

**A CASE STUDY EXPLORATION OF RISK IDENTIFICATION AND RISK
MANAGEMENT IN A VIRTUAL PROJECT TEAM SETTING**

by

Jorge Regueira, Jr.

MARC MUCHNICK, PhD, Faculty Mentor and Chair

ROBIN PARRY, PhD, Committee Member

JOHN MACHNIC, PhD, Committee Member

Rhonda Capron, Ed.D, Dean, School of Business and Technology

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Capella University

September 2016

ProQuest Number: 10179214

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10179214

Published by ProQuest LLC (2016). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

© Jorge Regueira, Jr., 2016

Abstract

This qualitative case study identifies risk management issues and effective risk management practices used to mitigate the risk issues faced by virtual project teams. Virtual project team members and virtual project managers provided data through a survey which gave insights into the risk virtual project teams face. The participants in the study had relevant experience in the area of virtual projects as a team member or manager. The organization selected for this study was a United States based consulting firm offering technical and management resources to companies in need of these services. Results of the study aligned with the two research questions. The results of the study aligned with the research questions what are the risk management issues faced by virtual project teams and what are risk management practices that are effective in mitigating the risk issues faced by virtual project teams. Study results indicated five project risk areas that impact virtual project teams and three risk management practices that can give virtual project teams the ability to mitigate risk. The Identified virtual project team risk and management practices were further expanded through triangulation of the data collected on virtual project risk shows that 40% had issues with attendance and engagement on calls, 30% felt the need for new higher training was delayed or lacking, 50% identified technology was inadequate, 30% mentioned that communication was the cause of project risk, and 50% of participants stated that language differences impacted communication on project call which could lead to project risk. Additionally, the participants provided areas that would help mitigate the risk potential on virtual project teams. 25% identified planning as an area that would increase the success of a project,

25% stated that better transition and training of new employs was key, and 30% mentioned that improving technology.

Dedication

I dedicate this dissertation to my daughters Ashley and Kayla Regueira. With hard work and dedication anything you put your mind to can be accomplished.

Acknowledgments

I acknowledge Dr. Marc Muchnick whose firm but understanding guidance made it possible for the completion of this project. Additionally, I would like to thank all the participants who provide their time which allowed me to complete a difficult part of this project.

Table of Contents

Acknowledgments	iv
List of Tables	vii
List of Figures	viii
CHAPTER 1. INTRODUCTION	1
Introduction to the Problem	1
Background of the Study	2
Statement of the Problem	3
Purpose of the Study	3
Rationale	4
Research Questions	5
Significance of the Study	5
Definition of Terms	7
Assumptions and Limitations	8
Nature of the Study / Theoretical/Conceptual Framework	10
Organization of the Remainder of the Study	12
CHAPTER 2. LITERATURE REVIEW	13
Theoretical Framework: Open System Theory	13
Foundational Studies on Virtual Project Team Risks and Risk Management	17
Virtual Project Teams	23
Conclusion	43
CHAPTER 3. METHODOLOGY	46
Research Design and Methodology	46
Sample	48
Instrumentation/Data Measures	49
Data Analysis	53
Validity and Reliability	55
Ethical Considerations	57
Summary of Methodology	58
CHAPTER 4. RESULTS	60
Introduction	60

Description of the Sample	60
Findings	62
Conclusions	92
Summary	94
CHAPTER 5. DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS	95
Introduction	95
Research Summary	95
Discussion of Results	100
Implications of the Study Results	111
Limitations	116
Recommendations for Further Research	118
Conclusion	119
REFERENCES	122
APPENDIX A. STATEMENT OF ORIGINAL WORK	132
APPENDIX B. INTERVIEW QUESTIONS	134

List of Tables

Table 1. Expert Panel Qualifications	50
Table 2. Demographic Characteristics of Sample.....	61
Table 3. Project Planning Risk Management Issues.....	63
Table 4. Losing or Adding a Virtual Project Team Member Risk Management Issues	66
Table 5. Technology Risk Management Issues	68
Table 6. Risk Management Issues Related to the Nature of the Virtual Environment.....	70
Table 7. Risk Management Issues Related to Communication	73
Table 8. Cultural and Language Differences Contributing to Communication Issues	75
Table 9. Project Planning Risk Management Practices	77
Table 10. Risk Management Practices to Mitigate Issues with Team Member Changes..	81
Table 11. Technology Risk Management Practices.....	82
Table 12. Risk Management Practices Related to the Nature of the Virtual Environment	84
Table 13. Communication Related Project Management Practices	85
Table 14. Practices to Accommodate Cultural and Language Differences	88
Table 15. Additional Support, Resources, and Recommendations for Risk Management	92

List of Figures

Figure 1. Conceptual Framework.....	11
-------------------------------------	----

CHAPTER 1. INTRODUCTION

Introduction to the Problem

As collaboration becomes increasingly important in developing the knowledge that makes business organizations more competitive in their respective industries, virtual project teams have grown in popularity (Plazas, 2012). More organizations strive to compete in their dynamic environments by using virtual project teams. The rapid advancements of new communication technologies have further accelerated the trend such that today, it has become a norm for larger organizations to employ virtual project teams to some degree (Reed & Knight, 2010). These flexible and adaptable organizations use virtual project teams as one of the primary methods to attain higher levels of responsiveness and efficiency.

With virtual project teams, there is a growing trend towards simultaneous and parallel working within organizations. According to Raisinghani et al. (2010), the trend in using virtual project teams is not likely to suffer a decline in the coming years. Instead, the opposite is more likely, because of increased costs in traveling, more deadlines, tighter schedules, as well as higher expectations to provide quality for deliverables. Information technologies and internet-based platforms sustain companies' growth and progress as teams work and interact using these mediums. (Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015; Nunmaker, Reining, & Briggs, 2009).

In response to the constant demands of change and the pressures of global expansion, organizations have become compelled to utilize their team members more strategically and efficiently (Beranek & Clairborne, 2012; Reed & Knight, 2010). However, despite the recognition that virtual project teams can lead to higher efficiency, there exist various management and employee challenges affecting the effectiveness of virtual project teams.

These challenges can lead to huge risks or adverse effects for the organizations. However, there remain a dearth of literature determining what specific adverse effects can result from using virtual project teams and what risk management strategies was best to alleviate them.

Background of the Study

As more organizations move their project management efforts to a virtual setting, more research on the risks associated with these changes is necessary (Reed & Knight, 2010). Moreover, research on risks linked with costly project failure regarding the use of virtual project teams should be accompanied by the research on the strategies that would best effectively manage these risks (Morley, Cormican, & Folan, 2015; C. P. Scott & Wildman, 2015). Existing literature on project management revealed that risk management is critical for project success and avoidance of project problems, failures, and even huge scale disasters. Several researchers asserted that high project failure rates can be traced back to the lack of good risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011).

Many studies have shown that for co-located, or traditional face-to-face project teams, risk management practices are vital to their success. Project risks are essentially eliminated through sound risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011). Risks have also been studied using the lens of success factors and researchers who did so described the identification of risks as a facilitating function necessary for a project to be successful. The same can be said of virtual project teams. The very nature of such teams includes the absence of face-to-face interactions. Furthermore, members of virtual teams may be from different parts of the world which can pose additional significant challenges (Hertel & Orliowski, 2015).

Managing virtual project teams can pose some unique and distinctive challenges because of restricted opportunities for communication and limited, or no direct face-to-face interaction. As a result of these challenges, specific risks or adverse effects can potentially occur, requiring virtual project teams to plan and carry out organizational activities and objectives. More research is needed to study the unique challenges and the appropriate management strategies to address them (Hertel & Orliowski, 2015).

Statement of the Problem

Organizations are now more inclined to use virtual project teams because they can draw on the expertise of individuals residing in various parts of the world. Moreover, increasing evidence showed virtual project teams can be as productive as face-to-face teams. However, virtual project teams have unique risks management issues that should be considered (Loskutova, 2014; Moore, 2007). Earlier studies showed that virtual project teams can sometimes fail because of risk management issues that may include cultural differences and communication problems (Barnwell et al., 2012)

There were numerous challenges associated with organizations moving to a virtual project management setting. The risks related to achieving project success with the use of virtual project teams have increased. The specific problem is that due to these unique risks leading to project failures, more research needs to be done to elucidate the management strategies that can help organizations mitigate the risks of using virtual project teams in advance and help safeguard against project failures (Loskutova, 2014; Moore, 2007).

Purpose of the Study

The purpose of this study was twofold: first, to determine risk management issues faced by virtual project teams and second, to identify effective risk management practices in

an effort to mitigate the risk issues faced by virtual project teams. This study used a qualitative case study design with interview-based methodology to collect data. In addition, documentation and artifacts from the case setting was examined to address the research questions.

Rationale

There were a number of studies that provide scholarly support for the current research. Gilson et al. (2015) found project managers of virtual project teams still rely heavily on existing traditional project management risk identification and handling approaches. Such methods were designed originally for face-to-face or co-located teams. Furthermore, unique challenges have already been documented that plague virtual project teams. Communication issues, trust issues, and technological issues represent a few of the challenges found in the literature. Even if traditional teams also experience these issues, they may occur at greater intensity and frequency for virtual project teams, making the use of virtual project teams in handling important projects risky (Cascio, 2000). Dafoulas and Macaulay (2002) described how software development project teams had cultural differences that provided benefits and barriers on a project. According to Malhotra and Majchrzak (2004), the use of virtual project teams is starting to become commonplace yet the rapid growth of projects being handled by virtual project teams is not accompanied by customized processes and procedures, standards, methods or even guidelines on how to achieve success with virtual project teams.

In addition to the foundational studies mentioned, recent studies provide information related to the current study. Siebdrat et al. (2009) found the quality of task-related processes determines whether distance among team members can become a liability or an opportunity.

Gera (2013) designed a study comparing virtual project teams and face-to-face teams and found virtual project teams offer a structure enabling individuals to work for organizations notwithstanding the time and space. Gera (2013) found members of virtual project teams may be more prone to conflicts and encounter difficulties in making decisions but ultimately, there were no differences between face-to-face and virtual project teams' performance.

Knowing these risks can help virtual team leaders design communication lines that would make sure all team members were participating (Barnwell et al., 2012). The project manager of a virtual team acts as a liaison among all the stakeholders of the virtual team, the members of teams, as well as the home office (Barnwell et al., 2012). If project leaders are aware of the risks of virtual project teams, they can implement and maintain lines of communication better. In addition they can be more aware that everything affecting the flow of the information can also significantly shape the outcomes of the virtual project teams and their projects (Barnwell et al., 2012).

Research Questions

The proposed research study addressed the following questions within the context of the case setting:

RQ1: What are the risk management issues faced by virtual project teams?

RQ2: What are risk management practices that are effective in mitigating the risk issues faced by virtual project teams?

Significance of the Study

Constant economic and global changes challenge organizations and businesses alike to conform to a new work paradigm: performing tasks anytime and anywhere in actual or virtual spaces (Marginson & Bui, 2009). Research has clearly indicated that although the

utilization of virtual project teams is beneficial to organizations, challenges arise in association with the utilization of such teams (Moore, 2007). The virtual project team faces project risk issues, which should be mitigated to be successful in achieving their goals. The proposed study is timely and significant in that it may assist organizations to equip and empower virtual project teams with the knowledge that can optimize team performance (Nunmaker, Reining, & Briggs, 2009).

The findings of the study are expected to contribute to the growing body of knowledge regarding virtual project teams. Businesses that are cautious or reluctant to implement virtual work solutions may find that this study provides better knowledge of what the risks are associated with such teams and how they can best avoid these risks in a virtual business. Findings of the study may also help businesses better predict challenges and prepare strategies to resolve issues more effectively (Loskutova, 2014). Overall, the findings of the study are expected to be beneficial for companies entertaining the option of virtual project teams or those who already have virtual project teams. Virtual team leaders can make sure teams are productive and deliver on stakeholders requirements (Loskutova, 2014). Apart from these benefits to businesses, the academic field also may benefit from the findings. From an academic point of view, the findings of the study may lead to the development of theories about virtual work environments (Loskutova, 2014).

The study is also significant because even though the use of virtual project teams is a way for companies to respond to global demands, effective management of virtual project teams can provide unprecedented benefits (Loskutova, 2014). Virtual project teams have been observed and have the capacity to amplify the benefits of teamwork (Loskutova, 2014). The higher the degree of virtuality and diversity, the higher the potential benefits derived

from establishing an effective virtual team. In particular, if virtual project teams comprised of members with diverse perspectives, the chances of innovation occurring are higher (Loskutova, 2014). Moreover, for leaders to maximize virtual team effectiveness, they have to have a clear idea of the risks and barriers virtual project teams face. For virtual project teams to be effective, the members should have a clear understanding of their goals as well as the processes necessary to achieve them. Skilled virtual project team leaders know that communication lines can be affected by certain factors including various world views held by team members that may impact how they interpret issues and perceptions of their roles on the team. Leaders who are unaware that these differences may become risks, would not be equipped to manage the virtual project teams well (Loskutova, 2014).

Definition of Terms

Below are the definitions of key terms used in the study:

Project manager. This is defined as an employee responsible for overall project organization, planning, and resource management in order to successfully meet the project scope. A project manager is defined as a resource assigned by the organization to manage the project deliverables to achieve project goals (PMI, 2013).

Project team member. This refers to a group of people with certain skill sets carrying out interdependent tasks and who are geographically distributed or collocated. Project team members share responsibility for project outcome and typically report directly to the project manager (Horwitz et al., 2006).

Risk. This is defined as activities and factors leading to virtual team project failures (Moore, 2007).

Risk Identification. This refers to the process of determining what events can affect the organization and the causes that can trigger these events (East Coast Main Line Company, 2010).

Risk Management. This is defined as the “culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects.” (East Coast Main Line Company, 2010, p.1)

Virtual project team. This refers to a group of people carrying out interdependent tasks and who are geographically distributed. Members conduct their core tasks mainly through an electronic medium, and even without face-to-face interactions, share responsibility for team outcomes (Horwitz et al., 2006).

Assumptions and Limitations

Assumptions

Theoretical. The key theoretical assumption within the study is the risk within a virtual project team can compromise the output and overall efficacies of the group (Kumar & Srinidhi, 2006). Theoretically, it is assumed the findings from this study contributed to the scientific knowledge of managing virtual project teams while focusing on risks. The researcher provided an in-depth exploration of risk identification and management to identify ways of mitigating risks associated with virtual project team management.

Topical. In terms of topical assumptions, it is assumed virtual project teams are exposed to a unique environment, which results in risks that can prevent the team from achieving the goals of the project. Wong and Burton (2002) findings show the need for additional studies in the area of the virtual team. The relevance of the study to the field of

virtual project teams is that it considers the nature of such environments in terms of handling and mitigating risks to achieve the goals of the team.

Methodological. Methodologically, the first assumption is that there was commonalities among different virtual project teams within the case setting. The next assumption is that participants was honest about their experiences. The third assumption is that risks in the workplace vary due to the nature of virtual project teams where members work in different geographic locations. The final assumption is the virtual project teams was implementing risk management practices to mitigate or reduce risks.

Limitations

The characteristic limits of a case study model was primarily caused by the subjective methods used to collect data (Yin, 2013) and as such may apply to this study. The subjective nature of the data may make validation and reliability challenging because the data collection and analysis procedures was exposed to biases from the researcher. The researcher's limited experience with data collection or interviewing also provides a limitation for the study. Because of the exploratory nature of the study, this study analyzed existing practices within virtual project teams without testing potential solutions to risk management issues.

Other limitations include the geographic location of the study. Because virtual project teams may be located in different geographic areas, interview sessions were conducted via telephone calls. The geographic location considered in this study also results in limitations regarding generalization of findings. In using phone interviews, this study is limited to analyzing transcribed data without considering the expression and movements of the interviewee in answering the questions. Data collected required the participants to be truthful in the answers they provide.

Nature of the Study / Theoretical/Conceptual Framework

Virtual project teams are a result of technological advancements and global competition that share features of an open system. Open systems theory expands general systems theory by considering how each element of the system interacts without physical boundaries (Bertalanffy, 2008). According to the general systems theory, different parts within living systems are interactive, interdependent, and affect the larger more complex system (Gadman & Cooper, 2005; Katz & Kahn, 1978). As an adaptation of general systems theory, open systems theory emphasizes co-existence “between an organization and its environment because of interactive and interdependent relationships” (Morrison, 2004). The characteristics of open systems include flexibility to adapt to constant change, and unclear roles that can negatively impact the building and value of outcomes because the system lacks a formalized structure that can slow down response time (Morrison, 2004). The open systems nature of virtual project teams also exposes organizations to risks, which hinder the achievement of their goals. Therefore, the focus of this study is to identify such risks within the context of open systems theory, and analyze risk management practices within a case environment.

Under open systems theory, the individual and environment was considered in a holistic, correlative, as well as supplementary manner instead of treating them as separate and distinct from each other (Bertalanffy, 2008). Therefore, there is no individual influencing the environment or vice versa; instead, both were mutually affecting each other (Bertalanffy, 2008). In open systems theory, development and change was considered significant such that these processes take place due to the mutual dependence of the organism and its surrounding (Bertalanffy, 2008). The open system is said to be receiving or gathering its energy and

information from the outside, and then storing this energy until there is a circumstance that would warrant its use. As such, the system and its surroundings adjust to one another (Bertalanffy, 2008). Moreover, systems that are considered open was said to have the natural tendency to expand in size and increase its complexity (Bertalanffy, 2008).

Open systems theory is relevant to the research questions presented in this study, because the theory addresses the characteristics of virtual project teams, including flexibility, information decentralization, and responding to rapid environmental change (Gadman & Cooper, 2005; Morrison, 2004). With a lack of hierarchy constraints in open systems, virtual project teams were exposed to numerous risks that should be mitigated to ensure team effectiveness (Kumar & Srinidhi, 2006). If risks was not identified and mitigated appropriately, the output of the team is compromised (Kumar & Srinidhi, 2006). Beyond the use of open systems theory as the theoretical foundation of this study, Figure 1 illustrates the conceptual framework as a depicted by the interrelatedness of risk identification, risk management, and virtual team project success.

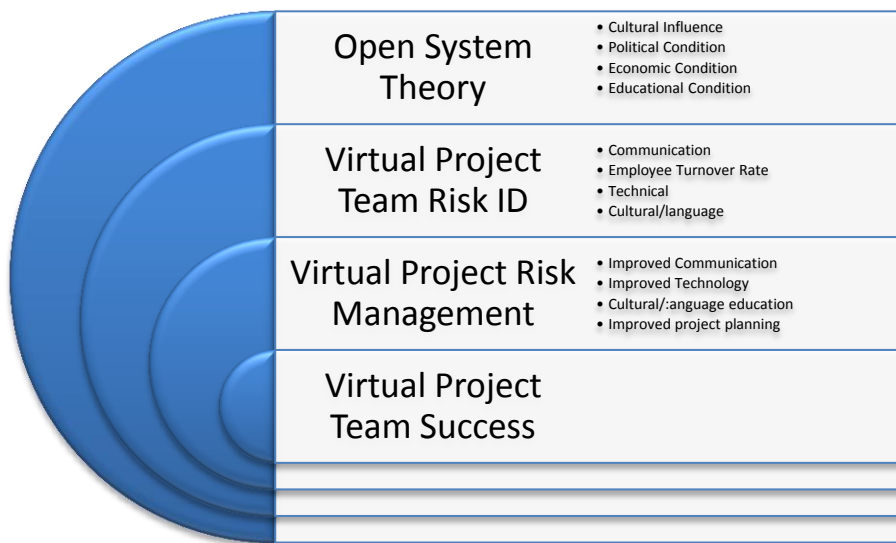


Figure 1. Conceptual Framework

Organization of the Remainder of the Study

There were a total of 5 chapters in this research study. Chapter 2 contains the literature review. Chapter 3 explained the research design, data collection, and analysis. Chapter 4 presented the study findings. Chapter 5 summarized the study results and provide a conclusion and recommendations for future studies.

CHAPTER 2. LITERATURE REVIEW

This section presents the review of related literature pertaining to this study. The focus of this study is to determine the risk management issues that virtual project teams encounter and to determine the best practices to avoid failure. The literature review will provide the foundation for these goals by looking at studies with relevant topics. These topics will include factors such as risk identification and management in virtual project teams, success factors supporting virtual team projects, and key obstacles that virtual project teams encounter. These include, but are not limited to a lack of trust, communication barriers, and logistics.

Theoretical Framework: Open System Theory

Biologist Bertalanffy (1968) expanded on the organization theory concept by discussing the impact open system theory provides to research. The use of open system theory in a qualitative study provides a comprehensive result of the actuality that exists within organizations (R. W. Scott, 2008). Open system theory is the understanding that all organizations are unique and therefore cannot be conceived the same. The external environment provides influences that will shape the organization in either a positive or negative way (Hall & Clark, 2010). Bousquet and Curtis (2011) mentioned effective organizations rely on the interactions of external influences along with the different elements within the organization in order to ensure success.

Open System Theory Studies

Geldenhuis, Levin, and Van Niekerk (2012). Risk management is a topic that impacts all areas of any organization. Geldenhuis, Levin, and Van Niekerk (2012) conducted a study to view the impact of risk management and how it can affect employee behavior. The

study was conducted in a bank located in Africa. Geldenhuys et al. (2012) mentioned that in order to identify how risk management influenced behavior, they needed to interpret risk management as system psychodynamic.

Being that the study was developed to evaluate the working of an organization, the researcher deemed it appropriate to use a qualitative method for this study. Qualitative method is becoming preferred methods for studies involving interview survey questions within organizations (R. W. Scott, 2008). Geldenhuys et al. (2012) also identified that they used an interpretative approach for investigation of the case organization's behaviors while using a case study method to carefully describe the information gathered from the research.

The researchers identified a bank in Africa as the location to conduct the study. The researchers outlined that purposeful sampling was the method used for gathering senior officials within the bank. The requirements for the population were that they had responsibilities for managing risk within the bank. The population size for this study was 39 participants all with risk management responsibilities (Geldenhuys et al., 2012).

The research provided the researchers with five themes that influenced the anxiety of the senior leaders. The first identified theme was that the implementation of risk management strategies introduced higher anxiety levels Geldenhuys et al. (2012). Theme two identified a strong divide between corporate bank managers and subsidiary banks (Geldenhuys et al., 2012). The subsidiary banks are viewed in this study as external influence to the managers who participated in the study. Theme three revealed that risk management is viewed by the managers as an excessive control (Geldenhuys et al., 2012). This theme derives from the political condition in Africa when the participants feel risk management is another form of control for people within the organization. Theme four mentioned that the participant of the

study view risk management as a metric that minimizes the human component from the work environment (Geldenhuy et al., 2012). The participant voiced that the use of risk management reduces the want for personnel within the organization to take ownership. Finally, theme five identified that risk management brings a negative relationship with customers (Geldenhuy et al., 2012). The thought behind this is that risk management fosters a relationship based on fear when those relationships were based on trust.

Rautiainen, Pihkala, and Ikavalko (2012). The purpose of this study was to take a systemic view of family business from an open systems perspective. The researcher's main focus was on a family business that specialized in the flower business (Rautiainen, Pihkala, & Ikavalko, 2012). The emphasis of the research focused on ownership within the family business and the researchers found that ownership within the family business is important socially and psychologically (Rautiainen et al., 2012). The study also took a look at the social groups outlined in each of the family businesses. Also, the research views the success of the family business by how the business meets each generation's needs.

The methodology used for this study was qualitative with an applied and single case study to evaluate a family business (Rautiainen et al., 2012). The case study provided the researchers with an understanding of how information in a narrative format provides new knowledge to the research (Tracy, 2010). The case study shows how some firms have better capabilities to pursue entrepreneurial activities versus less experienced family businesses. In order to have a suitable sampling size, the procedure used will be important in a study to ensure generalization for a larger population (Tracy, 2010). The researchers also deployed purposeful sampling of the target population in order to ensure the required population size was achieved.

The population for this study consisted of a development taking 55 years. During this time, the researchers viewed 20 companies with a range of the companies being startups, acquisitions, and buyouts (Rautiainen et al., 2012). The current state of the company has the main corporations with three sub companies all owned by a mother and son. Additionally, one of the sisters runs one of the sub companies, two uncles operate the other businesses, and a sister has a catering business with a successful track record (Rautiainen et al., 2012). The population size for this study was deemed adequate for the research in order to produce data saturation.

It is important to account for the many layers that are found within a family business while also understanding the dynamic element of ownership (Rautiainen et al., 2012). The research showed that ownership of the family business changes regularly. The changes were attributed to illness, lifestyle changes, other family situations, and retirements (Rautiainen et al., 2012). Another finding focused on special maintenance and management requirements for the business, which impacted the family. The impacts brought debates about how to accomplish the management of the business as a whole and how to maintain the success of the business into the future. These debates raised tension among the members of the family (Rautiainen et al., 2012). Additionally, the study found that in an open system, the business and family is more of a constant interaction within each of the business environments. This led the researchers to three characteristics that needed consideration. The first consideration is that the business is a core for the environments instead of a buffer and is not able to block external influences. Second, subsystems within the business must run efficiently in order for the core business to succeed as a whole (Rautiainen et al., 2012). Third, there must be entropy and cohesion within the family to ensure diversification among all members of the

business to stay intact. This concluded with the understanding that the core business cannot survive without its subsystem and that subsystems can be influenced by external sources that can affect the core business.

Open System Theory, Risk Management, and Risk Identification

Open system theory provides researchers with the ability to view how outside influences shape the project for risk identification in a virtual project team environment (Flood, 2010). Virtual project team members must realize these influences in order to predict the risk that can impact the project (R. W. Scott, 2008). These influences or risks to the project can come from various areas not limited to technology, politics, education, or economics. It is also important to understand that risks are evident in the organization's internal elements (Ellis & Herbert, 2011). Virtual project teams have the potential to encounter international policies that impact the way a project is deployed and run based on cultural differences; conducting research for an organization's benefits from the use of open system theory by taking into account all aspects of what impacts an organization (Rice, 2013).

Foundational Studies on Virtual Project Team Risks and Risk Management

Research on virtual project teams and their associated risks is still in its nascent stages. Most of the foundational studies on virtual project teams are fairly recent. However, there are several foundational studies that should be discussed to understand virtual project team risks and risk management which is the main focus of the current study. This section will provide a discussion of these foundational studies.

Kirkman, Rosen, Gibson, & McPherson (2002)

According to Gilson et al. (2015) work teams have been used in the United States as

early as the 1960s. However, the widespread use of teams to achieve quality only started in the 1980s. In the late 1980s and early 1990s, companies started to use empowered work teams to achieve efficiency and effectiveness. On these early years, line-level employees were at the forefront of decision-making processes so that bureaucracy can be reduced, the cycle times reduced, and services can be improved. The team concept has been so successful that by the mid-1990s, companies started to export the concept to their foreign affiliates located in Asia, Europe, and Latin America. With advancements in communication technologies and the phenomenon of globalization, the team concept evolved to virtual project teams, which proliferated worldwide.

Kirkman et al. (2012) detailed that advances in communication and information technology formed new opportunities for organizations to create, develop, and manage virtual project teams. These teams have members with distinctive skills and working together, even though they are located geographically far from each other. They engage in collaboration to achieve important organizational tasks. Under such a setup, challenges are inevitable.

One of the earliest studies on virtual team risks, Kirkman et al. (2012) interviewed a group of virtual team members, team leaders, general managers, and executives across 65 virtual project teams in Sabre Inc. The company is one of the most innovative organizations in the travel industry. From these interviews, five main types of challenges that virtual project teams can face were revealed. Specifically, these challenges are building trust, achieving cohesion, maintaining a team identity, overcoming the isolation of members, and attaining the balance between technical and interpersonal skills among team members. The study's findings are considered useful for the current proposed study because they represent

some of the risks that virtual project teams may still face today.

Cascio (2000)

Another early study on virtual team risks was conducted by Cascio (2000). As early as 2000, Cascio already proclaimed that virtual workplaces, wherein employees were operating remotely from each other and managers, were likely to be commonplace in the future and widely used by organizations because of the various advantages attached to such a decision. However, Cascio also claimed that certain challenges and risks may offset these advantages. In their research, Cascio found there are five main risks to using virtual project teams: insufficient physical interaction, loss of face-to-face synergies, low levels of trust, problems with predictability, and reliability, as well as deficient levels of social interaction. These risks can lead to high and maintenance costs, reduced levels of cost efficiencies, cultural clashes and feelings of isolation among team members.

Cascio not only provided an early list of risks associated with virtual project teams, but they also provided an early list of strategies that managers can carry out to handle these risks. The cited researcher called on managers to stop focusing on time and instead focus on results. Companies are also called to see that having virtual project teams does not mean needing fewer managers. Instead, existing managers should be equipped with better supervisory skills.

This foundational study is important for most lines of inquiry. It was essential for the current research study because it also offered a set of possible risks that virtual project teams can face in today's world. Moreover, it offers some risk management strategies that companies can take on to effectively manage their virtual project teams and use these to attain their respective successes.

Dafoulas and Macaulay (2002)

Another study that can be considered foundational in the literature on virtual team risks is the one by Dafoulas and Macaulay (2002). It is considered foundational because it is one of the first to study the effects of cultural differences in the effectiveness of virtual software teams. In this study the researchers found that cultural backgrounds of members can act as one of the important risks of virtual project teams.

Dafoulas and Macaulay (2002) evaluated how virtual project teams fared in software development projects because these projects increasingly extend beyond the boundaries set by organizations or nations. A project can have members residing in numerous countries, so members naturally have different cultural backgrounds. After outlining some of the primary benefits and barriers of virtual software teams, the researchers focused their study on clarifying why the cultural differences of the team members and leaders act as one of the most critical risks of virtual team projects. According to Dafoulas and Macaulay, virtual team members are usually expected to be interdependent and able to navigate their cultural differences successfully, even though this can be difficult to do. These differences can become a problem when various strategies are needed to motivate team members. In addition to presenting the problem of cultural differences, the researchers took their study one step further by providing evidence that computational support can be effective in resolving the conflicts and problems that may arise from virtual project teams with members from culturally diverse backgrounds.

Malhotra and Majchrzak (2004)

One foundational study on virtual team risk management was conducted by Malhotra and Majchrzak (2004). Their study is one of the first comprehensive studies on what would

serve as best practices for companies operating in hyper-competitive environments and using virtual project teams. They evaluated 55 successful virtual project teams to understand the practices in which strategic virtual team practices engaged. They also surveyed members of these companies from different industries. They found that these virtual teams engaged in some unique communication and knowledge sharing norms to achieve success. Moreover, they also have specific IT support requirements. In particular, for teams to be successful they must attain a strategic fit between task characteristics, team composition, as well as technology support. The findings also revealed that through the creation of a state of shared understanding about goals and objectives, task requirements and interdependencies, roles and responsibilities, and member expertise, virtual teams' outputs are likely to be of high quality. The foundational study's findings are important for the current study because it offers an early list of what virtual teams need to achieve the objectives that they were designed to accomplish. The findings also led to the generation of a theoretical model for future research on virtual teams.

Lurey and Raisinghani (2001)

Another study on virtual teams that can be considered foundational is the one by Lurey and Raisinghani (2001). They explored the issue of effectiveness within virtual teams even though they were faced with spatial and time challenges. Virtual teams have proliferated because of the globalization of the marketplace, which allow the organizations to achieve their goals better in a competitive environment. Gathering data from 67 individuals who were part of 12 virtual teams from eight companies belonging to high technology, agriculture, and professional services industries, results indicated that team performance and team member satisfaction depend largely on teams' processes and team members' relations

with each other. The early study showed that executive leadership styles only have limited or moderate effects on team performance. The tools and technologies used to carry out interactions and communication were also found to have minimal effects. This finding runs in contrast to other foundational studies, which claimed that best practices of successful virtual teams were largely shaped by the tools they use. The findings can be helpful for the current study because they can act as a foundation of what makes virtual teams fail or succeed. This is an important foundation because the current study's goal is to reveal a comprehensive picture of the risks virtual teams encounter and what management strategies can be used to respond to these risks effectively.

Jarvenpaa and Leidner (1998)

One more foundational study considered in this review was conducted by Jarvenpaa and Leidner (1998), which is commonly cited across literature on virtual teams. The study is one of the firsts to explore the issues of communication and trust in global virtual teams. According to the researchers, members transcending time, space, and culture, would naturally encounter communication and trust issues when working together in a team. They conducted a synthesis review of descriptive case studies on global virtual teams, the members of which mainly interact through asynchronous and synchronous computer-facilitated communication. They found that the trust being fostered in global virtual teams was only "swift trust." This is a type of trust that is both fragile and temporary. The findings of the study are important for the current research and literature review because more recent studies would show that up to now, communication and trust issues remain the top most critical issues and risks faced by virtual teams.

Virtual Project Teams

Virtual project teams or distributed project teams refer to groups comprised of members who are organizationally, geographically and time dispersed (Mumbi & McGill, 2008). Team members often reside in varying cities, states, or even countries, but they can work together because they have a well-articulated and clear idea of the start and end of a project as well as a schedule (Alavi & Tiwana, 2003). The use of virtual teams has increased significantly because of telecommunication advances and globalization. However, managing virtual team projects is not easy and constitutes a big challenge.

With internationalization and globalization, organizations have become less hindered and restricted by geographical issues, time and other traditional boundaries when conducting operations across the world. One more important effect of these events is the increased usage of virtual teams. The members of these teams are widely dispersed but come together to work on processes not limited to one specific geographic locale (Hoch & Kozlowski, 2014). Organizations are noticing that utilizing virtual teams gives them several business and economic advantages, such as reduced workspace costs, increased levels of productivity, better methods of serving customers across time zones, and improved capacity to work on projects for 24 hours daily (Kimble, 2011; Parker, Holesgrove, & Pathak, 2015). Despite these advantages, there exist barriers and risks hindering virtual teams from working effectively (Barnwell et al, 2014). The more aware project managers are of the barriers and risks hindering virtual teams from working effectively, the better chances they have of overcoming these challenges and attaining the objectives of the project (Barnwell et al., 2014).

The utilization of virtual teams has increased tremendously due to the innovative technological advancements supporting them (Zivick, 2012). Organizations can leverage talent from different regions to ensure the projects have the team members needed, both locally and globally; however, these changes require modifications in virtual project management (Raisinghani et al., 2010). The use of technological communication advancements has enabled organizations to acquire the skills and talents of geographically-diverse members to satisfy the needs of the organization's economic market changes (Zivick, 2012).

Management of Virtual Project Teams

With this increased use of virtual teams, there is a need to evaluate the risks associated with virtual teams and assess what strategies can mitigate these risks so project managers can handle teams better. Past studies claimed face-to-face interaction outperforms other types of interaction when it comes to affecting team performance (Foroughi, Perkins, & Jessup, 2005). However, more recent studies have found otherwise, showing virtual teams can perform as well as face-to-face teams (Gera, 2013; Siebdrat et al., 2009).

According to Macgregory (2007), design, culture, technical, and member training all comprise the virtual team activity. These factors are all related to socio-emotional factors of relationship building, trust, and cohesion. They are also linked to the factors of communication, coordination, and task-technology. If they are all interrelated properly, ideal results from virtual team projects can be expected, leading to perfection and satisfaction (Macgregory, 2007). Any failure to correctly integrate these factors can lead to lower than expected outcomes, so organizations that use virtual teams to carry out their projects should put a lot of effort in providing the necessary team members to ensure cohesiveness

(Macgregory, 2007). Managing virtual project teams is a serious challenge for project managers.

To avoid less than desirable project outcomes, risk identification and management is critical. Early research provided the conclusion that high project failure rates can be explained by the lack of effective risk management practices (Macgregory, 2007). Before risk management can be carried out, it is important to make sure that the correct risks and potential problems are identified (Macgregory, 2007). When it comes to virtual project related risks, Reed and Knight (2010; 2012) identified seven key risks to virtual project teams: knowledge transfer, team cohesion, cultural and language differences, insufficient technical resources, time inexperience, team member loss, and hidden interests and agendas. Virtual team members often have team participants that are not aware of the risks of working in such a setting (Reed & Knight, 2010; 2012). In addition, virtual team members who do not know the goals and objectives are project risk factors in and of themselves. Essentially the decentralized work environment makes clarification of goals more difficult than in co-located teams (Reed & Knight, 2012).

Member changes. The loss of key team members on a project can have a negative impact on project success (Reed & Knight, 2012). The turnover rate of team members may also contribute to problems across all aspects of project management within virtual project teams. Some of these would include loss of knowledge transfer, schedule delays, and financial impact to the project. When one team member leaves before a project is completed, the problem encompasses understanding the role that individual had on the project, as well as how to get the new resource up to the task in the shortest amount of time. This is especially true in a virtual team environment where personnel are not centrally located, making the task

of getting the new member up to speed more challenging. In addition, having redundancies in resource roles within the project will lessen the efforts on the overall project when turnover occurs (Berry, 2011; Hock & Kozlowski, 2014).

Virtual project team differences. Differences among team members can often negatively impact project team cohesion (Munkvold & Zigurs, 2007). Although all project teams can be negatively impacted by differences among team members, the effect on virtual teams can be worse than the impact on co-located teams. Cultural and language differences are significant factors in the success or failure of team cohesion (Plazas, 2012). Cultural differences can become a significant problem when team members from various countries have a different understanding of concepts or ideas, such as the notion of timeliness, or completeness. Cultural differences can be more problematic for virtual teams than co-located teams, whose team members can easily clarify what a concept means (Munkvold & Zigurs, 2007). Lack of team cohesion exists when there is jeopardy of good working relationships, leading to conflicts (Munkvold & Zigurs, 2007). Co-located team members have the advantage of bonding more quickly than virtual teams. Many organizations have identified these issues and work to ensure training is available for both management and employees to support better understanding and ways to find common ground between team members (Osman, 2011).

Hidden agendas. Another risk, highlighted by Kevin (2004), is the issue of hidden agendas among project team members, including managers. According to Kevin, when team members have personal interests that they want to advance through the actions of the team, this constitutes a hidden agenda, which may harm the team and negatively impact team goals. Compared to co-located teams, the effect of hidden agendas may be greater on virtual teams,

which lack the direct contact with other team members, limiting communication, trust, and even transparency. Having a direct and clear project goal outlined for the entire project team can help minimize the potential for hidden agendas among team members (Berry, 2011). Specific tools that can help manage and minimize potential for hidden agendas on a project include a well-developed role and responsibility matrix and a statement of work outlining the scope of the work on the project (Osman, 2011).

Success Factors of Virtual Project Teams

Although several risks are associated with the use of virtual project teams, the success of virtual project teams has also been studied extensively. Researchers have concluded there are various factors that can act as critical success elements for virtual project teams. These factors include leadership, effective meetings, members understanding their roles, and organizations providing collaborative tools (Berry, 2011). The absence of these critical success factors may be a key cause of virtual project team failure, and as such, they are worth discussing in this literature review (Hock & Kozlowski, 2014).

Role of leaders. The success of virtual project teams depends on the composition of the team itself, the leadership style, and the approaches used to impart ownership of key tasks. In order to ensure the highest levels of effectiveness, the formation of a virtual team requires team members who perceive their value as individual contributors first, yet also see their contributions as critical to the success of the overall team (Berry, 2011; Hock & Kozlowski, 2014). Even with team members who understand their value to the team, it is critical to have a successful leader managing the overall process of the project. There are many leadership styles that can impact the outcome of a project, but transformational leaders seem to have the edge when it comes to managing virtual project teams. A transformational

leader of a virtual team can also do much to avert potential conflicts and even crises that may impact their team over time (Eseryel & Eseryel, 2013). Studies have shown that virtual team leaders who are transformational leaders are just as effective as leaders who regularly see their subordinates face-to-face (Eseryel & Eseryel, 2013). Transformational leadership, it can be inferred, is critically important to the success of any virtual team.

In the context of increasing competition, leaders of virtual project teams need to be careful to nurture healthy, interdepartmental and even independent competition, without sacrificing team accomplishment (Mukherjee, Lahiri, Mukherjee, & Billing, 2012). One of the paradoxes of managing virtual project teams is to attain the highest levels of performance possible, which involves the management of collaboration versus the competition (Mukherjee et al., 2012). The team dynamics needed to accomplish this balance are critically important and require leaders to stay focused on building trust and transparency (Fan, Chen, Wang, & Chen, 2014; Politis, 2014).

Member meetings. The essence of transformational leaders' contributions to the effectiveness of virtual project teams is the creation of a trust-based approach to communication (Ferebee & Davis, 2012). As difficult as creating trust is from a distance, teams may hold offsite meetings, where team members can interact with each other face-to-face. These events can be held at the departmental level every six months and at the divisional level every year (Bathelt & Henn, 2014). Face-to-face meetings between team members and direct and extended leadership not only provide an opportunity for generating trust, but also foster shared ownership of team goals (Chang, Chuang, & Chao, 2011; Parke, Campbell, & Bartol, 2014). These meetings can also allow managers to gauge how each team member prefers to interact within the team environment. Collocated meetings provide

opportunities for teams to get to know each other in person, supporting social dynamics over the long term, and creating greater opportunities for knowledge sharing over time (Maynard, Mathie, Rapp, & Gilson, 2012).

Role of members. For virtual project teams to be effective, team members must see the success of the entire team as a critical part of their credibility within the broader organization. Team creation must be focused on selecting candidates who have a sense of accountability and responsibility to the performance of the team as a unit. These team members will not see their contributions as stand alone, but integral to the entire team's success (Gilson et al., 2015; Hardin, Looney, Fuller, & Schechtman, 2013). Performance scores significantly increase for teams who are trained on new processes and systems within the project team (Hardin, Looney, Fuller, & Schechtman, 2013). This is attributable to virtual team members assisting each other and further reinforcing the lessons learned from training sessions held at their offsite meetings.

Collaborative tools. Decision making within teams varies significantly based on the leadership style of the given leader or executive, the extent of decisions being made impacting individual supplier relationships, and the relative costs of the decisions over time. Decision-making involving the entire group is much more collaborative in nature, relying on internet-based technologies for sharing documents, presentations, and other materials to assist in the development of alternatives (Baker, 2002; Turban, Liang, & Wu, 2011). Virtual project teams are heavily reliant on collaborative forms of technology based on the internet in their decision-making approach across divisions.

Another aspect and related set of tools regarding virtual project teams is the concept of telecommuting. The majority of telecommuters are in highly-unique and often technically

complex professions, including computer programming, web application development, technical writing, product development in the software industry, and field and enterprise sales (Turban et al, 2011). Telecommuting is a means to give these professionals the time they need to complete complex tasks away from the distractions of an office.

Telecommuting is often seen as a corporate perk and a reward to those employees seen as most valuable to the firm. They are given the freedom to work from home as an incentive to retain them. However, the perception and evaluation of telecommuting vary significantly by company culture. For every enlightened manager or CEO who embraces telecommuting, there are many transactional, task-oriented managers who resist the idea, as they do not have the ability to micro-manage employees from a distance (Hock & Kozlowski, 2014). Telecommuting is likely to continue to grow over time; as oil prices fluctuate, there is a greater emphasis on green or environmentally-minded organizations. In addition, organizations are working on programs to reduce their carbon footprint, and the need to continually retain the most valuable workers over time (Hock & Kozlowski, 2014). All of these factors contribute to the growth of telecommuting, and is anticipated to do so for the next decade. The one unifying factor with regard to telecommuting is that, although there is great autonomy involved in providing an employee the opportunity to work from home, it can be isolating if the necessary technologies are not in place to enable connectivity with their team members (Golden, Veiga, & Dino, 2008). This aspect of technology as it relates to alleviating the isolation of telecommuters will likely be one of the most researched areas of virtual project teams in the years to come, as it holds insights into how technology can deliver a sustainable return on investment.

Challenges Faced by Virtual Project Teams

Even though virtual project teams offer several opportunities for organizations, many risks also are present (Ingason et al., 2010). Some of the risks faced by virtual project teams are the same as the risks faced by traditional, face-to-face teams. According to Khazanchi and Zigurs (2006), as well as Dow and Taylor (2008), project management is a challenging activity, and adding the complexity of a virtual environment increases the risks projects can encounter. Specifically, managers of virtual project teams deal with various challenges while managing including, but not limited to, communication breakdown, conflict among team members, lack of trust, time zone changes, knowledge transfer, and insufficient communication (Ingason et al., 2010). This section details the findings of existing literature on the risks faced by virtual project teams and their managers.

Communication breakdown. Even though communication breakdown is also experienced by traditional project managers (Osman, 2011), the issue is amplified for virtual project managers. Considering the complex nature of virtual collaboration, communication breakdown can be more frequent, leading to the failure of many projects. According to Osman (2011), virtual project managers face greater challenges when it comes to communication due to the factor of geographic distance separating virtual team members, making the issues faced by virtual project teams important to study. One challenge virtual project managers face is understanding the fundamental principles of their team, especially if there are significant differences in the time, space, and communication patterns among the members in this virtual environment (Berry, 2011). Communication in virtual project teams is largely nonverbal, leading to many unique issues. In the traditional project environment, project managers have the chance to communicate in a face-to-face manner with the team members, especially since, most of the time, they are in the same physical and geographic

location (Lee, 2013). When interactions are face-to-face, project managers have the opportunity to observe the body language of the team members. Project managers also have the capacity to evaluate the tone of their team members, giving them more insight into the thoughts and feelings of their members. However, none of these can be afforded to the virtual team managers.

According to Lockwood (2015), the combined effects of business offshoring, flexible work practices, as well as fast and constant technological advances have led to the increase of virtual interaction in communication and the formation of virtual project teams. However, business leaders continue to report managing these teams can be much more challenging compared to traditional face-to-face teams. One of the most-cited problems faced by the project managers is the constant communication breakdown experienced by the members and managers (Plazas, 2012). This leads organization to identify and develop training that will help team members better manage communication breakdown. Lockwood (2015) designed an analysis of training needs in a large globalized workforce under a program called “Communicating in Virtual Teams” using various instruments including surveys, interviews, document reviews, and meeting observations. Lockwood discovered the pertinent reasons for these constant breakdowns. Apart from the common problems of language, cultural issues, and misunderstandings, the findings indicated there are deeper problems of marginalization and identity confusion. These findings led to the conclusion that training programs for virtual project teams should also address these entrenched issues, apart from the common language and cultural issues. Addressing the technology and scheduling issues is seen as masking deeper issues faced by virtual team members (Lockwood, 2015).

Additionally, humans relate and understand meaning in messages through body language and different tones in verbal communication. Virtual team managers cannot study the body language nor hear the tone of voice of their team members when the communication methods include non-visual methods. Plazas (2012) claimed virtual team members only have the chance to read the body language of their team members when they talk over video conferencing. The opposite holds true as well. Team members cannot evaluate the body language of their managers when they cannot see them. Virtual team members and project managers have reduced their chances of hearing each other's tone of voice when they communicate exclusively through email, text, and instant messaging. This is a breeding ground for misunderstanding and miscommunication to take place, as there are no faces behind the words. Virtual team managers and members can wrongly interpret emotions and messages because they cannot see each other to determine what the other side is truly feeling (Plazas, 2012). This is why the challenges faced by virtual project managers in building and sustaining an effective team cannot be underestimated.

Cultural differences. Another challenge faced by virtual project teams relates to the cultural differences among the project team members. According to Stolovitsky (2012), traditional project managers face the challenges of cultural proficiency or cultural competence when they are managing teams composed of members from diverse cultural backgrounds. Project managers of virtual project teams composed of members and stakeholders residing and working in multiple locations can face challenges with which they have had little experience. Cultural differences can lead to conflict, and can create more obstacles to effective communication. These distinctions can also lead to significant coordination problems. Cultural and language variances are a constant problem

faced by virtual project teams. Even though traditional teams can also face these problems, these issues are more prevalent, if not commonplace, in virtual project teams (Piccoli, Powell, and Ives, 2004; Robey et al., 2000). These problems can be assuaged by managers who are willing to understand the uniqueness among their members and work with the challenges presented (Zofi, 2011).

It is important for virtual project managers to develop the skills to address cultural and language variances in order to minimize the conflict that can cause risk to the project. Ale Elbrahim, Ahmed, and Taha (2009) found virtual project team managers should know how to manage conflict, just like project managers of traditional teams. They should be able to observe and manage the cultural and functional diversity naturally present in virtual project teams, which makes it highly possible for mistrust to develop and grow. Moreover, managers of virtual project teams also face the challenge of developing virtual relationships (Zofi, 2011). Virtual project managers face the challenge of observing, assessing, and providing feedback on project work without face-to-face interaction and the challenge of developing each of the team members' skills.

Lack of trust. Trust issues can often affect virtual project teams during the start of projects. In any environment, trust can take time to build, but trust in virtual settings can take much longer to be established. People trust those whom they regularly meet face-to-face much sooner than those with whom they communicate using only electronic devices (Pangil & Chan, 2014). According to Brahm and Kunze (2012), managers of virtual project teams should emphasize the importance of trust among team members as early as possible. Members should facilitate trust among their members to attain high-performance outcomes.

Pangil and Chan (2014) found trust can lead to high team member satisfaction when working with virtual project teams. This is one of the key challenges to virtual team effectiveness.

In a virtual project team environment, members can engage in a unique form of trust called swift trust. Cognitive components of swift trust make it fragile and can easily unravel leading to trust issues among team members (Crisp & Jarvenpaa, 2015). This trust is said to be in need of actions to reinforce and continuously calibrate it. In their study, which evaluated the effects of swift trust on the performance of the virtual project teams, Crisp and Jarvenpaa (2015) carried out a longitudinal quasi-experimental study of a total of 68 ad-hoc virtual project teams whose members never interacted with each other face-to-face. Findings of the study revealed that trust can be positively influenced over time if team managers would conduct normative action processes, such as putting in place and monitoring performance norms supported by early trusting beliefs. Ultimately, these processes can also transform swift trust into trusting beliefs that can positively shape the performance of the virtual project teams.

Apart from project managers, virtual human resource managers are crucial for the formation of swift trust and for overcoming swift trust development barriers. Germain and McGuire (2014) concluded that aside from the managers, human resource professionals are vital to the success of virtual project teams. Zhang, Fang, Wei, and Chen (2011) also assessed two types of interpersonal trust in virtual project teams, sincerity-based trust and ability-based trust, and the associated effects on knowledge sharing in virtual project teams operating across China. Findings revealed sincerity-based trust has the higher capacity to encourage virtual project team members to transfer explicit knowledge to other team members. On the other hand, ability-based trust can have a more significant effect on the

team members' tendencies to look for or adopt explicit knowledge. Findings also revealed that both types of interpersonal trust are necessary to influence jointly members' tendencies to look for, transfer, and adopt tacit knowledge in virtual project teams across China. Cultural and language difficulties can further exacerbate these trust issues (Pangil & Chan, 2014).

Time zone differences. Another challenge faced by virtual project teams is the time zone differences among those comprising the team (Gibson et al., 2014; Goldberg, 2014). Even if asynchronous technologies could be used to overcome different daylight schedules, these technologies cannot ensure queries can immediately be answered in real time. Delays in feedback can negatively impact the success of projects, and can be both stressful and inefficient for virtual project teams (Lee-Kelly & Sankey, 2008). According to Pieciewicz (2010), even though communication technologies can bring together the team members residing and working in different locations, these tools cannot remove the time zone differences or lessen their impact. This is why virtual team managers should sort out these differences and assess their impact from the onset of the project initiative. Virtual team project managers must be experienced leaders and team players who possess strong communication and coordination skills to be effective in handling the team and to mitigate the many challenges time zones bring to the project. According to Nuells (2013), project managers of virtual project teams not only make sure their members can produce the deliverables, but also develop ways foster strong levels of collaboration and trust from team members located across many different time zones.

Knowledge transfer. Some studies acknowledge that knowledge transfer is by far the greatest obstacle to effective virtual project teams (Ngoma & Lind, 2015; Nidhra, Yanamadala, Afzal, & Torkar, 2013). In addition to knowledge transfer, there is the obstacle

of communicating the knowledge gained quickly throughout the virtual team (de Jong, Schalk, & Curseu, 2008; Zang, Chen, & Latimer, 2011). Both public and private sector-based virtual project teams require the ability to carry on project tasks seamlessly when team members leave the project. Ngoma and Lind (2015) claimed that sharing roles among virtual project team members would decrease the need to stop work flows due to project team members leaving the project. If a project team member leaves the project, the backup resource member would be able to continue the work flow, while mentoring the new team member (Nidhra, Yanamadala, Afzal, & Torkar, 2013). Even with this strategy, it is difficult to transfer the knowledge to new members in a virtual project team setting. Virtual project teams lack face-to-face interaction, impeding knowledge transfer to effectively occur consistently without sufficient planning and tools (Ngoma & Lind, 2015). In a virtual environment, it is difficult to demonstrate all aspect of a job and constant interruptions may also prolong the effort. Therefore, insufficient knowledge transfer is more of a risk for virtual teams compared to traditional, co-located teams.

Addressing Virtual Project Team Issues

Improving communication. The task of improving communication among virtual project team members requires project managers to take a different approach from traditional project management role. The research shows how virtual team risks may be addressed, considering how communication within virtual project teams might be enhanced (Barnwell et al., 2014). The level of communication throughout any virtual team is highly dependent on the level of trust the manager creates over time (Cogliser et al., 2013; Purvanova & Bono, 2009). Transparency breeds more effective communication, while a lack of transparency deters communication (Pinjani & Palvia, 2013). Effective communication is highly

dependent on subordinates and members of the virtual project teams feeling less threatened and more open to communicating. As projects grow in complexity, it is critical to measure team members, not by individualized performance, but by collaborative performance. Taking this step in measuring shared performance significantly improves the level of communication (Pinjani & Palvia, 2013).

In terms of enhancing communication, continually reinforcing the identity of the virtual team, its mission, role, and objectives are all critically important to ensuring that the motivation to communicate remains high (Wilson, Brown, & Thatcher, 2015). In order to ensure communications among the project team members remain high, virtual project managers should consistently reinforce the roles of the virtual team members. As projects continue down the timeline, collaboration and communication begin to drop off (Wilson et al., 2015). There is a need for continual strengthening of the role, mission, and objectives of the virtual team; this is one of the best potential strategies for enabling the enhancing of communication (Alahuhta, Nordbäck, Sivunen, & Surakka, 2014; Sivunen, 2006; Sivunen & Hakonen, 2011). Virtual team leaders should recognize the interruptions virtual team members face daily in order to help them navigate through the noise and continually reinforce how critical their role is in the virtual team thus ensure effective communication over time.

There is also the need to continually reinforce the integral role of project managers and virtual project teams. The practices that lead to enhancing communication in virtual project teams are also tied to the level of authenticity, transparency, and trust virtual team members perceive their manager or leader to have (Barki & Pinsonneault, 2005; Nazi & Pinsonneault, 2012). Teams should take a multi-faceted approach to overcoming communication barriers beginning with a highly-structured schedule of in-person meetings.

This will give virtual team members the opportunity to regularly meet with and discuss complex issues face-to-face, and more importantly, understand the people they work with at a more personal level (Kuntzberg, 2014).

Improving work life balance. The majority of virtual team members in private industries often have to contend with a significant number of disruptions in addition to the duality of their roles, when they work in virtual arenas (Olson, Appunn, McAllister, Walters, & Grinnell, 2014). When virtual team members are married and have children there is a need to balance family life with the needs of the organization. This translates into creating a work area in their homes allowing for long periods of uninterrupted work, where members can be productive (Lin & Ni, 2014). These workspaces in virtual team members' homes must be conducive to completing complex tasks quickly, as many are measured not by their hours logged into company networks, but in their accumulated accomplishments over time. As a result, the design of workspaces must be free of distractions and minimize the inherent conflicts of roles that home offices have the potential to create (White, 2014).

Improving technologies. Several technologies enable virtual project teams to be productive and attain their shared goals. This is important because one of the main problems identified by virtual project teams is related to communication barriers. Even with the existence of sophisticated tools, pervasive communication problems exist. The technologies included in this evaluation include collaboration portals that are Web-based and accessible from anywhere globally where there is an Internet connection, email, telephone, teleconference, video conferencing, and voicemail (Ashmore, 2012; Beach, Coates, Hinton, & Montoya, 2013). Each of these tools has a specific use for the attainment of the highest levels of performance within globally-based virtual project teams. Social networks are also

becoming one of the most powerful catalysts for innovation in the area of virtual project teams, as they are driving the development of state-of-the-art operating systems for smartphones and tablets including the Apple iPad (Morgan, Paucar-caceres, & Wright, 2014).

Social networking is a communication tool used by organizations for communication. Social networks are the catalyst for innovation in smartphones; they have overtaken operating systems as the primary focus of many companies, making collaboration more effective and creating knowledge sharing processes that can quickly scale globally (Morgan, Paucar-caceres, & Wright, 2014). The egalitarian nature of social networks also fuels the development of rapid advances in portal software, with Microsoft SharePoint emerging as the dominant leader in this area of global technology adoption (Barnwell, Nedrick, Rudolph, Sesay, & Wellen, 2014). What also emerges from their findings is the fact that none of these technologies are deployed in isolation from the other, and all are often deployed as part of a broader strategy or series of goals for remote teams to achieve (Barnwell et al., 2014). As research has indicated, the most successful virtual project teams are comprised of experts in their fields that have learned over time to be self-sufficient. The focus of these technologies taken together is to accelerate knowledge transfer and the sharing of expertise online on a virtually 24/7 timeframe (Olson et al., 2014). The study also revealed that these technologies must be evaluated, deployed, managed, and optimized with change management strategies in mind (Lamont, 2010). Integration of structured and unstructured content in these communication methods is unified through contextual search technologies that can create linguistic models on the fly to put unstructured, comment-based content into context quickly, so it can be used immediately by teams (Holtshouse, 2009).

Another aspect of the contextual search aspect of these portals is the ability to capture quickly the conversations with customers, other team members, and outside suppliers to create an ongoing discussion of project notes and action times completed. The portals in the best-run virtual project teams become the system of record for all activities, often becoming the basis for how project managers evaluate team progress towards goals and objectives (Lamont, 2010). All portal software providers are also starting to emulate the design criterion of social networks as well, creating the look and feel of Facebook, Twitter, and other interfaces, much the same way salesforce.com accomplished this with their Chatter application (Morgan, Paucar-caceres, & Wright, 2014).

Improving communication plan. A communication plan should put forward the rules of engagement outlining the frequency of communication taking place among members or between members and managers. Osman (2011) noted that communication plans should also put into place how information can best be generated, collected, distributed, stored, and then retrieved between managers, members, and stakeholders. The communication management plan should also be crafted before the project starts. It must also be constantly updated and reviewed for the duration of the project (Nuells, 2013). Nuells (2013) claimed successful management of virtual project teams entailed effective communication as well as quality teamwork and knowledge sharing. Nuells (2013) also highlighted how important the role of the project manager is in reinforcing these two factors for the duration of the project.

The role of a project manager is essential to the success of the project to keeping timelines, scope budget, communication, and managing relations among their team. Kurupparachchi and Perera (2010) expressed the need for virtual team managers to have a plan in terms of how best to approach their team members from different regions, countries,

and time zones. The study revealed that, compared to managers of traditional face-to-face teams, virtual team managers need more consideration of the work schedules and meeting times of the members. The project team members require constant communicating and have access to various communication tools ensuring smoothness of the project from start to finish. Anantatmula and Thomas (2010) also argued that an effective communication plan is one that can ensure improvement and foster trust within the team. In particular, a communication plan can be considered effective if such a plan results in an environment where the team members can comfortably and openly talk about conflicts, avoid rigid and inflexible structures that cannot be adapted to change, and promote the use of communication tools (Anantatmula & Thomas, 2010).

Improving Leadership. S. J. Marshall (2014) determined what can be considered effective leadership practice in virtual project teams and what can be considered the core competencies a leader should have in a virtual team. S. J. Marshall (2014) started the process of evaluation by hypothesizing what can be considered core competencies of virtual team leaders. These competencies were then operationalized and tested to determine how they contribute to the virtual team's effectiveness, as measured by team performance and the members' personal satisfaction. Findings revealed that practicing essential leadership competencies can lead to effective virtual project teams that can coordinate task delivery, as well as demonstrate the ability to communicate, to foster trust, and to handle multicultural diversity issues (Mukherjee et al., 2012).

Results also indicated effective virtual team leaders are those who engage in transactional leadership practices more than transformational leadership (S. J. Marshall, 2014). Also, the findings revealed personal satisfaction can best be shaped by how trust and

diversity management are handled, instead of performance (Lepsinger, & DeRosa, 2015). Moreover, for the team members, task coordination does not immediately lead to performance results. The findings showed that weak leadership can lead to conflict and low levels of team trust.

On the other hand, the results also revealed that team leaders, even if they have a strong desire to deliver and perform, can imply to the team members inadvertently that tasks are more important than having healthy team relationships (S. J. Marshall, 2014). Team members who were revealed by the findings to be more prone to emphasize personal satisfaction over performance would be potentially at odds with a team leader who is task-oriented (Lepsinger, & DeRosa, 2015). This does not mean these workers do not care about performance, but rather, that they can only do so if they are satisfied first. Hill, Lorinkova, and Karaca (2014) reviewed extant virtual leadership research and research related to which team leadership behaviors can most positively influence virtual team performance. Using the behavioral approach to leadership, the authors found that leaders who are task-focused, as well as relationship-focused, are the ones who can shape the performance of teams the most effectively. On the other hand, passive leadership was found to affect team performance negatively (Hill et al., 2014).

Conclusion

This chapter revealed that most companies are increasingly using virtual project teams because of the availability and accessibility of innovative technological advancements supporting effective virtual project teams (Zivick, 2012). The literature also indicated that benefits abound regarding the use of virtual project teams. For instance, with the use of virtual project teams, organizations can leverage talent from different regions to ensure the

projects have the team members needed both locally and globally, but these changes require modification to the way virtual project management has been handled (Raisinghani et al., 2010). In addition, using technological communication advancements can allow organizations to acquire the skills and talents of geographically-diverse members to meet the needs of the organization's economic market changes (Zivick, 2012). Some challenges have been documented, as well as how leaders can best respond to these issues. With the changes associated with moving to a virtual project management setting, the risks related to achieving project success have increased. Identifying project risks will help organizations develop the processes needed to mitigate these risks in advance and help safeguard against project failure (Moore, 2007).

The rapid growth of virtual project teams has been driven more by the recognition that global technologies and the applications they support can now make it possible to assemble the best possible experts in specific fields regardless of location. There is no longer the limitation of a single headquarters location or even a single city. The need to continually reinforce the mission, vision, and roles of team members has been shown to be critically important to effective communication and the establishment of trust over time (Morgan, Paucar-caceres, & Wright, 2014). The role of transformational leaders, specifically, has been shown to create the level of transparency and trust critical for teams to be effective in completing their objectives and staying connected with each other (Purvanova & Bono, 2009). The role of the leader and their propensity to create trust and sustaining it is critically important to the attainment of individual and shared goals by virtual project teams. The use of cross-functional teams' overlapping existing roles and responsibilities is also vital to many virtual team structures.

In addition, organizations need the ability to measure virtual team performance at the individual and cross-functional level to ensure collaboration is measured and rewarded. This is the paradox of measuring the performance of virtual project teams; the individual performance levels and identification with goals must be strong enough to support the commitment to cross-functional and collaborative goals as well (Raisinghani et al., 2010). Virtual project teams are expected to continue to grow in dominance over the coming decades, and the ability of individual workers to adjust to these changes is critical to their careers. However, even though virtual project teams are widely used among organizations, there is limited research on the risks associated with virtual team projects (Raisinghani et al., 2010). Therefore, there is a need to determine risk management issues faced by virtual project teams and to identify effective risk management practices used by virtual project teams. The research problem is focused on addressing the need to mitigate project failures through proper understanding of the risks associated with virtual projects.

CHAPTER 3. METHODOLOGY

Chapter 3 focused on the methodology used on the present study and included research design and methodology, sample, data collection, data analysis, validity and reliability, and ethics. The purpose of this study was twofold: first was to determine risk management issues faced by virtual project teams, and second was to identify effective risk management practices that helped mitigate the risk issues faced by virtual project teams. This study used a qualitative case study design with interview-based methodology to collect data. In addition, documentation and artifacts from the case setting were examined to address the research questions.

The proposed research study addressed the following questions within the context of the case setting:

RQ1: What were the risk management issues faced by virtual project teams?

RQ2: What were risk management practices that are effective in mitigating the risk issues faced by virtual project teams?

Research Design and Methodology

In this section, the overall design and methodology were discussed, providing a rationale for the research design and details explaining the design. A qualitative case study design was used in this study to determine the risk management issues and practices effective in mitigating risk issues faced by virtual project teams. Case study approach was used to provide a complete understanding of the data collected from the participants. Case studies help researchers understand the information in a narrative format providing new knowledge to the research (Tracy, 2010). Phone interviews and artifacts collection was the primary

method used to collect data. Triangulation proved a useful tool to analyze the results for this study (Tracy, 2010).

A qualitative research design was chosen for the study because it allowed the researcher to collect data that was specific to a particular context to understand an issue (Yin, 2013). Case studies can help researchers understand the information in a narrative format, providing new knowledge to the body of literature (Tracy, 2010). Case study was considered the most appropriate because it provided the ability to analyze multiple sources of data and triangulate the results from data sources such as interviews, archives, and documents (Seale, 1999). Using real life experiences of the participants provided insight into the risk and practices in a virtual project team. Case study analysis is different from other qualitative research approaches because it examines how a phenomenon is viewed in real life (Yin, 2013).

This study used a qualitative case study incorporating phone interviews with 20 virtual project team members. With the study dealing with virtual project teams, many of the participants were located across the United States; therefore, gathering together for a group interview face to face was not an optimal method for this study. The participants recruited for the study included 15 virtual project team members with five virtual project managers. Each participant was given the opportunity to provide feedback to the same survey questions. The sample size selected of 20 participants was appropriate for this study to generate sufficient depth to the study (Yin, 2013). The use of triangulation showed how members relate or differ in their views for each question. Adding another level of dimension to the study, the researcher collected artifacts that provided additional support of the participants' statements.

Sample

Site Selection/Setting

The target population for the study consisted of virtual project manager and project team members who worked in a virtual project team setting within one case organization. The sampling frame was from a list of virtual project team members and leaders obtained from the organizations. The list helped to identify potential participants for the sample to be recruited for this study. The population was limited to technology in order to ensure the findings of this study were focused on the circumstances and the uniqueness of virtual project team operations within the environment.

Sample Size

The sample for this study included 20 virtual project team members and leaders with more than two years of experience in virtual project team environments. The sample size of 20 participants was used to sufficiently gain the needed depth and scope of insight from participants. According to Eide and Showalter (2012), qualitative studies require smaller sample sizes; however, it is necessary to cite responses of participants to provide support for the generation of findings and conclusions. The samples included five project team leaders and 15 team members to have representation of different functions within a virtual project team and permit for triangulation of findings.

The inclusion criteria consisted of participants that met the following requirements. The participants needed to be males and females above 21 years old who were involved in a virtual project team environment more than two years, which helped ensure participants had sufficient experience in a virtual project team environment. Exclusion criteria included any

participant under the age of 21 and those with less than two years working in a virtual project team environment.

Sampling Procedures

Recruitment. To recruit the participants, permission to conduct the study was sought to ensure administrators allowed their employees to participate in the study. The administrator was asked to identify potential participants for the study who work in a virtual project environment. A recruitment letter was used to invite participants in this study. The recruitment letter was sent via email to each participant of the study. The letter provided an introduction and background of the research.

Participant Selection. The sampling procedure involved a non-probability, purposeful sampling technique, wherein participants were invited to participate in the study based on their eligibility to contribute to the achievement of the purpose of the study (Tracy, 2010). Qualitative research typically involves a small sample size, which drives the need to gather expert perspectives and knowledge in terms of the phenomenon being considered (Tracy, 2010).

Instrumentation/Data Measures

Interview Guide Development

Semi-structured interview questions were developed and field tested with the assistance of a panel of experts and role players. The semi-structured interview questions focused on providing an analysis of risk management practices used to identify and address risks within virtual project teams in an organization, thus addressing the research questions of the study. This case study used a semi-structured interview guide and related document review as the primary instrument with the identified participants (Denvers & Frankel, 2000).

As a means of supporting instrument validity, the development of interview questions was done under consultation with experts. Therefore, a panel of experts ensured the interview questions were appropriate for the study and aligned with the research questions to ensure the data collected for the study was appropriate to addressing the research questions of the study. Moreover, the panel of experts ensured proper language was used for the interview questions. Table 1 identifies two subject matter experts who participated in the expert panel review, which included Expert 1 was a Program Management Office director and Expert 2 had 10 years of expertise working in virtual projects teams. Feedback from the expert panel resulted in the final draft of the interview questions. Some of the feedback included adding additional questions that would be relevant to the study and adding additional demographic questions that would help determine differences in each participant. In addition, role-playing was conducted using a small group of individuals from the target population who were not included in the actual study sample. The final interview questions developed for this study provided in Appendix B.

Table 1. Expert Panel Qualifications

ID	Role	Roles/Credentials/Experience	Organization (as of July 2013)
Expert 1	Program Manager	Treaty Consulting Group (2011-Present) PMO Director, implementation project/program management (2004–2011) Certifications: PMI PgMP, CMMI, ISO9000 BSP computer Science, MBA Florida Institute of Technology, DM University of Phoenix	Harris CapRock (Melbourne, FL)
Expert 2	Project Manager	Project manager (1996-Present) Certifications: PMI PgMP MBA Business (University of Florida)	Harris CapRock (Melbourne, FL)

Methods, Procedures, and Documentation

The data collection followed a series of processes (S. J. Marshall, 2014):

1. Permission were sought from human resources at the case organization for the purpose of conducting interviews of virtual project team members
2. Human resources at the case organization was consulted to identify purposefully selected interview participants
3. An informed consent form was emailed to prospective participants
4. A common time for the telephone interview were arranged
5. Ensure there were minimal disruptions during the interview call
6. Interview
7. Transcription of data
8. Coding of data

The next stage for the data collection was to contact the participants for the study.

The researcher contacted all potential participants by sending each individual an email to explain the study, ensure the confidentiality of any information provided, and ask for the full participation of the participant. Next, the researcher scheduled interviews with willing participants. Participants were scheduled according to the best fit of time and convenience in addition to a selected location to conduct the semi-structured interviews. Participation was entirely voluntary, and individuals were not coerced into participating in interviews. The respondents were reminded after one week if they have not responded to the invitation to participate in the study. A reminder email was sent to those who did not respond. Once the

required sample size of a minimum of 20 virtual project team members and leaders was reached, the recruiting efforts were stopped (S. J. Marshall, 2014). The number of respondents interviewed was based on the availability of the respondents and the saturation of interview responses.

Preparation of the venue and securing the equipment for the interview was necessary before the interviews started. The researcher ensured that the venue is reserved, and all the equipment, such as the recorder, are all working. Barratt, Choi, and Li (2011) suggested that qualitative record data could include four types of information gathering strategies, including observation, interviews, documents, and audiovisual material. Interviews of the respondents were conducted. With the permission of the interviewee, the interview was audiotape recorded for the purpose of data transcription. The permission to audio record the interview was asked during the interview. The interviewee agreed to this prior to conducting the interview.

After the preparation of the venue and equipment, the interview proceeded. The data for the qualitative analysis was obtained through first-hand interviews of the chosen sample, guided by a semi-structured questionnaire. The interviews were conducted via phone at a time that the researcher and the interviewee deemed acceptable. Ellis and Levy (2009) proposed that while conducting qualitative interviews, researchers should facilitate a peaceful environment. The researcher made an effort to build rapport with each interviewee. During the interview, based on the response from the participant, the researcher asked follow-up questions. Each interview lasted approximately 60 minutes. Interview sessions were audiotaped and transcribed to ensure documentation of participant responses. The transcribed

interview data were analyzed to discover the real life experiences of the participants as they related to the research questions.

In addition to conducting the interviews, the researcher requested supporting documents and artifacts. Additional sources of data, such as risk plans, project charters, project plans, emails, team charters, and any other documents or artifacts that became relevant through the interview process were collected to assist in triangulation of findings generated from the responses of the interviewed participants. These articles provided information to contribute to the findings. Documentation included items such as risk logs templates, risk management plan, risk strategy, risk management software, and risk planning meeting minutes.

Data Analysis

The data gathered for this study was analyzed through content analysis (Leech & Onwuegbuzie, 2011) with the aid of NVivo 11.0. The following six steps were followed for the content analysis, as described by Leech and Onwuegbuzie (2011):

- Step 1: The first step is the design phase, where the context of the analysis is defined. This involves the identification of what needs to be known, but is not directly observable. During the design phase, the empirical procedures for analysis are specified, and the conditions under which the inferences made based on the data are considered valid are described.
- Step 2: The second phase involved focusing on, and defining the units of analysis. These units of analysis made it possible to draw a representative sample from the available data.

- Step 3: The third step involved sampling, which facilitated the reduction of biases inherent in the type of data collected.
- Step 4: The fourth step involved the coding of the data collected, or describing and classifying the units of analysis into the categories of the chosen analytical constructs. This fourth step was conducted in consideration of two criteria: reliability and relevance. Reliability is quantified based on intercoder agreement, while relevance pertains to the meaningfulness of the data.
- Step 5: The fifth step necessitates the drawing of inferences, which was the most crucial phase in content analysis. During this step, the analyst was tasked with determining how the accounts of coded data are related to the phenomena under investigation.
- Step 6: The last step involved the validation of the data and the inferences that were made based on the data. However, Leech and Onwuegbuzie (2011) asserted this step is inherently limited by the fact that content analysis was to infer what was not directly observable.

Triangulation was a method used to analyze data from different perspectives providing validity (Seale, 1999). Data triangulation was used to provide validation of the data collected from the interview questions and the collection of risk logs templates, the risk management plan, the risk strategy, the risk management software, and risk planning meeting minutes. The documents and artifacts was used to compare with the data collected from the interview questions; similarly, data obtained from project leaders was triangulated with data collected from team members to support validity of the findings.

Validity and Reliability

In any research study, reliability and validity are important to support the legitimacy, accuracy, and strength of the findings. Reliability and validity in research generally refer to statements of truths, consistency, and accuracy in measurement and strength of the results, in terms of unbiased and accurate findings (Ali & Yusof, 2011; Rennie, 2012). Although similar in concept, the terminology for qualitative research is often different, whereas quantitative researchers discuss validity and reliability, qualitative researchers, however, need to ensure rigor and trust, or the four attributes of dependability, credibility, transferability, and confirmability (Lincoln & Guba, 1985; Thomas & Magilvy, 2011).

Dependability

To address dependability, researchers need to ensure that the study can be replicated and result in the same findings (Zikmund & Babin, 2012). Moreover, to be considered dependable, the findings must be free of bias and be truthful (Goldblatt, Karnielli-Miller, & Neumann, 2011). As such, the researcher recognized the possibility of the findings being affected by personal bias and take actions to limit this effect (Bowen, 2009). Dependability can also be achieved by having an interview protocol so that participants was asked the same questions. Member checking is another method to support dependability, which includes the careful review of audio-recordings, field notes, as well as transcripts and asking the participants to check their own responses (audio recorded and transcribed) to see if something has been erroneously recorded or noted (C. Marshall & Rossman, 2011). Member checking, in particular, can make sure that interviews are accurate because participants have the opportunity to review them (Thomas & Magilvy, 2011). The researcher carried out

member checking through transcription review, so participants can check the entire transcript of their interviews for accuracy.

Credibility

Another concept discussed with regard to study rigor, in terms of validity and reliability of qualitative research, is credibility, which refers to providing a reliable picture of the participants' responses (Shenton, 2004). To support credibility, the researcher needed to ensure that transcripts match the data gathered through other methods such as notes. The data was also being checked against existing literature findings to support credibility.

Transferability

Transferability refers to the generalization of the research findings (Tobin & Bagley, 2004). A qualitative research study is considered reliable if the findings were transferable, which means the findings from one study can be applied to a condition or topic similar to the original study (Dumangane, 2013). The researcher can safeguard transferability by providing a comprehensive and detailed description of the research process so that the research findings may be duplicated in a different setting, supporting transferability of findings to different circumstances (Stake, 1995). Important details such as the research method, examples of raw data, as well as rigorous and rich analysis of the data must be provided.

Confirmability

Confirmability refers to the degree of others' ability to understand the findings of the study. According to Bowen (2009), to enhance confirmability, an audit trail can be used. An audit trail involves maintaining comprehensive journals, background data, and processes to provide clear rationale for certain procedures. This study incorporated note taking/journaling as part of the audit trail. Validity in qualitative research is discussed in terms of

trustworthiness, which refers to having achievable and recognizable processes and procedures taken to complete the research (Horsburgh, 2003). For the current study, the researcher thoroughly documented each step of the research process so that everything is transparent. Consultation with experts in the form of field testing occurred to support instrument validity.

Triangulation was a method used to analyze data from different perspectives in order to provide validity (Seale, 1999). The researcher carried out data triangulation to make sure the interview data are valid. To support triangulation, the researcher also collected risk logs templates, the risk management plan, risk strategy, risk management software, and risk planning meeting minutes. The documents and artifacts were used to triangulate the data collected from the interview questions by comparing the findings from different sources of data. In addition, data obtained from different groups of interviewees was compared.

Ethical Considerations

The study involves human subjects as participants, so ethical assurances were necessary. One important ethical consideration was keeping the participants' identity and responses confidential. To do this, all identifying information was removed from the presentation of the data and findings. Pseudonyms were used to present the data (participant 1, participant 2, and so on). The voluntary nature of the participation was also ensured. Participants who took part in the study were informed of their rights. The researcher did this through the informed consent form. The informed consent represents that there is trust between the researcher and the participants (Rose, Trevillion, Woodall, & Morgan, 2011). The informed consent form detailed the objectives of the study, the privacy and confidentiality rights of and assurance for the participants (Allen & Foulkes, 2011). The

informed consent was important because it implies that the researcher ensured data from participants were protected and the integrity of the research and participants was maintained. Participants who return the informed consent forms with their signatures indicate that they were willing to engage in the research study voluntarily. At the same time, participants understand that they may withdraw from the study at any time without penalty, as detailed in the informed consent form (Allen & Foulkes, 2011). If participants withdraw, their data become obsolete and was not used in any way. Should a participant wish to withdraw, written data already gathered from that participant would be shredded and related audio-recordings was deleted.

According to Slomka, McCurdy, Ratliff, Timpson, and Williams (2007), financial compensation to be given to participants in a research study is still a contentious issue. Some believe that compensation can influence the answers and behaviors of the participants (Gneezy, Meier, & Rey-Biel, 2011). Any additional sources of data, such as risk plans, project charters, project plans, emails, team charters, and any other document or artifact that becomes relevant through the interview was collected and kept in a locked cabinet and a password-protected computer. All transcribed and audio recorded data gathered in the course of completing the study was kept in a locked cabinet and a password-protected computer, respectively.

Summary of Methodology

Case study analysis method was chosen because the approach and model of qualitative research provides the opportunity to specifically analyze the circumstances within the focus of the study. A case study analysis method is appropriate when the focus of the study is to gain a deeper understanding of a phenomenon based on a bounded system (Yin,

2013), in this case, perceptions and experiences within virtual project teams with a focus on the determination of risk management issues and the identification of effective risk management practices that help in mitigating the risk issues. The findings of the content analysis can be used to provide valuable insights and recommendations for best practices implemented in order to handle risks and mitigate challenges faced by teams within this organization.

CHAPTER 4. RESULTS

Introduction

The purpose of this qualitative study was twofold: first, to determine risk management issues faced by virtual project teams and second, to identify effective risk management practices in an effort to mitigate the risk issues faced by virtual project teams. To accomplish this goal, data were obtained from a sample of 20 participants who were interviewed using semi-structured interview questions. Transcribed interviews were analyzed for common themes. This chapter provides a description of the sample obtained for the study and a review of the findings in the data analysis of the study. Key common themes within several thematic categories were continually compared, resulting in several overarching themes revealed from the analysis. These final themes, presented in the conclusion, represent the perceptions of the groups as a whole.

Description of the Sample

A total of 20 participants completed interviews and were included in the study. These participants represented both virtual project managers (team leaders; $n = 5$) and virtual project developers (team members, $n = 15$). These participants were evenly distributed by age between 30-39 years of age, 40-49 years of age, 50-59 years of age, and then an additional two participants who were aged 60 or more. The sample represented both males and females (11 and 9, respectively). Participants general education level was a Bachelor's education level ($n = 15$), with four individuals holding a Master's degree, and one having obtained a doctorate. Table 2 provides demographic information gathered on the sample, demonstrating a diverse sample in terms of age, gender, education, residence, and job role/description.

Table 2. Demographic Characteristics of Sample

Variable	Frequency	Percent
Age		
30-39	6	30%
40-49	6	30%
50-59	6	30%
60+	2	10%
Total	20	100%
Gender		
Male	11	55%
Female	9	45%
Total	20	100%
Education level		
Bachelors	15	75%
Master	4	20%
Doctorate	1	5%
Total	20	100%
Job title		
Project manager	6	30%
Technology manager	4	20%
Project coordinator	2	10%
Business systems consultant	2	10%
Technical project manager	1	5%
Services director	2	10%
Business analyst	1	5%
Application systems engineer	1	5%
Data analyst lead	1	5%
Total	20	100%
Length at current job		
0-2	6	30%
3-5 years	8	40%
6-8 years	1	5%
9-11 years	0	0%
12-14 years	2	10%
15-17 years	2	10%
18-20	0	0%
>20 years	1	5%
Total	20	100%
Residence		
North Carolina	10	50%
Arizona	3	15%
Iowa	2	10%
California	1	5%
Florida	1	5%
Texas	1	5%
South Dakota	1	5%
Total	20	100%
Virtual role		
Team member: Virtual project developer	15	75%
Team leader: Virtual project manager	5	25%
Total	20	100%

Findings

A qualitative analysis of the open-ended response data was used to identify themes revealed among the statements given by the participants in the study. The analysis of the data followed the procedures as outlined in the previous section. Data were obtained from a total of 20 participants (15 virtual team members and 5 virtual project managers). The interview data was broken down into coded units of analysis, which were categorized into thematic categories based on content and inferences in terms of how the coded content related to the topic (Leech & Onwuegbuzie, 2011). Based on the common responses that revealed themes in the data, overarching conclusions are drawn from the data.

The coded elements, grouped into thematic categories, are presented with the frequency for which each response was mentioned among the participants. In addition, textual, verbatim examples from the interview responses are included to highlight the key concepts as well as to provide clarity of these concepts. NVivo 11® qualitative analysis software was used to assist in the data coding and theme development by assisting in the classification, tracking the frequency of the data, sorting and arranging information from the data (Creswell, 2014). Comparing the thematic categories and elements throughout the analysis revealed common and overlapping themes in the data, which were used to identify the perceptions of the group as a whole and the conclusions of the analysis.

Risk Management Issues

Under risk management issues, responses formed several thematic categories of responses, within which themes were revealed. The thematic categories included project planning risk management issues, issues surrounding losing or adding a virtual team member, issues related to cultural or language differences, technology related issues, issues related to

the nature of the virtual environment, and communication issues. Each thematic category is discussed individually along with the common themes revealed within each category.

Project planning risk management issues. In terms of risk management, participants discussed project planning risks. Common responses highlighted themes revealed from the data related to (a) team member engagement (especially during conference calls or other virtual group tasks); (b) team member multi-tasking; (c) lack of correct dates, documentation, or budget; and (d) less effective communication. Common responses offered by participants are given in Table 3 with associated frequency of mention among the sample.

Table 3. Project Planning Risk Management Issues

Common Response	Frequency of mention
Team attention and engagement during conference calls and other tasks	8
Team multi-tasking	6
Lack of correct dates, documentation, or budget	3
Less effective communications	3
Poor accuracy in project estimation/timeline, task over/under estimation	3

The most commonly noted project planning issue was that of team attention and engagement. This was noted by virtual project managers (VPMs) and team members (VPTMs) alike. For example, one project manager (VPM3) detailed the issue surrounding “hosting meetings that last several hours and ensuring that you have all attendees’ one hundred percent attention and they are not distracted by other elements from their own work environment.” Similarly, one team member (VPTM8) described:

When team members are virtual, it is difficult to keep everyone’s attention and focus throughout long conference calls. When we are reviewing the project plan on a conference call, it is critical for key resources to be engaged. Far too often, people who are called on are multi-tasking and were not paying attention. ... We have had

situations arise recently where we have dates that are not correct in the plan, but aren't caught during planning reviews because the individuals who are responsible for those tasks are not paying attention to the detail of the plan. (VPTM8)

A related issue to team engagement was multitasking. During conference calls or virtually conducted conversations, team members were reportedly often trying to multi-task, which limited their attention and engagement. Again, this was noted by both VTMs and VPTMs. For example, VPTM2 noted, "It seems that employees are Multi-Tasking, and not fully paying attention to the Task on hand." Similarly, the project managers described the issue of team multi-tasking:

Keeping everyone actively engaged in conversations while managing projects virtually is often a challenge and adds risk to the project. People have a tendency to try to multi-task during conference calls, which leads to missed information that can be key to a projects success. (VPM4)

Risk management in a virtual environment is very challenging. Over the phone, many people are generally multi-tasking on other efforts and half paying attention to the subject at hand. This is a way of life in today's corporate environment where workloads are three times what they once were. (VPM5)

Although slightly less commonly noted, the lack of correct dates, documentation, or budgeting of time and resources was also described by both team members and one project manager as a risk management issue related to project planning. This was also noted as poor accuracy in in estimating timelines. Team member VPTM3 noted the problem of "not accounting for task(s) and or under [or] over estimating task(s) impacting DEV, QA, UAT and ultimately implementation delivery dates." Similarly, VPTM12 described in detail the relationship between these issues:

A risk management issue that was related to project planning that comes to mind, deals with the changing of project dates and deliverables and not being a participant in the discussion. I was unaware of the changes and proceeded to communicate and plan work with the QA teams on old obsolete dates. In working to complete a project artifact, another project team member informed me that the project

implementation strategy is changing and that the information that I am using is no longer valid. ... Another risk management issue related to project planning deals with the project implementation date being established before all the project tasks are defined. The project manager was targeting an implementation date without fully understanding all the tasks and resources required to complete those tasks. ... A number of projects set an implementation date and then attempt to timeline the project deliverables to the implementation date. The timelines often set unreasonable expectations to accomplish tasks resulting in missed requirements, milestones, delivery of faulty (buggy) code, numerous, and project change requests. (VPTM12)

Lastly, commonly cited by the participants was the issue of effective communications and collaborations, such that virtual discussions, problem solving, and brainstorming sessions were simply put, not as effective as in-person functions. VPM3 described:

Group design and problem solving sessions not as effective with virtual teams as local team collaborations. ... Brainstorming and design sessions that require white boards, Skype and other technology tools for visual aids along with technical documentation not as effective capturing the level of detail necessary. (VPM3)

Losing or adding a virtual project team member. The second thematic category of responses related specifically to risk management issues was formed from responses related to losing or adding a virtual project team member and how this affected risk management issues. Losing or adding a virtual project team member was felt to have effects on the project in general through (a) delays caused by the need for new team member training, (b) the lack of use of body language in communicating with and training new team members, (c) the need for extra attention for the new member, (d) the need to schedule and budget for additional meetings, (e) perceived significant effects on delays and budget, (f) difficulties with maintaining the attention of the new employee, and (g) delays and lack of project scope, budget issues, and (h) loss of key knowledge of an application or process. Table 4 illustrates the common responses offered by participants, forming the themes related to this thematic category, and the frequency of mention among the participants in the sample.

Table 4. Losing or Adding a Virtual Project Team Member Risk Management Issues

Common Response	Frequency of Mention
Training a new team member; training delays	6
Requires extra attention to bring on new members	3
Requires additional meetings for scheduling and budgeting	2
Significant effects on delays and budget	2
Attention of new employee when bringing up to speed	2
Loss of key knowledge of an application or process	2
Delays and lack of project scope, budget issues	2

When asked about the impact of losing or adding a virtual project team member, participants commonly noted several risk management issues. Most common involved issues of training, specifically in terms of the need for training and the delays due to this need. Again, this was noted by team members and managers alike. For example, one project manager (VPM4) explained the difficulty in adding a team member to a virtual project team: “Adding a virtual project team member can be difficult especially if they are not physically located near any other project resources. It can be difficult for them to be trained and come up to speed on the project.” This notion was supported by team member statements as well. VPTM8 noted the need for training, stating, “Adding or losing a team member will likely require training.” VPTM10 and VPTM12 also discussed the need for training the new member and the time cost to the team:

Bringing new resources into the mix often required 2-3 months of burn in time to ensure that the resources if fully capable of managing the required project tasks, ,, Factoring this into project planning is critical in mitigating project delays (VPTM10)

Training new Test Coordinators takes more time in a virtual environment. As a Test Coordinator, I often train new Wells Fargo Test Coordinators. Training these new

virtual team members takes more time and follow up to bring them up to speed. It also takes more effort to build a sense of team spirit and trust. (VPTM12)

In addition to training, the new team member also was reported to require extra attention, guidance, and time to answer questions and otherwise support the new member.

Project manager VPM5 and team member VPTM2 explained:

Losing or adding a virtual team member is very challenging and requires a great deal of attention to on board them properly. If there is another team member from your group, or at least in the same organization that sits near them, you can utilize this person as a point of contact for basic questions. (VPM5)

I find when adding new employees it takes more time to bring them up to speed, [as] they do not have local resources they can call upon. ... You need to add more time in training, guidelines, [and] answering questions. (VPTM2)

Other, less commonly noted risk management issues related to adding or losing team members included (a) the need for additional meetings for scheduling and budgeting, (b) significant effects on delays and budget, (c) the attention of the new member when attempting to bring him or her up to speed, and (d) loss of key knowledge of application or processes, and (e) delays and lack of project scope.

Technology related issues. The third thematic category under risk management issues was comprised of responses pertaining to technology-related issues. The most common response was technology failure or issues causing a lack of reliability of the technology (mentioned by 9 participants). Other common responses included background noise and other environmental issues, limited resources and access to technology across virtual team, the need for reliable, high speed internet connection, and difficulties associated with introducing new technology to the team. Table 6 illustrates the common responses among the participants in the study.

Table 5. Technology Risk Management Issues

Common Response:	Frequency of Mention
Technology failure or issues; lack of reliability of technology	10
Limits on resources and access to technology	3
Conference call background noise and other environmental issues	3
Introducing new technology; newness of technology	2
Need for reliable high speed internet connection and technology	2

By nature of the virtual environment, technology related risk management issues are central. Half of all the participants in this study, VPMs and VPTMs alike felt the greatest technology related risk management was the risk of technology failure or the lack of reliability of the technology that is necessary for the functioning of a virtual team process.

As an example, VPM4 discussed:

When working as a virtual project team you rely on tools such as phones, conference lines, email, live meeting capabilities, etc. If any of these go down, it makes it much more difficult to communicate across the team. It can impact work being done on a project as well and lead to delays. (VPM4)

Among other things, “There could be a loss of service, latency and propagation delays” (VPTM15) or “Sometimes there are connection issues” (VPTM6).

Other participants described problems with the ability to log in to work remotely, access issues, weather related technology outages, affecting the reliability of technology services. For example:

The problems I’ve experienced related to technology is when the ability to log in to work remotely is temporarily unavailable or when phone lines go down during a storm, for instance. These occurrences are always very temporary and haven’t posed much project risk, in my experience. (VPTM9)

Technology is not always reliable for everyone on a virtual team. Virtual team members (international and vendors) do not have the same access to remote technology tools and local teams (VPM3)

I encountered issues with the need of additional access requirements that were not mentioned nor addressed during business hours. I had a vendor during a critical time in the project not acknowledging the need to have access to servers off hours. This caused a few of our work tasks to be delayed by three days on our project timeline and schedule. (VPTM11)

Actual hardware can also be problematic, when team members do not have access to specific hardware needs. For example, participant VPTM13 explained:

I have faced situations where my customer requires that virtual team members utilize customer specific laptops, but will not allow anyone outside the US or Canada to have a laptop. This increases risk because it limits the resources available to work on the project.

Lastly, other issues related to technology included difficulties using the technology, such as background noise during conference. Project manager VPM1 noted:

I haven't had a ton of risk management issues related to technology that I have encountered with our virtual team. There is always the standard conference all background noises but for the most part our company has provided all the necessary tools for our teams to function well with virtual teams. (VPM1)

Nature of virtual environment. The fourth thematic category under risk management issues was formed from responses related to the nature of the virtual environment. The most common responses highlighted themes of (a) difficult communication; (b) time zone differences affecting team member availability; (c) difficulty ensuring collaboration, knowledge sharing, and working together; and (c) lack of team connectedness and relationship building. Also commonly noted were issues of availability of all team members, email lag in response time, and time zone differences.

Table 6. Risk Management Issues Related to the Nature of the Virtual Environment

Common Response	Frequency of Mention
Communication	6
Time zone differences	4
Meeting availability of all team members	4
Difficult to ensure collaboration, sharing of information, working in concert	4
Team connectedness and relationship building	3
Email lag in response time	2
Home distractions/ multi-tasking	2

Because virtual environments are dependent on the ability to communicate virtually, communication issues, as noted in the previous section, directly affect the virtual project team functionality. By nature, therefore, “clear communications” (VPM2) are essential.

Virtual project manager participant VPM4 explained:

I believe everything I previously mentioned relates to the nature of a virtual work environment and the inherent risk that is introduced to a project team. Communication gaps, whether its due to language or cultural differences, people multi-tasking and not staying on point, and the heavy reliance on phone and email conversations, are a few examples of the challenges with working in virtual project teams. (VPM4)

These challenges include difficulties getting in touch with team members when there are critical issues to deal with, as noted by VPTM6, who stated, “At times it’s hard to get in touch with team members when you need something immediately.”

The difficulties getting in touch with team members can also be the result of time zone differences. VPM3 described that time zone differences on an international basis contribute to risk management issues, “Time zone creates a big risk especially if some team members are international. It is very difficult to find time to host virtual team members in

five US time zones along with international.” Indeed, finding time that works for all team members when different time zones are involved was noted to be problematic by other participants as well. For example, the following participants described the effect of time zone differences to the virtual project team:

Time Zone differences are a big factor. When you work with teams spread out across the country or even the world, you have to find a time that works for everyone. For my team it is primarily US, but even with a 3 hour difference you have people working earlier in the Eastern Time Zone and people working later in the West. If you try to meet when everyone is meeting you can't meet before 8am Pacific or after 5PM Eastern. You have essentially truncated the standard work day or are asking project team members to either work earlier or later than normal. (VPM4)

Managing work with virtual resources across multiple time-zones has created issues because it creates small windows for scheduling project meetings, for example, we have advanced support resources in Israel who are done working by 10AM ET, so we often have delays because that small window is booked days and weeks in advance

Some described having difficulties with the availability of team members for conference calls or messaging and email response time. Participant VPTM13 described:

it can be challenging to ensure virtual team members show up for meetings on time because you can just corral them on the way to the conference room. You can try to text or instant message them, but there is no guarantee they responded. (VPTM13)

These problems of connecting with project team members across time zones and the availability of team members can create delays in the project timeline. This was noted by VPTM13 and VPTM1, who stated:

I have seen communication cycle be delayed on virtual teams because of working different time-zones and when a virtual team member is away without explanation. (VPTM13)

Time-zones can be a problem. For example, project may be delayed if we have to wait 15 hours to get a response from someone in another country. (VPTM1)

In addition, four of the virtual project team members discussed difficulty ensuring collaboration among team members. VPTM12 and VPTM13 explained:

It takes more effort to share visual information with virtual project team members. The issue that I encounter being virtual is that I rely on on-line meetings to share, where as in personal, I would be able to write and draw on a whiteboard. Using a white board is a more efficient means to communicate since multiple team members can access the board at once. (VPTM12)

By their very nature virtual teams increase the risk to a project because it is harder to ensure everyone is working in concert toward the same goal in the same manner. (VPTM13)

Lastly, other risk management issues related to the nature of the virtual environment, commonly noted by participants included difficulties with team connectedness and relationship building, email response lag time, and dealing with home or other environmental distractions and multi-tasking.

Communication issues. The virtual environment, as seen in the previous thematic category, by nature was described by participants as presenting communication issues. Technology is used to offset these communication difficulties in the virtual environment, where possible; however, participant responses related specifically to communication issues formed the fifth and final thematic category under risk management issues. The most common responses related to communication issues involved language and cultural differences between team members. In addition to cultural and language differences, common risk management issues related to communication discussed by participants included (a) miscommunication/ misunderstanding, (b) lack of body language in communication, (c) lack of adequate communication, and (d) use of multiple communication methods to support clarity, but contribute to too much noise. Table 7 illustrates the responses offered by participants and the commonality of these responses among the sample. Given the

high frequency of participants discussing language and cultural differences, these communication issues are discussed separately.

Table 7. Risk Management Issues Related to Communication

Common Response	Frequency of Mention
Language differences	10
Cultural differences	6
Miscommunication/ misunderstanding	3
Lack of body language	3
Not communicating enough; lack of adequate communication	3
Use of multiple communication methods, but too much noise (too many communications)	3
Delays in communication	2
Talking over each other; unsure who should answer	2

The language and cultural issues was discussed in the next subsection, as these were the most commonly noted among communication issues; however, in addition to language and cultural differences, miscommunication and misunderstanding were commonly noted by three participants, as well as lack of body language, inadequate communication, and the use of multiple communication methods. VPM1 discussed the difficulties of communication related to delayed email responses, team members paying attention during conference calls due to workloads necessitating multi-tasking, as well as discussed the importance of using multiple communication methods if the message that must be relayed is important.

In today's world communication is very difficult. It seems folks either don't read emails clearly or are paying attention to conference call because they are multitasking due to work loads. So it is important to use many communication vehicles on projects. And sometimes that includes multiple for the same message if it is important. So I coach the PM's on when we should use multiple or sometimes what method is appropriate for what is needed. (VPM1)

However, these issues and the use of emails and messaging to document communications can cause team members to feel inundated with these types of communications and losing their focus, as expressed by VPTM10, who complained, “Too many meetings, too many emails, too many IM’s end up desensitizing resources as to what they should really be focusing on.”

Because many of the communication methods in the virtual environment lack a visual component, often body language is not a factor in communication, which would normally assist in interpretation and understanding of the communication. The lack of body language as a communication tool was noted by three participants. For example, VPM3 described, “Body language for me plays a big role in telling me if someone understands what I am explaining. Virtual teams do not have the luxury of body language interpretation.”

Another issue is misinterpretation or misunderstanding, which can be caused by many factors, including language and cultural factors. VPM5 explained these risks to misunderstanding and the use of documentation to mitigate these risks:

The smallest misinterpretation due to language, culture, temporary mood swing or distraction on the part of the communicator can lead to detrimental issues for the project team and their ability to be effective down the road. To mitigate these risks, employees are relying HEAVILY on the use of e-mail to cover themselves. Documentation and then the subsequent approval or acknowledgement of said documentation is the only way that you can actually confirm that your point was 100% understood in a virtual environment. (VPM5)

Cultural/language differences. The most commonly mentioned communication issues were related to cultural and language differences between team members. These cultural and language differences among team members were noted to contribute to communication risk management issues by contributing to delays and other problems.

Communication is very important within a project team. Everyone needs to be on the same page. If some project team members are unable to communicate clearly due to

cultural or language differences, this can lead to miscommunication which can result in delays or worse. (VPM4)

Overall key common responses related to language and cultural differences included (a) language differences affecting ability to communicate (different languages or accents that are difficult to understand); (b) misunderstandings resulting from language or cultural differences; (c) perceptions of rudeness or arrogance stemming from cultural difference; and (d) religious holidays and calendar effects of different holidays. Table 8 shows the different common responses given by participants with regard to communication issues specific to language differences and cultural differences.

Table 8. Cultural and Language Differences Contributing to Communication Issues

Common Response	Frequency of Mention
Language differences	10
Difficulty understanding team members who speak different languages or have different accents	8
Misunderstanding; language and cultural differences can lead to misunderstanding	4
Contributing to inadequate knowledge transfer and reduced relationships	2
Cultural differences	6
Religious cultural implications: holidays and calendar effects, work hours, and gender contributions	3
Perceptions of rudeness and or arrogance	2

Language differences. Eight of the 20 participants in this study, including both VPMs and VPTMs, noted difficulties understanding team members who speak different languages or have different accents. Virtual project manager VPM1 stated, “I have a very hard time understanding team members that speak different languages or that have a strong accent.” VPM3 also noted this problem with different accent or dialects, who stated,

“Communication goes back to language-accent-dialect barriers.” Team member VPTM15 felt the different accents were the greatest challenges, asserting, “Accent differences pose the greatest challenge.”

These communication issues can contribute to misunderstanding and difficulties achieving effective knowledge transfer. For example:

When working with team members from India the language difference can be a risk. Usually we can overcome it, but pending on the resources role and what they are responsible for, the risk can turn into an issue. Example when doing defect resolution. If the resource responsible for resolving the defect cannot understand and/or cannot communicate their understanding back to the person who opened the defect, items can get lost in translation. The defect can get resolved incorrectly as there was a communication breakdown. (VTPM4)

Cultural differences. Cultural differences were noted by participants to contribute to communication difficulties. Two participants described cultural differences in communication that precipitated perceived rudeness, anxiety, or the team member demonstrating arrogance or being contentious. VPM2 explained, “I have also had difficulty working with people based in London and Dublin, no matter their ethnic background. They are often rude, anxious, arrogant and contentious. Maybe it’s the time difference.” This type of offense was also described by VPTM10, who gave an example, describing:

For example, there was once an HR related issue where one resource took offense to something another resource said. The second resource thought it was common place to interact in that manner with his peers; however, the first resource felt it was incredibly disrespectful and a blow to his religious beliefs. Ensuring our team members are proper. (VPTM10)

As noted by VPTM10, religious differences can contribute to this type of confusion.

Participant VPTM15 described the impact of holidays that impact availability of team members, stating, “Different cultural issues have come to light. Holidays are different with some resources and they were unavailable for meetings and implementations due to different

Holiday observations.”

Risk Management Practices to Mitigate Risks

After discussing the risk management issues related to the virtual environment, participants in this study were similarly asked about risk management practices that were or could be used to mitigate these noted risks. Following the risk management issues noted previously, the risk management practices demonstrated thematic categories of response data related to project planning, dealing with the loss or addition of team members, technology, the nature of the virtual environment, and communication, also involving ways to deal with language and cultural differences among team members.

Project planning. The first thematic category under risk management practices was developed from participant responses related to project planning practices. Commonly noted themes were revealed related to (a) formal project planning sessions; (b) in person meetings; (c) frequent or periodic team web meetings; (d) clear communication or having a communication strategy; and (e) tracking and documenting project issues and risks. Table 9 provides the common responses offered by participants and the associated frequency of mention among participants.

Table 9. Project Planning Risk Management Practices

Common Response	Frequency of Mention
Formal planning sessions; strong project planning	5
In person meetings; building time into plan for in-person visits and travel	4
Frequent or periodic team web meetings	4
Clear communication; communication strategy	3
Tracking and documenting project issues and risks	3

Risk management practices that were felt to mitigate issues related to project planning included formal planning sessions and other strong planning techniques, such as, “Create a solid project management plan, a project charter, a high-level impact assessment, and a good risk and control plan during the Define stage of development” (VPM2). This was collaborated by VPTM1, who noted, “Probably the most effective [practice] is basic project planning: creating milestones, assigning specific tasks to individuals, etc.” (VPTM1). This notion of particularly strong or formal planning was described in more detail by participants VPTM11 and VPTM4, who stated:

Established a project Kickoff call with all team members (requested all-hands on deck, especially for external resources) to outline the project plan which included the following: Collect all holiday and personal time off for all team members, ensure all team members skill-sets are in alignment with the technology work to be work on and integrated onto a new platform for the company, address any access levels needed to log in to any servers after hours, established all contact information is updated and distributed, ensure all milestone dates are static and agreement made to be met and if the dates cannot be met, to acknowledge any obstacles we need to discuss and take action if the project plan would have to be re-baselined to avoid any cost going over budget for the project. (VPTM11)

Risk management practices we have used are doing formal planning sessions with all parties and/or key parties involved with the project. This seems to flush out any gaps we have as it relates to resources or tasks and it also provide the opportunity for the team to meet each other face to face. Have the conversations we need to have during the planning phase of the project together vs over a Live Meeting. (VPTM4)

Another practice that was commonly noted to mitigate project planning risk management issues was the use of in person meetings where available. The following examples demonstrate how both virtual project managers and virtual project team members agreed that having at least sporadic in-person meetings can help to clear project planning issues.

Having key project team members meet up a 2-3 times during the project can really help. Especially if people can travel to meet up in person to review the requirements

so everyone is clear, reviewing the design to make sure everyone agrees it will work, and then for Go-live to monitor and react quickly to any post-install issues. (VPM4)

The utilization of in person meetings at key points in the project are key to helping the team truly engage on specific artifacts of the project. The initial baseline plan is one of those documents that is best reviewed in person when budget is available. (VPM5)

Face to Face JAD Sessions have proven effective for planning. Project Team members tend to pay more attention at face to face meetings; less multi-tasking taking place resulting in a high level of participation. I have observed that projects that invest in face to Face JAD planning sessions have fewer issues later in the project. (VPTM12)

The frequency of meetings, either in-person or virtual, was felt to be another factor that can mitigate risk management issues related to project planning. According to participants in this study, frequent we meetings can be used to monitor project status and can be increased depending on specific issues or when approaching milestones.

Setting up frequent web-meetings to monitor status is an effective risk mitigation tactic. The frequency of the meetings can increase to daily or multiple times per day when there are significant issues or nearing a critical milestone. (VPTM13)

Participant VPTM9 supported this notion, indicating the need for regular status meetings as well as documentation of proposed actions and meeting minutes, stressing the importance of documentation, particularly for team members who are not present or not engaged.

When project planning, especially when the project involves numerous teams and people, regularly occurring status meetings are critical, followed by detailed minutes and action items that are then posted for all to access. A strong PM that is both detailed and big-picture oriented is also critical. Adequate documentation is key so that everyone has an opportunity to understand project status and expectations, even if they were unable to attend meetings or otherwise not engaged during verbal exchanges. Document sign off is also important to make sure accountability is made clear. (VPTM9)

One aspect of the effectiveness of communications, such as the regular meetings noted previously, is the ability to provide clear communication, which requires “a good

communication strategy” (VPTM10). VPM1 similarly noted, “Strong communication styles are needed. Being able to clearly articulate what is needed. Again, using many different vehicles when communicating is key.” Indeed communication is necessary for the effectiveness and success of the virtual project team. However, the productivity and effectiveness of the team can be affected by changes in team membership.

Losing or adding team members. Other risk management issues brought up in the discussions with participants were those issues related to losing or adding team members. When asked what practices could mitigate these issues, participants commonly noted (a) having a transition and training plan; (b) providing support for the new member (through pairing with another member, additional training, or availability of other team members for assistance); (c) ensuring current Sharepoint and document repositories; (d) documenting all meetings and communications; (e) having clear expectations and roles for new members; (f) having a strong resource management plan with detailed contacts; (g) using in-person or one-on-one time to reduce communication issues; and (h) using check points. These were the themes revealed within this second thematic category. Table 10 provides these common responses/themes related to team member changes, such as the loss or addition of team members.

Table 10. Risk Management Practices to Mitigate Issues with Team Member Changes

Common Response	Frequency of Mention
Transition and training plan	5
Providing support for new member	5
Pairing new members with more experienced members	2
Team members available for explanations	1
Additional training	1
Ensure current sharepoint and document repositories	3
Document all meetings and communications	3
Clear expectations and role for new member	2
Strong resource management plan with detailed contacts	2
Use of in-person or one-on-one time to reduce communication issues	2
Use of check points	2

Participants in the study, both VPMs and VPTMs acknowledged that when the team adds or loses a team member, there is a need for extra “time to bring that new member(s) up to speed as quickly as possible” (VPTM2). In attempting to “bring that new member up to speed” (VPTM2), participants expressed the need for a training plan or “tweaking” of the training plan. Participant VPM5 stated, “The training plan should be tweaked as needed to make sure that the end goal is accomplished as quickly and efficiently as possible.”

Five participants noted the need to provide some sort of support for new members. This support, as noted by participants, could include (a) pairing new members with more experienced members, (b) additional training, and (c) ensuring team members are available for explanations. As such, the following examples from the interview texts demonstrate these suggested support mechanisms:

- When adding a virtual team member, pairing them with someone more experienced can go a long way. Someone they can reach out to and touch base with on a regular basis to ask questions and just observe helps bring them up to speed much quicker. (VPM4)
- Allow additional time for training virtual resources. (VPTM8)
- As new team members are added ... [can support them by] making yourself available for explanations if necessary. (VPTM 14)

Technology. The third thematic category under risk management practices was determined from responses related to technology risk management practices. The most common response was the need for technology documentation in terms of project plans, business requirements, design documents, testing plans, and resources and which technology used to support the project. Other common responses included (a) ensuring all team members have adequate and correct technology tools, (b) ensuring the technology documentation fully addresses which technologies used to support project, (c) using communication technologies that support documentation of communication (i.e., instant messaging [IM], recording calls), (d) using Sharepoint or WebEx sharing tools, and (e) using video chat and video conferencing to support collaboration. Table 11 illustrates the common responses forming themes in this thematic category, highlighting the importance of documentation of business and design plans, communications, and technology plans.

Table 11. Technology Risk Management Practices

Common Response	Frequency of Mention
Documentation of project plans; business requirement docs, design docs, testing plans, resources	6
Technology tools that support documentation of communications (IM, recording calls, etc.)	3
Ensuring all members have the right technology tools	2
Ensure tech documentation fully addresses which technologies was used to support project	2
Use of Sharepoint; WebEx sharing tools	2
Use of video chat and video conferencing to support collaboration	2

Risk management practices geared toward mitigating the risks associated with technology related risks were most commonly noted to include documentation of project plans and communications, as well as the technology tools to support such documentation. Participant VPTM7 discussed how his/her manager documented all of the needed access systems, stating, “My manager created a doc of all the systems that we need access to and a support person took care of getting us set-up on the systems.” Other team members noted regular reviews of the project plans and the use of instant messaging and online meetings to support communication between team members and accurate and effective project planning. VPTM4 asserted the need for “Planning, using project plans and reviewing them weekly with the team” and participant VPTM12 described the use of technology tools, stating, “Instant Messaging and On-Line meetings are indispensable tools for communication for virtual project team members. I use these tools constantly to ensure that communication is effective and synchronous.” Lastly, one of the project managers suggested recording the calls for playback, but noted the difficulties associated with recording all calls. “You could also record every call to have available to playback but I find that this takes a lot of storage and not used very much” (VPM1).

Nature of virtual environment. The fourth thematic category under risk management practices was developed from responses revealing the nature of the virtual environment, particularly in terms of practices affecting risk management. Common responses were (a) having frequent meetings, (b) keeping track of time zone differences, (c) using a variety of communication technology (both written and verbal) to support clear communications, and (d) supporting personal relationships with team members,

Table 12. Risk Management Practices Related to the Nature of the Virtual Environment

Common Response	Frequency of Mention
Utilize a variety of communication technology to support clear communications	4
Frequent meetings	3
Keeping track of time zone differences	2
Supporting personal relationships with team members	3

With the nature of the virtual environment, participants described the importance of communication and therefore, the benefits of using a variety of communication methods. Project manager participant VPM5 noted this risk management strategy, “Utilizing a variety of communication media to keep your team engaged allowed you to have fall back plans when one or more is not available.” This was similarly noted by team member VPTM14, who described both the importance of communication to team members and the use of multiple communication tools and documents to the ability to generate solutions to problems that arise. This participant explained:

Communication between team members is very important. Virtual team members can use many tools for communicating and sharing information such as SharePoint, IM, and email. Oftentimes architecture or design documents can also be used to communicate risks or challenges and have proven to be very useful for explaining complex solutions. ... Some practices that have helped are making yourself more available since you do not have to worry about driving into an office. You may take a call earlier or later in the day. (VPTM14)

Another team member observed the need for frequent meetings to reduce confusion and misinformation issues. This participant stated:

In my observation, frequent meetings have proven effective with disseminating information. I have noticed that projects with fewer or no regularly scheduled meeting tend to have more confusion and issues. As a Test Coordinator, I schedule weekly 1:1 meetings with individual test leads to ensure that we are in sync. These

sync up meetings allow open discussions and helps to identify issues ahead of time. (VPTM12)

Communication. Communication is critical to the virtual project teams, as time and space can be variable. Therefore, the fifth thematic category under risk management practices was developed from participant responses describing practices of communication to mitigate risk management issues. The common responses, highlighting common themes in the data, included (a) the use of multiple methods of communication, (b) asking questions, (c) clearly documenting key decisions made, (d) inclusion of in-person meetings, (e) being as clear and direct as possible (over communicate), and (f) establish weekly project status meetings. Table 13 gives the common responses and associated frequency of mention among the study participants, which indicate the common themes revealed within this category.

Table 13. Communication Related Project Management Practices

Common Response	Frequency of Mention
Use of multiple methods of communication	6
Be as clear and direct as possible/ over communicate	5
Include in person or face to face meetings	5
Ask questions	3
Clearly document key decisions made	3
Established weekly project status meetings	2

As was noted in the previous section on the nature of the virtual environment, communication is critical to effectiveness and success of the virtual project team. To facilitate communication among team members, technology is also critical. Thus, participants mentioned the benefits of using multiple methods of communication (as was noted in the previous section). For example:

Technology has enabled us to communicate in a number of ways including email, video conferencing and IM. One of the challenges with technology is that it has taken away the face to face communication including the handshake and body language when a deal has been struck or the expression of the importance of a risk to a client by the look on their face. (VPTM14)

Communications - do lots of it in many ways, meetings at many levels, status updates, escalations, decks – adjusting to the audience depending on what you are trying to say or get accomplished. (VPTM3)

Five participants, both VPTMs and PTMs, also noted the need to be direct and clear in team communications to reduce miscommunication and misunderstanding. VPM2 explained, “You need to be direct and honest with people who aren’t communicating effectively. Do a one-on-one call. Just emailing them about the problem is cold and off-putting.” Clarity was felt to ensure that the message is received and understood. Participants VPM4 asserted, “Be as clear as possible. Reiterate what you just heard to make sure you captured what the other person(s) was saying.” This was supported by other participants, such as VPTM12, who explained:

In my opinion, clear and open communication is key to for virtual project team members. Since majority of the communication for virtual project team members happen via email, it is important that the message sent is clear, succinct, and the expectations are called out. When sending out emails, I tried to ensure that my emails are brief but not vague, and closed with clear expectations. VPTM12

Another communication practice noted by participants in this study was the inclusion of in-person or face-to-face meetings. For example, VPTM12 explained that the in-person meetings supported relationship building and a stronger sense of cohesion within the team, stating, “On long term projects, it would help to plan and budget for face to face meetings. This helped to build relationship and a sense of ‘team,’ which would allow a much closer partnership with the project team. However, participants also acknowledged that these in-person meetings are not always possible in a virtual work environment. VPTM4 noted, “It’s

not always possible to have face to face meetings, but if possible, do it. Just like building a team that is in the same physical office, try to do the same with the virtual team members.”

Other participants noted the importance of asking questions among team members to provide this kind of clarity of communications, team work, and effective knowledge sharing.

The following examples from both VPMs and VPTMs demonstrate this theme:

Don't be afraid to ask questions and as the project manager always encourage people to ask questions and ask if everyone is clear. (VPM4)

Open discussions and not having the fear of asking questions for clarifying the situation. Being able to say I need more information on conference calls and side meetings. (VPTM15)

Another important aspect of clear communications was providing clear documentation, as discussed by VPM4, who asserted the need to “clearly document when key decisions are made.”

Certain communication difficulties were noted to be related to cultural and language differences, as was previously described in the section of risk management issues. The practices described by participants to mitigate the specific risks associated with cultural and language differences are offered in the following section.

Cultural and language differences. As part of the communication thematic category, responses of participants showed a recognition of practices to mitigate risk management issues related to cultural and language differences that affect communication. Key common responses of participants highlighted the use of written correspondence, communication to ask for clarification or clear understanding, embracing diversity through diversity awareness and training, researching other cultures and languages (especially holidays), and allowing

additional time on calls to accommodate speaking slowly and clarifications. Table 14 shows all of the responses commonly noted by participants and the associated frequency of mention.

Table 14. Practices to Accommodate Cultural and Language Differences

Common Response	Frequency of Mention
Use of written correspondence	5
Communication; asking for clarification or understanding; clear understanding	4
Embrace diversity / access to diversity awareness and training	4
Research the culture or language, especially holidays	2
Allow additional time on calls; speaking slowly on conference calls	2

Practices to mitigate issues related to cultural and language differences, which are inherent in the virtual project environment, particularly with internationally located team members, highlighted the use of written correspondence, clarification through additional communications, and the ability of team members to embrace diversity (supported through access to diversity awareness and training). In terms of the impact of written correspondence in supporting effective communication when dealing with language and cultural differences, VPTM4 explained:

Risk management practices related to language differences has proven to be written correspondence vs verbal. When explaining something over the phone is not working, the team switches gears quickly to Instant Message or Email to ensure all parties have a good understanding.

Asking for clarity was seen as important to avoiding misunderstanding and supporting clarity of communications. These clarifying communications can address both language difficulties and cultural differences by supporting greater understanding.

Participants VPM2 and VPM4 explained:

If someone with a non-standard American accent (or one you can't follow) speaks too softly, quickly, or unclearly, ask that person politely to restate what he/she said. If someone writes incoherently, have him/her rewrite the email or document with your suggestions for clarity. If someone is consistently rude or obstructionist, contact his/her manager directly and explain how the situation is affecting the project's health.(VPM2)

Speaking slowly on conference calls, making sure to be detailed and clear in emails, and if you are not entirely sure what someone is asking stating, state what you believe they are trying to communicate and ask if that is correct. And do not be afraid to ask questions. There are no dumb questions when it comes to projects and it is always better to ask the question and validate that you are clear than not ask and make the wrong assumption. (VPM4)

Diversity awareness was described by four participants specifically as a means of mitigating cultural differences. VPTM3 stated that team members need to “embrace diversity, partner on understanding, and get creative on communication: live meetings, written status updates.” Indeed, VPTM5 supported the importance of embracing diversity, as this participant asserted, “Being able to recognize the diversity among the project team, vendors, and business partners created a happier and more effective project team.”

To achieve the goal of team members who embrace diversity, having access to diversity training and materials is essential. VPTM10 suggested, “Make sure team members have access to diversity awareness materials.” With diversity training, acceptance, and understanding, misinterpretation and misunderstanding can be minimized. According to VPTM9:

The biggest risk with cultural and language differences is the misinterpretation of what is being communicated. Having the team take diversity and culture sensitivity training would help individuals understand how to accurately interpret cultural differences and effectively work together to better understand each other (i.e., such as how to ask sensitively ask questions of each other about their culture and language).

Additional support, resources, and recommendations for practice. As a final thematic category, participant responses related to thoughts of additional support and resources and recommendations for practice to mitigate risk management issues, as noted throughout this analysis. Recommendations offered by participants continued to support the use of in-person, face-to-face meetings to support communication. The following examples demonstrate participants' encouragement of in-person communications, particularly with project managers and for more long-term projects, when possible:

If you have the ability to travel and meet in person a couple of times with the broader project team, go out and get away from the office. (VPM4)

One recommendation is to have one-on-one meetings with your project sponsor and/or manager to communicate the project status and risks to your manager. If any issues or risks need to be escalated, this can be addressed during the one-on-one meeting. (VPTM11)

On long term projects, it would help to plan and budget for face to face meetings. This helped to build relationship and a sense of "team" which would allow a much closer partnership with the project team. (VPTM12)

In addition, leadership support and understanding of the challenges of the virtual team was felt to contribute to risk management. Both VPMs and VPTMs noted the importance of leadership support. VPTM15 stated, "Managerial support is key. They must not be afraid to take action to reduce risk opportunities." Similarly, VPM2 suggested, "Having a fully supportive and intelligent program manager is the best prevention for any project going south." As a final example, VPM4 noted the impact of "Leadership support and understanding of the challenges with working in a virtual team environment, [such as] funding to travel, can go a long way with keeping the team on the same page and even promotes team building."

Other recommendations and support for risk management was felt to come from supporting relationship building and team building, reviewing and monitoring risks, team member engagement and involvement in issue resolution, and the use of Sharepoint, or other tools for collaboration and sharing across the virtual team. Building relationships supports team cohesion and ability to collaborate to overcome risks. “Trying to build the relationships as much as possible with the project team members can help overcome a lot of the risks associated with virtual teams” (VPTM4). In addition, identifying and monitoring risks can support mitigation of risks toward minimal impact, as noted by VPTM8, who stated:

The key to risk management is to identify all risks and assess each of them for the level of impact. Once assessed, the project team needs to determine which ones have the highest potential impact and identify ways to mitigate them or minimize the impact. Risks should be visible and communicated regularly to the project team members and stakeholders, to ensure that they are monitored and addressed.

In resolving issues and reducing new issue development, participants suggested to “Try to keep people engaged in the conversations and paying attention” (VPM4). Lastly, efforts to resolve issues were felt to be most efficient and effective when all the team members, specifically all parties involved in or affected by the problem, have ownership in the resolution and identified risk management. Inclusion of all team members was felt to support effective risk management. Participant VPM3 described:

Involve all impacted parties in the description of the problem and the options for resolutions assign team members ownership to identified risks. ... You must find ways to include everyone in discussions and secure consensus of team members before moving on.

Table 15. Additional Support, Resources, and Recommendations for Risk Management

Common Response	Frequency of Mention
Meet in person; face to face meetings	5
Leadership support and understanding of challenges	4
Relationship and team building	3
Monitor risks/ constant review of risks	3
Sharepoint/ use of tools that allow whiteboard sharing	3
Team member engagement and involvement in solutions	3

Conclusions

From the various thematic categories and themes evident within these categories, several overarching conclusions were drawn representing the experiences and perceptions of the group, as described in the interview data. These conclusions relate first to identified risk management issues and then to risk management practices that serve to mitigate the identified risks.

Project Planning Issues and Related Effects of Team Member Changes

Project planning risks were identified as team attention and engagement issues, often due to team member multi-tasking, and lack of proper documentation and accuracy in project estimations. Project planning and outcomes were affected by the team member changes (loss and/or addition of virtual project team members), which were felt to affect delays and create budget issues primarily due to the need for additional training and support and the loss of key knowledge.

Practices supporting risk management related to issues in project planning and team member changes included elements supporting the creation of a clear communication strategy, such as having organized, formal planning sessions; inclusion of in-person meetings

when possible; frequent or periodic team meetings; as well as tracking and documenting project risks and issues. Participants in this study also suggested supporting team member engagement and involvement in solution development through delegating tasks, giving team members direct responsibilities and contributions. Practices aimed at addressing issues related to the addition and/or loss of team members included development of a transition and training plan to provide support (pairing with a more experienced member, and availability of other members to the new member), documentation of resources and project plans, and maintaining clear expectations for the new members.

Nature of the Virtual Environment affected by Communication and Technology

The nature of the virtual environment was felt to present several risk management issues. These issues included less effective communication, collaboration, and knowledge/information sharing; team member availability limitations due to access and availability; and team cohesion, connectiveness, and relationship building issues. Critical issues related to technology use in the virtual environment include lack of technology reliability and access limitations, technology failure, and background noise or environmental distractions. Related communication issues centered on misunderstanding and miscommunication stemming from difficulties in communicating due to lack of body language, language and cultural differences (including religious and cultural implications such as holidays, gender contributions, and perceptions of rudeness etc.), delays in communication, and lack of adequate communication.

Risk management practices to mediate risks associated with issues stemming from the nature of the virtual environment, communication issues, and technology issues included having frequent meetings, tracking time zone differences, supporting the development of

personal relationships between team members, maintaining clear and direct communication and using a variety of communication methods and technology to support clear communication, and including in-person meetings and communications. In addition, asking questions, seeking clarification, and using written correspondence can be used to support more effective communication, especially when language or cultural differences are problematic. Supporting an acceptance of cultural diversity through increased awareness and cultural sensitivity and diversity training was also felt to address issues related to cultural and language differences between team members. Lastly, participants in the study highlighted the importance of leadership support for the challenges faced by the team.

Summary

Chapter 4 has provided a detailed description of the findings resulting from the analysis of qualitative interview data obtained from a sample of 20 virtual project team members and managers. Interview data were coded and categorized into several thematic categories, which highlighted themes within each category based on commonality of participant responses. These themes were further combined and analyzed to develop the conclusions of the analysis, revealing both perceived risk management issues and practices felt to address those issues. Chapter 5 provided a discussion of these results, specifically in relation to the research questions of the study and to the prior literature in the field.

CHAPTER 5. DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This final chapter presents conclusions developed from the results offered in Chapter 4 within the framework of the research questions, research design, and an understanding of previous literature and the theoretical framework. The research results are discussed in this chapter within the context of the research questions and the previous literature. From the conclusions, implications for practice and recommendations for further study are offered. The conclusions of this research can be used by organizational leadership to address risk management challenges within the virtual team setting.

Research Summary

Despite recognition that virtual project teams can lead to higher efficiency, various management and employee risks pose a threat to the effectiveness of virtual project teams. Research has shown that virtual project teams can sometimes fail because of risk management issues that may include cultural differences and communication problems (Barnwell et al., 2014). Managing virtual project teams can pose some unique and distinctive challenges because of restricted opportunities for communication and limited, or no direct face-to-face interaction. As a result of these challenges, specific risks or adverse effects can potentially occur, requiring virtual project teams to plan and carry out organizational activities and objectives.

The purpose of this study was to determine risk management issues faced by virtual project teams and to identify effective risk management practices to mitigate the risk issues faced by virtual project teams. Therefore, this study was designed to collect and analyze data

to interpret implications for the following research questions within the context of the case setting:

RQ1: What are the risk management issues faced by virtual project teams?

RQ2: What are risk management practices that are effective in mitigating the risk issues faced by virtual project teams?

Significance

Global economics has supported the need for anytime and anywhere project teams in a variety of environments, including virtual environments (Marginson & Bui, 2009).

Although virtual project teams have been shown to be beneficial to organizations (Moore, 2007), these virtual teams face unique project risk issues that must be mitigated in order to be successful in achieving the project goals. The significance of this study is that the findings may assist organizations to better equip and empower virtual project teams with the knowledge needed to support optimal team performance (Nunmaker et al., 2009).

The findings of the study are expected to contribute to the growing body of knowledge regarding virtual project teams. The findings provide in-depth understanding of the risks and practices that help to avoid or address these risks by supporting the ability to predict specific challenges and prepare effective strategies to address challenges or risks to project goals and deadlines (Loskutova, 2014), particularly for businesses that have been hesitant to support implementation of virtual work solutions or those who are struggling with existing virtual project team issues. By supporting project risk management in this way, virtual team leaders can support team productivity and delivery of stakeholder requirements (Loskutova, 2014). Academically, the findings may lead to the development of theories about virtual work environments (Loskutova, 2014).

As companies respond to global demands, the findings of this study are significant to enabling more effective management to support optimal benefits from the use of virtual project teams (Loskutova, 2014). Given the high degree of diversity and the associated benefits from establishing effective virtual teams particularly in terms of global expertise and diverse provide perspectives supporting greater innovation (Loskutova, 2014). This same diversity can cause issues with communication and interpretation of issues and roles on the team. It is important, therefore, that leaders remain aware of potential communication and cultural issues that present potential risks, in order to effectively manage virtual project teams (Loskutova, 2014) and fully receive the benefits these teams have to offer.

Literature Reviewed

The literature reviewed revealed that most companies are increasingly using virtual project teams because of the availability and accessibility of innovative technological advancements supporting effective virtual project teams (Kirkman et al., 2012; Zivick, 2012), as well as the multiple benefits obtained with the use of virtual project teams. However, virtual project teams come inherent with several identified risks, which can lead to high maintenance costs, low efficiency, cultural issues, and feelings of isolation among team members (Cascio, 2000). These risks include (a) insufficient physical interaction and loss of face-to-face synergies (Cascio, 2000; Plazas, 2012), affecting communication (Ingason et al., 2010; Osman, 2011), low levels of trust (Ingason et al., 2010), problems with predictability, and reliability, as well as deficient levels of social interaction (Cascio, 2000); (b) issues with knowledge transfer (Ingason et al., 2010; Ngoma & Lind, 2015; Nidhra et al., 2013). In addition to knowledge transfer, there is the obstacle of communicating the knowledge gained quickly throughout the virtual team (de Jong, Schalk, & Curseu, 2008; Zang, Chen, &

Latimer, 2011), team cohesion, cultural and language differences (Dafoulas & Maccaulay, 2002; Munkvold & Zigurs, 2007; Plazas, 2012; Piccoli et al., 2004; Robey et al., 2000), insufficient technical resources, time inexperience and time zone difficulties (Gibson et al., 2014; Goldberg, 2014; Ingason et al., 2010; Lee-Kelly & Sankey, 2008; Piecewicz, 2010), team member loss, and hidden interests and agendas (Reed & Knight, 2010, 2012).

Indeed, risk management has been found to be critical for project success and avoidance of project problems, failures, and even huge scale disasters, with higher project failure rates traced back to the lack of good risk management practices. (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011) and risks essentially eliminated through sound risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011). The literature also highlighted strategies for virtual project team managers to manage these risks (Morley et al., 2015; C. P. Scott & Wildman, 2015). Risk identification and management (Macgregory, 2007); focus on results, rather than time (Cascio, 2000); unique communication and knowledge sharing norms supported through IT support (Malhotra & Majchrzak, 2004), the importance of team member relationship building (Lurey & Raisinghani, 2001), trust (Brahm & Kunze, 2012; Jarvenpaa & Leidner, 1998; Macgregory, 2007), and team cohesion (Macgregory, 2007). Success factors of virtual project teams able to ensure high levels of effectiveness included members who perceive their value as individual contributors as well as critical to the success of the team (Berry, 2011; Hock & Kozlowski, 2014); transformational leadership (Eseryel & Eseryel, 2013); team collaboration rather than competition (Mukherjee et a., 2012); staying focused on building trust and transparency (Fan et al., 2014; Politis, 2014).

The literature supported key practices to more successful virtual project team risk management of these issues to include improving work life balance (Olsen et al., 2014), improved technology (Ashmore, 2012; Beach et al., 2013), improved and advanced communication plans (Osman, 2011; Nuells, 2013), and improved leadership practice (S. J. Marshall, 2014). However, the specific problem is that due to the unique and changing risks leading to project failures, more research needs to be done to elucidate the management strategies that can help organizations mitigate the risks of using virtual project teams in advance and help safeguard against project failures (Loskutova, 2014; Moore, 2007).

Methodology

The purpose of this study was twofold: first, to determine risk management issues faced by virtual project teams, and second, to identify effective risk management practices in an effort to mitigate the risk issues faced by virtual project teams. To address this purpose, the study used a qualitative, case study design with interview-based methodology to collect data. In addition, documentation and artifacts from the case setting were examined to address the research questions. A total of 20 participants, five virtual team leaders and 15 virtual team members, contributed to the open-ended response data gathered from the individual, face-to-face interview questions.

Data Analysis Findings

The semi-structured interviews provided open-ended response data collected from the sample of 20 participants who represented both virtual project managers (team leaders; $n = 5$) and virtual project developers (team members, $n = 15$). Qualitative analysis of the data supported the development of themes related to project planning issues and practices, and the nature of the virtual environment and how it is affected by communication technology.

These themes included risks associated with team engagement, lack of proper documentation, lack of accurate estimations, and the effects of team member changes (loss and/or addition of team members). In addition, the nature of the virtual environment itself presented risk management issues identified by participants, including communication, collaboration, and information sharing issues, team member availability, and team cohesion. The thematic findings and recommendations based on these findings are described in greater detail in the following sections.

Discussion of Results

The results of this study support and build on previous research identifying risks and effective practices to mitigate these risks. The discussion centers on addressing the research questions of the study and is therefore organized according to the research questions. The study was also theoretically based on open systems theory, considering how different parts of a system interact regardless of physical boundaries or not (Beralanffy, 2008). The different aspects of the functioning virtual project team remain interactive and interdependent, affecting the larger system of the team (Gadman & Cooper, 2005; Katz & Kahn, 1978). With an emphasis on the organization and the environment and the associated relationships, open systems theory explain the inherent need for flexibility and adaptability to change, as well as unclear roles and often non-formalized structure of virtual project teams and the risks of negative impacts on project goals and team success. Therefore, the focus of this study was on identifying risks and analyzing risk management practices within a case environment.

Risk identification and management is critical to avoiding less than desirable project outcomes, as research has shown that high project failure rates can be explained by the lack of effective risk management practices (Macgregory, 2007). However, before risk

management can be effectively implemented, the risks and potential problems must be identified (Macgregory, 2007). Thus, this discussion begins with the first research question to identify risk management issues faced by the virtual project teams.

Risk Management Issues Faced by Virtual Project Teams (RQ1)

From the identification of themes in the data, risks were identified related to project planning, team member changes (loss/gain), communication and knowledge sharing, team cohesion/connectedness, and technology. Each of these risk areas are discussed individually in terms of the results of this study and in the context of the prior literature.

Project planning risks. Project planning risks identified in this study highlighted team attention and engagement issues inherent in the virtual team environment. These engagement issues were noted often to be related to team member multi-tasking. The majority of virtual team members in private industries have to contend with a significant number of disruptions in addition to the duality of their roles, when they work in virtual environments (Olson et al., 2014). The participants in this study similarly noted that team members were multitasking or distracted by their environment, which resulted in decreased engagement and/or inattention, supporting poor communication and project delays. These engagement issues, particularly in terms of team member multi-tasking as a distraction, were not previously noted in the literature reviewed and possibly a newer development in the virtual project team environment, as a greater variety of types of work are being done remotely and more workers participate remotely, providing a novel finding for this study.

In addition, related project planning issues were felt to stem from the lack of proper documentation and accuracy in project estimations in this study. Cascio (2000) similarly found problems with predictability, and reliability, leading to high and maintenance costs,

reduced levels of cost efficiencies. These risks were likewise closely associated with communication issues, noted in the following sections and noted to be supported by previous literature.

Team member change risks. Team member changes (loss/addition) were noted to promote delays due to the need for additional training and support, as well as the loss of key knowledge. Team member loss and the effects on knowledge transfer were noted by Reed and Knight (2010, 2012). The loss of key team members on a project typically has a negative impact on project success (Reed & Knight, 2012). Participants in this study also noted the time needed for additional training and other support, such as other team members taking time to explain or to otherwise assist the new member. These issues were felt to lead to reduced efficiency, project delays, and potential increased costs.

Communication and knowledge sharing risks. Perhaps the most common risk noted in different contexts during the interviews was communication issues. Communication issues were noted to be inherent in the nature of the virtual environment used by virtual project teams. Communication in virtual project teams was described by participants as less effective, limited information sharing, and difficult collaboration. These issues of communication and knowledge transfer were noted in previous research (Reed & Knight, 2010, 2012).

Knowledge/information sharing and team member collaboration efforts also were felt to be hindered by team member availability, which was affected by access to technology and availability of team members, also relating to issues such as time zone differences. Participants in this study discussed difficulties in organizing meeting times due to time zone differences, for example. Insufficient communications, communication breakdown, time

zone changes, and poor knowledge transfer all also were noted by Ingason et al. (2010) as challenges faced by virtual project team managers.

Although communication breakdown can be a problem for traditional project managers as well (Osman, 2011), the issue can be amplified among virtual project teams, considering the complex nature of virtual collaboration in which communication issues can be more frequent, supporting project failure (Osman, 2011). The increased challenges faced by virtual project managers in terms of communication can stem from geographic distances that separate team members requiring other modes of communication that are not real-time, including difficulties associated with incorrect interpretation of messages and emotions due to the lack of visual communication (Plazas, 2012), and, as described by the participants in this study, difficulties arranging real time engagement.

The lack of visual communication (i.e., body language) also was noted frequently by the participants in this study, who described risks associated with the lack of body language in the interpretation of communications. Similarly, Cascio (2000) found insufficient physical interaction, and the loss of face-to-face synergies to be serious risks to effective management.

According to the prior literature, knowledge transfer is by far the greatest obstacle to effective virtual project teams (Ngoma & Lind, 2015; Nidhra et al., 2013). In addition to knowledge transfer, there is the obstacle of communicating the knowledge gained quickly throughout the virtual team (de Jong et al., 2008; Zang et al., 2011). As noted by participants, lack of real-time communications due to time zone differences or other geographic differences further limits the rapid communication of knowledge gained. These risks were noted by the participants in this study, but often related specifically to the loss/addition of team members, rather than directly to communication issues.

Team cohesion risks. Lastly, team cohesion, connectiveness, and relationship building issues were noted and related to communication difficulties and, in particular, cultural and language differences that impact communication risk. Lack of team cohesion exists when there is a lack of good working relationships, leading to conflicts (Munkvold & Zigurs, 2007). Identification of these risks, organizations have ensured the implementation of training for both management and employees to support better understanding and ways to find common ground and support bonding between team members (Osman, 2011). In this study, these risks of team cohesion centered on misunderstanding and miscommunication stemming from difficulties in communicating due to lack of body language (inherent to certain communication modes in the virtual environment) and language differences, and cultural differences (including religious and cultural implications such as holidays, gender contributions, and perceptions of rudeness etc.).

Kirkman et al. (2012) also described challenges in achieving cohesion, while also highlighting issues of building trust, maintaining team identify, overcoming isolation among members, and attaining balance of the technical and interpersonal skills of team members. Although the participants in this study described risks associated with team unity and cohesion, a commonly noted risk in the literature was trust issues (Crisp & Jarvenpaa, 2015; Jarvenpaa & Leidner, 1998; Kirkman et al., 2012), which was not noted by the participants in this current study. In addition, despite the research pointing to the development of “swift trust” in virtual project groups, which tends to be a more fragile type of trust, leading to trust issues among team members (Crisp & Jarvenpaa, 2015; Jarvenpaa & Leidner, 1998), the findings of this study did not support problems with trust among team members.

The role of culture in building team relationships and cohesion was commonly noted.

This finding supported previous research highlighting cultural differences as risks. This supported the findings of Dafoulas and Macaulay (2002), who found that cultural backgrounds of members can act as one of the important risks of virtual project teams. Indeed team members in this present study described difficulties with both communication/understanding, as well as times of limited availability of team members due to religious holidays or other cultural commitments. Similarly, language differences (in addition to cultural differences) were described as affecting team relations; this included different languages as well as specific accents that made communication more difficult to understand. Similar risks related to cultural and language differences were noted in the literature (Reed & Knight, 2010, 2012). Ingason et al. (2010) also described the breakdown of communication stemming from conflict between team members, and Cascio (2000) described deficient levels of social interaction as well as cultural clashes and feelings of isolation among team members.

These types of cultural and language differences among team members can often negatively impact project team cohesion (Munkvold & Zigurs, 2007). Although all project teams can be negatively impacted by differences among team members, regardless of whether they are virtual or co-located, the effect on virtual teams may be worse given the inherent cultural and language differences when team members are located around the globe. Indeed, prior research has contended that cultural and language differences are significant factors in the success or failure of team cohesion (Plazas, 2012). Cultural differences can become a significant problem when team members from various countries have a different understanding of concepts or ideas, such as the notion of timeliness, or completeness.

Indeed, this study, as well as prior research, has noted the impact of cultural differences on effective communication, as these differences can lead to misunderstanding and conflict (Munkvold & Zigurs, 2007; Osman, 2011). These distinctions can also lead to significant coordination problems. Cultural and language variances are a constant problem faced by virtual project teams. Even though traditional teams can also face these problems, these issues are more prevalent, if not commonplace, in virtual project teams (Piccoli et al., 2004; Robey et al., 2000). These problems can be assuaged by managers who are willing to understand the uniqueness among their members and work with the challenges presented (Zofi, 2011).

Technology-related risks. Advances in communication and information technology have formed new opportunities for organizations to create, develop, and manage virtual project teams (Kirkman et al., 2012); however, these opportunities do not come without risk management issues. Critical issues revealed in this study related to technology use in the virtual environment included lack of technology reliability and access limitations, technology failure, and background noise or environmental distractions.

Communication issues related to technology included miscommunication due to the use of certain communication modalities (e.g., lack of body language noted with email, or voice only communication), delays in communication, and general lack of adequate communication. Indeed, members of virtual teams may be from different parts of the world, which can pose additional significant challenges (Hertel & Orlitowski, 2015), such as language differences, cultural differences, and communication risks associated with delays in communication due to delayed response times. Inherent in the global virtual project team, time zone differences among those comprising the team can be a risk, as noted by the

participants in this study as well as previous research (Gibson et al., 2014; Goldberg, 2014). Although technology supports synchronous and asynchronous communications, these technologies cannot ensure immediacy of responses. Delays in feedback can negatively impact the success of projects, and can be both stressful and inefficient for virtual project teams (Lee-Kelly & Sankey, 2008). According to Pieciewicz (2010), even though communication technologies can bring together the team members residing and working in different locations, these tools cannot remove the time zone differences or lessen their impact.

Effective Risk Management Practices

According to the literature, research on risks linked with costly project failure regarding the use of virtual project teams should be accompanied by the research on the strategies that would best effectively manage these risks (Morley et al., 2015; C. P. Scott & Wildman, 2015). Existing literature on project management revealed that risk management is critical for project success and avoidance of project problems, failures, and even huge scale disasters. Project risks can be minimized by sound risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011) and high project failure rates can be traced back to the lack of good risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011).

Project management practices. In this study, key risk management practices to support effective management of the noted risks highlighted strategies to support clear communication. Participants cited the effective practices of organized, formal planning sessions, the inclusion of in-person meetings when possible, increased frequency of meetings, and tracking and documentation of identified project risk issues. These findings generally supported previous research. Prior research described offsite meetings as a means

of supporting member face-to-face interaction as part of a trust-based approach to communication (Ferebee & Davis, 2012) and were found to foster a shared ownership of team goals (Chang et al., 2011; Parke, Campbell, & Bartol, 2014). One researcher called for in-person meeting every 6-12 months (Bathelt & Henn, 2014). In addition, collocated meetings provide opportunities for teams to get to know each other in person, supporting social dynamics and relationship building/team cohesion over the long term, and creating greater opportunities for knowledge sharing over time (Maynard et al., 2012), addressing several identified risks.

Results of this study also highlighted practices supporting team member engagement and involvement in solution development through delegating tasks, giving team members direct responsibilities and contributions. The team ownership supported through in-person meetings, as noted previously, would support greater engagement and involvement in solution development. Research has suggested that in order to ensure high levels of effectiveness, the formation of a virtual team requires team members who perceive their value as individual contributors first, yet also see their contributions as critical to the success of the overall team (Berry, 2011; Hock & Kozlowski, 2014).

Practices related to team member changes. Practices aimed at addressing issues related to the addition and/or loss of team members included development of a transition and training plan to provide support (pairing with a more experienced member, and availability of other members to the new member), documentation of resources and project plans, and maintaining clear expectations for the new members. Macgregory (2007) supported that design, culture, technical, and member training all comprise the virtual team activity, with these factors related to socio-emotional factors of relationship building, trust, and cohesion,

as well as linked to the factors of communication, coordination, and task-technology. Further, Macgregory asserted that optimal results come from proper interrelatedness of these factors, whereas failure to correctly integrate these factors can lead to lower than expected outcomes. Thus, organizations that use virtual teams to carry out their projects should attempt to ensure cohesiveness among team members (Macgregory, 2007). With the loss of a team member and the addition of a new member, the team cohesion is disrupted. With the transition and training plan as well as documentation of resources and project plans, the participants aligned their suggestions with Macgregory (2007) to support effective project management.

Practices to mitigate risks of virtual environment. Risk management practices to mediate risks associated with issues stemming from the nature of the virtual environment, communication issues, and technology issues included having frequent meetings, tracking time zone differences, supporting the development of personal relationships between team members, maintaining clear and direct communication and using a variety of communication methods and technology to support clear communication, and including in-person meetings and communications. In addition, asking questions, seeking clarification, and using written correspondence can be used to support more effective communication, especially when language or cultural differences are problematic.

Despite the participant views in this study supporting technology tools to enhance communication and allow for clarification and questioning, prior research failed to support that the tools and technologies used to carry out interactions and communication were found to have minimal effects (Lurey & Raisinghani, 2001); however, the finding by Lurey and Raisinghani (2001) stood in contrast to other foundational studies, which claimed that best practices of successful virtual teams were largely shaped by the tools they use. Decision-

making involving the entire group is much more collaborative in nature, and relies on internet-based technologies for sharing documents, presentations, and other materials to assist in the development of alternatives (Baker, 2002; Turban et al., 2011). Virtual project teams are heavily reliant on collaborative forms of technology based on the internet in their decision-making approach across divisions. Although this research noted difficulties in collaborative efforts, attempts to utilize new collaborative technologies may be helpful in supporting these endeavors.

An additional strategy offered by the participants in this study used to support an acceptance of the cultural diversity inherent in global project teams was through increased awareness and cultural sensitivity and diversity training, which was felt to address issues related to cultural and language differences between team members. Although cultural differences were noted in prior literature, the strategy of providing cultural sensitivity training or awareness training was not previously noted in the reviewed content. From this research, this is an important piece of the project team effectiveness, as miscommunications and communication issues related to cultural differences can be offset by sensitivity training, supporting greater understanding of cultural differences in particular.

Lastly, participants in the study highlighted the importance of leadership support for the challenges faced by the team. Prior research has supported the impact of transformational leadership in avoiding risks and conflicts that may impact team performance over time (Eseryel & Eseryel, 2013). Studies have shown that transformational virtual team leaders are just as effective as leaders who regularly see their subordinates face-to-face (Eseryel & Eseryel, 2013), suggesting that transformational leadership is critically important to the success of any virtual team. However, previous research by Lurey and Raisinghani

(2001) suggested that executive leadership styles only have limited or moderate effects on team performance.

This study findings did not specify types of leadership, rather, only that the team members identify leadership support for the challenges faced. Attaining the highest levels of performance possible involves the management of collaboration versus the competition (Mukherjee et al., 2012). The team dynamics needed to accomplish this balance are critically important and have been shown to require leaders to stay focused on building trust and transparency, which tend to be transformational traits Fan et al., 2014; Politis, 2014). Malhotra and Majchrzak (2004) contended that for teams to be successful, they must attain a strategic fit between task characteristics, team composition, and technology support. Malhotra and Majchrzak's findings also revealed that through the creation of a state of shared understanding about goals and objectives, task requirements and interdependencies, roles and responsibilities, and member expertise (i.e., team cohesion and collaboration), virtual teams' outputs are likely to be of high quality. According to previous literature, for virtual project teams to be effective, team members must see the success of the entire team as a critical part of their credibility within the broader organization and seeing their contributions as integral to the entire team's success (Gilson et al., 2015; Hardin et al., 2013). The implications looked at ways to support team cohesion, engagement, communication, and the notion of team success.

Implications of the Study Results

Although some prior research has claimed face-to-face interaction outperforms other types of interaction when it comes to affecting team performance (Foroughi et al., 2005), more recent studies have found otherwise, showing virtual teams can perform as well as face-

to-face teams (Gera, 2013; Siebdrat et al., 2009). However, essential to the ability of virtual project teams to perform is risk management. Identified risks in this study support the need to address specific risks associated with team member engagement, team member changes (the loss and/or addition of team members), communication and knowledge sharing, team cohesion, and technology related risks. Results of this study support specific practices to address these risks.

The study implications for open system theory center around the impact external influences have on risk within virtual project teams (Meyer & O'Brien-Pallas, 2010). Some of the identified external influences include communication tools that fail to provide the environmental needs to help virtual project team members effectively share information (Doll & Trueit, 2010). Communication tools require organizations to invest the infrastructure with involvement of external resources (Rice, 2013). Another external influence identified in the study was that organizations are finding value in outsourcing work to overseas resources, which brings a level of complexity around cultural and language barriers. Cultural barriers present ethical and political issues that organizations may not be accustomed to supporting (Gharajedaghi, 2011). Additionally, language barriers can impact effective communication during virtual meetings (Flood, 2010). These challenges lend themselves to other areas of impact within virtual project teams.

Project planning risks were felt to stem from the lack of proper documentation and accuracy in project estimations, which supported prior literature (Cascio, 2000), and can decrease general project efficiency and increase costs. These risks were likewise closely associated with another significant finding of multiple levels of communication risks, also supported by previous literature. Team member communication risks, noted as inherent to the

nature of the virtual environment were a theme running throughout the data in terms of affecting project planning, development, and delivery of project goals. Team member communication affects aspects of team cohesion and relationship building, collaboration, and knowledge transfer, all critical elements to team success and all aspects supported by the literature. Conversely, communication was noted to be negatively affected by cultural and language differences (including religious and cultural implications such as holidays, gender contributions, and perceptions of rudeness), and time zone differences, again, inherent to the virtual environment and supported by prior literature.

The findings also pointed to risk management practices supporting clear communication and documentation strategies. The implication to practice is for management to implement these strategies toward improving effective communication among team members and documentation of critical knowledge and processes for the team, such as the specific practices offered by participants of having organized, formal planning sessions; inclusion of in-person meetings when possible; frequent or periodic team meetings; as well as tracking and documenting project risks and issues. In addition, to address cultural and language differences, specific cultural sensitivity and language training was suggested to improve misunderstanding and miscommunications due to cultural and language differences.

The participants in this study specifically described team member multitasking and/or being distracted by their environment, resulting in the risk of decreased engagement and/or inattention. This inattention was felt to support poor communication and project delays. Although prior research noted disruptions as an issue for virtual team members (Olson et al., 2014), engagement issues in particular, such as members being distracted during conference calls and members multitasking during calls or meetings as a distraction, added to the

literature on this topic. The ability of team member to multitask may, in fact, be a newer development with the advances of communications technologies. Participants in this study also suggested supporting team member engagement and involvement in solution development through delegating tasks, giving team members direct responsibilities and contributions, providing direct implications for practice. Frequent meetings, as a suggested practice for project planning risks, as well as cultural sensitivity training, could also support improved team member engagement, but team managers need to be aware of multitasking and should include delegations of tasks to the meetings as well as the overall work/productivity, making individual team members uniquely responsible for distinct aspects of the meeting itself.

Team member changes (loss/addition) represented an additional risk of project delays due to the need for additional training and support, as well as the loss of key knowledge. The risks associated with team member loss and the negative effects on knowledge transfer and team productivity and success were noted by in the research literature (Reed & Knight, 2010, 2012). The results of this study in terms of the time needed for additional training and other support necessary to get new team members up to speed, added specific effects of team member changes to the existing literature. The practices aimed at addressing issues related to the addition and/or loss of team members included development of a transition and training plan to provide support (pairing with a more experienced member, and availability of other members to the new member), documentation of resources and project plans, and maintaining clear expectations for the new members. These practices provide direct implications to management in terms of providing team member support during times of team member changes (addition/loss).

Critical issues related to technology use in the virtual environment included lack of technology reliability and access limitations (as team members are globally distributed), technology failure, and background noise or environmental distractions. Technology-related communication issues centered on misunderstanding and miscommunication stemming from difficulties in communicating due to lack of body language, delays in communication, and lack of adequate communication. Risk management practices recommended by participants, and providing implications of this study included having frequent meetings, tracking time zone differences, supporting the development of personal relationships between team members, maintaining clear and direct communication and using a variety of communication methods and technology to support clear communication, and including in-person meetings and communications. Technology can provide a vast variety of methods to communicate, such as web-based technologies accessible globally where there is an Internet connection, email, telephone, teleconference, video conferencing, and voicemail (Ashmore, 2012; Beach et al., 2013). Given the lack of uniformity globally in access and technology resources, communicating in different technology modalities can support greater access by ensuring team members are receiving the information accurately and in a timely fashion, regardless of access difficulties.

In addition, team managers should support team members asking questions, seeking clarification, and using written correspondence in addition to verbal correspondence to support more effective communication. These practices can be especially beneficial when language or cultural differences are problematic. As noted to support enhanced communication between team members, increased cultural awareness and sensitivity/diversity training programs can be used to address issues related to cultural

differences between team members. The inclusion of a communication plan at project start can be used to clearly communicate the rules of engagement outlining the frequency of communication taking place among members or between members and managers. The plan can and should be updated and reviewed continuously to support optimal communications throughout the project process (Nuells, 2013). Osman (2011) noted that communication plans should also put into place how information can best be generated, collected, distributed, stored, and then retrieved between managers, members, and stakeholders.

Lastly, participants in the study highlighted the importance of leadership support for the challenges faced by the team. This was supported by prior research, which called for leadership support for the specified challenges to project team efficiency (S. J. Marshall, 2014) and transformational leadership to provide that support by supplying an environment of open communication and expectations, trust, and cohesiveness (Mukherjee et al., 2012; Fan et al., 2014; Politis, 2014). The implication of these varied findings support a strong, transformational leadership role in which managers provide clear role expectations and training needed to support team member knowledge, cohesion, and collaboration to further support effectively meeting team goals in a trusting and supportive environment.

Limitations

Given the exploratory nature of the study, this study was limited to analysis of risks and existing practices within virtual project teams to address these risks, without testing potential solutions to risk management issues. This qualitative case study offers insight into the risks and risk management practices of these particular virtual project team managers and team members, which can be used to shed light on potential risks and risk management

practices affecting other virtual project teams. As such, the findings of the study may not be generalizable to other virtual project teams.

Methodologically, this study was limited to telephone interviews due to geographic constraints. By nature, virtual project team members are often dispersed in different geographic locations on a global scale, requiring the researcher to conduct telephone interviews, rather than in-person interviews. This limitation results in limitations on data collection and ultimately, generalization of findings. The telephone interview data lacked researcher notes on nonverbal communications during the interview and were therefore limited to transcription of verbal responses only. The transcribed data were analyzed for themes without considering the expression, movement, and other nonverbal communication of the participant when responding to the interview questions, limiting the researcher's understanding of the responses.

The data collected was limited to the responses offered by participants and the openness and honesty of participants in providing these responses. Despite efforts to probe for additional information during the interviews, the researcher was limited by the relative openness of participants in sharing their thoughts and experiences. By human nature, some respondents were simply more eloquent and detailed in describing their experiences and perceptions. As a result, chosen material to highlight themes in the analysis, often reflected a predominance of certain participants who were willing to share more detailed and informative discussion. The researcher remained cognizant of the benefits of providing diversity of text examples according to participants, and attempted to use text examples from different participants as much as possible in the presentation of the data analysis and results. However, this process was limited by the details offered by particular participants.

The coding process was limited to being conducted by hand using the analysis software to provide an organized workspace, but did not include word frequency analysis offered through the analysis software. This was left out due to the inaccuracy and lack of proper relatedness of the results from the word frequency analysis. The program did not have the human capacity to distinguish context associated with words, nor to distinguish between relevant content and conversation fillers. For this reason, concept frequencies, rather than word frequencies, were used and tracked and documented by the research using the program.

Recommendations for Further Research

The results of this study in combination with the prior research reviewed suggest the need for additional investigation on this topic. One suggestion offered by the participants was the use of diversity/sensitivity training in addressing risks associated with cultural differences between team members. Additional research examining the impact of such a training module would support effective management of this risk. Such research may include quantitative pretest, posttest study or qualitative research examining the perceived improvements in group dynamics.

Additional research on the relationship between transformational leadership style and virtual project team productivity and/or risk management could shed light on the importance of leadership and the ways leadership style affect team functionality, effectiveness, and success. A quantitative study examining leadership style and team success in terms of meeting project goals could demonstrate a significant relationship that would impact management practices. This type of research on transformational leadership could also include evidence on the support for strategies aimed at enhancing engagement of team

members, as the results of this study suggest that more transformational leadership characteristics that promote team member autonomy, responsibility, and accountability, while also supporting the creation of a trusting, cohesive environment could provide positive effects on team member engagement and attention, a risk identified in this study.

Conclusion

Existing literature on project management supports risk management as critical for project success and avoidance of project failures, as project risks can be minimized by sound risk management practices (Anantatmula & Fan, 2013; Zwikael & Ahn, 2011). The purpose of this study was to determine risk management issues faced by virtual project teams and to identify effective risk management practices in an effort to mitigate the risk issues faced by virtual project teams. The study used a qualitative case study design with interview-based methodology to collect data from a sample of 20 virtual project team members and leaders with more than two years of experience in virtual project team environments and included five project team leaders and 15 team members to have representation of different functions within a virtual project team.

From the identification of themes in the data, risks were identified related to project planning, team member changes (loss/gain), communication and knowledge sharing, team cohesion/connectedness, and technology. Specific risks described by participants included team attention and engagement issues, lack of proper documentation and accuracy in project estimations, loss and/or addition of team members causing delays due to the need for extra training and support and loss of key knowledge, and several risks related to the nature and functionality of the global virtual team. These included less effective communication, collaboration, and knowledge sharing; team member availability limitations due to

technology access and member and time zone differences inherent to the global virtual team dynamic; relationship building issues due to lack of direct contact causing challenges associated with team cohesion and connectedness; specific technology issues inclusive of technology failure, non-universal access to technologies, and environmental distractions; and general communication challenges related to lack of body language, cultural and language differences causing miscommunication and misunderstanding, and delays in communication.

Risk management practices to mediate risks associated with project planning and issues stemming from the nature of the virtual environment, communication issues, and technology issues included creation of a clear communication strategy, having frequent, organized, and/or formal planning and update meetings, tracking time zone differences, supporting the development of personal relationships between team members, maintaining clear and direct communication (including seeking clarity and use of written correspondence and the use of a variety of communication methods and technology to support clear communication, particularly when language differences are present), and the use of in-person meetings and communications whenever possible. In addition, practices to support acceptance of cultural diversity through increased awareness and cultural sensitivity and diversity training was also felt to address issues related to cultural differences between team members. Participants in this study also suggested supporting team member engagement and involvement in solution development through. Practices aimed at addressing issues of team member engagement and the addition or loss of team members included development of a transition and training plan to provide support for the new member, documentation of resources and project plans, delegation of tasks, giving team members direct responsibilities and contributions and maintaining clear expectations for the all members. Lastly, participants

in the study highlighted the importance of leadership support and potential benefits of transformational type leadership characteristics to team success.

The open systems nature of virtual project teams also exposes organizations to risks, which hinder the achievement of their goals. In the context of open systems theory, these risks and risk management practices result from the unique interactions of a virtual project team that lacks physical boundaries, stressing the different roles, environments, technology, and cultures of the system and the effects to the large complex system of the team and team success. The findings of the study contribute to the growing body of knowledge regarding virtual project teams and how both individuals and environment have a mutual impact on the risks, risk management solutions, and ultimately, the effectiveness and success of the virtual project team.

REFERENCES

- Alahuhta, P., Nordbäck, E., Sivunen, A., & Surakka, T. (2014). Fostering team creativity in virtual worlds. *Journal for Virtual Worlds Research*, 7(3). doi:10.4101/jvwr.v7i3.7062
- Alavi, M., & Tiwana, A. (2003). Knowledge management: The information technology dimension. *The Blackwell handbook of organizational learning and knowledge management*, 104-121.
- Ale Ebrahim, N., Ahmed, S., & Taha, Z. (2009). Virtual teams: a literature review. *Australian Journal of Basic and Applied Sciences*, 3(3), 2653-2669. Retrieved from <http://ssrn.com/abstract=1501443>
- Ali, A. M., & Yusof, H. (2011). Quality in qualitative studies: The case of validity, reliability and generalizability. *Issues in Social & Environmental Accounting*, 5, 25-64. Retrieved from <http://www.isea.icseard.uns.ac.id/>
- Allen, C., & Foulkes, W. D. (2011). Qualitative thematic analysis of consent forms used in cancer genome sequencing. *BMC medical ethics*, 12(1), 14. doi:10.1186/1472-6939-12-14
- Anantatmula, V., & Fan, Y. (2013). Risk Management Instruments, Strategies and Their Impact on Project Success. *International Journal of Risk and Contingency Management (IJRCM)*, 2(2), 27-41. doi:10.4018/ijrcm.2013040102
- Anantatmula, V., & Thomas, M. (2010). Managing global projects: A structured approach for better performance. *Project Management Journal*, 41(2), 60-72. doi:10.1002/pmj.20168
- Ashmore, S. (2012). The impact of process on virtual teams: A comparative analysis of waterfall and agile software development teams. Retrieved from <http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=3267&context=etd>
- Baker, G. (2002). The effects of synchronous collaborative technologies on decision making: A study of virtual teams. *Information Resources Management Journal*, 15(4), 79.
- Barki, H., & Pinsonneault, A. (2005). A model of organizational integration, implementation effort, and performance. *Organization Science*, 16(2), 165-179. doi:10.1287/orsc.1050.0118
- Barnwell, D., Nedrick, S., Rudolph, E., Sesay, M., & Wellen, W. (2014). Leadership of international and virtual project teams. *International Journal of Global Business*, 7(2), 1-8. Retrieved from <http://www.gsmi-usa.com/Pages/default.aspx>

- Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: trends, research outcomes, and future research implications. *Journal of Operations Management*, 29(4), 329-342. doi: 10.1016/j.jom.2010.06.002.
- Bathelt, H., & Henn, S. (2014). The geographies of knowledge transfers over distance: toward a typology. *Environment and Planning A*, 46(6), 1403-1424. doi:10.1068/a46115
- Beach, M., Coates, S., Hinton, C., & Montoya, D. (2013). By design: building trust in virtual teams. *Shared Knowledge Conference Journal*, 1(1). Retrieved from <https://ejournals.unm.edu/index.php/nmskc/article/view/3028/2509>
- Bertalanffy, L. V. (1968). General system theory: Foundations, development, applications. *New York, NY: George Braziller Publishing*.
- Beranek, P. M., & Clairborne, M. C. (2012). The impact of training on virtual project teams: a TIP investigation. *International Journal of Information Technology Project Management (IJITPM)*, 3(1), 36-48. doi:10.4018/jitpm.2012010103
- Berry, G. R. (2011). Enhancing effectiveness on virtual teams: Understanding why traditional team skills are insufficient. *Journal of Business Communication*, doi:10.1177/0021943610397270.
- Bousquet, A., & Curtis, S. (2011). Beyond models and metaphors: complexity theory, systems thinking and international relations. *Cambridge Review Of International Affairs*, 24(1), 43-62. doi:10.1080/09557571.2011.558054
- Bowen, G. A. (2009). Supporting a grounded theory with an audit trail: An illustration. *International Journal of Social Research Methodology*, 12(4), 305-316. doi:10.1080/13645570802156196
- Brahm, T., & Kunze, F. (2012). The role of trust climate in virtual teams. *Journal of Managerial Psychology*, 27(6), 595-614. doi:10.1108/02683941211252446
- Cascio, W. F. (2000). Managing a virtual workplace. *The Academy of Management Executive*, 14(3), 81-90. doi:10.5465/AME.2000.4468068
- Chang, H. H., Chuang, S. S., & Chao, S. H. (2011). Determinants of cultural adaptation, communication quality, and trust in virtual teams' performance. *Total Quality Management*, 22(3), 305-329. doi:10.1080/14783363.2010.532319
- Cogliser, C. C., Gardner, W., Trank, C. Q., Gavin, M., Halbesleben, J., & Seers, A. (2013). Not all group exchange structures are created equal: effects of forms and levels of exchange on work outcomes in virtual teams. *Journal of Leadership & Organizational Studies*, 20(2), 242-251. doi:10.1177/1548051812472370

- Crisp, C. B., & Jarvenpaa, S. L. (2015). Swift trust in global virtual teams. *Journal of Personnel Psychology*. doi:10.1027/1866-5888/a000075
- De Jong, R., Schalk, R., & Curseu, P. L. (2008). Virtual communicating, conflicts and performance in teams. *Team Performance Management: An International Journal*, 14(7/8), 364-380. doi:10.1108/13527590810912331
- Denvers, R. M. & Frankel, K. J. (2000). Study design in qualitative research. *Education for Health*, 3(13), 263-271.
- Doll, W. E., Jr. & Trueit, D. (2010). Complexity and the health care professions. *Journal of Evaluation In Clinical Practice*, 16(4), 841-848. doi:10.1111/j.1365-2753.2010.01497.x
- Dumangane, C. (2013). Conducting multi-generational qualitative research in education: An experiment in grounded theory. *Qualitative Research*, 13(3), 379-381. doi:10.1177/1468794113475416
- Eide, E. R., & Showalter, M. H. (2012). Methods matter: Improving causal inference in educational and social science research: A review article. *Economics of Education Review*, 31(5), 744-748. doi:10.1016/j.econedurev.2012.05.010.
- Ellis, B. & Herbert, S. I. (2011). Complex adaptive systems (CAS): An overview of key elements, characteristics and application to management theory. *Informatics in Primary Care*, 19(4).33-37. Retrieved from: <http://www.clininf.eu/journal.html>
- Eseryel, U. Y., & Eseryel, D. (2013). Action-embedded transformational leadership in self-managing global information systems development teams. *The Journal of Strategic Information Systems*, 22(2), 103-120. doi:10.1016/j.jsis.2013.02.001
- Fan, K. T., Chen, Y. H., Wang, C. W., & Chen, M. (2014). E-leadership effectiveness in virtual teams: motivating language perspective. *Industrial Management & Data Systems*, 114(3), 421-437. doi:10.1108/IMDS-07-2013-0294
- Ferebee, S. S., & Davis, J. W. (2012). Emergent leadership, persuasion, and trust in virtual leaderless groups. *The Exchange*, 1(1).
- Flood, R. (2010). The relationship of “systems thinking” to action research. *Systemic Practice & Action Research*, 23(4), 269-284. doi:10.1007/s11213-010-9169-1
- Gadman, S., & Cooper, G. (2005). Strategies for collaborating in an interdependent impermanent world. *Leadership & Organization Development Journal*, 26(1/2), 23-34. doi:10.1108/01437730510575561
- Geldenhuis, D. J., Levin, M. M., & van Niekerk, A. (2012). Risk management as a social defence against anxiety. *SA Journal of Industrial Psychology*, 38(2), 1-9.

- Germain, M. L., & McGuire, D. (2014). The role of swift trust in virtual teams and implications for human resource development. *Advances in Developing Human Resources, 16*(3), 356-370. doi:10.1177/1523422314532097
- Gibson, C. B., Huang, L., Kirkman, B. L., & Shapiro, D. L. (2014). Where global and virtual meet: The value of examining the intersection of these elements in twenty-first-century teams. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 217-244. doi:10.1146/annurev-orgpsych-031413-091240
- Gilson, L. L., Maynard, M. T., Young, N. C. J., Vartiainen, M., & Hakonen, M. (2015). Virtual teams research: 10 years, 10 themes, and 10 opportunities. *Journal of Management, 41*(5), 1313-1337. doi:10.1177/0149206314559946
- Gneezy, U., Meier, S., & Rey-Biel, P. (2011). When and why incentives (don't) work to modify behavior. *The Journal of Economic Perspectives, 19*(1), 191-209. doi:10.1257/089533011798394550
- Goldberg, J. (2014). Preparing for global health care innovation: Virtual capstone design teams [Senior Design]. *Pulse, IEEE, 5*(1), 70-72. Retrieved from <https://www.deepdyve.com/lp/institute-of-electrical-and-electronics-engineers/preparing-for-global-health-care-innovation-virtual-capstone-design-aO70IzXVWz>
- Goldblatt, H., Karnieli-Miller, O., & Neumann, M. (2011). Sharing qualitative research findings with participants: Study experiences of methodological and ethical dilemmas. *Patient Education and Counseling, 82*(3), 389-395. doi:10.1016/j.pec.2010.12.016
- Hall, A., & Clark, N. (2010). What do complex adaptive systems look like and what are the implications for innovation policy? *Journal of International Development, 22*(3), 308-324. doi:10.1002/jid.1690.
- Hardin, A., Looney, C., Fuller, M., & Schechtman, G. (2013). Participative goal setting in self-directed global virtual teams: The role of virtual team efficacy in goal setting effectiveness and performance. *System Sciences, 36*(3), 363-372. doi:10.1109/HICSS.2013.442
- Hertel, G., & Orlikowski, B. (2015). Project management in distributed virtual teams. In applied psychology for project managers (pp. 305-321). *Springer Berlin Heidelberg*. doi:10.1016/j.hrmr.2005.01.002
- Hill, N. S., Lorinkova, N., & Karaca, A. (2014). A critical review and meta-analysis of leadership behaviors and virtual teams performance. *Academy of Management Proceedings, 1*(1). doi:10.5465/AMBPP.2014.12990
- Hoch, J. E., & Kozlowski, S. W. (2014). Leading virtual teams: Hierarchical leadership,

- structural supports, and shared team leadership. *Journal of Applied Psychology*, 99(3), 390. doi:10.1037/a0030264
- Holtshouse, D. (2009). The future of knowledge workers. *KM World*, 18(8), 1-30. Retrieved from <http://www.kmworld.com/>
- Horsburgh, D. (2003). Evaluation of qualitative research. *Journal of Clinical Nursing*, 12(2), 307-312. doi:10.1046/j.1365-2702.2003.00683
- Horwitz, F. M., Bravington, D., & Silvis, U. (2006). The promise of virtual teams: identifying key factors in effectiveness and failure. *Journal of European Industrial Training*, 30(6), 472-494. doi:10.1108/03090590610688843
- Jarvenpaa, S. L., & Leidner, D. E. (1998). Communication and trust in global virtual teams. *Journal of Computer-Mediated Communication*, 3(4), 0-0. doi:10.1111/j.1083-6101.1998.tb00080
- Katz, D. & Kahn, R. (1978). *The social psychology of organizations*. New York, NY: John Wiley.
- Kimble, C. (2011). Building effective virtual teams: How to overcome the problems of trust and identity in virtual teams. *Global Business and Organizational Excellence*, 30(2), 6-15. doi:10.1002/joe.20364
- Kumar, G., & Srinidhi, T. (2006). A synthesizing framework for technology and content choices for information exchange. *Information Technology and Management*, 7, 239-247. doi:10.1007/s10799-006-0274-x
- Kurupparachchi, D., & Perera, H. S. C. (2010). Impact of TQM and technology management on operations performance. *IUP Journal of Operations Management*, 9(3), 23. doi:10.1108/02656710910924152
- Lamont, J. (2010). Collaboration: A new picture develops. *KM World*, 19(10), 8-9. Retrieved from <http://www.kmworld.com/Articles/Editorial/Features/Collaboration-A-new-picture-develops-70847.aspx>
- Lee-Kelley, L., & Sankey, T. (2008). Global virtual teams for value creation and project success: A case study. *International Journal of Project Management*, 26(1), 51-62. doi:10.1016/j.ijproman.2007.08.010
- Lee, M. R. (2013) *Leading virtual project teams: Adopting leadership theories and communication techniques to 21st century organizations*. Oxford, UK: Taylor and Francis Group.

- Leech, N. L., & Onwuegbuzie, A. J. (2011). Beyond constant comparison qualitative data analysis: Using NVivo. *School Psychology Quarterly*, 26, 70–84. doi:10.1037/a0022711
- Lepsinger, R., & DeRosa, D. (2015). How to lead an effective virtual team. *Ivey Business Journal Online*. Retrieved from <http://iveybusinessjournal.com/how-to-lead-an-effective-virtual-team/>
- Lin, C. C., & Ni, S. Y. (2014). Improving performance of virtual team: Lessons learned from online game players. *Management of Engineering & Technology*, 258-264.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Thousand Oaks, CA: Sage.
- Lockwood, J. (2015). Virtual team management: what is causing communication breakdown? *Language and Intercultural Communication*, 15(1), 125-140. doi:10.1080/14708477.2014.985310
- Lurey, J. S., & Raisinghani, M. S. (2001). An empirical study of best practices in virtual teams. *Information & Management*, 38(8), 523-544. doi:10.1016/S0378-7206(01)00074-X
- MacGregor, S. P. (Ed.). (2007). *Higher creativity for virtual teams: Developing platforms for co-creation*. IGI Global.
- Malhotra, A., & Majchrzak, A. (2004). Enabling knowledge creation in far-flung teams: best practices for IT support and knowledge sharing. *Journal of Knowledge Management*, 8(4), 75-88. doi:10.1108/13673270410548496
- Marginson, D., & Bui, B. (2009). Examining the human cost of multiple role expectations. *Behavioral Research in Accounting*, 21(1), 59-81. doi:10.2308 /bria.2009.21.1.59
- Marshall, C. & Rossman, G. B. (2011). *Designing qualitative research*. Thousand Oaks, CA: Sage Publications, Inc.
- Marshall, S. J. (2014). An exploration of effective leadership practice in virtual teams. doi:10.019.1/97176
- Meyer, R. M., & O'Brien-Pallas, L. L. (2010). Nursing services delivery theory: an open system approach. *Journal of Advanced Nursing*, 66(12), 2828-2838. doi:10.1111/j.1365-2648.2010.05449.x
- Maynard, M. T., Mathieu, J. E., Rapp, T. L., & Gilson, L. L. (2012). Something (s) old and something (s) new: Modeling drivers of global virtual team effectiveness. *Journal of Organizational Behavior*, 33(3), 342-365. doi:10.1002/job.1772

- Moore, T. (2007). Virtual team members in new product development: An investigation into the influence of leadership behaviors. Retrieved from ProQuest UMI Dissertations and Theses Full Text. (UMI No. 3274080)
- Morgan, L., Paucar-caceres, A., & Wright, G. (2014). Leading effective global virtual teams: The consequences of methods of communication. *Systemic Practice and Action Research*, 27(6), 607-624. doi:10.1007/s11213-014-9315-2
- Morley, S., Cormican, K., & Folan, P. (2015). An Analysis of virtual team characteristics: A model for virtual project managers. *Journal of technology management & innovation*, 10(1), 188-203. doi:10.4067/S0718-27242015000100014
- Morrison, J. (2004). Project management effectiveness as a construct: A conceptual study. *South African Journal of Business Management*, 35(4), 73-94. doi:10.019.1/79052
- Mukherjee, D., Lahiri, S., Mukherjee, D., & Billing, T. K. (2012). Leading virtual teams: How do social, cognitive, and behavioral capabilities matter? *Management Decision*, 50(2), 273-290. doi:10.1108/00251741211203560
- Mumbi, C., & McGill, T. (2008). An investigation of the role of trust in virtual project management success. *International Journal of Networking and Virtual Organisations*, 5(1), 64-82. doi:10.1504/IJNVO.2008.016003
- Munkvold, B. E., & Zigurs, I. (2007). Process and technology challenges in swift-starting virtual teams. *Information & Management*, 44(3), 287-299. doi:10.1016/j.im.2007.01.002
- Ngoma, N. S., & Lind, M. (2015). Knowledge transfer and team performance in distributed organizations. *International Journal of Knowledge-Based Organizations (IJKBO)*, 5(2), 58-80. doi:10.4018/ijkbo.2015040104
- Nidhra, S., Yanamadala, M., Afzal, W., & Torkar, R. (2013). Knowledge transfer challenges and mitigation strategies in global software development: A systematic literature review and industrial validation. *International Journal of Information Management*, 33(2), 333-355. doi:10.1016/j.ijinfomgt.2012.11.004
- Nuells, N. (2013). Effective project management of virtual teams. *PM World Journal*, 2(11), 1-5. Retrieved from <http://pmworldjournal.net/article/effective-project-management-virtual-teams/>
- Nunmaker, J., Reining, B., & Briggs, R. (2009). Principles for effective virtual teamwork. *Communications of the ACM*, 53, 113-117. doi:10.1145/1467247.1467275
- Olson, J. D., Appunn, F. D., McAllister, C. A., Walters, K. K., & Grinnell, L. (2014). Webcams and virtual teams: An impact model. *Team Performance Management*, 20(3), 148.

- Osman, H. (2011). The virtual project manager: Seven best practices for effective communication, project management institute. Retrieved from http://www.thecouchmanager.com/wp-content/uploads/2011/08/whitepaper_hassan-osman_the-virtual-project-manager_cisco.pdf
- Pangil, F., & Chan, J. M. (2014). The mediating effect of knowledge sharing on the relationship between trust and virtual team effectiveness. *Journal of Knowledge Management*, 18(1), 92-106. doi:10.1108/JKM-09-2013-0341
- Parke, M. R., Campbell, E. M., & Bartol, K. M. (2014). Setting the stage for virtual team development: Designing teams to foster knowledge sharing. *Academy of Management Proceedings*, 4(1). doi:10.5465/AMBPP.2014317244
- Parker, D. W., Holesgrove, M., & Pathak, R. (2015). Improving productivity with self-organized teams and agile leadership. *International Journal of Productivity and Performance Management*, 64(1), 112-128. doi:10.1108/JPPM-10-213-0178
- Piccoli, G., Powell, A., & Ives, B. (2004). Virtual teams: team control structure, work processes, and team effectiveness. *Information Technology & People*, 17(4), 359-379. doi:10.1108/09593840410570258
- Piecewicz, M. M. (2010). Communication in global work group projects. *Journal of Intercultural Management*, 36-48.
- Pinjani, P., & Palvia, P. (2013). Trust and knowledge sharing in diverse global virtual teams. *Information & Management*, 50(4), 144-153. doi:10.1016/j.im.2012.10.002
- Plazas, P. (2012). Challenges of managing a virtual team with an ocean in between. Retrieved from <http://pmworldlibrary.net/wp-content/uploads/2013/02/PMWJ6-Jan2013-PLAZAS-Challenges-of-Managing-Virtual-Team-UTD-SecondEdition.pdf>
- Politis, J. (2014). The effect of e-leadership on organizational trust and commitment of virtual teams. Paper presented at the 254-261.
- Purvanova, R. K., & Bono, J. E. (2009). Transformational leadership in context: Face-to-face and virtual teams. *The Leadership Quarterly*, 20(3), 343-357. doi:10.1016/j.leaqua.2009.03.004
- Raisinghani, M., Arora, A., Baylor, E., Brown-Philips, S., Coleman, C., & Craig, K. (2010). Virtual project management of globally outsourced IT projects. *International Journal of Management and Information Systems*, 14(5), 1-7.
- Rautiainen, M., Pihkala, T., & Ikävalko, M. (2012). Family business system models - A case study and some implications of open systems perspective. *Journal of Small Business and Entrepreneurship*, 25(2), 155-168,253-254.

- Reed, A. H., & Knight, L. V. (2010). Project risk differences between virtual and co-located teams. *The Journal of Computer Information Systems*, 51(1), 19-30.
- Reed, A. H., & Knight, L. V. (2012). Technology related risks on virtual software development projects. *International Journal of Information Technology Project Management (IJITPM)*, 3(1), 1-14. doi:10.4018/jitpm.2012010101
- Rice, A. L. (2013). The enterprise and its environment: A system theory of management organization (Vol. 10). *Routledge*.
- Robey, D., Khoo, H. M., & Powers, C. (2000). Situated learning in cross-functional virtual teams. *Technical Communication*, 47(1), 51-66. Retrieved from http://www.communicationcache.com/uploads/1/0/8/8/10887248/situated_learning_in_cross-functional_virtual_teams.pdf
- Rose, D., Trevillion, K., Woodall, A., Morgan, C., Feder, G., & Howard, L. (2011). Barriers and facilitators of disclosures of domestic violence by mental health service users: qualitative study. *The British Journal of Psychiatry*, 198(3), 189-194. doi:10.1192/bjp.bp.109.072389
- Scott, C. P., & Wildman, J. L. (2015). Culture, communication, and conflict: A review of the global virtual team literature in leading global teams (pp. 13-32). Springer New York.
- Scott, R. W. (2008). Organizations and organizing: Rational, natural, and open systems perspectives. *Upper Saddle River, NJ: Prentice Hall*.
- Seale, C. (1999). Quality in qualitative research. *Qualitative Inquiry*, 5, 465-478. doi:10.1177/107780049900500402
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63-75. Retrieved from https://www.researchgate.net/publication/228708239_Strategies_for_Ensuring_Trustworthiness_in_Qualitative_Research_Projects
- Sivunen, A. (2006). Strengthening identification with the team in virtual teams: The leaders' perspective. *Group Decision and Negotiation*, 15(4), 345-366. doi:10.1007/s10726-006-9046-6
- Sivunen, A., & Hakonen, M. (2011). Review of virtual environment studies on social and group phenomena. *Small Group Research*, 42(4), 405-457. doi:10.1177/1046496410388946
- Slomka, J., McCurdy, S., Ratliff, E. A., Timpson, S., & Williams, M. L. (2007). Perceptions of financial payment for research participation among African-American drug users in HIV studies. *Journal of General Internal Medicine*, 22(10), 1403-1409. doi:10.1007/s11606-007-0319-9

- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Stolovitsky, L. (2012). Strategic project management in global economy: Best practices in managing geographically dispersed project teams. *PM World Journal*, 1(2), 1-4. Retrieved from <http://pmworldjournal.net/wp-content/uploads/2012/09/PMWJ-Sep2012-STOLOVITSKY-StrategicPMinGlobalEconomy-AdvisoryArticle.pdf>
- Thomas, E., & Magilvy, J. K. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Pediatric Nursing*, 16(2), 151-155. doi:10.1111/j.1744-6155.2011.00283.x
- Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16, 837–851. doi:10.1177/1077800410383121
- Turban, E., Liang, T. P., & Wu, S. P. (2011). A framework for adopting collaboration 2.0 tools for virtual group decision making. *Group Decision and Negotiation*, 20(2), 137-154. doi: 10.1007/s10726-010-9215-5
- White, M. (2014). The management of virtual teams and virtual meetings. *Business Information Review*, 31(2), 111-117. doi:10.1177/0266382114540979
- Wilson, D. W., Brown, S. A., & Thatcher, S. M. (2015). Examining predictors and outcomes of identity communication in virtual teams. *ECIS 2015 Proceedings*. Retrieved from http://aisel.aisnet.org/ecis2015_rip/20
- Yin, R. K. (2013). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Publications.
- Zhang, L., Chen, F., & Latimer, J. (2011). Managing virtual team performance: An exploratory study of social loafing and social comparison. *Journal of International Technology and Information Management*, 20(1), 103. Retrieved from <http://scholarworks.lib.csusb.edu/jitim/vol20/iss1/6>
- Zikmund, W., & Babin, B. (2012). *Essentials of marketing research*. New York, NY: Cengage Learning.
- Zivick, J. (2012). Mapping global virtual team leadership actions to organizational roles. *The Business Review, Cambridge*, 19(2), 18-25.
- Zofi, Y. S. (2011). *A manager’s guide to virtual teams*. New York, NY: AMACOM.
- Zwikael, O., & Ahn, M. (2011). The effectiveness of risk management: an analysis of project risk planning across industries and countries. *Risk analysis*, 31(1), 25-37. doi:10.1111/j.1539-6924.2010.01470.x

APPENDIX A. STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University's Academic Honesty Policy (3.01.01) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person's ideas or works.

The following standards for original work and definition of *plagiarism* are discussed in the Policy:

Learners are expected to be the sole authors of their work and to acknowledge the authorship of others' work through proper citation and reference. Use of another person's ideas, including another learner's, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)

Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else's ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University's Research Misconduct Policy (3.03.06) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.


Statement of Original Work and Signature

I have read, understood, and abided by Capella University's Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the *APA Publication Manual*.

Learner name
and date

Jorge Regueira Jr, 8/1/2016


Signature of Researcher

Mentor name
and school

Dr. Marc Muchnick Capella University

APPENDIX B. INTERVIEW QUESTIONS

Participants Demographic:

1. Name:
2. Age:
3. Current title:
4. Length of time in role:
5. Are you a virtual project team leader (i.e. manager) or virtual project team member (i.e. developer)?
6. Current role and responsibilities:
7. Gender:
8. Place of residence:
9. Educational background (i.e. degrees or certifications):

Primary Questions:

I. Risk Management Issues:

- a. What risk management issues related to project planning, if any, have you encountered in your virtual project team role? Please provide specific examples.
- b. What risk management issues related to losing or adding a virtual project team member, if any, have you encountered in your virtual project team role at? Please provide specific examples.
- c. What risk management issues related to cultural or language differences, if any, have you encountered in your virtual project team role? Please provide specific examples.
- d. What risk management issues related to technology, if any, have you encountered in your virtual project team role? Please provide specific examples.
- e. What risk management issues related to the nature of the virtual work environment, if any, have you encountered in your virtual project team role? Please provide specific examples.
- f. What risk management issues related to communication, if any, have you encountered in your virtual project team role? Please provide specific examples.
- g. What other risk management issues, if any, have you encountered in your virtual project team role? Please provide specific examples.

II. Effective Risk Management Practices:

- a. What risk management practices related to project planning, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- b. What risk management practices related to losing or adding a virtual project team member, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- c. What risk management practices related to cultural or language differences, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.

- d. What risk management practices related to technology, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- e. What risk management practices related to the nature of the virtual work environment, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- f. What risk management practices related to communication, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- g. What other risk management practices, if any, have proven effective in mitigating risks faced by virtual project teams? Please provide specific examples.
- h. What additional support and/or resources, if any, would help more effectively mitigate risks faced by virtual project teams? Please provide specific examples.
- i. What other recommendations, if any, would help more effectively mitigate risks faced by virtual project teams? Please provide specific examples.