UNIVERSITY OF OREGON
APPLIED INFORMATION MANAGEMENT

Presented to the Interdisciplinary Studies Program:
Applied Information Management and the Graduate School of the University of Oregon
in partial fulfillment of the requirement for the degree of Master of Science

Unique Characteristics and Related Project Management Challenges of Global Virtual Teams

CAPSTONE REPORT

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June 2006

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Abstract

for

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As companies continue to expand globally, virtual teams utilizing information and communication technology are formed to accomplish company goals. Success in these teams requires increased knowledge of the unique characteristics and related management challenges. Selected literature published since 1996 is examined, to produce a reference guide for project managers. Six global virtual team characteristics are identified: geographic dispersal; structural flexibility; technology-based communications; cultural diversity; high task interdependence; and lack of shared work experience.

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Chapter One - Purpose of Study

Brief Purpose

Today, the structure of a project team can incorporate a number of unique characteristics that were not part of project teams in the past (Gray & Larson, 2006). These can include the following characteristics: (1) global team membership, (2) virtual team interaction, (3) ability to respond with flexibility, and (4) acceptance of high levels of uncertainty (Gray & Larson, 2006). In 2001, Grant, Graham & Heberling noted that "project team structures have evolved to reflect the changes in the structure of the organizations" (p. 1). This new project team structure, called global virtual teams, "offers many benefits over collocated teams" (Loughran, 2000, p.1). Zakaria, Amelinckx and Wilemon (2004) go on to state that the, "global virtual team diversity offers potential richness", but that it also, "presents major challenges" (p17). These same authors also suggest that, "global virtual teams face more challenges" (Zakaria, Amelinckx and Wilemon, 2004, p.17) than localized teams. "Virtual team research and case studies indicate that it is more difficult for virtual teams to achieve success than teams that meet face-to-face" (Loughran, 2000, p.3). Because of the high chance for failure new, or updated processes and techniques, will have to be utilized in order to, "overcome known obstacles" (Loughran, 2000, p.2). The assumption underlying this study is that because global virtual project teams are becoming more prevalent, examination of the unique nature of such teams is necessary.

The purpose of this paper is to describe the unique characteristics and related project management challenges of global virtual teams, as they function in companies with worldwide interests in technology-based environments. The goal is to provide the project management field, including project managers, team leaders, stakeholders, executive management and project team members with a list of key characteristics of the global virtual team structure, as well as a discussion of related project management challenges. The intent is to document information that may lead to a better understanding of how to adapt to this new project team structure. As one example, Hayes (2005) believes that as employees become more distanced from the center of the organization, project management activities require more, "creative problem-solving on a daily basis (Hayes, 2005). Hayes (2005) states that these problem-solving issues must be corrected so project team members can communicate more effectively and thus, "lead to more creative problem-solving and task completion, and greater adaptability" (p.1).

This qualitative study is designed as a literature review (Leedy & Ormrod, 2001) in order to collect and analyze selected references that detail the unique characteristics, and related project management challenges, of global virtual teams. The literature is collected from written articles, journals, publications and case examples published between 1996 and 2006 that pertain specifically to the nature of global virtual project teams.

The literature is analyzed using conceptual analysis (Colorado State University Writing Lab, 2006) for the purposes of: (1) identifying the unique characteristics; and (2) related project management challenges within global virtual teams.

The results of the conceptual analysis are presented in a series of tables (see Figures 4 - 10). Figure 4 presents the identified unique characteristics of global virtual teams, supported by documentation from the literature. Figures 5 - 10 present a description of related project management challenges associated with project teams operating in a global virtual environment.

The identified unique characteristics and project management challenges are combined in the form of a separate table (see Appendix A) that aligns the characteristics and the project management challenges that arise in relation to these unique characteristics. Appendix A is designed to be used by project management professionals as a quick reference guide when working in global virtual team environments.

Full Purpose

Project teams have had to change and adapt the way they function, as the organizations that utilize them have shifted in the way they operate (Grant, Graham & Herberling, 2001). With the increase in acceptance of inter-organizational alliances, flatter organizational structures and an increased shift from production to service-related businesses, project teams have had to move to an increasingly virtual environment (Leidner, Kayworth & Mora-Tavarez, 1999a). *Virtual*, by definition, means that project teams now rely mainly on electronic communication as their main form of contact instead of traditional face-to-face interaction (Zakaria, Amelinckx & Wilemon, 2004). A *global virtual team* can be defined as a group of people who work interdependently with a shared purpose across space, time and organizational boundaries using technology (Lipnack & Stamps 2000). Based on these definitions the global virtual team now has, "unique characteristics that make it possible to differentiate them both from traditional teams and from one another" (Bell and Kozlowski, 2002, p.12).

Lipnack & Stamps (2000) state that as society moves further into the information age, we are seeing that "new technologies enable greater engagement among team members, as well as between team members and their clients and business partners" (Hayes, 2003, p. 1). These technologies, or communication tools, typically "provide a supporting pillar to the successful completion of the project" (Ellis, 1996, p. 2). Technology that is used by virtual teams include such things as video conferencing, email, voicemail and white board technologies (Ramachandran, 2004), all with the purpose of placing more emphasis on real-time communication (Ellis, 1996). It should

also be noted that "the implementation of such technologies (groupware) is more difficult and yields more unintended consequences than is typically acknowledged" (Ellis, 1996, p. 2). Technology may be the driver for this new shift in organizational culture, but "successful collaborative work requires 90 percent people and 10 percent technology" (Lipnack & Stamps, 2000, p. 28). Lipnack & Stamps (2000) go on to state that it is "people who bring about the change in the way that they work" (p. 50), and not necessarily the technology.

This qualitative study is designed as a literature review (Leedy & Ormrod, 2001) selecting and analyzing references that detail the unique characteristics of global virtual teams. The aim is to provide a focus on the relationship between the unique characteristics of a global virtual team and the associated project management challenges. As stated by writers at the University of Toronto (2005), the purpose of a literature review is to "convey to your reader what knowledge and ideas have been established on a topic and what their strengths and weaknesses are" (p. 1). Leedy & Ormrod (2001) suggest that by knowing as much about the proposed topic as possible, the more "effectively you can tackle your own research problem" (p. 70).

Literature collection is performed in two steps, as described in the University of Toronto material (2005). The first step, information seeking, entails searching out written articles, journals, publications and case examples published between 1996 and 2006 that pertain to the nature and work of global virtual project teams. This time frame is important because the start date reflects the era when organizations first embraced the

use of Web technologies, and began to face the need to adjust to a global virtual environment.

The second step in data collection, critical appraisal, entails a review of each piece of literature in order to select unbiased and valid studies. Criteria used in appraising the content of the literature utilized to support this study include the following:

- Verifying that the author is a recognized authority (Leedy and Ormrod, 2001 p. 11). This verification is completed by determining if the authors work is cited by another author in the same field or if the author had published numerous literature pieces within the same field;
- Verifying that the content is focused directly on one or more of the elements of the study; and
- Verifying that the research-based materials reflect standard protocols for well designed research.

Once literature collection is complete content is further analyzed using a conceptual analysis process (Colorado State University Writing Lab, 2006). Coding during the conceptual analysis involves "reading through the text and manually writing down concept occurrences," specifically those related to two primary concepts—the global virtual team characteristics and related project management challenges (Colorado State University Writing Lab, 2006). In this case, coding proceeds in two stages, each in succession. In stage one, using an initial set of coding concepts; selected literature is coded to identify global team characteristics. Then in stage two a second set of coding

concepts is developed, based on the identified list of characteristics, for use when coding the same set of literature to identify related project management challenges.

Once identified, characteristics and project management challenges are presented in a series of tables (see Figures 4 - 10). The table in figure 4 presents and defines the unique characteristics of a global virtual team. The tables in figures 5 – 10 then present and define the particular project management challenges raised by some of these unique characteristics.

Data presented in this series of tables are combined, and presented in a separate table (see Appendix A), that aligns the characteristics and the project management challenges that arise in relation to these unique characteristics. This final table is designed for use as a reference guide for the project management field, which includes project managers, team leaders, stakeholders, executive management and project team members. As the structure of project teams evolves toward a more global virtual environment, project management has been forced to adapt as well (Grant, Graham & Herberling, 2001). Significant challenges exist for those organizations that deploy global virtual teams (Hayes, 2005). While they are similar to challenges of the traditional project team, they become more pronounced in a virtual setting (Leidner & Kayworth, 1999b). The emergence of virtual teams has radically altered the way organizations work and communicate (Zakaria, Amelinckx and Wilemon, 2004). Virtual team management now faces several new and complex challenges. Leidner and Kayworth (1999b) back this up by stating, “firms are faced with increased challenges to coordinate tasks across time

zones, physical boundaries, and cultures, as well as organizational contexts" (p.3). Bell and Kozlowski (2002) state that, "it is difficult to ascertain how the unique characteristics of virtual teams affect critical leadership functions" (p.4). In addition Bell and Kozlowski (2002) state that there, "is little current theory to guide research on the leadership and management of virtual teams" (p.4). Loughran (2000) notes that "Virtual teams are not a passing trend but rather will become the workday norm in years to come" (p. 13). As more and more organizations adopt the global virtual team environment they need to continue their ability to foster global virtual teams (Loughran, 2000). Due to these changes, "Organizations planning to adopt or currently using virtual project teams" (Furst, Reeves, Rosen & Blackburn, 2004, p.6) are the primary beneficiaries of this research.

Limitations

- The time frame of relevant literature is limited to published pieces between 1996 and 2006. The reason for this limitation is due to the importance of this era, in that it reflects when Web technologies were more prominently utilized in organizations. To illustrate this, in the late 1990s, General Electric completed an assessment of critical capabilities for the future and found that, "teams are more virtual than they've ever been and are rapidly becoming more so" (Lipnack and Stamps, 2000, p.7). Based on this study, GE has been training its famous "Black Belts" (Lipnack and Stamps, 2000, p.7) in virtual teaming. Not only does this reference demonstrate the timeframe for when organizations began to embrace the use of Web technologies, but it also demonstrates the accompanying shift within large organizations from a co-located view to a global view for project management.

- The conceptual analysis approach is selected for use in this study because it enables a broad view into the unique characteristics and project management challenges found within a global virtual team. Multiple thoughts and theories currently exist on what the key characteristics and challenges are of global virtual teams. Given the abundance of information, obtaining a detailed review of literature is imperative. Using the conceptual analysis approach enables the researcher to view all information that might be relevant and important (Colorado State University Writing Lab, 2006).

- In determining what publications to select for review, electronic searches are limited to ones with the presence of one or more of the following two concepts documented—global virtual team characteristics and associated project management challenges. No other aspects of global virtual teams are examined.

Problem Area

In recent years corporate activities have shifted to become more global in nature due to the dramatic shift in the way organizations compete in the various industries they specialize in (Boudreau, Loch, Robey & Straub, 1998). To go along with this new global environment, advanced information technologies now "play a central role in such structures because technology permits new organizational designs to overcome the spatial and temporal dispersion" (Boudreau, Loch, Robey and Straub, 1998, p.4). One result is the new organizational unit termed the global virtual team (Bell and Kozlowski, 2002, p3). Companies are starting to rely more on virtual teams, on a global scale, in order to

conduct both short and long-term projects (Grosse, 2002). According to a recent study, 60 percent of the professional and management tasks of Global 200 companies are performed through global virtual teams (Zakaria, Amelinckx & Wilemon, 2004). Meanwhile, it is predicted that "50 percent of virtual teams would fail to meet either strategic or operational objectives due to the inability to manage the distributed workforce" (Zakaria, Amelinckx & Wilemon, 2004, p. 17).

Leidner and Kayworth (1999b) offer their support of this new organizational unit stating that "the use of global virtual teams will provide a significant opportunity to coordinate complex business tasks across potentially far flung confederation of organizations" (p. 4). The existence and rapid growth of global virtual teams is more apparent in today's corporate environment than ever. In May 1998, the Harvard Business School published a report by Elkins (2000) that states "15 million Americans worked in 'virtual offices'" (p.28). Furthermore, the findings state "the number is growing 20 percent yearly" (Elkins, 2000, p.28). In support of this report, the Garnter Group predicted that, "by 2002, there will be more than 108 million people worldwide working regularly outside a traditional office" (Elkins, 2000, p.28). These studies and others like them demonstrate the prolific expansion of virtual teams, both locally and worldwide. What we are beginning to see is a steady growing number of managers who find themselves, "leading project teams with members located literally around the world" (Kerber, 2004, p.1).

The use of global virtual project teams has been shown to offer many benefits over co-located teams (Loughran, 2000). Such benefits include:

- Ability to work anytime and anywhere, 7 days a week, 24 hours a day.
- Personnel better equipped to respond because project team resources with specialized skills sets can be utilized for project deliverables.
- Reduced costs by effectively using new technologies and by reducing costs associated to travel expenses and face-to-face meetings.
- Shortened cycle of time for the project because with project teams spanning multiple countries project related work can occur almost 24/7.
- Increased innovative thinking because teams can be "assembled based on respective team members' skills as opposed to their physical location" (Loughran, 2000, p. 2).
- Leveraged learning; through utilizing technology, "knowledge generated by projects can be categorized as knowledge in projects, knowledge about projects, and knowledge from projects" (Desouza & Evaristo, 2004, p. 87).
- Quick and efficient collaboration within and across organizational boundaries.
- Ability to transcend time and space boundaries.
- Provision of continuous coverage on projects.

(Loughran, 2000; Lipnack & Stamps, 2000; Oakley, 1998)

However, along with the new found benefits there are new and existing project management challenges that come with global virtual teams. Lipnack & Stamps (2000) have observed, "The way is not easy. Today's teams are complex and reflect all the stresses and strains induced by the extraordinary shift" from traditional to virtual (p. 23). This complexity is now a major concern among senior executives who must plan how to survive effectively in this new global virtual business environment (Boudreau, et al., 1998). For example, Loughran (2000) states that "…at each level of separation, team members face greater challenges in attaining—and maintaining—team cohesiveness" (p.3). Kerber (2004) also states that "team leaders typically find that achieving alignment and commitment to the team's purpose are far more challenging for virtual teams, especially those that cannot meet face-to-face" (p.1). Traditional project teams on their own have been shown to experience a less than 5% success rate even when operating at an optimal performance (Kerber, 2004). When compared to the global virtual team, the added complexity presents "a number of unique challenges that often prevent them from obtaining successful outcomes" (Furst, Reeves, Rosen & Blackburn, 2004, p.6).

Based on these findings, organizations should not underestimate the challenges associated with establishing global virtual teams. Knowing that "virtual teams are often less effective than face-to-face teams on many outcome measures" and that "virtual project teams can experience difficulties at every stage of their development" (Furst, Reeves, Rosen & Blackburn, 2004, p.6) there needs to be an increased understanding of the nature of a global virtual team. Furst, Reeves, Rosen and Blackburn (2004) further explain that a better understanding can provide, "managers with important insights that

might increase a team's contributions to firm performance" (p.6). Kerber (2004) elaborates:

> Ultimately, the challenge for leaders of virtual teams is to create a level of collaboration and productivity that rivals the experience of the best co-located teams, and to accomplish these outcomes against the backdrop of the rapid changes facing nearly every business today. Leaders of truly virtual teams must be able to facilitate team cohesiveness by taking full advantage of existing and emerging collaborative technologies. (p.2)

Findings from this study are valuable to businesses that operate in geographically dispersed environments and more specifically to project team members within those businesses, including managers and leaders, that are required to work "across cultural, organizational and geographical boundaries" (Zakaria, Amelinckx, Wilemon, 2004, p. 15). The information can provide a reference guide to global organizations which outlines the characteristics of a global virtual team and the project management challenges these types of teams can pose.

Definitions

Challenge: In this study, a challenge refers to any condition that does not foster a, "collaborative interactive permissive space where global virtual team members are actively encouraged to engage in regular and frequent reciprocal cross-cultural exchange of ideas and the creation of new team-created solutions" (Zakaria, Amelinckx and Wilemon, 2004 p.15-16).

Characteristic: In this study, a characteristic refers to any aspect that is unique to a global virtual team, such as being geographically dispersed or primary communication through telecommunications.

Co-located (co-location) projects: Projects running in one central location (Desouza & Evaristo, 2004).

Conceptual analysis: The process of "looking at the occurrence of selected terms within a text or texts" for the purpose of "quantifying and tallying its presence" within a selected text (Colorado State University Writing Lab, 2006).

Content analysis: A detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes or biases within that material (Leedy & Ormrod, 2001).

Culture: The totality of socially transmitted behavior patterns, beliefs, institutions and all other products of human work and thought characteristic of a community or country (Gray & Larson, 2006).

External project: A type of project that is dependent upon funding from external sources and is consequently under more or less direct control of external customers. In addition, this type of project has additional challenges, over an internal project, in that they must simultaneously meet the objectives of the external sponsor and the host organization (Olson & Branch, 2002).

Global virtual team: A team made up of groups of distributed people working together to achieve a common goal or solve a shared problem through the use of computer-mediated communication technologies, linking them across time, space and cultural barriers. Loughran (2000) defines five types of "virtual teams":

1. Same organization; same department,
2. Same organization; different department,
3. Different organization; similar cultures,

4. Different organizations; different cultures,

5. Different organizations, or companies; different cultures; different nationalities.

For the purpose of this paper, the definition provided in item 5—different organizations, or companies; different cultures; different nationalities—is used as the definition of "global virtual team."

Internal project: A type of project that is required to meet performance standards and goals specific to the host organization. Goals are created in order to reinforce understanding of and commitment to the organization's strategies and enhancement of its core competencies (Olson & Branch, 2002)

Leading: The process of arousing enthusiasm and directing human resource efforts toward organizational goals (Matooane-Tshishonga, 2005).

Leading by example: When the project manager becomes the "model for what the whole team (the group, the organization, the company) stands for, rather than just standing up for some personal or idiosyncratic set of values" (Kouzes & Posner, 2002, p. 77–78)

Leader: A person who is able to facilitate team cohesiveness by taking full advantage of existing and emerging collaborative technologies (Kerber & Buono, 2004).

Leadership: The process of inspiring others to work hard to accomplish important tasks (Matooane-Tshishonga, 2005).

Literature review: The purpose of a literature review is to, "convey to your reader what knowledge and ideas have been established on a topic and what their strengths and weaknesses are" (University of Toronto, 2005, p.1).

Proactive: What results when a project resource acts in anticipation of future problems, needs or changes (Webster's online dictionary).

Project: An endeavor in which human, material, and financial resources are organized in a novel way, to undertake a unique scope of work, for a given specification, within constraints of cost and time, so as to achieve beneficial changes defined by quantitative and qualitative objectives.

Project activities: An element of work performed during the course of a project. An activity normally has an expected duration, an expected cost, and expected resource requirement. Activities can be subdivided in tasks (PMI 1996:4).

Project communication: The processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information (PMI 1996:4).

Project management: The application of knowledge, skills, tools and techniques to project activities to meet the project requirements (Gray & Larson, 2006).

Project manager: The individual responsible for managing a project (Gray & Larson, 2006).

Project resource: Any person, group, skill, equipment or material used to accomplish a task, work package or activity (Gray & Larson, 2006).

Project risk: An uncertain event or condition that, if it occurs, has a positive or a negative effect on the project objective (PMI 1996:4).

Project scope: The work that must be done to deliver a product with the specified features and functions (PMI 1996:4).

Project sponsor/stakeholder: Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or completion. They may also exert influence over the project and its results (Gray & Larson, 2006).

Project task: The lowest level of effort on the project (PMI 1996:4).

Project team: A small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable (Olson & Branch, 2002).

Project trust: The belief that project resources will do what they are supposed to do in order to make the project successful. "Teams with trust converge more easily, organize their work more quickly, and mange themselves better. Less trust makes it much more difficult to generate and sustain successful virtual teams" (Lipnack & Stamps, 2000, pp. 69–70).

Project vision: The "image a project team holds in common about how the project will look upon completion, how they will work together, and/or how customers will accept the project" (Gray and Larson, 2006, p.356)

Chapter Two – Review of References

The review of reference chapter is developed in the form of an annotated bibliography documenting the key references that are utilized in this research paper. The references are presented in alphabetical order and each reference annotation identifies the specific aspects of the reference that is utilized in this research paper, the parts of this research paper that utilize the reference and the criteria that is used in determining the references credibility.

Bell, B. S., and Kozlowski, S. W. J. (2002). A Typology of Virtual Teams: Implications for Effective Leadership. Group and Organization Management 27(1):14–49. Retrieved March 25, 2006, from http://digitalcommons.ilr.cornell.edu/hrpubs/8/.

The literature reference, "A Typology of Virtual Teams: Implications for Effective Leadership" is a case study that looks at "delineating the dimensions of a typology to characterize different types of virtual teams" (p.2). This is accomplished by first differentiating between a traditional co-located team from a global virtual team and then documenting the different types of global virtual teams, while at the same time identifying the characteristics and leadership challenges. The following sections of this case study are of critical importance to this research paper:

1. The detailed explanation of a global virtual team.
2. The explanation of how virtual teams came to be and why this team context will continue to stay.
3. The comparison of characteristics between virtual teams and conventional teams, along with an outline of potential challenges.

To summarize the comparison between traditional and virtual teams, virtual project teams work with great distances between team members while traditional project teams are generally co-located. Because of this distance virtual teams rely heavily on technology to connect team members and the distance has the effect of reducing traditional face-to-face communication. This case study is used to help support the purpose and problem areas of this research study while also providing content for the overall analysis. The details documenting the characteristics and challenges of global virtual teams are pertinent to both stages 1 and 2 of this research paper.

Both authors of this study, Bradford S. Bell and Steve W. J. Kozlowski, are respected professionals in the field of virtual project teams, as evidenced by the fact that this case study is repeatedly cited in most all literature references used in this research paper. This case study is published in *Group & Organization Management,* which is an international forum for the latest research and analysis in organizational behavior, organization theory, business strategy, and human resources.

Boudreau, Marie-Claude, Loch, D. Karen, Robey, Daniel, and Straub, Detmer. (n.d.). Going Global Using Information Technology to Advance the Competitiveness of the Virtual Transnational Organization. Georgia State University. Retrieved April 11, 2006, from www.cis.gsu.edu/~drobey/Cis8160/Global.pdf.

"Going Global: Using Information Technology to Advance the Competitiveness of the Virtual Transnational Organization" is an article that attempts to outline the benefits of global virtual organizations, the criteria that make up a successful global

virtual organization and the technology that is used in order to overcome the challenges associated with global virtual organizations.

This article presents information pertinent to the two stages of data analysis in this research paper: stage 1, identifying unique characteristics of a global virtual teams and stage 2, identifying challenges related to these characteristics. Two specific characteristics of global virtual teams are of particular interest, gleaned from this study are: 1) flexibility and 2) spatial and temporal independence. As it relates to global virtual teams, flexibility allows the project team to be, "formed, disbanded, and reformed to respond to rapidly changing business needs" (p.10). The second characteristic of interest, spatial and temporal independence, relates to bringing together geographically dispersed team resources.

Along with these unique characteristics, the article also brings up one particularly interesting challenge as it relates to global virtual teams, and that is coordination. As the authors explain, coordination is a challenge because with the "federated and dispersed nature of virtual organizations, traditional coordination and control mechanisms are ineffective" (p.11).

This article is also used to help form the problem area for this study as well as providing sources in the data analysis. The fact that the article was published in the *Academy of Management Executive* and that the article is cited in various other resources

utilized for this research paper provide support for why this article is selected as a literature reference.

Colorado State University Writing Lab. (2006). Writing Guides Conducting Content Analysis. Retrieved April 6, 2006, from http://writing.colostate.edu/guides/research/content/com2b1.cfm.

The Colorado State University Writing lab has provided a writing guide for how to conduct content analysis. The guide includes the following definition of content analysis; "research methodology that examines words or phrases within a wide range of texts". In addition the writing lab discusses two types of content analysis methods: conceptual analysis and relational analysis. For the purpose of this research paper conceptual analysis is used. In conceptual analysis, "a concept is chosen for examination, and the analysis involves quantifying and tallying its presence". The conceptual analysis involves 8 specific steps. They are as follows; (1) deciding the level of analysis; (2) deciding how many concepts to code for; (3) deciding whether to code for existence or frequency of a concept; (4) deciding on how to distinguish among concepts; (5) developing rules for coding references; (6) deciding what to do with "irrelevant" information; (7) coding the documented references; and (8) analyzing the results from the coding process. These steps are outlined in Chapter three – Method of this research paper.

This reference forms the primary basis of support for content development in the Method chapter of this research paper. The 8 documented steps are followed and the

results documented. This reference has been deemed credible because of its suggested use in the University of Oregon AIM Capstone course.

Dube, Line and Pare, Guy. (2004). The Multifaceted Nature of Virtual Teams. Idea Group. Retrieved May 08, 2006, from Google (Scholar) database: http://www.idea-group.com/downloads/excerpts/1591401666E.pdf#search='characteristics%20global%20virtual%20team'

This online reference is segmented into various chapters. The chapter labeled "The Multifaceted Nature of Virtual Teams" is of particular importance for this research paper. The chapter helps to define what a virtual team is and then differentiates it from a virtual group, virtual organization, virtual community and telecommuting. After this differentiation is made, the chapter explains in detail the characteristics which make up the virtual team and the methodology used to determine these characteristics. The goal is then to associate various challenges that arise from the different configurations of virtual teams. As stated by the authors Dube and Pare (2004), "the main purposes of this chapter are to clarify the nature of virtual teams and to identify the key characteristics that will allow researchers as well as practitioners to differentiate among different configurations of virtual teams" (p.3).

Within the chapter characteristics of the virtual teams are broken down into two categories. The first category details characteristics that are common to all virtual teams. The second category details the characteristics that make a virtual team more complex than a traditional team. Both categories provide a wealth of information for stage 1 data analysis in this study. The challenges that are presented are relevant to the characteristics

provided in each case example. This association brings a different perspective to a global virtual team in that not all teams will experience the same challenges if the characteristics are different between the teams. For instance, the level of technology usage can help determine the complexity and therefore the challenges that are a part of a team.

The authors are well known experts in the field of virtual project teams and are cited in other references used in this research paper. In addition, this chapter is published through a peer-reviewed journal thus demonstrating the knowledge and experience of the authors.

Furst, Stacie A., Reeves, Martha, Rosen, Benson, Blackburn, Richard S. (2004). Managing the life cycle of virtual teams. Academy of Management Executive. Vol. 18, No. 2. Retrieved May 2, 2006, from http://pages.stern.nyu.edu/~wstarbuc/mob/VirtualTeams.pdf

The purpose of the study, "Managing the life cycle of virtual teams" is to examine why it is that, while virtual project teams are currently growing in popularity with various organizations, these teams are also experiencing failure. In order to determine where these failures are most likely to occur, the authors developed a field study consisting of six virtual teams. The study follows each virtual team through the course of a project and attempts to identify the "factors at each stage of the virtual-team lifecycle that affected team performance" (p.6).

There are three specific areas within the reference that are important to this research paper. The first area is a discussion of the history of the emergence of the global virtual team. The authors explain the reasons for the increased use of global virtual teams

and examine why they are growing in popularity. The second area of interest is the authors' ideas related to the various challenges of a virtual project team. And lastly, the third area explains how these challenges are related to four stages of virtual team development (also frequently used to define traditional team development), 1) forming, 2) storming, 3) norming, and 4) performing (Tuckman, 1965). At the forming stage, the authors detail the challenges related to getting to know each team member within a virtual team. During the storming stage, the author discusses the challenges that arise when team members start to develop roles and responsibilities within the team. The authors go on to explain the norming stage and how it involves challenges related to how team members share information. Finally, during the performing stage the authors discuss the challenges related to how project team members work toward the project goal or deliverable. The Tuckman model, as described in this article, is of importance only to the extent that it documents the characteristics and challenges relative to a global virtual team.

The material specifically related to the challenges faced in virtual teams, is selected as one entry in the data set for data analysis. The material used from this reference also helps support the purpose of this research paper by demonstrating that virtual teams are a common component of most global organizations and that challenges exist within this team context.

The reference is deemed credible and useful because it was originally published in the *Academy of Management Executive*. This association is a leading professional group

of scholars dedicated to creating and disseminating knowledge about management and organizations. By researching each author through online means it is determined that each author is a respected professional in their field. On numerous occasions they are cited for their work on global virtual teams. In addition, these authors have published pieces of literature from a variety of well known organizations on management.

Hayes, Brigitte. (2003). Crossing Oceans and Firewalls: Project Management for Virtual Teams. Proceedings of the Project Management Institute Global Congress North America, September 18–25. Retrieved April 13, 2006, from www.teamdirection.com/tdweb/webdocs/Resources/Crossing_Oceans_and_Firewalls.pdf#search='define%20colocated%20project%20teams'.

Brigitte Hayes is the Vice President of Marketing and Strategic Alliances for Team Direction Inc. The article "Crossing Oceans and Firewalls Project Management for Virtual Teams" is published in a proceeding from the 2003 Project Management Institute Global Congress North America. The Project Management Institute is considered the pioneer in the field of project management. This is one of two articles utilized for this research paper authored or co-authored by Brigitte Hayes.

The reference outlines various characteristics of global virtual teams that can lead to additional challenges that might not necessarily occur with a co-located project team. A summary of these characteristics are as follows:

1. Physical separation. Because of the fact that team members can be located anywhere on the globe there are increased challenges related to collaboration

2. Team members working for multiple organizations. Because of team members coming from different organizations, the sharing of knowledge becomes a greater challenge.
3. Different time zone. Due to the fact that project team resources can be located in different time zones there are added challenges when trying to schedule meetings.
4. Language and cultural differences. There are challenges that can arise as team members try to communicate and understand information and knowledge that is being passed between different cultures.

The article also attempts to align technology solutions to the various challenges and supports these solutions with documented case studies.

The details on unique global virtual team characteristics and related challenges are pertinent to the first and second stages of data analysis. Portions of this article are utilized to build the purpose of this research paper, specifically by supporting the notion that technology has allowed for greater engagement between project team members no matter where they are located.

Hayes, Brigitte and Buiron, Florent. (2005). At the Edge of the Enterprise – Where Challenge Meets Results. Proceedings of the Project Management Institute Congress, Global Congress, Edinburgh, Scotland. Retrieved April 19, 2006, from www.teamdirection.com/tdweb/webdocs/AtTheEdgeOfTheEnterprise-final.pdf

The authors of this article are Brigitte Hayes, the Vice President of Marketing and Strategic Alliances for Team Direction Inc. and Florent Buiron a CRM Team Lead for

Steelcase. The article "At the Edge of the Enterprise – where Challenge Meets Results" is published in a proceeding from the 2005 Project Management Institute Global Congress North America. The Project Management Institute is considered the pioneer in the field of project management. This is one of two articles utilized for this research paper authored or co-authored by Brigitte Hayes.

The article outlines various challenges that are directly attributed to the distribution of team members in a global virtual environment. A summary of these challenges are as follows:

1. Creating an effective work environment.
2. Lack of trust with the project team.
3. Lack of team identity.
4. Language and cultural issues.
5. Challenges related to virtual leadership.

The article also attempts to align technology solutions to the various challenges and then supports these solutions with documented case studies through three separate scenarios involving a company named Steelcase, who is a "global leader in the office furniture industry" (Hayes and Buiron, 2005, p.4).

The details related to challenges associated with global virtual teams are pertinent to the second stage of data analysis, identifying global virtual team challenges. Portions of this literature reference are utilized to build the purpose of this research paper,

specifically by demonstrating how the case of project management challenges that can arise due to some of the unique characteristics of global virtual teams, such as geographic dispersion of team members.

Leidner, Dorothy, Kayworth, R. Timothy, and Mora-Tavarez, Manuel. (1999b). The Global Virtual Manager: A Prescription for Success. INSEAD. Retrieved April 19, 2006, from http://ged.insead.edu/fichiersti/inseadwp1999/99-67.pdf**.**

"The Global Virtual Manager: A Prescription for Success" is a field-based research study undertaken in order to assess the core issues and challenges faced by global virtual teams. The study consists of a group of twelve culturally diverse global virtual teams with members from Europe, Mexico, and the United States (Leidner and Kayworth, 1999b). Team members for the field-based research study were drawn from various MBA programs at leading business schools. Each team was given the same set of deliverables with a high degree of autonomy and flexibility for how to accomplish these goals. The research study is selected as one entry in the data set used for content analysis in this study. It discusses challenges as they relate to global virtual teams and the related management practices that can be used to help overcome these challenges. Four particular challenges facing global virtual teams are outlined in the study: 1) communication, 2) culture, 3) technology, and 4) project management (leadership). It is these four specific challenges that are pertinent to the second stage of this research study.

Varying parts of this reference are used to help support the purpose, problem area and data analysis sections of this research paper. The challenges documented in this field research study are attributed to the unique characteristics of global virtual teams. In

particular, communication challenges arise as "team members attempt to interact, share meaning, and reach consensus in the absence of rich face-to-face interaction" (p.9). Challenges related to culture can have a "profound impact on how individuals perceive information, act upon it, and relate to other individuals" (p.12). Technology-created challenges are attributed to the fact that teams experience, "varying levels of difficulty in using information technology" (p.14). This demonstrates that each global virtual team faces not only limitations with respect to the varying technology skill level each team member possesses but also with respect to the types of technology tools offered by the organization. Lastly, the field study documents project management challenges in general, as described in the purpose statement of this paper, stating that with the increase in complexity and other related challenges associated with global virtual teams comes an increased requirement for effective leadership.

The authors of this field-based study each serve on the faculties of academic institutions. Tim Kayworth is an Assistant Professor of Management Information Systems in the College of Business at Baylor University. Kayworth and has been previously published in the *Journal of Information Technology Management* and the *International Conference on Information Systems (ICIS)*. Dorothy E. Leidner is an Associate Professor of Information Systems at INSEAD in Fontainebleau, France. Both Kayworth and Leinder have published a variety of studies on global virtual teams. This is one of two studies by this pair of authors, utilized in this research paper.

Lipnack, Jessica, and Stamps, Jeffrey. (2000). Virtual Teams: People Working Across Boundaries with Technology. 2nd ed. New York: John Wiley & Sons.

Jessica Lipnack and Jeffrey Stamps are considered the leading experts in virtual teams and networked organizations. The book "Virtual Teams People Working across Boundaries and Technology" is in its second edition and has been published and translated for people all over the world.

The focus of the book is an examination of virtual teams, and their problems, followed by a set of proven techniques to solve those problems. The Introduction and Chapter One include a discussion of the history of virtual teams and the current need for virtual teams. Chapters Two through Five examine the networked organization and its creation. The chapters then go on to discuss the importance of trust within a virtual team and the impact of distributed team member locations. In Chapters Six through Nine, the authors describe in great detail the four parts of their virtual team model; (1) time, as it relates to how a virtual team functions through time; (2) purpose, as it relates to why the team is together and what will drive the team to want to succeed; (3) people, as it relates to resources, skills, roles and responsibilities within the virtual team; and (4) links, which detail the various methods that project team member can link to each other. Within Chapters Ten through Twelve, the authors offer practice and theory based on their experiences and then in Chapters Thirteen and Fourteen the book is wrapped up by the authors discussing the future trends, needs and actions related to the virtual team and the networked organization.

Portions of this reference are used to help build the purpose, limitations, problem area, definitions and data for content analysis in this research paper. Material utilized in stage 1 of the content analysis, identifying unique characteristics, and stage 2 of the content analysis, identifying related challenges, are primarily taken from Chapters One and Six through Nine, with particular interest in the four-dimension model of virtual teams: time, purpose, people and links.

Loughran, Julia. (2000). Working Together Virtually: The Care and Feeding of Global Virtual Teams. DOD Command and Control Research Program. Retrieved on April 9, 2006, from www.dodccrp.org/events/2000/5th_ICCRTS/cd/papers/Track4/009.pdf.

The author wrote the paper as a white paper for the company ThoughtLink, Inc. ThoughtLink is a technology and consulting company that identifies and implements the most innovative and appropriate methods and technologies to help teams accomplish their goals through both virtual and co-located means. Because of the author's experience with the topic of virtual teams and the company's focus on project teams, this literature reference is seen as credible.

This paper presents "the various types of virtual teams" (p.2). Loughran discusses the challenges facing the different types of virtual teams and then shares "lessons learned in how to best address these obstacles" (p.2). In addition, the literature reference outlines five different types of virtual teams. Specifically, the fifth type defined as a team consisting of members from "different organizations; different cultures; different nationalities" (p.2) is the definition selected for use in this research paper. Also of

interest is the description of four obstacles found within global virtual teams: (1) cultural differences, (2) lack of a shared goal, (3) communication problems, and (4) lack of trust. The reference also presents methods for overcoming these obstacles, but this information was not relevant to the purpose of this research paper.

The information found in this literature reference is helpful in shaping the purpose, problem area and supporting definitions used in this research paper. It also provides data for content analysis. On a limited scale this reference provides data related to stage 1, unique characteristics of global virtual teams and on a much larger scale for stage 2, challenges related to these unique characteristics.

Zakaria, Norhayati, Amelinckx, Andrea, and Wilemon, David. (2004). Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams. Creativity and Innovation Management. 13(1):15–29. Retrieved April 9, 2006, from ECO.

This paper evaluates the following three questions: "(1) what are the cross-cultural challenges faced by global virtual teams?; (2) how do organizations develop a knowledge sharing culture to promote effective organizational learning among culturally-diverse team members?; and (3) what are some of the practices that can help maximize the performance of global virtual teams?" (p.2).

Prior to answering these questions, the authors set the stage by evaluating what and why global virtual teams are utilized. Three characteristics of global virtual teams are outlined. They are (1) team members are dispersed geographically, (2) they rely on,

"technology-mediated communication" (p.2) and (3) the global virtual team is a functioning team.

In addition to these characteristics, the article outlines various "human challenges" that are directly related to implementing a global virtual team. These challenges are summarized as follows: (1) creating effective leadership; (2) managing conflict and global virtual team's dynamics; (3) developing trust and relationships; (4) understanding cross-cultural difference; and (4) developing intercultural communication competence (p.2).

Norhayati Zakaria is a lecturer at the Faculty of International Studies at University Utara Malaysia, Andrea Amelinckx is the Director of the International Management Program, Faculty of Management, University of Lethbridge and David Wilemon is a Snyder professor of Innovation Management at the School of Management at Syracuse University.

Chapter Three – Method

The methodology utilized for this research is qualitative. This type of methodology "uses a naturalistic approach that seeks to understand phenomena in context-specific settings" (Hoepfl, 1997, p. 4). More broadly defined, qualitative research is "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Hoepfl, 1997, p. 5). Hoepfl (1997) goes on to state that this method is better suited for attempting to understand any phenomenon for which little is already known. This method allows the researcher to "gain insight about the nature of a particular phenomenon" (Leedy & Ormrod, 2001, p.148).

The primary research method of this study is the Literature Review. A literature review is used because "the researcher must also be well versed in the literature related to the problem so that he or she knows what to look for" (Leedy & Ormrod, 2001, p.148).

Literature Collection

As defined by the University of Toronto (2005), the purpose of a literature review is to "convey to your reader what knowledge and ideas have been established on a topic and what their strengths and weaknesses are" (p.1). Based on this definition of a literature review, the selection and collection of valid reference sources involves a two-step process. The first step involves establishing an initial set of search terms and/or phrases that apply to the topic of global virtual teams and the unique characteristics associated with those teams. It should be noted that within this pre-defined search term

list, specific words and/or phrases were "recorded as the same even when they appear in different forms" (Colorado State University Writing Lab, 2006). For example, for the purpose of literature collection, global team is also defined as non-co-located team, distant project team, and cross cultural project team. The following is the list of terms and/or phrases used in the first step of the literature collection process, derived from previous knowledge combined with a preliminary review of pertinent databases:

- communication/global virtual team
- collaboration/global virtual team
- trust/global virtual team
- vision/global virtual team
- networking/global virtual team
- project team location
- non-co-located project team
- distant project team
- cross cultural project team
- project teams
- co-located project teams
- project team structure
- global virtual project management
- project management/virtual
- flexible/adaptive project management
- global virtual team/classification
- global virtual team/characteristics

- global virtual team/challenges
- project management/challenges
- global virtual team/features
- global virtual team/skills

Searches are performed in online academic institutions, online libraries, commercial search engine Web sites and published books or periodicals. The following is a list of specific sources (and associated databases) where searches are performed:

- University of Oregon Libraries
  - EBSCO Host (Professional Development Collection)
  - EBSCO Host (Academic Search Premier)
  - EBSCO Host (Computer Source)
  - EBSCO Host (Vocational and Career Collection)
  - ArticleFirst
  - ECO
  - Business Source Premier
- Questia.com: The world's largest online collection of complete books, journals and articles.
- Project Management Professional web sites:
  - pmi.org: specialized web site for project management professionals.
  - gantthead.com: an online community for Information Technology project managers.

  - ittoolbox.com: professional online Information Technology community.
- Virtual Project Team Professional web site:
  - vrtprj.com: professional online community directed at the management and technology of virtual organizations.
  - my.execpc.com/2F/1D/ottman/index.htm: personal website documenting personal experience with global virtual project teams.
- Commercial Search Engines:
  - google.com(scholar)
  - yahoo.com
  - dogpile.com

While performing the searches, sources are evaluated along the following selection criteria, as well:

- Only references published between 1996 and 2006 are selected. The reason for this limitation is due to the relevance of the time period being when organizations started to embrace new technologies and apply them for global virtual team purposes.
- Only references that are available in full text articles, usually in the Microsoft Word or Adobe PDF format, are selected for examination.
- Only references where the author could be cross-referenced through other retrieved literature are selected for examination.

- For search engines that offered results with a relevance percentage, only literature sources that had a relevance of 75% or higher are used for evaluation. If there were multiple pages of results with a high relevance only the literature sources that were listed within the first 3 pages are evaluated.

Data Analysis

After completing the selection and collection process related to literature sources that support the research purpose, the content is analyzed to "determine the presence of certain words or concepts within texts or sets of texts" (Colorado State University Writing Lab, 2006). More specifically, the method of conceptual analysis is used. Conceptual analysis is defined as selecting a concept for examination and then quantifying and tallying the presence of this concept within the pre-defined selection of literature (Colorado State University Writing Lab, 2006). By breaking down specific textual references "into manageable categories" (Colorado State University Writing Lab, 2006), the research is able to be better analyzed, manipulated and documented for details regarding unique characteristics and project management challenges as they relate to global virtual teams. In addition, by utilizing a conceptual analysis strategy, insights are gained into not only just words related to the research topic but also phrases and ideas that might not have otherwise been documented during the research process.

The analysis process involves two sequential coding stages, designed to: (1) identify the unique characteristics of global virtual teams; and (2) identify related project management challenges. A data set of 12 sources is assembled for use in content analysis

in stages 1 and 2. Sources are identified below, in Figure 1. Each individual source is identified with an 'X' if the source adds content to describe either unique characteristics or project management challenges.

Data Analysis Sources	Stage 1 Coding Sources in which Characteristics are identified	Stage 2 Coding Sources in which Challenges are identified
Managing the life cycle of virtual teams / Stacie A. Furst, Martha Reeves, Benson Rosen, and Richard S. Blackburn	☐	☒
Leadership challenges in global virtual teams: lessons from the field / Kerber, K. W.	☐	☒
The Global Virtual Manager: A Prescription for Success / Timothy R. Kayworth and Dorothy Leidner	☐	☒
Working Together Virtually: The Care Feeding of Global Virtual Teams / Julia Loughran	☐	☒
Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams / Norhayati Zakaria, Andrea Amelinckx, and David Wilmon	☒	☒
The Multifaceted Nature of Virtual Teams / Line Dube and Guy Pare	☒	☒
Virtual Team Interaction Styles: Assessment and Effects / Richard E. Potter and Pierre A. Balthazard	☒	☒
Going Global: Using Information Technology to Advance the Competitiveness of the Virtual Transnational Organization / Marie-Claude Boudreau, Karen D. Loch, Daniel Robey, and Detmar Straub	☒	☒
At the Edge of the Enterprise – where Challenge Meets Results / Brigitte Hayes and Florent Buiron	☐	☒

Crossing Oceans and Firewalls ***Project Management for Virtual*** **Teams /** Brigitte Hayes	☒	☒
Virtual Teams People Working Across Boundaries with Technology / Jessica Lipnack and Jeffrey Stamps	☒	☒
A Typology of Virtual Teams: Implications for Effective Leadership / Bradford S. Bell and Steve W. J. Kozlowski	☒	☒

Figure 1: Sources Used in Content Analysis

At the beginning of the conceptual analysis process, the following research questions are posed (Colorado State University Writing Lab, 2006):

- How the structure of traditional project teams changed as organizations has have shifted to global virtual teams?
- What are the unique characteristics of a global virtual team?
- What project management challenges can be directly related to the unique characteristics of a global virtual team?

"Once chosen, the text must be coded into manageable content categories" (Colorado State University Writing Lab, 2006). A coding process is established with the goal of "reducing the text to categories consisting of a word, set of words, or phrases the researcher can focus on, and code for specific words or patterns that are indicative of the research question" (Colorado State University Writing Lab, 2006). In order to make the required coding choices, the following eight steps for category coding are performed (Colorado State University Writing Lab, 2006).

1. Decide the level of analysis:

The level of analysis is demonstrated by "determining which word, set of words, or phrases will constitute a concept" or idea as it relates to the purpose of this research (Colorado State University Writing Lab, 2006). For this study, coding is conducted in stage 1 at a concept level and in stage 2 at a more specific word/phrase level, which is based on the results from stage 1 finding.

2. Decide how many concepts to code for:

The first stage of coding proceeds based on a pre-defined single larger concept, stated as "What are the unique characteristics of global virtual teams". Application of this concept during coding requires careful reading of context, which is continuously guided by **comparison to a set of definitions** for the following two larger concepts:

- Characteristic -- referring to any aspect that is unique to a global virtual team, such as being geographically dispersed or primary communication through telecommunications; and
- Global Virtual Team – referring to a team made up of groups of distributed people working together to achieve a common goal or solve a shared problem through the use of computer-mediated communication technologies, linking them across time, space and cultural barriers.

Once the set of unique characteristics of global virtual teams is identified, then in stage two (using the same literature) a second set of coding concepts is developed, in

relation to this set of characteristics. This second coding set is used to identify **related** global virtual project management challenges, identified in relation to the following definition: any condition that does not foster a, "collaborative interactive permissive space where global virtual team members are actively encouraged to engage in regular and frequent reciprocal cross-cultural exchange of ideas and the creation of new team-created solutions" (Zakaria, Amelinckx and Wilemon, 2004 p.15-16).

3. Decide whether to code for existence or frequency of a concept:

Key concepts, guided by specific definitions, are coded for existence within the documented literature. Existence is defined as counting a concept only once, no matter how many times it appears in the body of the referenced text (Colorado State University Writing Lab, 2006).

4. Decide how you will distinguish among concepts:

For the purpose of this research paper the ability to generalize coding terms is important. By definition, generalization provides the ability to code other concepts, or ideas, even if they are in a different form than what was originally stated (Colorado State University Writing Lab, 2006). Because of the broad stage 1 concept, unique characteristics of global virtual teams, a high degree of generalization is required. Once the initial level of coding has been completed less generalization is used in developing stage 2 because the challenges documented are directly related to the unique characteristics of global virtual teams. In addition because of the high degree of generalization within the initial stage of research it is important to allow the use of implication to various terms and/or phrases. Implication refers to the ability of the

researcher to not only code for a specific word or phrase but also for words and phrases that imply the same meaning as the original coded value (Colorado State University Writing Lab, 2006).

5. Develop rules for coding your text:

The following rules of translation apply, in order to streamline and organize the coding process (Colorado State University Writing Lab, 2006):

- Each situation is evaluated on a case by case basis, through careful review of context.
- For the stage 1 coding process if a word and/or phrase found in the literature reference can be generalized under the pre-defined guiding definitions (documented in step 2 of the content analysis process) then these words and/or phrases are acceptable.
- For the stage 2 coding process the coding of key words and/or phrases is based on the emergent findings from the unique characteristics discovered in the stage 1 process. The words and/or phrases used for coding challenges within a global virtual team are directly related to the unique characteristics.

6. Decide what to do with "irrelevant" information:

The first stage of the coding process allows for broad use of generalization and thus requires an individual evaluation of all coded terms and/or phrases on a case by case basis in order to determine their relevance. In the second stage of the coding process, challenges which are identified through emergent data found from unique characteristics are required to have a direct relation to a unique characteristic discovered during the stage

1 process. All other challenges, related or un-related, to global virtual teams are seen as irrelevant for the purpose of this research study.

7. Code the texts:

A manual review of the text is conducted in order to identify the occurrence of key concepts, or ideas. This manual review involves, "reading through the text and writing down concept occurrences" (Colorado State University Writing Lab, 2006). The stage 1 coding process, identifying unique characteristics of global virtual teams, involves reading through a pre-determined collection of literature references discovered through various online resources utilizing the search terms and/or phrases documented in the literature collection section of this research paper. As words and/or phrases are encountered, as they relate to the guiding dictionary terms defined in step 2 of the content analysis process, an evaluation is made. If the work and/or phrase is related to a **unique** characteristic of the global virtual team, or if the characteristic is common to both traditional and global virtual project teams, but the **magnitude of complexity** changes the overall function of the characteristic making it unique then the term is recorded.
In stage two, identifying the challenges related to the unique characteristics, the emergent data collected from stage 1 is utilized for coding within the same set of literature references used in stage 1. The overall concept for this stage is to find words and/or phrases of challenges that are directly related to the unique characteristics found in the stage 1 process. These coded words and/or phrases are then recorded.

Data Presentation

8. Analyze Results:

Once the coding process has been completed the data is analyzed, "to draw what ever conclusions and generalizations are possible," as it relates to the stated research purpose (Colorado State University Writing Lab, 2006). The coded results are presented as a series of tables for easy review. The first table, presented in Appendix B, identifies the unique characteristics of a global virtual team. This table documents the recording of unique characteristic (bolded), the source in which the characteristic is located, and the context in which it is used. A template for this table is shown in Figure 2. The final set of characteristics is presented in Figure 4.

Unique Characteristics of Global Virtual Teams
Source • **Characteristic #1** • **Characteristic #2**
Source • **Characteristic #1** • **Characteristic #2**

Figure 2: Template for Appendix B: Reporting the Identification of Unique Characteristics of Global Virtual Teams

Appendix C presents a set of tables that document the recording of the project management challenges as they relate to the global virtual team characteristics identified in Figures 5 - 10. For each unique characteristic, the table documents: the unique characteristic, the source(s) where the challenge is identified (with author and year of publication), and the related challenge as it appears in the source(s). A template for this table is shown in Figure 3.

Unique Characteristic
Source • **Project Management Challenge #1** • **Project Management Challenge #2**
Source • **Project Management Challenge #1** • **Project Management Challenge #2**

Figure 3: Template for Appendix C: Reporting the Identification of Project Management Challenges Related to Unique Global Virtual Team Characteristics

The results of the conceptual analysis (stages 1 and 2) are combined into a final outcome of this study, designed in the form of a reference guide (see Appendix A). Appendix A aligns the identified unique characteristics of global virtual teams with the associated project management challenges related to each characteristic. The alignment is designed to provide the project management field with a better understanding of the challenges in the current project team environments, where movement toward global and virtual teams is the trend. As the project management profession continues to move into the global virtual environment it will become more and more evident that "leadership, not management is the style of a successful" (Ellis, 1996, p. 1) project manager.

Chapter Four –Analysis of Data

Unique Global Virtual Team Characteristics – Report of Stage 1 Data Analysis

As presented in the Method Chapter, the content analysis process of this study involves two sequential coding stages. The first stage identifies the unique characteristics of global virtual teams and the second stage identifies the related project management challenges that are associated with the unique characteristics. The purpose in identifying the unique characteristics of the global virtual team is to better, "clarify the nature of virtual teams" (Dube and Pare, p.3, 2004) and to give a better understanding for the configuration of global virtual teams.

During the initial coding process, in determining unique characteristics, the documented literature reference is thoroughly reviewed at a concept level. Concept coding is guided by the research question: "What are the unique characteristics of global virtual teams"? The stage 1 coding process is further guided by comparison of the definitions related to "Characteristic" and "Global Virtual Team" (see Definitions). As defined by Loughran (2000) a global virtual team is a group of distributed people working together to achieve a common goal or solve a shared problem through the use of computer-mediated communication technologies, linking them across time, space and cultural barriers. Relevant to this study, the team is comprised of members from different organizations, or companies, different cultures and/or different nationalities.

A characteristic is defined as any aspect unique to a global virtual team, such as being geographically dispersed or using telecommunications to support primary

communication. As the coding process is conducted, terms and/or phrases that align with these definitions are identified.

As the selected literature is analyzed, characteristics are highlighted and then transferred to a Microsoft Word table where the source, with page number, and characteristic are documented. In addition, key words and/or phrases are bolded in order to demonstrate the key aspects of the characteristic. The results are presented in Appendix B.

To assist in understanding and quantifying the coding results, duplicate characteristics are removed and the various remaining characteristics are collapsed into six main topic categories. This step accounts for the fact that although a characteristic may be considered "unique", it often tends to align with other similar characteristics. Figure 4 presents the six main characteristics and the sub-category characteristics that are grouped within each one.

Unique Global Virtual Team Characteristics: Six Main Categories	**Number of Articles**
#1 - Team members are geographically dispersed	**6**
• Team members can work in different time zones • Physical separation between team members • Team members have spatial and temporal independence • Team members have the capability to cross boundaries of space and time • Team members are geographically and often temporally distributed	
#2 - Teams are structured flexibly	**5**
• Teams are characterized by dynamic membership as people come and go in order to complete specific tasks • Teams provide the capability to provide a more flexible organizational response • Team members can be either full or part time to the project depending on task and experience • Team members can have distinct complementary areas of expertise • Teams can be characterized by a discrete lifecycle • Team members' roles change constantly because of the dynamic project process	

Unique Global Virtual Team Characteristics: Six Main Categories	Number of Articles
• Global virtual teams are a living system • Team members are flexible in that resources can be easily reassigned to respond to shifting opportunities"	
	4
#3 - Teams communicate predominantly through technology	
• Teams must have the correct ICT (technology) specific to a given situation • Teams rely on technology-mediated communication rather than face-to-face interaction • Teams rely on linking technologies for information, data and personal communication • Teams use technology to interact and collaborate between and among team members • Team members work predominately through ICT (technology and related tools) for communication, collaboration, coordination and information sharing	
	4
#4 - Team members are culturally diverse	
• Team members can differ in national, cultural and linguistic attributes • Teams can span functional, organizational and cultural boundaries	
	3
#5 - Team members demonstrate a high degree of task interdependence	
• The dispersed nature of virtual teams requires members to be able to work with a high degree of task interdependence • A global virtual team is a functioning project team in that there are interdependencies in task management, shared responsibility and relationship management • Because virtual teams need higher levels of interdependence in roles, individual members require correspondingly higher levels of relative independence and voluntary behavior	
	1
#6 - Team members lack shared work experience	
• Teams frequently do not have the opportunity to develop good working relationships • Team members exhibit different ICT (technology) skill levels	

Figure 4: Unique Global Virtual Team Characteristics: Six Main Categories

Related Project Management Challenges – Report of Stage 2 Data Analysis

Once the unique characteristics of global virtual teams are identified and documented, stage 2 coding is performed. During the stage 2 coding process, references are analyzed a second time looking specifically for words/phrases directly related to project management challenges associated with unique characteristics of the global virtual team. This coding process is conducted at the concept level utilizing the definition of the term "Challenge" as the guide. For purposes of this research paper, challenge is defined as any condition that does not foster a "collaborative interactive permissive space where global virtual team members are actively encouraged to engage in regular and frequent reciprocal cross-cultural exchange of ideas and the creation of new team-created solutions" (Zakaria, Amelinckx and Wilemon, 2004 p.15-16). As the coding process is conducted, terms and/or phrases that align with the definition are identified.

As references are coded, key words and/or phrases are highlighted and transferred to a Microsoft Word table where the challenge is associated with a characteristic of global virtual teams. The source and specific page number where the challenge is found within a given reference are noted. In addition, key words and/or phrases are bolded in order to better identify the specific challenge. The results presented in Appendix C are collapsed into a set of summary tables created to categorize the challenges identified in relation to each characteristic. The process used in this larger categorization effort was to look at the bolded words and/or phrases and group those that reflect similar concerns. For example, challenges concerning aspects of communication are categorized under the

larger heading "*The need to communicate effectively"*. Figures 5 through 10 present the six main characteristics and their associated challenges and sub-category challenges.

5 Project Management Challenges Related to Unique Characteristic #1 – Team members are geographically dispersed

Project Management Challenges	# of Articles
Geographic Challenge #1 – The need to lead and manage the project	**6**

Project managers must be able to:

- Develop team relationships, because there are fewer opportunities for informal work and non-worked related conversation
- Articulate project goals and assign responsibilities to team members
- Provide continuous feedback throughout the life of the project
- Build team awareness regarding availability of team members, distribution of new or changed information, project status and resource day-to-day activities
- Surface and resolve issues quickly through ad-hoc discussions
- Execute performance management functions
- Perform team development functions
- Build a team identity and team dynamics
- Create an effective work environment
- Create a level of collaboration and productivity that will make the project team successful

Geographic Challenge #2 - The need to build trust	**3**

Project managers must be able to:

- Build trust because the process is slower and more difficult to develop at a distance
- Build trust because identifying with team members is far more difficult for distributed team members joining global virtual teams from vastly different cultures
- Build trust because people unaccustomed to working with others they have never met in person may operate with a distrustful attitude

Geographic Challenge #3 –The need to communicate effectively	**3**

Project managers must be able to:

- Communicate among sub-groups in which information may not be reported to the whole team, thus leading to unfair information sharing
- Communicate as team members attempt to interact, share meaning, and reach

consensus in the absence of rich face-to-face interaction
- Communicate failures to the whole team, in large part because global virtual teams lack the visual and auditory cues that can be transmitted by face-to-face teams

Geographic Challenge #4 - The need to coordinate effectively	**3**
Project managers must be able to: • Provide greater project coordination in order to avoid delays because of the mix of national cultures and time zone differences • Manage in the increased coordination costs due to the numerous external and internal relationships that must be managed across time and space • Coordinate in ways that add a sense of team engagement with team objectives because team members not collocated will not collaborate	
Geographic Challenge #5 – The need to achieve commitment among team members	**2**
Project managers must be able to: • Align team members for best productivity • Make sure each team member is committed to the team's purpose	

Figure 5: Challenges related to Unique Global Virtual Team Characteristic #1: Geographically Dispersed

2 Project Management Challenges Related to Unique Characteristic #2 – Teams are structured flexibly	
Project Management Challenges	**# of Articles**
Structural Flexibility Challenge #1 - The need to lead and manage the project	**5**
Project managers must be able to:	
• Build trust, cohesion and relationships with a short-duration project activity • Over allocate team resources because of the possibility of team members being assigned to too many projects • Feel committed to one particular project • Adjudicate, when project teams compete for the same resources • Keep up team performance and synergy with competing pressure from other team member projects • Be highly flexible individuals • Establish structures and norms in virtual teams with more discrete lifecycles - i.e. teams that are formed quickly and then disbanded • Recognize problems and the ability to determine an appropriate course of action because there are no established operating patterns • Maintain performance management functions as team members hold multiple roles • Bring the team together virtually, through synchronous or asynchronous means of communication and interaction • Learn how to create agendas for virtual team events, as a way to address multiple time-related issues and help tie the overall project schedule together	
Structural Flexibility Challenge #2 - The need to develop the virtual project team	**4**
Project managers must be able to:	
• Work within short development lifecycles and dynamic memberships • Maintain developmental functions as team members hold multiple roles • Understand the eccentricities with the project team lifecycle, for example there are two major points in a global virtual team lifecycle when stress is predictable - at the beginning and at the end of the project	

Figure 6: Challenges related to Unique Global Virtual Team Characteristic #2: Structurally Flexible

5 Project Management Challenges Related to Unique Characteristic #3 – Teams communicate predominantly through technology	
Project Management Challenges	**# of Articles**
Communicate through technology Challenge #1 – The need to coordinate work ***Project managers must be able to:*** • Avoid time delays in communication via technology	**3**
Communicate through technology Challenge #2 – The need to resolve conflict ***Project managers must be able to:*** • Resolve conflict through technology in a timely manner, without prolonging the final resolution • Use technology effectively as sole communication tool to resolve conflicts	
Communicate through technology Challenge #3 – The need to establish social presence ***Project managers must be able to:*** • Use technology as a way to build a sense of presence among team members, with minimum misinterpretations and misunderstandings • Use technology in a way that limits erroneous stereotypes that can be made in the absence of more complex (rich) information	**2**
Communicate through technology Challenge #4 – The need to select the most effective technology ***Project managers must be able to:*** • Identify technologies that are appropriate for certain tasks	**2**
Communicate through technology Challenge #5 – The need to work with varied technology skills ***Project managers must be able to:*** • Provide training around the use of shareware and other technology platforms • Establish a common (or at least compatible) set of technology tools	**2**

Figure 7: Challenges related to Unique Global Virtual Team Characteristic #3: Communication Predominantly through Technology

3 Project Management Challenges Related to Unique Characteristic #4 – Team members are culturally diverse

Project Management Challenges	# of Articles
Cultural diversity Challenge #1 - The need to communicate effectively	**6**

Project managers must be able to:

- Accommodate a variety of languages within project teams
- Understand the specific cultural diversity within the team and be able facilitate communication between and among team members
- Identify language and cultural issues that can hamper verbal communication and lead to misunderstandings
- Attend to the fact that team members may not have any experience in working across borders so there may be challenges related to developing intercultural communication competence in team members
- Find ways in which culturally different groups can understand each other better by optimizing the use of technologies and techniques both in training programs and re-world operations
- Relate to different languages and cultures and the amount of misunderstandings or lack of contribution
- Understand cross-cultural differences. For instance in some cultures non-verbal cues may pose certain difficulties for those that rely more on body language, gestures, facial expressions and proximity for understanding

Cultural diversity Challenge #2 - The need to lead and manage the project	**3**

Project managers must be able to:

- Know that project team members filter information through their cultural lenses, thereby giving rise to a potentially broad range of misinterpretations or distortions
- Understand that cultures vary in their sense of urgency or timing to complete projects and to meet deadlines
- Work within different leadership constructs and expectations, while avoiding difficulties in creating effective team leadership in a global virtual team
- Manage conflict and detect the existence of conflict
- Determine how to best manage performance of team members who span different functional areas, organizations, and/or, cultures

Cultural diversity Challenge #4 - The need to build trust	**2**

Project managers must be able to:

- Create trust within the project team members of varied cultures
- Develop relationships among team members who do not have a shared or

common understanding of each other and/or the nature of the team itself

Figure 8: Challenges related to Unique Global Virtual Team Characteristic #4: Cultural Diversity

2 Project Management Challenges Related to Unique Characteristic #5 – Team members demonstrate a high degree of task interdependence	
Project Management Challenges	**# of Articles**
Task Interdependence Challenge #1 – The need to lead and manage the project ***Project managers must be able to:*** • Keep non-committed project team members from free-riding on other team members • Develop common goals because most often team members bring different goals and agendas to their team's efforts from the start	**2**
Task Interdependence Challenge #2 –The need to communicate and coordinate effectively ***Project managers must be able to:*** • Coordinate an intensive use of technology which can add complexity to communication within an interdependent team environment	**1**

Figure 9: Challenges related to Unique Global Virtual Team Characteristic #5: Task Interdependence

2 Project Management Challenges Related to Unique Characteristic #6 – Team members lack shared work experience	
Project Management Challenges	**# of Articles**
Shared work experience Challenge #1 – The need to manage dysfunctional conflicts ***Project managers must be able to:*** • Identify and handle conflicts early among estranged team members so that they do not become dysfunctional	**1**
Shared work experience Challenge #2 – The need to build trust ***Project managers must be able to:*** • Define, discuss and model exemplary trust behavior in all areas of the working relationship	**1**

Figure 10: Challenges related to Unique Global Virtual Team Characteristic #6: Lack Shared Work Experience

Chapter Five – Conclusion

Global Virtual Team Characteristic and Challenge Reference Guide

The notion from Gray and Larson (2006) that it is a much greater challenge to build a project team when members cannot engage in face-to-face interactions provides a good way to summarize the purpose of this research paper. The premise for this study is that global virtual teams are the wave of the future. Kirkman, Rosen, Gibson, Tesluk and McPherson (2002) state, "as organizations expand globally, the need to tap the talents, experience, and special skills of employees working in distant locations will increase", but "creating and supporting virtual teams is a very difficult assignment" (p.77). These authors believe that by identifying challenges, difficulties and learning from past experiences, project management professionals will be better prepared to develop a global virtual project team (Kirkman, Rosen, Gibson, Tesluk and McPherson, 2002).

In order for global virtual project teams to be successful, project managers need a better understanding of the unique characteristics and related project management challenges of global virtual teams, as they function in companies with worldwide interests in technology-based environments.

The purpose of this study is to identify the unique characteristics of global virtual teams. In summary, the six unique characteristics of global virtual teams are identified (see details in Figure 4):

1) Team members are geographically dispersed;

2) Teams are structured flexibly;
3) Teams communicate predominantly through technology;
4) Team members are culturally diverse;
5) Team members demonstrate a high degree of task interdependence; and
6) Team members lack shared work experience.

In order to work successfully within these unique global virtual team characteristics, project managers must possess specific skills, in order to be able to address a significant number of challenges (see details in Figures 5 – 10). They must learn how to lead and manage teams at a distance and across multiple cultures. In order to engage participation and commitment to project goals, they need to be able to build trust among varied members from different cultures and with different expectations and skills. They must know how to recognize and address conflict before the team becomes dysfunctional. Time is a big concern – in terms of time management, time zones and cultural notions of time. The need to select the right technology and design strategies that support effective communication and efficient project coordination, through the technology medium, is central.

The final outcome of this research study is a reference guide (see Appendix A) that can be used by professionals within the project management field as a basis for a better understanding of the project management challenges associated with global virtual teams and the leadership skills needed to address them. The reference guide aligns the six main characteristics of global virtual teams with the related project management

challenges for easy review. Ellis (1996) phrases the need of the global virtual team manager best when he states that,

> The PM of tomorrow will no longer call weekly status meetings where all of the team members meet in the same room but rather the same forum. The Virtual Team will be a more geographically dispersed, diverse culture, and varied in disciplines. With this in mind the Virtual Project Manager will need to understand this diversity and be able to use it to the advantage of the project (p.2-3).

As noted by Zakaria, Amelinkx and Wilemon (2004), the overall success of a global virtual project team and the "ability to create a knowledge-sharing culture within a global virtual team rests on the existence (and maintenance) of intra-team respect, mutual trust, reciprocity and positive individual and group relationships" (p.1). Although the virtual team relies on technology, there is a "human component" (Zakaria, Amelinckx and Wilemon, 2004, p.1) that fosters an environment where the global virtual team can succeed. This is obvious by the quantity of challenges categorized under the heading, *GVTs are Geographically Dispersed*, in the Reference Guide (see Appendix A). Lipnack and Stamps (2000) state it best when they make the comment that "successful collaborative work requires 90 percent people and 10 percent technology" (p. 28). It is this human component for all global virtual project team management that becomes very important and should be stressed by all project management professionals.

APPENDIX A

Global Virtual Team Characteristics and Related Project Management Challenges: A Reference Guide

GVTs are geographically dispersed	GVTs are structured flexibly	GVTs communicate predominantly through technology	GVTs are culturally diverse	GVTs exhibit a high degree of task interdependence	GVTs lack shared work experience
Project managers must be able to: • Develop team relationships, because there are fewer opportunities for informal work and non-worked related conversation • Articulate project goals and assign responsibilities to team members • Provide continuous feedback throughout the life of the project • Build team awareness regarding availability of team members, distribution of new or changed information, project status and resource day-to-day activities	**Project managers must be able to:** • Build trust, cohesion and relationships with a short-duration project activity • Over allocate team resources because of the possibility of team members being assigned to too many projects • Feel committed to one particular project • Adjudicate, when project teams compete for the same resources • Keep up team performance and synergy with competing pressure from other team member projects	**Project managers must be able to:** • Avoid time delays in communication via technology • Resolve conflict through technology in a timely manner, without prolonging the final resolution • Use technology effectively as sole communication tool to resolve conflicts • Use technology as a way to build a sense of presence among team members, with minimum misinterpretations and misunderstandings • Use technology in a way that limits erroneous	**Project managers must be able to:** • Accommodate a variety of languages within project teams • Understand the specific cultural diversity within the team and be able facilitate communication between and among team members • Identify language and cultural issues that can hamper verbal communication and lead to misunderstandings • Attend to the fact that team members may not have any experience in working across borders so there may be	**Project managers must be able to:** • Keep non-committed project team members from free-riding on other team members • Develop common goals because most often team members bring different goals and agendas to their team's efforts from the start • Coordinate an intensive use of technology which can add complexity to communication within an interdependent team environment	**Project managers must be able to:** • Identify and handle conflicts early among estranged team members so that they do not become dysfunctional • Define, discuss and model exemplary trust behavior in all areas of the working relationship

GVTs are geographically dispersed	GVTs are structured flexibly	GVTs communicate predominantly through technology	GVTs are culturally diverse	GVTs exhibit a high degree of task interdependence	GVTs lack shared work experience
• Surface and resolve issues quickly through ad-hoc discussions • Execute performance management functions • Perform team development functions • Build a team identity and team dynamics • Create an effective work environment • Create a level of collaboration and productivity that will make the project team successful • Build trust because the process is slower and more difficult to develop at a distance • Build trust because identifying with team members is far more difficult for distributed team members joining global virtual teams from vastly different cultures	• Be highly flexible individuals • Establish structures and norms in virtual teams with more discrete lifecycles - i.e. teams that are formed quickly and then disbanded • Recognize problems and the ability to determine an appropriate course of action because there are no established operating patterns • Maintain performance management functions as team members hold multiple roles • Bring the team together virtually through synchronous or asynchronous means of communication and interaction • Learn how to create agendas for virtual team events, as a way to address multiple time-related	stereotypes that can be made in the absence of more complex (rich) information • Identify technologies that are appropriate for certain tasks • Provide training around the use of shareware and other technology platforms • Establish a common (or at least compatible) set of technology tools	challenges related to developing intercultural communication competence in team members • Find ways in which culturally different groups can understand each other better by optimizing the use of technologies and techniques both in training programs and re-world operations • Relate to different languages and cultures and the amount of misunderstandings or lack of contribution • Understand cross-cultural differences. For instance in some cultures non-verbal cues may pose certain difficulties for those that rely more on body language, gestures, facial expressions and proximity for understanding		

GVTs are geographically dispersed	GVTs are structured flexibly	GVTs communicate predominantly through technology	GVTs are culturally diverse	GVTs exhibit a high degree of task interdependence	GVTs lack shared work experience
• Build trust because people unaccustomed to working with others they have never met in person may operate with a distrustful attitude • Communicate among sub-groups in which information may not be reported to the whole team, thus leading to unfair information sharing • Communicate as team members attempt to interact, share meaning, and reach consensus in the absence of rich face-to-face interaction • Communicate failures to the whole team, in large part because global virtual teams lack the visual and auditory cues that can be transmitted by face-to-face teams • Provide greater project coordination in order to avoid delays because of the mix of	issues and help tie the overall project schedule together • Work within short development lifecycles and dynamic memberships • Maintain developmental functions as team members hold multiple roles • Understand the eccentricities with the project team lifecycle, for example there are two major points in a global virtual team lifecycle where stress is predictable, at the beginning and end of the project		• Know that project team members filter information through their cultural lenses, thereby giving rise to a potentially broad range of misinterpretations or distortions • Understand that cultures vary in their sense of urgency or timing to complete projects and to meet deadlines • Work within different leadership constructs and expectations, while avoiding difficulties in creating effective team leadership in a global virtual team • Manage conflict and detect the existence of conflict • Determine how to best manage performance of team members who span different functional areas, organizations, and/or, cultures		

GVTs are geographically dispersed	GVTs are structured flexibly	GVTs communicate predominantly through technology	GVTs are culturally diverse	GVTs exhibit a high degree of task interdependence	GVTs lack shared work experience
national cultures and time zone differences • Manage in the increased coordination costs due to the numerous external and internal relationships that must be managed across time and space • Coordinate in ways that add a sense of team engagement with team objectives because team members not collocated will not collaborate • Align team members for best productivity • Make sure each team member is committed to the team's purpose			• Create trust within the project team members of varied cultures • Develop relationships among team members who do not have a shared or common understanding of each other and/or the nature of the team itself		

APPENDIX B

Report of Content Analysis Stage 1 – Identifying Unique Characteristics in the Literature

Appendix B documents the recording of unique characteristics identified through content analysis (stage 1) of the selected references. Characteristics are aligned with specific references.

Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams, Norhayati Zakaria, Andrea Amelinckx and David Wilemon (2004)

- Team members are **geographically dispersed** (p.2)
- **Rely on technology mediated communication** rather than face-to-face interaction to accomplish tasks (p.2).
- A global virtual team is an **actual functioning team** in that there is interdependence in task management, shared responsibility and relationship management (p.2).
- Team members who **differ in national, cultural and linguistic attribute** (p.3).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- Works **predominately** through ICT (technology related tools) for communication, collaboration, coordination and information sharing (p.4).
- Can be **geographically dispersed** (p.11).
- Obtaining the **correct ICT (technology)** specific to a given situation (p.9).
- Team members will have **different skill levels** of the use of ICT (technology) (p.10).
- Teams are **flexible** in that they can be assembled temporarily in order to accomplish specific tasks or on a more permanent basis to address on-going issues (p.12).
- Prior **shared work experience**. As project teams are brought together members might have or might not have worked together in the past (p.12).
- Project team members can be either **full time or part time** to the project depending on task and experience (p.12).
- Because team members are dispersed there is a higher degree of **task interdependence** (p.13).
- **Cultural diversity** (p.14).

Virtual Team Interaction Styles: Assessment and Effects, Richard E. Potter and Pierre A. Balthazard (n.d.)

- Virtual team members have **distinct complimentary areas of expertise** (p.3).
- Team members are **geographically and often temporally distributed** (p.3).

- Allows for **flexibility** and responsiveness permitting team members to rapidly assemble dispersed and disparate experts into a virtual team (p.4).
- **Use of technology** to interact and collaborate between team members (p.4).

Going Global: Using Information Technology to Advance the Competitiveness Of the Virtual Transnational Organization, Marie-Claude Boudreau, Karen D. Loch, Daniel Robey and Detmer Straub, (1998)

- Relative **spatial and temporal independence** - geographical boundaries can be easily transcended (p.8).
- **Flexibility** - where resources can be easily reassigned to respond to shifting opportunities in global markets (p.8).

Crossing Oceans and Firewalls Project Management for Virtual Teams, Brigitte Hayes (2003)

- **Physical separation** between team members (p.1).
- Team members **working in different time zones** (p.2).
- **Cultural diversity** (p.2)**.**

Virtual Teams People Working Across Boundaries with Technology, Jessica Lipnack and Jeffrey Stamps (2000)

- Global virtual teams are a living system. Teams are made up of people with **interdependent roles and a web of relationships aligned through shared purpose** (p.125).
- Virtual Teams need **higher levels of interdependence in roles**, they require correspondingly **higher levels of relative independence** and voluntary behavior in the individual members (p.175)
- **Role flexibility** because the project process is dynamic and roles change constantly (p.174).

A Typology of Virtual Teams: Implications for Effective Leadership, Bradford S. Bell and Steve W. J. Kozlowski (2002)

- The most critical and important feature of virtual teams is that they **cross boundaries of space and time** (p.13).
- **Reliance on linking technologies** for information, data and personal communication (p.15).
- Virtual teams can **span functional, organizational and cultural boundaries** (p.27).
- Virtual teams are characterized by a **discrete lifecycle** (p.30).
- Characterized by **dynamic membership** as people come and go as they complete specific tasks (p.30).
- Virtual teams provide the capability for **more flexible organizational response -**

meaning that roles attributed to virtual team members will often be substantially more dynamic than in traditional settings (p.31)

APPENDIX C

Report of Content Analysis Stage 2 – Identifying PM Challenges in the Literature

Appendix C documents the recording of project management challenges, identified through content analysis (stage 2) of the selected references. Challenges are listed as they relate to each of the six main unique global virtual team characteristics.

#1 - Team members are geographically dispersed

Managing the life cycle of virtual teams, Furst, Reeves, Rosen & Blackburn (2004)

- Challenge of developing team relationships because there are **fewer opportunities for informal work and non-worked related conversations** (p.8).
- The challenge of building **trust because the process is slower** and more difficult to develop (p.8).

Leadership Challenges in Global Virtual Teams: Lessons from the Field, Kenneth W. Kerber and Anthony F. Buono (2004)

- **Achieving alignment and commitment to the team's purpose** are far more challenging for virtual teams (p.1).
- The challenge is to **create a level of collaboration and productivity** that rivals the experience of the best collocated teams (p.2).

The Global Virtual Manager: A Prescription for Success, Leidner and Kayworth (1999b)

- Virtual teams potentially face a much **greater strain on communications** as team members attempt to interact, share meaning, and reach consensus in the absence of rich face-to-face interaction (p.19).
- Challenges for the project manager to be able to **articulate project goals** and to **assign responsibilities** to team members (p.15).
- Challenges for the project manager to **provide continuous feedback** throughout the life of the project (p.16).

Working Together Virtually: The Care and Feeding of Global Virtual Teams, Julia Loughran (2000)

- Can experience **communication failures** in large part because global virtual teams lack the visual and auditory cues that can be transmitted by face-to-face teams (p.5).
- Challenges related to **building trust** because identifying with team members is far more difficult for distributed team members joining global virtual teams from vastly different cultures (p.6).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- Getting **alignment** and **commitment** to work are more difficult (p.9).
- **Communication challenges** among sub-groups in which information may not be reported to whole team, thus leading to unfair information sharing (p.11).
- Challenges related to a mix of **national cultures** and **time zone differences**. Such challenges can create delays and necessitate greater coordination (p.11).

Going Global: Using Information Technology to Advance the Competitiveness Of the Virtual Transnational Organization, Marie-Claude Boudreau, Karen D. Loch, Daniel Robey and Detmer Straub, (1998)

- Virtual teams have greater challenges as it relates to **coordination** (p.11)**.**

At the Edge of the Enterprise - where Challenges meets Results, Brigitte Hayes and Florent Buiron, (2005)

- Challenges in **creating an effective work environment** because many times critical information is not readily available and distribution means are not effective (p.1).
- Challenges related to a **lack of trust** because people unaccustomed to working with others they have never met in person may operate with a distrustful attitude (p.2)
- Challenges in **building a team identity and team dynamics**. The lack of a physical gathering place can impact the sense of belonging to a team, resulting in disengagement and lack of motivation (p.2).

Crossing Oceans and Firewalls Project Management for Virtual Teams, Brigitte Hayes (2003)

- Challenges related to lack of **coordination and there not being a sense of team and disengagement from team objectives** (p.1).
- Challenges related to **general team awareness** such as availability of team members, distribution of new or changed information, project status and resource day-to-day activities (p.1).
- Challenges related to the **inability to surface and resolve issues quickly** through ad-hoc discussions (p.2).

A Typology of Virtual Teams: Implications for Effective Leadership, Bradford S.

Bell and Steve W. J. Kozlowski (2002)

- Challenges for leaders to execute **performance management functions** (p.34).
- Challenges in performing **team development functions** (p.35).

#2 - Teams are structurally flexible

Managing the life cycle of virtual teams, Furst, Reeves, Rosen & Blackburn (2004)

- Challenges in **keeping up team performance and synergy** with competing pressure from other team member projects (p.8).
- Challenges relate in how to **coordinate work and accomplish team objectives** when team members are in different work settings (p.9).

The Global Virtual Manager: A Prescription for Success, Leidner and Kayworth (1999b)

- Challenges for a project manager to be **highly flexible** (p.16).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- Challenges related to **team building** because of the possibility of a teams short life-cycle (p.12).
- Challenges in building **trust, cohesion and relationships** with a short-duration project activity (p.12).
- Challenges related to **over allocated team resources** because of the possibility of team members being assigned to too many projects (p.12).
- Challenges related to **feeling committed** to one particular project (p.13).
- Resource allocation challenges arise when project teams have to **compete for the same resources** (p.13).

Going Global: Using Information Technology to Advance the Competitiveness Of the Virtual Transnational Organization, Marie-Claude Boudreau, Karen D. Loch, Daniel Robey and Detmer Straub, (1998)

- Virtual teams have greater challenges are it relates to **coordination** (p.11)**.**

Virtual Teams People Working Across Boundaries with Technology, Jessica Lipnack and Jeffrey Stamps (2000)

- Challenges related to the **eccentricies with the project team lifecycle** (p.128).
- **Coming together** is a major challenges for virtual teams (p.133)
- Challenge in learning how to **create agendas for virtual team events** (p.134).

A Typology of Virtual Teams: Implications for Effective Leadership, Bradford S.

Bell and Steve W. J. Kozlowski (2002)

- There are challenges for leaders to **establish structures and norms in virtual teams with more discrete lifecycles** - i.e. teams that are formed quickly and then disbanded (p.38).
- Challenges related to **recognizing problems and the ability to determine an appropriate course of action** because there are no established operating patterns (p.38).
- Teams with short-lifecycles and dynamic memberships have challenges in **team development** (p.39).
- When team members hold multiple roles there are new challenges in **maintaining performance management functions** (p.40)
- When team members hold multiple roles there are new challenges in **maintaining developmental functions** (p.41)

#3 - Teams communicate predominantly through Technology

Managing the life cycle of virtual teams, Furst, Reeves, Rosen & Blackburn (2004)

- Challenge of trying not to make **erroneous stereotypes** in absence of complete information (p.8).
- Challenges of trying to **resolve prolonged conflicts** through the use of technology (p.9).
- **Challenges of controlling misunderstandings** that may occur more readily between team members (p.9).
- Challenges related to **identifying technologies** that are appropriate for certain tasks (p.8).
- Challenges in creating new **habits around the use of shareware and other technology platforms** which will allow team members to share and archive information (p.9).

The Global Virtual Manager: A Prescription for Success, Leidner and Kayworth (1999b)

- Challenges related to **difficulties that project team members experience with the technology** used to communicate (p.22).
- Challenges related to the **time delays in communication** (synchronous versus asynchronous) (p.10).
- Challenges related to the **limitations in the ICT** (technology) used (p.11).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- **Coordinating** work and **resolving** conflict are more difficult (p.9).
- Because technology can be **limited** in **social presence** and **information richness**, there are challenges related to interpretations and misunderstandings (p.9).

#4 - Team members are culturally diverse

The Global Virtual Manager: A Prescription for Success, Kayworth and Leidner (1999b)

- Challenges related to project team members **filtering information through their cultural lenses**, thereby giving rise to a potentially broad range of misinterpretations or distortions (p.12).
- Cultural diversity can create additional **communication challenges** for team members (p.12).
- Challenges related to how cultures vary in their **sense of urgency or timing to complete projects and to meet deadlines** (p.13).

Working Together Virtually: The Care and Feeding of Global Virtual Teams, Julia Loughran (2000)

- The challenge is to **find ways in which culturally different groups can understand each other** better by optimizing the use of technologies and techniques both in training programs and re-world operations (p.5).

Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams, Norhayati Zakaria, Andrea Amelinckx and David Wilemon (2004)

- Because different cultural groups have different leadership constructs and expectations there are challenges related to **creating effective team leadership** in a global virtual team (p.7).
- Because addressing conflict situation and even detecting the existence of conflict is not always straight forward in various cultures there are challenges related to **managing conflict and global virtual team dynamics** (p.7).
- When interacting with team members from different cultures there are challenges related to **understanding cross-cultural differences**. For instance in some cultures non-verbal cues may pose certain difficulties for those that rely more on body language, gestures, facial expressions and proximity for understanding (p.9).
- When global team members do not have a shared or common understanding of each other and/or of the nature of the team itself there are challenges in **developing trust and relationships** (p.8).
- When global virtual teams are developed team members may not have any experience in working across borders so there may be challenges related to **developing intercultural communication competence** in team members (p.9).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- Different national cultures come with a variety of languages which amplify **challenges with communication and/or coordination** (p.14).

- Challenges in **creating trust** within the project team members (p.14)

At the Edge of the Enterprise - where Challenges meets Results, Brigitte Hayes and Florent Buiron, (2005)

- Challenges related to **different languages and cultures** and the amount of misunderstandings or lack of contribution related to these challenges (p.2).

Crossing Oceans and Firewalls Project Management for Virtual Teams, Brigitte Hayes (2003)

- Challenges related to **languages and cultural issues** that can hamper verbal communication and lead to misunderstandings (p.2).

A Typology of Virtual Teams: Implications for Effective Leadership, Bradford S. Bell and Steve W. J. Kozlowski (2002)

- Challenges for leaders to determine **how to best manage performance of team members who span different functional areas, organizations, and/or, cultures** (p.36).
- **Team development functions** are also more challenging as virtual teams are distributed across different organizations, cultures, and functions (p.37).

#5 - Team members demonstrate a high degree of task interdependence

Managing the life cycle of virtual teams, Furst, Reeves, Rosen & Blackburn (2004)

- Challenges related to **keeping non-committed project team members from free-riding** on other team members (p.10).

Working Together Virtually: The Care and Feeding of Global Virtual Teams, Julia Loughran (2000)

- There are difficulties in **developing common goals** because most often team members bring different goals and agendas to their team's efforts from the start (p.5).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- There are additional requirements for **more communication and coordination** among team members which is made even more complex due to intensive use of technology (p.14).

#6 - Team members lack shared work experience

Managing the life cycle of virtual teams, Furst, Reeves, Rosen & Blackburn (2004)

- If there is not a leader then challenges arise that are related to **building trust** for project teams that do not have a prior working relationship (p.11).

The Multifaceted Nature of Virtual Teams, Dube & Pare (2004)

- Challenges related to teams that have not worked together and which are vulnerable to **dysfunctional conflicts** (p.12).

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