applications that facilitate group work) for communication and information exchange. In Table 3, Horvath and Tobin (2001) have set out the characteristics of virtual teams, all teams and traditional teams while in Table 3 the common criteria and other characteristics of virtual teams are stated based on different literature.

<table>
<thead>
<tr>
<th>Virtual teams</th>
<th>All teams</th>
<th>Traditional teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographically dispersed</td>
<td>Multiple individuals</td>
<td>Face to face</td>
</tr>
<tr>
<td>Communication through technology</td>
<td>Task interdependence</td>
<td>Communication primarily in person</td>
</tr>
<tr>
<td>Shared goals</td>
<td>Organisational setting</td>
<td></td>
</tr>
</tbody>
</table>

Literature related to virtual teams revealed a lack of depth in the definitions. Although virtual teamwork is a current topic in literature about global organisations, it has been problematic to define what ‘virtual’ means across multiple institutional contexts (Chudoba et al., 2005). The concept of a “team” is described as a small number of people with complementary skills who are equally committed to a common purpose, goals and working approach for which they hold themselves mutually accountable (Zenun et al., 2007). It is worth mentioning that virtual teams are often formed to overcome geographical or temporary separations (Cascio and Shurygailo, 2003). Virtual teams work across boundaries of time and space by utilising modern computer-driven technologies.

The term “virtual team” is used to cover a wide range of activities and forms of
technology-supported working (Anderson et al., 2007). Virtual teams are comprised of members who are located in more than one physical location. This team trait has fostered an extensive use of a variety of forms of computer-mediated communication that enable geographically dispersed members to coordinate their individual efforts and inputs (Peters and Manz, 2007). Gassmann and Von Zedtwitz (2003) defined “virtual team as a group of people and sub-teams who interact through interdependent tasks guided by common purpose and work across links strengthened by information, communication and transport technologies.” Another definition suggests that virtual teams, are distributed work teams whose members are geographically dispersed and coordinate their work, predominantly with electronic information and communication technologies (Hertel et al., 2005). From the perspective of Leenders et al. (2003), virtual teams are groups of individuals collaborating in the execution of a specific project while geographically and often temporary distributed, possibly anywhere within (and beyond) their parent organisation.

Lurey and Raisinghani (2001) defined virtual teams as groups of people who work together although they are often dispersed across space, time and/or organisational boundaries.

Amongst the different definitions of the concept of a virtual team the following form is one of the most widely accepted: (Powell et al., 2004)“ in this research virtual teams are defined as groups of geographically, organisationally and/or time dispersed workers brought together by information technologies to accomplish one or more organisation tasks”. The degree of geographic dispersion within a virtual team can vary widely from having one member located in a different location than the rest of the team to having each member located in a different country (Staples and Zhao, 2006). This means that next to virtual communication, virtual teams might use natural communication amongst those team members who are present at the same location.

Along with Bal and Teo (Bal and Teo, 2000) it can be concluded that a team will become virtual if it meets four main common criteria and other characteristics that are summarised in Table 4.

Geographically dispersed teams allow organisations to hire and retain the best people regardless of location. The temporary aspect of the team appears less emphasised (Lee-Kelley and Sankey, 2008), although Bal and Teo (2000) Paul et al. (2005) and Wong and Burton (2000) included ‘temporary’ in virtual team definition, but some authors like Gassmann and VonZedtwitz (2003) use, ‘may be temporary’ for some team members.

Table 4 Common criteria of virtual teams (source: (Bal and Teo, 2000))

<table>
<thead>
<tr>
<th>Characteristics of virtual teams</th>
<th>Descriptions</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Driven by common purpose (guided by a common purpose)</td>
<td>(Bal and Teo, 2001a, Shin, 2005, Hertel et al., 2005, Gassmann and Von Zedtwitz, 2003b, Rezgui, 2007)</td>
</tr>
<tr>
<td></td>
<td>Involved in cross-boundary collaboration</td>
<td>(Bal and Teo, 2001a, Gassmann and Von Zedtwitz, 2003b, Rezgui, 2007, Precup et al., 2006)</td>
</tr>
<tr>
<td>Other characteristics</td>
<td>It is not a permanent team</td>
<td>(Bal and Teo, 2001a, Paul et al., 2005, Wong and Burton, 2000, Cascio and Shurygailo, 2003, Leenders et al., 2003)</td>
</tr>
<tr>
<td></td>
<td>Small team size</td>
<td>(Bal and Teo, 2001a)</td>
</tr>
<tr>
<td></td>
<td>Team member are knowledge workers</td>
<td>(Bal and Teo, 2001a, Kirkman et al., 2004)</td>
</tr>
<tr>
<td></td>
<td>Team members may belong to different companies</td>
<td>(Dafoulas and Macaulay, 2002, Leenders et al., 2003)</td>
</tr>
</tbody>
</table>
3.2. Virtual Teams: Origins and Trends:

In pre-historic times, the nomadic era of hunters and gatherers was the first time when man came together in small groups with a shared vision of ‘survival’. The first communication tools were fires, beacons, smoke signals, communication drums and horns. Figure 1 illustrates the timeline of communication tools.

According to Dictionary.com, the word ‘virtual’ drew its meaning from ‘virtue’ in early 14th century. Then came the agricultural civilisation which led to the growth of hierarchies in organisations. This was followed by the birth of bureaucratic organisations of Industrial era. But by late 1950s, it started taking up a new meaning of ‘temporarily simulated or extended by computer software’. In recent past, a team constituted of members from more or less one culture, present at one place and time working together to achieve a defined goal. While work teams were used in the U.S. as early as the 1960s, the widespread use of teams and quality circles began in the Total Quality Management movement of the 1980s. In the late 1980s and early 1990s, many companies implemented self-managing or empowered work teams. With the don of Information Age, a new form of organisational structures has emerged, which is known as the network organisations. To cut bureaucracy, reduce cycle time, and improve service, line-level employees took on decision-making and problem-solving responsibilities traditionally reserved for management. By the mid-1990s, increasing numbers of companies such as Goodyear, Motorola, Texas Instruments, and General Electric had begun exporting the team concept to their foreign affiliates in Asia, Europe, and Latin America to integrate global human resource practices (Kirkman et al., 2001).

Now, due to communication technology improvements and continued globalisation, virtual teams have increased rapidly worldwide (Kirkman et al., 2002). This era is growing popularity for virtual team structures in organizations (Walvoord et al., 2008, Cascio, 2000). Communication in the virtual teams go directly between the people who need the information and who have it (Lipnack and Stamps, 1999).

The surging sale of PCs in 1960s followed by the popularity of cellular phones in 1970s, voicemail in 1980s, and internet & World Wide Web in 1990s gradually paved way for the virtual workplace. Keeping with the changes in the human civilisation, the organisational structures also evolved. “Communication between a virtual team leader and its members is the glue that holds a virtual team together” (Bergiel et al., 2008 p.427). Technology is the enabler that allows the leader and the team members to come together (Kerber and Buono, 2004).

In a major review of the literature on virtual teams, Martins et al. (2004) conclude that ‘with rare exceptions all organisational teams are virtual to some extent. We have moved away from working with people who are in our visual proximity to working with people around the globe (Johnson et al., 2001). Nowadays, virtual teams are the latest buzzword in the corporate circles of 21st century. Though virtual teams rely heavily on information and communication technology but it is not just restricted to the IT industry. Today almost all industry sectors ranging from construction, manufacturing, healthcare and automotive to retail and non-profit are benefiting from the virtual teams.

It is the rise of the network technology that made the use of virtual teams feasible (Beranek and Martz, 2005).
3.3. Four types of Virtual Teams:

Generally, various forms of “virtual” work can be differentiated depending on the number of persons involved and the degree of interaction between them. The first is “telework” (telecommuting) which is done partially or completely outside of the main company workplace with the aid of information and telecommunication services. “Virtual groups” exist when several teleworkers are combined and each member reports to the same manager. In contrast, a “virtual team” exists when the members of a virtual group interact with each other in order to accomplish common goals. Finally, “virtual communities” are larger entities of distributed work in which members participate via the internet, guided by common purposes, roles and norms. In contrast to virtual teams, virtual communities are not implemented within an organisational structure, but are usually initiated by some of their members. Examples of virtual communities are Open Source software projects (Hertel et al., 2005). Teleworking is viewed as an alternative way to organise work that involves the complete or partial use of ICT to enable workers to get access to their labour activities from different and remote locations (Martínez-Sánchez et al., 2006). Cascio and Shurygailo (2003) have clarified the difference form of virtual team by classifying it with respect to two primary variables namely, the number of location (one or more) and the number of managers (one or more). Therefore there are four categories of teams:

1. Teleworkers: A single manager of a team at one location
2. Remote team: A single manager of a team distributed across multiple locations
3. Matrixed teleworkers: Multiple manager of a team at one location
4. Matrixed remote teams: Multiple managers across multiple locations

Following Kristof et al. (1995), a global virtual team can be defined to be a temporary, culturally diverse, geographically dispersed, electronically communicating work group (see Figure 2). The notion of temporary in the
definition describes teams where members may have never worked together before and who may not expect to work together again as a group (Jarvenpaa and Ives, 1994, Lipnack and Stamps, 1997). The characterisation of virtual teams as global implies culturally diverse and globally spanning members that can think and act in concert with the diversity of the global environment (DeSanctis and Poole, 1997, Jackson et al., 1995). Finally, it is a heavy reliance on computer-mediated-communication technology that allows members separated by time and space to engage in collaborative work.

3.4. Conclusion

A summary of the definition of a virtual team may be taken as: groups of geographically, organisationally and/or time dispersed workers brought together by information and telecommunication technologies to accomplish one or more organisational tasks (Alavi and Yoo, 1997, Dietz-Uhler and Bishop-Clark, 2001, Jarvenpaa and Leidner, 1998). While they can be on going, virtual teams are often assembled on an “as needed basis” to cooperate on specific deliverables, or to fulfil specific customer needs (Chase, 1999, Lipnack and Stamps, 1997). Distinctive features of virtual teams include their preponderant, and at times, exclusive reliance on IT to communicate with each other, their flexible composition, and their ability, if necessary, to traverse traditional organisational boundaries and time constraints. Virtual teams are often assembled in response to specific needs and are often short lived (Chase, 1999). This is not a defining characteristic of the virtual team, but rather a by-product of the specialised function they often serve.

A particular type of virtual team that has received significant research attention is the global virtual team (e.g., Jarvenpaa and Leidner, 1999, Kayworth and Leidner, 2000, Maznevski and Chudoba, 2000), distinguished because it draws members that work and live in different countries and are culturally diverse.
4. Virtual- versus Natural Communication
4.1. Introduction

Evolving technologies allow organisations to become increasingly global. This trend has led organisations to adopt virtual communication to face global challenges. As increasing numbers of organisations implement various virtual communication tools, face-to-face contact has shifted to virtual communication, bringing forth new opportunities and threats. This paper explores the debate between face-to-face and virtual communication and identifies the costs and benefits associated with each, in addition to identifying strategies for effectively utilising virtual communication.

Virtual communication has become the norm for many organisations (Baltes et al., 2002). As technology has evolved, time and distance barriers have dissolved, allowing for access to experts worldwide. The reality of business today demands the use of virtual communication for at least some work, and many professionals will sit on a virtual team at some point (Dewar, 2006). Although virtual communication offers many advantages, it is not without challenges.

Virtual communication and natural communication are both powerful means of communicating in both personal and professional life. Virtual communication and natural communication are very different, and they should be used appropriately. To better understand the extent to which virtual communication can replace the natural communication, we need to know when each type of communication is appropriate and when not. This brings us to the following question:

**Research question 1**

*When is virtual communication appropriate to be used instead of natural communication and when not?*

To answer this question, the advantages and disadvantages of both virtual and natural communication will be discussed.

4.2. Advantages and disadvantages of natural communication

**Advantages of Face-to-Face Communication**

Natural communication is characterised through the use of personal contact. Personal contact allows a person to perceive the person they are communicating with wholly. This means that when naturally communication with someone you are privy to their tone of voice, physical motions, hand gestures, speech patterns, and facial expressions. It also makes it easier to understand the meaning of some communication because voice inflections are available. Face-to-face communication has a number of significant advantages, and many observers argue that there is no replacement for face-to-face contact, regardless of how far technology has evolved (Duke, 2001).

**Presence of Non-verbal Cues**

When communicating face-to-face, the speaker can draw on visual cues from the audience to gain quick, immediate feedback and make rapid adjustments as necessary (Storper and Venables, 2004).

**Builds Trust**

Visual cues and social presence in face-to-face dialogue also enable members to more easily learn about one another’s background, skills, experiences, and areas of expertise (Rosen et al., 2007). These cues build trust within groups that interact face-to-face (Storper and Venables, 2004).

**Message of Importance to Recipients**

Although organising and planning for face-to-face contact can be difficult, this in itself can send a message of value to the recipients (Storper and Venables, 2004). Even though face-to-face communication has long been the trusted mode of contact, it also has a number of disadvantages.

**Maintains Tacit Knowledge**

Face-to-face contact facilitates the transfer of tacit knowledge (Bower et al., 2001),
or knowledge that is not written or definable, but gained through experience (Griffith et al., 2003).

**Disadvantages of Face-to-Face Communication**
Natural communication has positive aspects of understanding, but sometimes things can be misconceived through natural communication because people do not have as much time to think before they respond. Natural communication allows for natural transfers of emotions and meanings that are more easily perceived in person, but things can be misunderstood if not said and or expressed correctly (e.g. due to lingual or cultural barriers).

**Power differences Salient**
Face to face communication allows power relations (a relationship where there is an unbalance of power between the people involved) to be reinforced which can effectively democratise team members. Power differences allow unequal participation, resulting in more unequal levels of participation within heterogeneous groups (Dietz-Uhler and Bishop-Clark, 2001, Hertel et al., 2005, Lind, 1999).

**Minority Expression Lower**
Research suggests that minority expression is lower in face-to-face groups, inhibiting trust in heterogeneous groups and creating unequal participation among members (Krebs et al., 2006, Lind, 1999, McLeod et al., 1997). Minority expression, which is a quantitative difference between team members, must not be confused with unbalanced power relationships, which is a qualitative difference.

**Costly (business travel)**
Additionally, facilitating face-to-face contact between co-workers or with clients is often unrealistic for certain organisations, as business travel is too costly (Rosen et al., 2007, Storper and Venables, 2004).

Both the advantages and disadvantages of natural communication are presented in Table 5.

**Table 5 Advantages and Disadvantages of Face-to-Face Communication**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Non-verbal Cues</td>
<td>Power Differences Salient</td>
</tr>
<tr>
<td>Builds Trust</td>
<td>Minority Expression Lower</td>
</tr>
<tr>
<td>Can send Message of Importance</td>
<td>Costly (business travel)</td>
</tr>
<tr>
<td>to Recipients</td>
<td></td>
</tr>
<tr>
<td>Maintains Tacit Knowledge</td>
<td></td>
</tr>
</tbody>
</table>

**4.3. Advantages and disadvantages of Virtual Communication**

**Advantages of Virtual Communication**
CMC has many advantages for organisations given increased globalisation and the need for rapid knowledge transfer across borders and time zones. CMC addresses time constraints (Duke, 2001), as asynchronous technologies (with a delay between sender and recipient, such as email) allow users to communicate at any time and location with access to the technology (Dietz-Uhler and Bishop-Clark, 2001, Rosen et al., 2007). Asynchronous communication allows time to think about what you are trying to communicate before actually sending or replying a message, which reduces miscommunication.
CMC has saved major transnational organisations up to $50 million (Bergiel et al., 2008), proving it to be a cost-effective way of conducting business (Baltes et al., 2002, Cascio, 2000). CMC allows telework, which provides cost savings to employees by eliminating time-consuming commutes to central offices and offers employees more flexibility to co-ordinate their work and family responsibilities (Johnson et al., 2001). It also permits organisations to attract and retain top talent because workplace flexibility is increasingly seen as a crucial aspect of job satisfaction for many employees (Bergiel et al., 2008). Additionally, CMC provides organisations with access to experts that would otherwise only be accessible at very high travel costs (Cascio, 2000, Rosen et al., 2007). Moreover, CMC holds promising implications for recruitment. With CMC, organisations can recruit talented individuals who may not be willing to relocate for a job but are willing to work virtually (Bergiel et al., 2008, Cascio, 2000).

In addition to cost savings, CMC eliminates the non-verbal cues and power differences present during FTF communication as described in en en the previous paragraph. Virtual teams are also valuable to many businesses because team members commonly focus their interests on tasks instead of shared social or cultural environments, which often impact the dynamic within conventional teams (Hamilton and Scandura, 2003). This fosters a working environment that encourages innovation and decreases discrimination by hierarchy, employee impairments, race or age because productivity is more important than other characteristics (Bergiel et al., 2008).

Greater Equality
CMC can create equal opportunities at the workplace. Physically disadvantaged employees like people in wheel chairs, have greater access to the virtual environment than the physical workspace, creating teams that are more diverse in makeup and fostering greater creativity and innovation. Moreover, as performance in a virtual team is evaluated solely on productivity (given that physical appearance remains anonymous), age and race discrimination are greatly reduced in a virtual setting (Bergiel et al., 2008). Dietz-Uhler and Clark (2001) found that when groups engaged in CMC followed by a face-to-face discussion, they perceived their interactions as more enjoyable than groups who did not engage in CMC prior to a face-to-face discussion. Dietz-Uhler and Clark (2001) argue that this difference was attributable to the fact that CMC enables greater freedom of thought, in turn improving the dialogue.

Generally speaking, Dietz-Uhler and Clark (2001) argue that CMC is a practical alternative to face-to-face communication, as participants report it to be enjoyable, effortful and valuable.

Horvath and Tobin (2001) maintained that virtual teams are utilised for sharing existing knowledge and to innovate. The formation of virtual teams allows organisations to draw talent quickly from different functions, locations and organisations. The goal is to leverage intellectual capital and apply it as quickly as possible (Duarte and Snyder, 2006, p. 3). The virtual team is likely to exist for one or more of the following purposes (Nemiro et al., 2008):

a) To involve individuals with the best skills and expertise
b) To ensure twenty-four hour working
c) To reduce the office overhead by having team members work from home
d) To save time or money or both

Telecommuting
Remotely located team members are more and more often a reality of workplace teams both globally and locally as telecommuting becomes a common answer to budgetary problems in a challenging economy and work/life balance issues that have long been a concern of Human Resource managers (Derven, 2007, Madsen, 2006). Remote employees generally report a high degree of satisfaction with telecommuting, including greater work/life flexibility. In addition, they report being able to more quickly master new
technologies used in daily work (Golden, 2006). In reaction to the vast returns a company and an employee can see, telecommuter work grew over 20% between 2005 and 2006. At least a quarter of the world’s workforce (878 Million workers) is estimated to consist of mobile employees (Cisco, 2007). Responding to this rapid growth, companies are assessing whether telecommuting is a good idea for a wide variety of employees.

Although CMC provides myriad benefits to organisations in terms of cost, diversity, recruitment, and access to expertise, it also has a number of disadvantages- both logistical and deep-rooted.

**Disadvantages of Virtual Communication**

**Technical problems common**

CMC poses countless technical and logistical problems, which often are very time-consuming, such as scheduling, coping with time delays and encountering software problems (Bergiel et al., 2008, Bower et al., 2001, Powell et al., 2004).

**Difficult to Schedule**

Specifically, synchronous CMC can be difficult to schedule due to time zone barriers (Bergiel et al., 2008).

**Training and Comfort with Technology**

Training and technological expertise issues also arise in a virtual environment, (Bergiel et al., 2008, Bower et al., 2001, Powell et al., 2004) as team members frequently lack the training necessary to function effectively and navigate the technology in a virtual environment (Bergiel et al., 2008). This results in what is referred to as a generational gap between those comfortable with technology (the under 30’s) and those less comfortable (Bergiel et al., 2008).

CMC also generates many interpersonal challenges. The absence of non-verbal cues and tacit knowledge transfer makes communication difficult (Bower et al., 2001; Lantz, 2001; Hill, 2000; Powell et al., 2004). These deficiencies eliminate social presence and hinder relationship formation, cohesion and trust, all of which are imperative to a virtual team’s success (Cascio, 2000, Powell et al., 2004).

**Lack of Social Presence**

The lack of social presence creates an environment in which members easily misinterpret facts or make incorrect assumptions. Sometimes people need to see or feel or even smell to understand a certain situation. Virtual team members often incorrectly assume others’ intentions when they do not respond to emails or misinterpret the meaning and emotion of written language (Bergiel et al., 2008, Dewar, 2006).

**Higher Levels of Interpersonal Conflict**

Furthermore, these interpersonal struggles can induce conflict, which is harder to discover and manage in a virtual team, and negatively impacts productivity (Bergiel et al., 2008, Hertel et al., 2005, Rosen et al., 2007). Specifically, Stark and Bierly (2009) found a positive correlation between highly virtual groups and interpersonal conflict.

**Negative Cultural Issues**

Powell et al. (2004) found that culturally diverse virtual teams experienced coordination and communication issues. However, as technologies offer greater information richness, these differences may begin to reappear.

Technology not only increases the option for how information is communicated, but it also increases the scope of miscommunication (Mouriño-Ruiz, 2009, p.271). They cannot provide the same richness as face-to-face interaction. Because of delays in transmission and the lack of social and nonverbal cues, communication technologies can interfere with open communication, knowledge sharing, and the ability of teams to identify and resolve misunderstandings (Gibson and Cohen, 2003). In general, Baltes et al. (2002) argue that CMC groups are rarely more effective, take less time and are less satisfied than face-to-face groups.
Both the advantages and disadvantages of Computer-Mediated Communication are presented in Table 6.

Table 6 Advantages and Disadvantages of Virtual Communication

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creates Greater Equality</td>
<td>Technical problems common</td>
</tr>
<tr>
<td>More Opportunity for Physically Disadvantaged</td>
<td>Difficult to Schedule</td>
</tr>
<tr>
<td>Reduces Costs</td>
<td>Training and Comfort with Technology</td>
</tr>
<tr>
<td>Allows Communication Across Time Zones and Locations</td>
<td>Lack of Social Presence</td>
</tr>
<tr>
<td>Enables Access to Experts</td>
<td>Higher Levels of Interpersonal Conflict</td>
</tr>
<tr>
<td>Has Positive Impact on Recruitment</td>
<td>Negative Cultural Issues</td>
</tr>
</tbody>
</table>

4.4. Conclusion

Both virtual and natural communication have advantages and disadvantages. This means that the one is more appropriate to be used in a certain situation then the other. Therefor the following research question will be answered according to the previous statements and discussions.

Answering research question 1

*When is virtual communication appropriate to be used instead of natural communication and when not?*

Natural communication is more appropriate when it is really important to understand the meaning of some communication. While communicating naturally, team members can more easily learn about one another’s background, skills, experiences, and areas of expertise in order to gain trust amongst the team members. There seems to be no alternative when it comes to transfer of tacit knowledge, or knowledge that is not written or definable, but gained through experience. Virtual Communication is more appropriate when natural communication is not of great importance or in some cases not even possible. CMC can be used as an alternative to face-to-face communication allowing top talent from across borders and time zones to still form a team.

Teleworking can be put to use to eliminate time-consuming commutes to central offices and to offer employees more flexibility to co-ordinate their work and family responsibilities. Workplace flexibility is increasingly seen as a crucial aspect of job satisfaction for many employees. Even physically disadvantaged employees have greater access to the virtual environment than the physical workspace. CMC allows a much broader scope of talent that can be accessed creating teams that are more diverse in makeup and fostering greater creativity and innovation.

There is no ideal communication medium and its choice depends on team’s task and the stage of team’s life cycle. Rich media should be used in early stages to develop interpersonal and task related working patterns of members (O’Neill et al., 2008). Technology provides linkages for sharing ideas, information, coordination and building bonds of trust over virtual teams (Lipnack and Stamps, 1999).

Figure 3 provides a summary considerations for choosing the communication medium to best fit the task at hand as described by Wainfan and Davis (2004). The blocks on the left side of

Figure 3 represent time-sequenced tasks performed by typical groups. The degree of shading represents the spectrum from tasks that may be adversely affected by virtual collaboration (darkest) to those that may
benefit from virtual collaboration (lightest). For instance, forming a new team is best done FTF, where leaders can communicate goals and objectives and can get a sense of the group’s understanding and commitment. In addition, early FTF communications help team members get to know their colleagues through informal meetings.

CMC can be a good alternative for Natural communication, but there are challenges that virtual team members face to be successful.
5. Challenges of Virtual Teams
5.1. Introduction

Once it is known when virtual communication is more appropriate, we must know the challenges virtual teams need to deal with and how to successfully perform virtual communication and collaboration. This brings us to the second question:

Research question 2
What are the challenges of virtual teams?

5.2. Unique Characteristics & Challenges of Virtual Teams

Geographic dispersion and lack of face-to-face communication create new challenges for members of virtual teams. Research shows that geographic dispersion among people generates negative outcomes, such as a decline in communication, mutual knowledge problems and work coordination difficulties (Weisband, 2007).

Decline in communication

Declines in opportunities for communication are even more problematic when such communication lacks face-to-face contact and nonverbal cues. As suggested by Earley and Gibson (2002), people rely primarily on nonverbal signals to help them navigate social interactions. These nonverbal cues affect both the way in which people work and the quality of their work in a team.

Opportunities for ambiguity

The absence of nonverbal cues in turn increases opportunities for ambiguity. This ambiguity implies greater uncertainty, especially when processing information and making sense of various tasks and members’ perspectives. Thus, virtual teams need to overcome powerful barriers to effectiveness.

Dynamics of Global Virtual Teams

Global virtual teams (GVTs) span time zones, geographical boundaries, and are frequently composed of diverse members representing different disciplines, functions, professions, business units, organisations, countries, and cultures.

Local priorities rather than team objectives

In general, the greater the number of differences among members, the greater are team barriers to effectiveness (Gibson and Cohen, 2003). This is especially true when virtual team members are composed of members from different countries and cultures who face pressure to pursue local priorities, rather than team objectives. Indeed, casual, face-to-face contact with local colleagues of similar backgrounds and cultures, cultural differences among members, and time zone differences that reduce opportunities for communication are all forces that inhibit global mind-set among members which in turn reduces overall team effectiveness (Kerber and Buono, 2004).

“Information Overload”

Moreover, a lack of proper databases and people trained to manoeuvre knowledge can result in “information overload” (Rosen et al., 2007).

Work coordination difficulties

Additionally, CMC poses coordination challenges. It can be difficult to establish a vision and mission in a virtual team due to the flexibility of time, space and the lack of visual cues (Dewar, 2006).

Mutual knowledge problems

Due to cultural and language differences, knowledge sharing can also be difficult in a virtual team (Bergiel et al., 2008, Powell et al., 2004).

Message of unimportance

When coordinating with external or intra-organisational constituencies, the speed and ease of virtual communication can send a message of unimportance to the recipient (Storper and Venables, 2004). When communicating virtually, recipients may
deduce that they are not significant enough to warrant the expense of face-to-face time.

The challenges virtual teams meet are summed in Table 7.

Table 7 Challenges of Virtual Communication

<table>
<thead>
<tr>
<th>Challenges</th>
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<tbody>
<tr>
<td>Decline in communication</td>
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<tr>
<td>Opportunities for ambiguity</td>
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<tr>
<td>Local priorities rather than team objectives</td>
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<tr>
<td>“Information Overload”</td>
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<tr>
<td>Work coordination difficulties</td>
</tr>
<tr>
<td>Mutual knowledge problems</td>
</tr>
<tr>
<td>Message of unimportance</td>
</tr>
</tbody>
</table>

5.3. Culture

Technology has globalised the communication process by making interacting with others more accessible. Understanding communication norms of other cultures will help you effectively communicate with people from other countries. Culture is a complex, multidimensional construct that can be studied on several levels: international, national, regional, business, and organisational. Each individual is influenced by a wide range of cultural factors: ethnic, organisational, and national. Commonly used definitions of cultural diversity include racial, sexual, organisational, professional, and national heterogeneity. Cultural diversity is here defined as heterogeneity of national cultures of team members; an individual’s national culture is considered to be that of his or her country of residence.

All teams experience challenges in culture, logistics, communication, and so on, but with virtual teams, those challenges are exacerbated by not being in the same room or locale (Brown et al., 2010).

Culture is one of a virtual team’s most significant boundaries. For humans culture is a set of learned values, attitudes and meanings that are shared by the members of a group. Culture is one of the primary ways in which one group differentiates itself from another. It can however affect people assumptions, behaviours, and expectations about leadership practices, work habits and team norms. Members of virtual teams are drawn from various organisations, including customers, suppliers, associations, communities and other stakeholders groups. Each member brings his or her organisation’s culture to the team (Duarte and Snyder, 2006).

People from different countries and cultures will have their own view of the world and ways of doing things. (As an example, try asking each person to define ‘team’ and see what you get.) When setting up your virtual team, it is easy to overlook this and assume that we are all the same. In so doing, you may unknowingly cause great offence to others (Fleming, 2006). Awareness of different cultures is of great importance while trust is a play an important role as well.

5.4. Trust

Establishing trust is a crucial component of a cohesive virtual team. Trust is often difficult to achieve because many teams are assembled for a short period of time to complete specific tasks (Powell et al., 2004). Creating trust within a team is frequently done through face-to-face interactions among team members that take place early in the team’s life span. These encounters have been found to be effective in allowing team members to socialise, build rapport with other individuals, and increase understanding of the team’s purpose (Handy et al., 1999).
In-person interactions are also important because they can contribute or accelerate the creation of “swift trust.” Many virtual teams experience this as a result of the perceived integrity of other individuals, reliable and continuous communication, and effective leadership early in the project lifecycle (Powell et al., 2004). If established, swift trust can significantly benefit the group so that virtual meetings have more robust participation of team members and subsequent virtual meetings are more task related and less social.

The level of trust between individuals in virtual teams can often be identified and enabled by the frequency and the length of emails sent between members (Jarvenpaa and Leidner, 1998). Virtual team members that communicate task related information most frequently and in shorter, more digestible emails have been shown to have stronger working relationships and experience higher levels of trust than employees that communicate less frequently and with more text. Virtual teams that experience high levels of trust between team members often have improved team member awareness and experience improved projects (Hart and McLeod, 2003).

Unfortunately the virtual employment relationship produces less inherent trust than exists between a traditional manager and employee (Merriman et al., 2007). Remote employees are most productive when allowed to self-manage. Trust goes hand-in-hand with greater decision-making responsibilities and greater autonomy can help foster creativity in remote employees (Derven, 2007). Though, leaders sometimes find this the most difficult part of remote management. Managers are challenged to find a balance between people and the task at hand - between the two extremes of micro managing and allowing too much distance (Derven, 2007).

It can be difficult to maintain a strong trust between company and telecommuter without frequent access to reliable communication. Companies must provide adequate connections to the “office” for remote employees to be a productive member of the virtual team. Access to audio conference features, e-mail, and telephone are crucial, and communication over these tools must always be as seamless as possible. Virtual communication is impersonal by nature and can be easily misinterpreted, and there is large room for error in the interpretation of e-mail. The phone remains the most frequently used and effective communication tool for remote employees.

Social Media

Communication that is mediated by various technologies (from ordinary mail to today's ICT) provides important evidence for the study of social networks. Given that networks generate the possibility of interpersonal communication, data on technology use can provide important information on sociability. However, it is also true that personal networks not only shape, but also are shaped by technological means for communication, since these entail the re-constituting of social ties and the re-drawing of social boundaries (Licoppe and Smoreda, 2005).

Communication within the company as a whole, beyond just one’s manager, is very important for keeping remote employees engaged. In a survey of bloggers, Nardi et al. (2004) describe different motivations for “why we blog”. Their findings indicate that blogs are used as a tool to share daily experiences, opinions and commentary. Social networking has become a popular way for employees to feel more engaged with local employees. Internal social networks are used for building a sense of personal community between remote employees but can also offer a convenient tool in the way of professional knowledge information sharing. LinkedIn, Facebook, and even MySpace groups on the internet have also become popular ways for employees to connect with one another.

While virtual teams have many advantages, they frequently struggle to establish a strong sense of trust between individuals, frequent team member inter-
communication, and effective leadership; all of which are necessary for team success.

5.5. Conclusion

Answering research question 2

**What are the challenges of virtual teams?**

The right side of Figure 4 lists challenges that participants may face as a function of the task and the communication mode chosen. Similarly, facilitators should be aware of mediated groups’ tendency to uncharitably attribute motivations of others, both in-group members and especially those in out-groups.

Geographic dispersion among people generates negative outcomes, such as a decline in communication, mutual knowledge problems, and work coordination difficulties. The absence of nonverbal cues can be confusing when processing information and making sense of various tasks and members’ perspectives. A greater difference among members hinders team effectiveness. Casual, face-to-face contact with local colleagues of similar backgrounds and cultures, cultural differences among members, and time zone differences that reduce opportunities for communication are all forces that inhibit a global mind-set among members which in turn reduces overall team effectiveness. Moreover, a lack of proper knowledge sharing can result in “information overload”. Additionally, CMC poses coordination challenges and knowledge sharing can also be difficult in a virtual team. When coordinating with external or intra-organisational constituencies, the speed and ease of virtual communication can arouse the feeling that it is unimportant.

All teams experience challenges in culture, logistics, communication, and so on, but with virtual teams, those challenges are exacerbated by not being in the same room or locale. It can however affect people assumptions, behaviours, and expectations about leadership practices, work habits and team norms. In Figure 4 the problems at each selection of communication medium are stated.

When setting up a virtual team, it is easy to overlook this and assume that we are all the same. In so doing, you may unknowingly cause great offence to others.
Figure 4 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004))
6. Success factors for virtual teams
6.1. Introduction
Once it is known when virtual communication is appropriate and which challenges virtual teams need to deal with, it is important to understand the success factors of virtual teams. This brings us to the third and last question.

Research question 3
What are the success factors for virtual teams?

For virtual teams to operate successfully, the challenges, as described in paragraph 5, need to be overcome.

6.1. Global Virtual Team Effectiveness
While numerous challenges and forces act against virtual team effectiveness, virtual teams can amplify the benefits of teamwork; the higher the degree of virtuality and differences, the higher the potential benefit (Gibson and Cohen, 2003). Furthermore, when virtual teams are composed of members from different perspectives and knowledge bases (as in global virtual teams), the mind-set of team members are tempted to change which makes innovation is more likely to occur.

Enabling Conditions
To maximise virtual team effectiveness, two important enabling conditions must be established (Gibson and Cohen, 2003). First, members need to develop a shared understanding about their goals, processes to achieve them, tasks, and knowledge about each team member's knowledge, skills, and abilities. In global virtual teams, team members will have different “thought worlds” regarding ways of perceiving their tasks, key issues, and making sense of their situation; shared understanding helps virtual team members bridge these differences. Equally important is the establishment of mutual trust, defined as a shared psychological state characterised by Gibson and Cohen (2003) as “an acceptance of vulnerability based on expectations of intentions or behaviours of others within the team”. Mutual trust is important to create a safe and open environment for members to give ideas and take risks. However, this trust is particularly difficult to establish in global virtual teams. The challenge relates back to the unique characteristics of virtual teams; electronically-mediated communication lacks the nonverbal cues that are essential for building trust. Therefore, managers of global virtual teams must have an understanding of cultural differences and the ways in which he/she can adapt leadership style and communication skills to establish the conditions necessary for virtual team effectiveness. Consistent with the personal characteristics underlying a global mind-set, managers must be sensitive to cultural differences, value diversity of opinion and thought processes, and be willing and able to adapt their leadership style according to team dynamics and situations.

6.2. Conclusion
Answering research question 3
What are the success factors for virtual teams?

Powell et al. (2004) have developed a scheme based on the theory of Lipnack and Stamps (1997) about virtual team system of principles indicating the key importance of people, purpose and links (see Figure 5). In this scheme the processes have been split into socio-economic (relationship building, cohesion and trust) and task processes (communication, coordination, and task technology-structure fit), as shown in Figure 6.

The theory provided by Powell et al. (2004) suggests that when job satisfaction and performance is poor, there is a need to look into the inputs, such as technical expertise. It may be possible that the technical expertise of the virtual team members is inadequate and thereby ultimately influencing the overall performance. For achieving the outputs (satisfaction, performance), it is important that all inputs and processes should be compatible, effective and adequate. Also in Figure 7 some solutions are stated per problem for a
communication medium to perform successfully.

Figure 5 Virtual Team System of Principles (source: (Lipnack and Stamps, 1997))

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Processes</th>
<th>Produced outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>Independent members</td>
<td>Shared leadership</td>
</tr>
<tr>
<td>Purpose</td>
<td>Cooperative goals</td>
<td>Interdependent tasks</td>
</tr>
<tr>
<td>Links</td>
<td>Multiple media</td>
<td>Boundary-crossing interactions</td>
</tr>
</tbody>
</table>

Figure 5 Focus of early virtual team research (source: (Powell et al., 2004))

Figure 7 Strategy for Selecting the Best Medium for Virtual Collaboration (source: Wainfan and Davis (2004))
7. Virtual communication versus physical real estate
7.1. Introduction

Because this study is done within the Masters of Real Estate & Housing, the real estate part of this study is slightly discussed in this chapter. Further elaboration about the implications of virtual communication and other ICT trend on Real Estate can be found in my graduation thesis.

Virtual communication allows virtual teams to be geographically, organisationally and/or time dispersed while they are brought together by information technologies to accomplish one or more organisational tasks. The degree of geographic dispersion within a virtual team can vary widely from having one member located in a different location than the rest of the team to having each member located in a different country.

7.2. Office places

Vos et al. (1999) describe two offices, namely the central office and the teleworking office. At a conceptual level three major trends can be distinguished: a change of place, space and use (see Figure 8):

a. Change of place: teleworking

This means that employees work at a distance from the central office, for example, in a satellite office or a business centre, at a clients' office, at home or in a place that is not primarily intended for work ('instant office').

b. Change of space: new office-layouts

This means that the layout of the office is changed to adapt to new activities. For instance a change from a traditional cellular office to an open plan office or to what-is-called a combi-office or cocon office – a concept that combines open spaces for communication with cellular spaces for concentration.

c. Change of use: flexible workspace

One component of flexible use of space is 'place rotation'. The employees move from place to place, depending of the activities of that moment. This requires a variety of workspaces, e.g. quiet cells or 'cockpits' for concentration work, group offices or open space for team work and interaction, touch down workplaces for short term activities, coffee corners for informal meetings and so on. A related concept is desk sharing. Instead of having one's own workspace people share one with colleagues or choose the place which is free at that moment.

These three trends cannot be seen in isolation because they are strongly interconnected. Teleworking, for example, results in lower occupation densities at the central office building. For this reason teleworking is often combined with desk-sharing and non-territorial offices. Other crucial changes that come along with office innovation are changes in supportive facilities, particularly office furniture, ICT and filing systems.

Vos et al (1999) elaborate on the different office typologies and the aspects of office place, space and use (see Figure 8). Besides the historical characterisation, the different types of firms are also distinguished by the location at which is worked at. The word 'place' is referred to the physical distribution of workplaces. There are two types of places that can be distinguished: the central office and the teleworking office.

The central office

The central office corresponds to the traditional notion of an office. In this view, the office is seen as an accommodation of workplaces for the employees of the same department or department within the organisation. A feature of the central office is the direct (face to face) contact between employees. In addition, the central office can be used as a medium to the identity (image) of the organisation by its appearance. Employees who are not bound to the central office make use of the telework office. Tele means distance.

The telework office

A teleworking office is thus an office which is remotely located from the central office. To keep in contact with colleagues 'teleworkers' rely on the information technology like the mobile phone, laptop, etc.}
The first, second and third place

In my graduation thesis I redefined the types of offices into the first, second and third place where office workers can perform their activities (see Figure 9). First place offices are similar to the central offices as described by Vos et al. (1999). The telework office, as described by Vos et al. (1999), are divided into the second and third place. The second place is referred to a home office while the third place is referred to all other types of places (e.g. business centres, railway stations, outdoors etc.).

Once virtual communication no longer makes it necessary to be physically present at the central office, workers are able to work from second and third places forming virtual teams. Working from the second or third places brings a wide range of benefits, including improved work-life balance, reduced stress and improved productivity for the employee, as well as cost-effectiveness, scalability and reduced property commitment for businesses.

However, the willingness of workers to work at second and third places depends on several factors like the quality of the work environment, ICT facilities, financial, organisational and social aspects, which are discussed in my graduation thesis.

7.3. Conclusion

It can be concluded that less frequent physical presence of workers is required allows larger distances between the central office and the second and third places. Increasing geographical dispersion of workers will challenge organisations to manage their employees and the environment they work in concerning locations, buildings and facilities on a larger scale.
Figure 9 Workplace locations
8. Conclusion
8.1. Background: from natural to virtual communication

In recent years, activities in all types of organisations have become increasingly more global, competition from both foreign and domestic sources has grown dramatically, and there has been a continued shift from production to service/knowledge-based work environments (Townsend et al., 1998). People working in virtual teams use technology to communicate with each other rather than working face-to-face or traveling to meetings. Virtual communication technology refers to any means of interacting with others in virtual reality via synchronous (simultaneous) and asynchronous (delayed interaction) methods such as computer mediated communication (CMC).

Work together apart: Virtual teams

Virtual teams are described differently by different authors. The definition of a virtual team may be taken as: small temporary groups of geographically, organisationally and/or time dispersed knowledge workers who coordinate their work predominantly with electronic information and communication technologies in order to accomplish one or more organisation tasks. Global virtual team consist of members who work and live in different countries and are culturally diverse. Altogether, there are four categories of teams:

1. Teleworkers: A single manager of a team at one location
2. Remote team: A single manager of a team distributed across multiple locations
3. Matrixed teleworkers: Multiple manager of a team at one location
4. Matrixed remote teams: Multiple managers across multiple locations

Many observers argue that there is no replacement for face-to-face contact, regardless of how far technology has evolved (Duke, 2001). This means that in different situations one is more appropriate than the other.

8.2. Answering the research questions

The findings of this literature study, as described in chapter 4, 5 and 6, are used to answer the main research question. First the answers of research question 1, 2 and 3 will be stated.

Answering research question 1

When is virtual communication appropriate to be used instead of natural communication and when not?

Natural communication is more appropriate when it is really important to understand the meaning of some communication, when team members need to learn about one another’s background, skills, experiences, and areas of expertise in order to gain trust amongst the team members. There seems to be no alternative when it comes to transfer of tacit knowledge, or knowledge that is not written or definable, but gained through experience.

Virtual Communication is more appropriate when natural communication is not of great importance or in some cases not even possible. CMC can be used as an alternative to face-to-face communication allowing top talent from across borders and time zones to still form a team.

Teleworking can be put to use to eliminate time-consuming commutes to central offices and to offer employees more flexibility to co-ordinate their work and family responsibilities. Workplace flexibility is increasingly seen as a crucial aspect of job satisfaction for many employees. Even physically disadvantaged employees have greater access to the virtual environment than the physical workspace. CMC allows a much broader scope of talent that can be accessed creating teams that are more diverse in makeup and fostering greater creativity and innovation.

CMC can be a good alternative for Natural communication, but there are challenges that virtual team members face to be successful.
Answering research question 2

What are the challenges of virtual teams?

The right side of Figure 11 lists challenges that participants may face as a function of the task and the communication mode chosen. Similarly, facilitators should be aware of mediated groups’ tendency to uncharitably attribute motivations of others, both in-group members and especially those in out-groups.

Geographic dispersion among people generates negative outcomes, such as a decline in communication, mutual knowledge problems, and work coordination difficulties. The absence of nonverbal cues can be confusing when processing information and making sense of various tasks and members’ perspectives. A greater difference among members increases team barriers to effectiveness. Casual, face-to-face contact with local colleagues of similar backgrounds and cultures, cultural differences among members, and time zone differences that reduce opportunities for communication are all forces that inhibit global mind-set among members which in turn reduces overall team effectiveness. Moreover, a lack of proper knowledge sharing can result in “information overload”. Additionally, CMC poses coordination challenges and knowledge sharing can also be difficult in a virtual team. When coordinating with external or intra-organisational constituencies, the speed and ease of virtual communication can send a message of unimportance to the recipient.

All teams experience challenges in culture, logistics, communication, and so on, but with virtual teams, those challenges are exacerbated by not being in the same room or locale. It can however affect people assumptions, behaviours, and expectations about leadership practices, work habits and team norms.

When setting up your virtual team, it is easy to overlook this and assume that we are all the same. In so doing, you may unknowingly cause great offence to others.

Answering research question 3

What are the success factors for virtual teams?

To maximise virtual team effectiveness, two important enabling conditions must be established (Gibson and Cohen, 2003). First, members need to develop a shared understanding about their goals, processes to achieve them, tasks, and knowledge about each team member’s knowledge, skills, and abilities. In global virtual teams, team members will have different “thought worlds” regarding ways of perceiving their tasks, key issues, and making sense of their situation; shared understanding helps virtual team members bridge these differences. Equally important is the establishment of mutual trust. Mutual trust is important to create a safe and open environment for members to give ideas and take risks. Managers of global virtual teams must have an understanding of cultural differences and the ways in which he/she can adapt leadership style and communication skills to establish the conditions necessary for virtual team effectiveness. Consistent with the personal characteristics underlying a global mind-set, managers must be sensitive to cultural differences, value diversity of opinion and thought processes, and be willing and able to adapt their leadership style according to team dynamics and situations.

It is important to take into account the value of on-going investment in language and intercultural communication training. Especially for new members of project teams working on different continents, to help reduce potential distrust, and allow teams to get more quickly and work together efficiently.

Virtual team output can be optimised by improving inputs as shown in Figure 10. Figure 11 provides a summary considerations for choosing the communication medium to best fit the task at hand as described by Wainfan and Davis (2004). In addition, early FTF communications help team members get to know their colleagues through informal meetings.
8.3. Answering the main research question

To what extent can virtual communication replace natural inter-team member communication?

If we look at when natural inter-team member communication really is required, according to the literature findings it can be concluded that natural communication cannot be replaced in the following situations:

- when it is necessary to transfer of tacit knowledge, or knowledge that is not written or definable, but gained through experience.
- when building up trust
- when it is really important to understand the meaning of some communication.

Sometimes physical meetings are almost impossible due to the costs and/or organisational factors like scheduling all participants together at the same place and at the same time. In these cases, communication technology should be tending to Face-to-Face Communication as much as possible to communicate as much relevant information as possible to obtain clear understandings and prevent misunderstandings. However, many observers argue that there is no replacement for face-to-face contact, regardless of how far technology has evolved (Duke, 2001). Only time will tell how close technology can bring virtual communication to natural communication.

According to Gibson (2003), virtual communication cannot provide the same richness as face-to-face interaction. Because of delays in transmission and the lack of social and nonverbal cues, communication technologies can interfere with open communication, knowledge sharing, and the ability of teams to identify and resolve misunderstandings. Regardless of this statement, virtual communication still needs to mimic the crucial elements of face-to-face communication as much as possible to prevent misunderstandings.

At the beginning of this research the following hypothesis was stated:

If virtual communication is successfully implemented amongst virtual teams, then it is not necessary for team members to physically meet at all.

It was expected that virtual communication can replace natural inter-team member communication when team members can easily operate the needed ICT and anticipate on possible miss-communication and take differences in culture and time-zones into consideration. According to Bergiel et al (2008) team members frequently lack the training necessary to function effectively and navigate the technology in a virtual environment. This results in what is referred to as a generational gap between those comfortable with technology (the under 30’s) and those less comfortable. The ease of ICT operation by team members, anticipate on possible miss-communication and differences in culture can be steered on by giving inputs as illustrated in Figure 11.

While communicating naturally, team members can more easily learn about one another’s background, skills, experiences, and areas of expertise in order to gain trust amongst the team members. There seems to be no alternative when it comes to transfer of tacit knowledge, or knowledge that is not written or definable, but gained through experience. For building up trust, social media can play a significant role for team members to get to know each other, bond and trust each other.

It seemed that team members prefer natural communication over virtual communication, but use virtual communication as an alternative. With the use of virtual communication, workplace flexibility is increasingly seen as a crucial aspect of job satisfaction for many employees (Bergiel et al., 2008). With CMC, organisations can recruit talented individuals who may not be willing to relocate for a job but are willing to work virtually (Bergiel et al., 2008, Cascio, 2000).
Virtual communication equals opportunities in the workplace. Moreover, as performance in a virtual team is evaluated solely on productivity (given that physical appearance remains anonymous), age and race discrimination are greatly reduced in a virtual setting (Bergiel et al., 2008). The work arrangement of virtual teams has been found to be advantageous for many firms because it reduces the costs and time associated with employee travel. It also permits organisations to attract and retain top talent because workplace flexibility is increasingly seen as a crucial aspect of job satisfaction for many employees (Bergiel et al., 2008). Although face-to-face meetings have been the traditional way to conduct business for time immemorial, the rise of the manager and the large corporation means that the old 'spit in the handshake' is no longer the preferred method of cutting a deal in the realm of global transactions.

The success factors of virtual teams are made clear, which provide guidelines to successfully implement virtual communication amongst team members. Once these teams operate successfully physical meetings will always be desired when it is really important to understand the meaning of some communication, in order to build up trust and if there are other solutions used for these situations, team members will always have to meet physically to transfer tacit knowledge, or knowledge that is not written or definable, but gained through experience.

This does not mean that virtual communication amongst team members will remain the same. When workers are increasingly willing to work virtually, physical presence amongst team members will occur less frequently. This allows larger distances between the central office and the second and third places. Increasing geographical dispersion of workers will challenge organisations to manage their employees and the environment they work in concerning locations, buildings and facilities on a larger scale.

9. Reflection

The willingness of working virtually instead of naturally is not addressed as much in this research, but is elaborately set out in my graduation thesis. Despite the willingness, virtual communication can replace natural inter-team member communication for the most part except when transfer of tacit knowledge must take place, when it is really important to understand the meaning of some communication.

The debate over whether virtual communication is a viable alternative to face-to-face communication is an on-going discussion. According to the literature, if used effectively and appropriately, virtual communication shows a promising strategy for organisations to pursue. When utilising virtual communication, attention must be paid especially to the mechanisms and members involved, to ensure maximum benefit to the organisation. Regardless of the debate, organisations must recognise that virtual communication is sustainable, and with the right tools, technology, people and processes, organisations can utilise virtual technologies to achieve high quality and satisfying results.
Literature


S. Beyerlein (Eds.), The handbook of high-performance virtual teams: A toolkit for collaborating across boundaries. San Francisco: John Wiley & Sons, Inc.


Appendix: logbook

The time spent for this explorative literature study is supposed to be equivalent to 6 ECTS, being 168 hours. My motivation for this literature study has been to understand the literature needed for the further course of my graduation thesis. The time spent on this study exceeds the time which is reserved for it. There is a lot of literature on virtual teams and management of teams. However, these literature where for the most part scanned quickly and only focused on the parts that define or explain virtual communication and parts that are related to the research questions. This resulted in findings conducted from small parts in many literatures.

Data acquisition

The time spent finding relevant articles, using the key words described in the end of the first chapter, and reading the articles’ abstracts and/or conclusions to determine its usefulness is about 26 hours. A number of articles have been selected while they are not included in this study, but instead they are used for my graduation thesis.

Documentation

Writing the report took about 68 hours mainly spread over a period of three months (January-February 2013).
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