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College of Business and Economics
School of Commerce
Department of Project Management**

Exploring the Factors that Contribute to Virtual Team Success: An Analysis of Gaps and Opportunities, Case of NRECA International

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**A Project Work Submitted to Addis Ababa University, College of Business and Economics,
School of Commerce in Partial Fulfillment of the Requirements for the Degree of Master of
Arts in Project Management**

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June, 2023

Statement of Declaration

I, the undersigned, declare that this study entitled “Exploring the Factors that Contribute to Virtual Team Success: An Analysis of Gaps and Opportunities, Case of NRECA International” is my own work. I have undertaken the research work independently with the guidance and support of my advisor. This study has not been submitted for any degree or postgraduate program in this or any other institutions and that all sources of materials used for the work have been duly acknowledged.

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Statement of Certification

This is to certify that the project work prepared by Samson Demissie, entitled: “Exploring the Factors that Contribute to Virtual Team Success: An Analysis of Gaps and Opportunities, Case of NRECA International” and submitted in partial fulfillment of the requirements for the Degree of Master of Arts in Project Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Acknowledgement

First, Thank God for His divine guidance and blessings on this journey.

Thank you NRECA staff for providing inputs and participating in this project.

I would also like to extend my gratitude to my advisor Dr Mahir, for providing excellent feedback and constructive comments throughout the entire process. Thank you so much for your valuable contributions.

Also, I would like to express my heartfelt appreciation to my Dear wife Fev, for taking up my responsibilities while I was engrossed in completing my thesis. Your unwavering support and encouragement kept me going.

Last but not least, I want to thank me for believing in me, for doing all this hard work, for having no days off, I want to thank me for never quitting.

Abstract

In an increasingly globalized work environment, the effectiveness of virtual teams has become vital. This qualitative research explores the factors that contribute to virtual team success at NRECA International, focusing on communication, leadership, trust, cultural disparities, and technology. The data for this study was collected through interviews and small group discussion with 28 NRECA staff members. Once the responses from interviews and small group discussions reach a point of data saturation, the data collection process is subsequently halted. The data analysis process involved analyzing the results of the interviews and small group discussions to identify patterns and themes that emerged. Descriptive statistics were used to examine the frequency and distribution of responses, while content analysis was conducted to identify common themes and patterns in the responses. Key findings emerged from the analysis. A significant majority (80%) of the participants preferred virtual team setups over traditional work environments, highlighting their advantages. Effective communication was identified as crucial, with over 50% of participants emphasizing its significance. Strong leadership was universally recognized as a key driver of virtual team success. Trust was highlighted by 12 participants, while cultural awareness and sensitivity impacted virtual team dynamics, as mentioned by five participants. Technical competence of team members was considered vital by almost all participants. Time management and flexibility were also identified as factors contributing to virtual team success. To address the challenges faced by virtual teams and improve performance, this research proposes investing in versatile technological solutions, such as videoconferencing and collaborative platforms. By making substantial investments in technology that enables efficient communication and collaboration, NRECA International can provide stable internet connections, reliable power supplies, and cutting-edge collaborative tools to ensure seamless teamwork despite geographical dispersion. Furthermore, cultivating strong leadership skills through comprehensive training programs will empower virtual team leaders to address the unique challenges of managing remote teams successfully.

Keywords: virtual teams, success of virtual teams, communication, leadership, trust, cultural disparities, technology, NRECA International, collaboration, teamwork

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ACRONYMS

- CMC - Computer-mediated communication
- SGD – Small group discussion
- NRECA – National Rural Electrification Corporative Association
- VT – Virtual Team

CHAPTER 1: INTRODUCTION

A virtual team, as defined by (Gassmann & von Zedtwitz, 2003), is a collection of people who collaborate on a particular job or objective without being constrained by space or time. They may work across organizational boundaries and be geographically dispersed (Gibbs et al., 2017). They utilize technology for communication and collaboration and may have particular difficulties like trust-building obstacles and communication barriers (Gibson & Gibbs, 2006).

Virtual teams have become increasingly prevalent in today's globalized and technology-driven world (Kirkman et al., 2002). As organizations seek to expand their operations and enter new markets, virtual teams enable them to work with individuals and groups from different parts of the world without the constraints of physical proximity. While virtual teams offer several benefits, these teams are not without challenges. Many factors can contribute to the success or failure of virtual teams, ranging from communication barriers to cultural differences (Sridhar et al., 2008).

Globalization has led to virtual or distributed teams, where technology like email, social media, web-based meetings, and video conferencing is used to facilitate collaboration among team members who are not physically located in the same place (Gibbs et al., 2017). This arrangement offers some unique advantages, such as the ability to access specialized expertise, regardless of location. One of the most striking shifts in workplace dynamics because of the COVID-19 epidemic has been the quick shift from traditional teams to virtual teams. Before the pandemic, virtual teams were already becoming more prevalent and significant, but the move to remote work has expedited this trend (Kniffin et al., 2021).

Also, the quick development of communication technology has had a significant impact on how firms operate, leading to a rise in the use of virtual teams across a variety of industries. Geographically separated members of virtual teams use contemporary communication systems to cooperate across time zones, cultures, and organizational barriers. The desire for enterprises to access the global talent pool, maximize resources, increase efficiency, and increase flexibility in response to the dynamic business environment has spurred the widespread adoption of virtual teams (Aim Strategies, 2010). The performance of these teams is influenced by a variety of factors. Key elements include effective communication, trust, team cohesion, leadership, and the appropriate use of technology (Gibbs et al., 2017). Each of these factors plays an essential role in determining the success and efficiency of a virtual team. Understanding and addressing these

factors can significantly enhance the performance and productivity of teams operating in a virtual environment. This paper aims to delve into these factors and their impact on virtual team performance.

To conduct business across numerous nations, National Rural electrification cooperative (NRECA) International, a leader in the provision of sustainable energy solutions, has also embraced the usage of virtual teams.

1.1 Background

The purpose of this study is to explore the factors that contribute to virtual team success and to analyze the gaps and opportunities for improvement in virtual team collaboration practices. This study will focus on the case of National Rural electrification cooperative (NRECA) International, a non-profit organization that provides technical assistance to international utilities and rural electrification projects. As a global organization, NRECA International relies heavily on virtual teams to complete projects that span multiple countries and time zones.

1.2 Background of the Company

The National Rural Electrification Cooperative Association (NRECA) functions as a preeminent developmental organization, devoted to augmenting the provision of dependable electricity in developing nations. Established in 1962, the association's endeavors have been predominantly focused on the advancement and expansion of electric infrastructure, establishment of self-reliant and proficiently managed electric utilities, and rendering technical assistance to national electrification strategists.

In collaboration with a multitude of energy ministries and electrification agencies, NRECA has effectively executed an array of national electrification analysis projects, strategy projects, and least-cost geospatial plans. These projects have received substantial support from multilateral development banks, including the World Bank. NRECA International has successfully completed five National Electrification Analysis/Strategy projects under the auspices of the World Bank in countries such as Kenya, Angola, Ethiopia, Malawi, and Liberia. Presently, NRECA International is engaged in analogous projects in Zambia, Zimbabwe, and Ghana.

Moreover, the scope of NRECA International's expertise extends to three finalized national least-cost geospatial electrification planning projects in Kenya, Papua New Guinea, and Colombia. They are also involved in two ongoing projects in the Democratic Republic of Congo and Zimbabwe. Simultaneously, NRECA is participating in two mini-grid feasibility studies for multiple mini-grids in the Central African Republic and the Democratic Republic of Congo.

NRECA is also working on a national electrification analysis project for an alternative sponsor in Malawi. This project employs sophisticated analytical techniques akin to those utilized in the Haiti Through the development and implementation of a sophisticated least-cost geospatial electrification platform, NRECA significantly enhances the efficiency and cost-effectiveness of electrification endeavors. This avant-garde platform facilitates the identification of regions where electrification initiatives can be implemented with minimal expenditure for financial institutions. By accurately pinpointing these areas, the platform promotes more effective planning and resource allocation, ultimately delivering significant benefits to the communities receiving electrification services.

In addition to the electrification platform, NRECA offers comprehensive services in mini-grid and stand-alone renewable energy design and implementation. This ensures seamless deployment of electrification initiatives, particularly in rural communities where access to electricity is crucially needed. This holistic approach to electrification not only addresses infrastructural requirements but also fosters sustainable development in underserved areas.

NRECA also possesses substantial expertise in the realm of electricity sector financial analysis and institutional governance. This service guarantees that financial institutions possess the requisite financial and monitoring capabilities for effective oversight of the electrification process, ensuring accountability and transparency in the execution of projects.

Moreover, NRECA provides rural utility institutional design and development services, which contribute to the efficient organization and management of utilities. This, in turn, ensures the consistent availability of electricity to communities in rural regions, bolstering their quality of life and fostering economic growth.

In summary, NRECA delivers an extensive range of services to banks and other organizations, with the aim of optimizing the efficiency and cost-effectiveness of electrification processes. These

services have proven instrumental in facilitating the successful rollout of electrification initiatives, ultimately improving living standards and promoting sustainable development in rural communities.

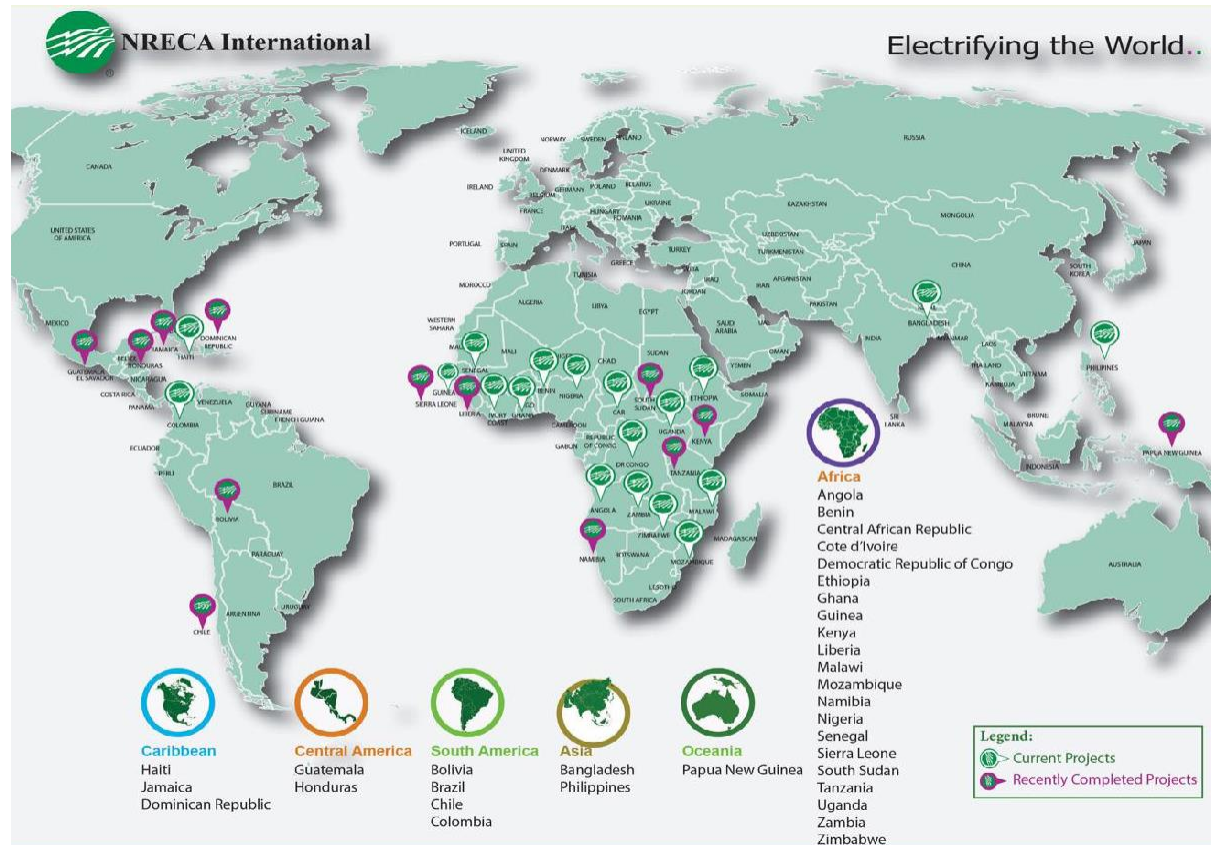


Figure 1 NRECA Project location, Undergoing and Completed (Source NRECA.org)

Although virtual team is not new for NRECA, it has reached its peak after COVID 19 which forced the company to implement remote working strategy in almost all its project offices.

1.3 Statement of the problem

Existing literature has consistently identified several key factors that contribute to effective virtual team performance. Studies have highlighted the importance of communication, leadership, trust, cultural awareness, and technology infrastructure in enabling virtual teams to collaborate and achieve successful outcomes (e.g., Gibson and Gibbs, 2019; Hertel et al., 2005; Kirkman et al., 2002). These factors have been shown to impact virtual team dynamics, productivity, and overall performance. However, there is a need for empirical evidence specifically focused on the context

of NRECA International's global projects to understand how these factors influence virtual team success within the organization.

To address this gap in the literature and provide practical insights for NRECA International, this research aims to investigate the factors that contribute to virtual team success at NRECA International, focusing on communication, leadership, trust, cultural disparities, and technology infrastructure. By examining the experiences and perceptions of NRECA staff members involved in virtual team projects, this study seeks to provide empirical evidence that supports the importance of these factors in ensuring the optimal performance of virtual teams within the organization.

By establishing a link with NRECA International's global projects, this research not only contributes to the existing literature on virtual team effectiveness but also offers practical implications and recommendations specific to the organization. The findings will serve as a valuable guide for NRECA International in enhancing virtual team collaboration, addressing challenges, and achieving continued success in its global projects.

1.4 Objective

General Objective

The main objective of this project is to examine the gaps and opportunities for improvement in virtual team collaboration practices in NRECA International.

Specific Objective

The specific objectives of this study are to:

1. To identify the current virtual team collaboration practices in NRECA INT.
2. To examine the gaps and challenges in the current virtual team collaboration practices in NRECA INT.
3. To explore opportunities for improvement in virtual team collaboration practices in NRECA INT.

1.5 Research questions

What factors contribute to the success of NRECA International's virtual teams under current practices?

How do certain factors like communication, leadership, trust, and cultural differences impact the performance of virtual teams under current practices at NRECA International?

What are the specific challenges that hinder the success of virtual teams in NRECA International?

How have these challenges been addressed so far?

How can technologies and tools like videoconferencing, project management software, and collaborative platforms enhance the effectiveness of virtual teams at NRECA International?

How does the organizational culture and structure of NRECA International influence the performance of virtual teams and what changes are needed to optimize these factors?

1.6 Scope of the Study

The scope of this research is focused on the virtual team collaboration practices within NRECA International. Specifically, it investigates the current practices employed by virtual teams within the organization, the challenges these teams face under current practices, and potential areas for improvement.

The study will analyze the factors contributing to the success of virtual teams, including elements such as communication, leadership, trust, and cultural differences. It will also assess the role of specific technologies and tools like videoconferencing, project management software, and collaborative platforms in enhancing team effectiveness.

Furthermore, the research will delve into the impact of NRECA International's organizational culture and structure on the performance of virtual teams and identify necessary changes or interventions for optimization.

While the study will provide insights that may be applicable to other organizations, it is important to note that the research is tailored to NRECA International's unique context. Therefore, the findings may not be universally applicable to all organizations or industries.

1.7 Significance of the Project

The primary objective of this research is to examine the factors that contribute to effective virtual team collaboration while pinpointing areas for enhancement. The study will specifically concentrate on NRECA International's practices, with the intention of providing recommendations to bolster team collaboration. By doing so, this investigation will add to the growing body of knowledge on virtual team collaboration and offer valuable insights that can benefit organizations relying on virtual teams to accomplish their objectives.

The research will adopt a comprehensive methodology to scrutinize the diverse factors that contribute to successful virtual team collaboration. This will encompass an exhaustive analysis of the communication, technology, and leadership practices employed by NRECA International's virtual teams. Moreover, the study will identify gaps and challenges that impede efficient virtual team collaboration, presenting recommendations to address these concerns.

The overarching aim of this investigation is to broaden our comprehension of virtual team collaboration and offer insights that can assist organizations in enhancing their virtual team practices. The findings of this research will be of immense value to NRECA International and other organizations that depend on virtual teams to achieve their goals. By improving their virtual team collaboration practices, organizations can bolster their overall performance and attain greater success in an increasingly dynamic global business landscape.

CHAPTER 2: LITERATURE REVIEW

2.1 What Is Virtual Team? Origins and Trends

Definition *Virtual teams are group of people and sub-teams who interact through interdependent tasks guided by common purpose and work across links strengthened by information, communication, and transport technologies* (Gassmann & von Zedtwitz, 2003).

virtual teams, are distributed work teams whose members are geographically dispersed and coordinate their work predominantly with electronic information and communication technologies (e-mail, video-conferencing, telephone, etc.) (Hertel et al., 2005).

According to Gassmann & von Zedtwitz,(2003), The origins of virtual teams can be traced back to the early days of the internet. In the 1980s, researchers began to explore the potential of using computer-mediated communication (CMC) to support teamwork. In the 1990s, the internet made CMC more accessible and affordable, and virtual teams began to emerge in the workplace.

The first virtual teams were often used for research and development projects. However, as the technology has improved, virtual teams have been used for a wider range of tasks, including customer service, marketing, and sales(Kirkman et al., 2002).

The use of virtual teams is expected to continue to grow in the future and below are factors that are driving this trend according to (Powell et al., 2004)

- The rise of globalization: Organizations are increasingly operating in a globalized marketplace, and they need to be able to collaborate with partners and suppliers around the world.
- The growth of the internet: The internet has made it easier and more affordable to communicate and collaborate online.
- The increasing availability of technology: There are several technologies that can support virtual teamwork, such as video conferencing, project management software, and cloud-based collaboration tools.

The degree of geographic dispersion within a virtual team can vary widely from having one member located in a different location than the rest of the team to having each member located in a different country (Staples & Zhao, 2006).

According to Ebrahim et al., (2009) virtual teams have four main characteristics. These include:

- Virtual Teams are culturally diverse.
- Virtual teams are geographically diverse.
- Virtual teams communicate electronically.
- Virtual teams may be temporal or permanent.

A team will become virtual if it meets four main common criteria and other characteristics that are summarized in Table 1.

Table 1 Characteristics of virtual team source: Ebrahim et al., (2009)

Common criteria	Geographically dispersed (over different time zones)
	Driven by common purpose
	Guided by a common purpose
	Enabled by communication technologies
	Involved in cross-boundary collaboration
Other characteristics	It is not a permanent team
	Small team size
	Team member are knowledge workers

2.2 Project management, Contemporary issues in project management and Virtual teams

To ensure that projects are finished on schedule, within budget, and to the satisfaction of stakeholders, project management is crucial. Project management has changed significantly over time from traditional to current approaches. The Theory of Constraints, on which conventional project management is founded, places a strong emphasis on finding the bottleneck or limiting factor that may prevent the project's success (Şimşit et al., 2014). The constraints are then controlled in the task list, and the emphasis is now on making sure that the bottleneck doesn't prevent the other activities from moving forward.

On the other side, modern project management techniques place a high value on creativity, adaptation, flexibility, and stakeholder engagement (Akhmetshin et al., 2019). These techniques

have evolved to use technology to maximize productivity and place an emphasis on timely communication, collaboration, and risk management (PMI, 2017).

Traditional project management follows a rigorous methodology that was developed in the conventional manufacturing sector. To accomplish project goals, it uses a linear model that incorporates a series of phases, including initiation, planning, execution, monitoring, control, and closing (PMI, 2017). All tasks are interdependent; thus, one must be finished before the other can begin. When unforeseen hurdles arise, this sequential method may lead to project failure because it restricts flexibility, gives no space for error or modifications, and leaves no room for change. Conventional techniques also entail little to no client participation and frequently treat the team as a separate entity (PMI, 2017).

The contemporary project management method acknowledges that project dynamics are mutable and flexible. To ensure a successful end, the team recognizes the project's inherent risks and uncertainties, adjusts proactively, and talks with stakeholders. The modern method encourages cross-functional cooperation, transparency, and more creative thinking (Sarkar & Locatelli, 2017).

Project management is a complex and challenging task, but it is also an essential skill for any organization that wants to be successful. By understanding the contemporary issues in project management and by using the latest technologies, project managers can improve the efficiency and effectiveness of their projects (Ahuja et al., 1994).

According to Dempsey et al., (2021), One of the most important contemporary issues in project management is the increasing complexity of projects. Projects are becoming increasingly complex due to a number of factors, such as the need to integrate multiple disciplines and technologies, the need to work with global teams, and the need to meet increasingly demanding customer expectations. This complexity can make it difficult to manage projects effectively.

Agile methodologies have also gained popularity over the years, with many organizations embracing them for software development projects. Agile development's flexibility allows businesses to respond rapidly to changing market demands while reducing project risk. Agile development also involves more significant emphasis on team collaboration, reducing hierarchical structures that have led many projects to fail in the past (Sarkar & Locatelli, 2017).

Another important contemporary issue in project management is the need for greater collaboration and communication. Successful projects require the collaboration of a wide range of stakeholders, including project managers, team members, customers, and suppliers. Project managers need to be able to effectively communicate with all stakeholders and to build relationships of trust. Communication is essential for managing risk, resolving conflicts, and keeping stakeholders informed of project progress(Hartley, 2020).

2.3 Virtual Teams and Contemporary project management

Virtual teams are a relatively new method of working that combines geographically dispersed resources and collaborates on project tasks by utilizing modern technologies. The advantages of modern project management approaches are heightened by the possibility of working with a team that is not restricted by geographical borders(Serrat, 2017).

Stakeholder involvement, cooperation, and communication are prioritized in modern project management. The inclusion of all resources and stakeholders in decision-making processes is a crucial tenet for enhancing project success rates. By utilizing the right technical tools, virtual teams can apply these concepts in a way that makes communication and collaboration simple, rational, and engaging(Ur Rehman et al., 2020).

Because real-time information is accessible in the digital environment, virtual teams can work quickly and give immediate feedback(Morrison & Jaime, 2020). The sharing, editing, and real-time feedback of documents that are important for achieving project objectives are made possible through digital collaborative workplaces. As a result, virtual teams can unite various stakeholders in pursuit of a common objective(Yang et al., 2022).

The administration of virtual teams is also consistent with modern project management techniques that place a premium on risk mitigation, adaptation, and flexibility(Dumitrascu & Capatina, 2020). In order to effectively coordinate work across virtual teams, project managers need to possess high levels of coordination, communication, and systems knowledge. To prevent the problem of communication gaps, these project managers must incorporate adaptive problem solutions, process automation, and continual feedback among the team members(Sridhar et al., 2008).

2.3.1 Advantage and Disadvantage of virtual team in Project management

Virtual teams in project management have been increasingly used by organizations due to their immense benefits. However, virtual teams have their advantages and disadvantages. Below, benefits and drawbacks of virtual teams in project management from different literatures is assessed.

2.3.1.1 Advantages of Virtual Teams

Virtual teams have become increasingly popular in modern project management due to their ability to access a wider talent pool and reduce costs associated with travel and facilities. While virtual teams have been studied, there is a need to synthesize the advantages of virtual teams as identified in different articles. Hence, below is a synthesis of advantages of virtual team identified by different research.

Flexibility and Agility

Virtual teams offer increased flexibility and agility for organizations. According to Ferrer Conill, (2013), virtual teams enable organizations to quickly assemble teams with the necessary expertise from different locations to work on projects. This flexibility allows organizations to adapt to changing market conditions and project requirements. Barnes, (2018) further support this argument, stating that virtual teams offer organizations the ability to scale up or down their workforce as needed. This advantage is particularly important in the current business environment where organizations need to be agile to remain competitive.

Cost Savings

Virtual teams offer cost savings for organizations. Serrat, (2017) argues that virtual teams eliminate the need for physical office space and reduce travel costs associated with bringing team members together. Furthermore, virtual teams allow organizations to access a wider talent pool, including individuals who may not be able to relocate due to personal or family reasons (Hertel et al., 2005). This advantage is particularly important for small and medium-sized enterprises that may not have the financial resources to maintain physical offices or support relocation expenses.

Improved Work-Life Balance

Virtual teams offer improved work-life balance for team members. Connelly & Turel, (2016) argue that virtual teams allow team members to work from home or other locations, which reduces commuting time and allows for more flexibility in work schedules. This flexibility can lead to improved job satisfaction and reduced turnover rates (Barnes, 2018). Moreover, virtual teams can provide team members with greater autonomy and control over their work, which can enhance their sense of fulfillment and motivation (Angelo & McCarthy, 2021).

Improved Collaboration and Knowledge Sharing

Virtual teams offer improved collaboration and knowledge sharing. Ocker, (2008) argue that virtual teams can utilize communication and collaboration tools such as video conferencing, instant messaging, and project management software to facilitate information exchange and knowledge sharing. Furthermore, virtual teams can leverage the diversity of their team members to generate new ideas and perspectives (Kankanhalli et al., 2007). This advantage is particularly important for organizations that operate in diverse markets and need to leverage the knowledge and expertise of their team members to gain a competitive advantage.

Increased Productivity and Efficiency

Virtual teams offer increased productivity and efficiency. Hertel et al., (2005) argue that virtual teams can work around the clock due to different time zones, which can accelerate project timelines. Furthermore, virtual teams can reduce distractions and interruptions that may occur in traditional office environments (Connelly & Turel, 2016).

This advantage is particularly important for organizations that operate in fast-paced industries and need to deliver projects on time and within budget. In conclusion, according to the articles mentioned above, virtual teams offer several advantages to organizations, including increased flexibility and agility, cost savings, improved work-life balance, improved collaboration and knowledge sharing, and increased productivity and efficiency budget.

2.3.1.2 Disadvantages of Virtual Teams

Despite numerous research and authors arguing about advantages of virtual teams described above, such as increased flexibility, reduced costs, and improved work-life balance, they also raise several

disadvantages. They claim virtual teams also have several disadvantages that may impact organizational performance, below are a few of them.

Lack of Face-to-Face Communication

One of the main disadvantages of virtual teams is the lack of face-to-face communication. According to a study by Kankanhalli et al., (2007), virtual teams rely heavily on technology-mediated communication, which can be less effective than face-to-face communication. This can lead to misunderstandings, misinterpretations, and a lack of trust among team members. Furthermore, virtual teams may lack the social interaction and informal communication that occurs in traditional office environments, which can impact team cohesion and morale (Hertel et al., 2005). A study by Hertel et al., (2005) also found that virtual teams may experience more communication breakdowns than traditional teams due to the lack of social cues and nonverbal feedback.

Difficulty in Building Trust

Virtual teams may also struggle with building trust among team members. Serrat, (2017) also argues that trust is a critical component of virtual teamwork, and it can be challenging to establish trust in a virtual environment. Team members may not have the opportunity to build relationships and develop a sense of camaraderie, which can make it difficult to establish trust and collaboration. Moreover, virtual teams may lack the nonverbal cues that are important for building trust, such as facial expressions and body language (Ocker & Fjermestad, 2008).

A study by Ocker & Fjermestad, (2008) found that virtual teams may rely more on trust-building strategies such as transparency, accountability, and communication than traditional teams.

Difficulty in Managing Team Conflicts

Virtual teams may face difficulties in managing team conflicts. Hertel et al., (2005), says that virtual teams may have a greater potential for conflicts due to the lack of face-to-face communication and social interaction. Furthermore, virtual teams may lack the mechanisms for resolving conflicts that are available in traditional office environments, such as informal discussions and mediation. This can lead to conflicts that go unresolved, which can impact team morale and performance. A study by (Ebrahim et al., 2009) found that virtual team conflicts can

be more complex and difficult to resolve than traditional team conflicts due to the lack of social context and nonverbal cues.

The collaborative process can often be problematic without active management practices being enforced to facilitate team building and problem-solving activities. Conflict resolution can also become challenging, particularly given that virtual team members are often geographically displaced and may come from different backgrounds, making agreement challenging without clear communication strategies (Ferrer Conill, 2013).

Technology and Infrastructure Issues

Virtual teams rely heavily on technology and infrastructure, which can be a disadvantage. According to a study by Barnes and Hinton (2018), virtual teams may face technical issues such as connectivity problems, software glitches, and hardware malfunctions. These issues can lead to delays in project timelines and impact team performance. Moreover, virtual teams may require significant investment in technology and infrastructure, which can be a financial burden for small and medium-sized enterprises. A study by (Ebrahim et al., 2009) also found that virtual teams may experience challenges in selecting and implementing appropriate technology tools for communication and collaboration.

The dynamic of a virtual team may cause communication barriers, particularly if face-to-face communication is scarce, making it difficult for the team to develop a sense of camaraderie towards a common goal (Bhat et al., 2017). It is essential for project managers to ensure that the team is integrated, and communication channels are open to deal with any issue that may arise during the project (Mortensen et al., 2009).

Virtual teams can also face potential security threats that arise from the sharing of sensitive data through virtual communication channels, making it essential to create specific security measures to prevent confidentiality breaches (Eseryel et al., 2021).

While virtual teams provide numerous advantages for project management, organizations should understand the inherent challenges and develop policies and processes to manage them effectively. Project managers need to understand and mitigate the challenges, such as communication barriers and collaboration challenges in virtual environments (Bergiel et al., 2008). These challenges can be addressed using appropriate technology, structured team composition, communication, and

leadership support. As a result, project managers can use virtual teams as an opportunity, thereby increasing productivity, competitiveness, and project success(Aim Strategies, 2010).

2.4 Factors that contribute to virtual team success

2.2.1 Communication

Effective communication is essential for the success of virtual teams. virtual teams face unique communication challenges, such as lack of nonverbal cues and time zone differences.

Communication is a critical factor in virtual team success. Studies have shown that effective communication can improve team performance by promoting knowledge sharing, coordination, and collaboration. For example, Manzevski & Chudoba, (2000) found that communication quality was positively related to team performance. Similarly, Depoo & Hyršlová, (2022) found that effective communication among virtual team members had a positive impact on team creativity and innovation.

Virtual teams rely heavily on communication technologies to facilitate communication and collaboration among team members. study by Lipnack & Stamps, (1997) found that virtual teams that used a variety of communication channels were more successful than those that relied on a single channel. The study found that virtual teams that used a variety of channels were better able to stay connected and to share information. The use of technology can both enable and hinder communication. For example, the use of video conferencing technology can enable virtual team members to see each other's nonverbal cues, which can improve communication effectiveness. However, the use of email as the primary communication tool can lead to misunderstandings and misinterpretations due to the lack of nonverbal cues. Therefore, it is important to select the appropriate communication technology to fit the specific communication needs of the virtual team.

Virtual teams face unique communication challenges that can impact team performance. These challenges include time zone differences, language barriers, and cultural differences. For example, Kirkman et al., (2002) found that cultural differences in communication styles can lead to misunderstandings and reduced communication effectiveness in virtual teams. Therefore, it is important for virtual team members to be aware of these challenges and take steps to overcome them.

Trust and Virtual Team Performance:

Altschuld & Kumar, (2010) argue that trust is a key factor in promoting knowledge sharing and collaboration among team members, which leads to improved team performance. This assertion is supported by Huang and Liang's (2012) multilevel analysis, which found that trust had a significant positive impact on team performance. Additionally, Zhang et al. (2014) found that trust-building strategies were critical in promoting effective communication and collaboration among team members in virtual teams.

Kanawattanachai & Yoo, (2002) point out that there are different types of trust that exist in virtual teams, including cognitive trust, affective trust, and behavioral trust. Cognitive trust is based on competence and expertise, affective trust is based on emotions and personal relationships, and behavioral trust is based on consistent behavior over time. This differentiation is important because the type of trust that exists in a virtual team can impact how effective it is in promoting collaboration and knowledge sharing.

Hinds & Mortensen, (2005) found that trust was more difficult to establish in global virtual teams compared to co-located teams. This is because cultural differences may create communication barriers that hinder the development of trust. Additionally, trust was less effective when it was based solely on task-related issues. This suggests that virtual teams need to establish trust based on social relationships and shared norms and values to be successful.

Building trust at the outset of a project is essential. The group must interact with one another and cooperate. The team members should believe that their efforts have been valued and recognized. The atmosphere throughout the project life cycle is set by early communication. It is advised to set up an in-person meeting as soon as the project starts to prevent feelings of isolation and separation. Exchanging photos and introducing each member's professional background can assist build a sense of connection and closeness if a face-to-face meeting is not possible. Last but not least, a leader's passion and optimism are crucial for building trust (Brake, 2006).

The following mechanisms are recommended by Akinlua, (2022) to build better trust between virtual team members

- Employ swift trust-building techniques. This approach is rooted in the notion that individuals tend to be more trusting of newcomers upon initial encounters. To capitalize

on this, the team manager must emphasize each member's skills and ensure that the team's goals are clearly conveyed and comprehended by all.

- Actively promote interpersonal trust within the team. Encouraging team members to share personal experiences and challenges in both professional and informal settings during meetings can help achieve this. Individuals naturally gravitate toward others who encounter similar obstacles.
- Maintain consistent and reliable communication. Effective communication is crucial for fostering trust and collaboration among virtual team members. Ensuring that communication channels are dependable and accessible to everyone can significantly enhance team dynamics.
- Implement a rotating power-sharing structure among team members. By distributing authority and decision-making responsibilities evenly among the team, members can feel more empowered and invested in the success of the group, leading to increased trust and collaboration.

Technology

Technology can play a major role in the success of virtual teams. The right technology can help team members to communicate, collaborate, and share information effectively. However, it is important to choose the right technology for the team and to make sure that team members are trained on how to use it effectively.

A study by Townsend et al.,(2000) found that virtual teams that used the right technology were more successful than those that did not. The study found that virtual teams that used the right technology were better able to communicate and to collaborate.

Another study by Fuller & Dennis, (2009) found that virtual teams need technology that is reliable and easy to use. The study found that virtual teams with reliable and easy-to-use technology were more likely to be successful.

Cultural diversity

Virtual teams typically include members from a variety of nations, each with their own traditions, cultures, and customs. Different ways of conversing and forming relationships are also influenced by culture.

Cultural differences are a common challenge faced by virtual teams, especially those that operate across national borders. Cultural differences can lead to misunderstandings, communication breakdowns, and reduced team cohesion.

Studies have shown that cultural differences can have both positive and negative impacts on virtual team performance. For example, Shachaf, (2008) found that cultural diversity in virtual teams can lead to increased creativity and innovation. However, that cultural differences in communication styles can lead to misunderstandings and reduced communication effectiveness, which can negatively impact team performance.

Cultural diversity has its positive effects next to the burdens. “Value in diversity comes from increased creativity, innovation and flexibility,” while “negative aspects of team diversity include communication difficulties, misunderstandings, decreased cohesion and increased conflict Stahl et al., (2010).

Cultural intelligence, ability to understand and effectively navigate cultural differences. can help virtual team members to better understand and appreciate cultural differences, which can improve communication effectiveness and team cohesion. High levels of cultural intelligence were positively related to team performance in virtual teams(Moynihan et al., 2006).

Effective strategies for managing cultural differences in virtual teams include promoting cultural awareness and sensitivity, providing cultural training, and building trust and respect among team members. For example, Moynihan et al.,(2006) found that promoting cultural awareness and sensitivity among team members can help to overcome cultural differences and improve team performance. Similarly, providing cultural training to virtual team members can improve communication effectiveness and reduce misunderstandings.

Leadership

Virtual teams need strong leadership to be successful. The leader needs to be able to motivate and inspire team members, set clear goals, and manage the team effectively (Mysirlaki & Paraskeva, 2020).

A study by (Curşeu et al., 2008) found that virtual teams with strong leaders were more successful than those with weak leaders. The study found that virtual teams with strong leaders were better able to stay focused and to achieve their goals.

Another study by Kayworth & Leidner, (2002) found that virtual teams need leaders who are able to build trust and create a sense of community. The study found that virtual teams with leaders who were able to build trust and create a sense of community were more likely to be successful.

Time Zone difference

Communication among members of a virtual team can be made or broken by timing. This is a direct result of the team members being dispersed throughout several time zones (Akinlua, 2022).

Since team members have different time zones, "working around the clock" is a common difficulty with virtual teams. The lauded benefit of utilizing time as efficiently as possible in 24/7 is not at all effortless. Colleagues frequently plan calls and conferences before or after their regular working hours so that they can hold meetings. The project manager needs to synchronize and coordinate more effectively for this. The odd schedules of virtual members can also interfere with their ability to maintain a healthy work-life balance, which the project manager must be aware of and carefully manage (Aim Strategies, 2010).

In addition to the factors discussed above, another challenge that virtual teams face is the difficulty of building a sense of shared identity and purpose among team members. In a traditional office environment, team members may share physical space, interact frequently, and have a shared understanding of organizational culture and values. In contrast, virtual team members may work in isolation, have limited face-to-face interaction, and come from different organizational cultures or backgrounds. A study by Beyerlein et al. (2016) found that virtual teams that had a strong sense of shared identity and purpose were more effective than those that did not. The study suggested

that virtual teams could benefit from activities that promote teamwork, such as team-building exercises or shared training programs.

Virtual teams may also face challenges related to technology and data security. Virtual teams often rely on cloud-based software and communication tools to share information and collaborate on projects. However, these technologies can be vulnerable to cyber-attacks and data breaches. A study by Hart, (2017) found that virtual teams that had effective data security measures in place, such as multi-factor authentication or encryption, were more effective than those that did not. The study suggested that organizations could benefit from investing in stronger data security measures to protect virtual team members and their data.

Work-life balance

Maintaining a healthy equilibrium between professional and personal responsibilities, particularly for virtual team members is important (Sridhar et al., 2008). Research suggests that virtual employees often struggle to separate their work and personal lives, leading to increased stress levels and a higher risk of burnout (Gajendran & Harrison, 2007). Various studies have identified strategies for managing workload, setting boundaries, and avoiding burnout, such as establishing a designated workspace, setting regular working hours, and taking breaks throughout the day. Additionally, research emphasizes the role of managers in promoting work-life balance through respecting employees' personal time and providing support services like mental health resources, time management training, and stress reduction techniques (Sridhar et al., 2008).

Organizational support

A crucial factor in the success of virtual teams is organizational support (Marlow et al., 2017). Numerous studies have looked into how providing the necessary resources, obtaining management approval, and implementing policies that support remote work can be beneficial (Gajendran & Harrison, 2007). Equipping virtual team members with the right tools and technologies, while also creating policies that encourage flexibility and cater to various needs, significantly contributes to a virtual team's effectiveness. Furthermore, research emphasizes the importance of management actively showing their dedication to remote work by cultivating a culture of trust and autonomy within the team (Gilson et al., 2014).

Clear goals and objectives

It has become evident that for virtual teams to remain focused and motivated, it is essential to establish clear goals and objectives (Powell et al., 2004). In fact, research demonstrates that when project objectives are well-defined, effectively communicated, and fully understood by all team members, it leads to better prioritization, more efficient allocation of resources, and enhanced overall performance of the team.

To ensure that team members stay aligned and motivated, it is important to regularly check in on their progress and conduct performance evaluations. Doing so not only helps maintain a sense of direction and purpose within the team, but it also helps identify potential issues that may need to be addressed (Dulebohn & Hoch, 2017).

Flexibility and adaptability

In today's fast-paced and ever-evolving business environment, flexibility and adaptability have become increasingly important traits for virtual teams to possess, particularly due to the unique challenges presented by remote work (Garro-Abarca et al., 2021). Numerous empirical studies have underscored the significance of virtual teams being open to change, as well as having the ability to modify their plans and strategies as required to adapt to shifting circumstances (Kirkman et al., 2002). This highlights the need for virtual teams to embrace an agile mindset and be prepared to pivot when needed, in order to ensure their continued success.

One way to foster this kind of adaptability among virtual team members is by cultivating a culture of continuous learning, innovation, and experimentation (Gibson & Gibbs, 2006). By encouraging team members to constantly explore new ideas and approaches, as well as to learn from both successes and failures, virtual teams can become more resilient and adaptable to change. This not only enhances the overall effectiveness of the team, but also helps individual team members to grow and develop professionally.

Management support

This support can take various forms, such as providing resources, training, and encouragement (Malhotra et al., 2007). Managers play a pivotal role in fostering a sense of trust, autonomy, and accountability among virtual team members (Ebrahim et al., 2009). Research

suggests that regular team meetings, one-on-one check-ins, and feedback sessions can contribute to employees feeling supported and valued (Han Crystal & Beyerlein, 2016). By creating an environment where virtual team members feel empowered and supported, organizations can foster strong team performance and drive success.

In summary, different literature reviewed for the study revealed several critical points regarding the advantages and disadvantages of virtual teams in project management. On the positive side, virtual teams offer flexibility and agility, allowing businesses to swiftly adapt to changing market conditions and scale workforce accordingly. They also provide cost savings through eliminating the need for physical office spaces and reducing travel expenses, while also enhancing work-life balance for team members. Virtual teams are noted to improve collaboration and knowledge sharing, as well as productivity and efficiency, especially in fast-paced industries. However, there are downsides, including the lack of face-to-face communication which can lead to misunderstandings and a lack of trust. The challenge of building trust in a virtual environment is also highlighted, with the absence of nonverbal cues and the difficulty in establishing camaraderie among team members.

In conclusion, virtual teams present a double-edged sword in project management. They offer significant benefits such as increased flexibility, cost savings, and improved work-life balance, which are particularly valuable in the current business environment. However, they also introduce new challenges, particularly in terms of communication and trust-building. Therefore, while the advantages of virtual teams make them an attractive option for many organizations, it is crucial to be cognizant of and actively address their potential disadvantages to ensure their successful implementation.

CHAPTER 3: RESEARCH METHODOLOGY

This study used a qualitative research approach with a case study design. The research involved data collection through interviews and small group discussion with virtual team members and managers in NRECA International.

The following section detailed how this research addressed the framed research questions, including the explanation of the required data, data sources, and workflow steps necessary to achieve the objectives and answer the research questions.

3.1 Research Design:

This research employs a qualitative approach to study the performance of virtual teams within NRECA International. It explores the challenges, opportunities, and gaps in virtual team collaboration through data collected from 28 participants, including team members and project managers, using interviews and small group discussions. All NRECA staff worked on virtual environment was a candidate for the study. The data collected was analyzed using descriptive statistics and content analysis to identify common themes and patterns. To ensure the validity and reliability of the study, the questions used in data collection were pretested. The interview questions were developed by the researcher, with some adapted from related literature. Ethical standards were maintained throughout the process, ensuring participant confidentiality and informed consent. The goal of this study was to understand the dynamics of virtual team collaboration and formulate recommendations for improvement.

Qualitative approach is selected due to its flexibility, as it allows the research design to be modified as the study progresses, enabling new questions to emerge during the data collection process. This flexibility was critical for this study, given the complexity of virtual team dynamics.

Using a qualitative approach also ensures an understanding of the context within which virtual teams operate. It is essential in this study to understand the specific context of NRECA International and how it impacts virtual team collaboration.

Furthermore, qualitative research allows for exploration of subjective experiences and perspectives. This was crucial to this study's aim to understand the dynamics of virtual team collaboration, by giving voice to the 'why' and 'how' of the participants' behaviors and attitudes.

3.2 Sampling

In this study, all individuals who have worked in a virtual environment were considered as potential participants. However, data collection was halted after the 28th participant, as the responses reached saturation. This indicates that no new or relevant data was emerging, signifying that all potential themes had been fully explored.

3.3 Data Collection

The data collection method used in this study aimed to explore the challenges, opportunities, and gaps in virtual team collaboration. Specifically, the semi-structured interviews and focus group discussion were conducted. The interview involved with 24 individuals' experts, including senior managers, senior experts, and junior experts. The interviews aimed to gather in-depth data about individuals' experiences, attitudes, and perceptions regarding virtual team collaboration.

Table 2 Interview participants information

Participant	Nationality	Position	Type of Interview	Duration(minute)
A	Bangladesh	Project manager	Online	28
B	Bangladesh	Project manager	Online	32
C	Bangladesh	Expert	Online	35
D	Bangladesh	Expert	Online	25
E	Bangladesh	Expert	Online	40
F	Bangladesh	Expert	Online	31
G	Bangladesh	Expert	Online	30
H	Bangladesh	Expert	Online	26
I	Ethiopia	Expert	Online	33
J	Ethiopia	Project manager	Face to face	32
K	Ethiopia	Expert	Face to face	35
L	Ethiopia	Expert	Online	36
M	Uganda	Expert	Online	27
N	Uganda	Expert	Online	30
O	Uganda	Expert	Online	31
P	Uganda	Expert	Online	40
Q	USA	Project manager	Online	26
R	USA	Project manager	Online	28
S	USA	Expert	Online	29
T	USA	Expert	Online	30
U	Central Africa	Expert	Online	31
V	Central Africa	Expert	Online	31
W	Ghana	Expert	Online	32
x	Tanzania	Expert	Online	30

Similarly, the small group discussion involved 4 individuals, including one senior manager and 2 senior experts, and 1 junior expert. The discussion aimed to gather data from a group of individuals perspectives on virtual team collaboration. The researcher served as moderator of the discussion.

Table 3 SGD participants information

Participant	Nationality	Position
AA	USA	Project manager
BB	Ethiopia	Expert
CC	Ethiopia	Expert
DD	Bangladesh	Expert

Gummesson, (1993) identifies two potential strategies for researchers to document interviews. The first strategy is to take detailed notes or record the conversation in its entirety. This approach offers the advantage of easy access to the interview for data analysis purposes. However, it can be quite time-consuming to transcribe and review the recorded material.

The second strategy is to document only the essential facts, hard data, and specific opinions or impressions, without recording the entire interview. This method is less time-consuming but does not provide the opportunity for re-examining the data in detail. Consequently, arranging a new interview may be necessary for further clarification or investigation.

In this research, the first strategy was employed by the researcher. Upon seeking permission from the interviewees, the conversations were auto captured (transcribed) using Microsoft team platform, allowing for a thorough examination of the material. This process facilitated the identification of similarities and differences between interviews, as well as the ability to analyze the data in-depth. Moreover, the transcriptions could also be revisited to evaluate elements such as intonation and pauses, contributing to a better understanding of the participants' perspectives.

Overall, the goal of both the interview and small group discussion was to explore the challenges, opportunities, and gaps in virtual team collaboration, and to gain insights on how to improve collaboration in virtual teams.

The Interview and the SGD were conducted face to face and online depending on the location of participants. The questions were open-ended questions that allow participants to share their experiences, opinions, and perceptions related to virtual team.

Small group discussions are often used in research studies to gather data from a diverse range of perspectives and to explore group dynamics and interactions. They provide a platform for

individuals to share their opinions and experiences in a supportive and non-judgmental environment. Additionally, Small group discussions can generate rich data that can be used to identify themes and patterns in participants' responses(Morgan, 1998).

In this study, small group discussions were used besides gathering data on the experiences and attitudes of participants on virtual team, it also aimed at analyzing integrity of interview results. The discussions were conducted online, and data is transcribed by hand.

In relation to the participants' nationality in the study, a total of 24 individuals were interviewed, encompassing a diverse range of nationalities. To provide a detailed breakdown, 8 respondents hailed from Bangladesh, 4 originated from the United States, 2 represented Central Africa, 4 were from Uganda, 4 identified as Ethiopian, while 1 participant each came from Ghana and Tanzania.

Additionally, the study incorporated a small group discussion which featured 4 participants, with 2 individuals from Ethiopia, 1 from the United States, and 1 from Bangladesh. Among the participants in the focus group, one individual held the position of project manager, while the remaining three were project team members.

In summary, the research encompassed a total of 28 participants, comprising 2 females and 26 males. The professional roles of these participants included 4 project managers and 24 project team members, thereby ensuring a diverse range of perspectives and experiences were represented in the study.

Qualitative interviews also possess inherent limitations, which became evident in the context of this study. The crux of this research hinged on engaging with virtual project managers, as their involvement was crucial not only for conducting interviews but also for informing respective team members to participate in the study. Consequently, a salient constraint emerged in the form of securing the participation of a sufficient number of virtual project managers who were amenable to contributing to this research endeavor.

3.4 Data Analysis

The data analysis process involved analyzing the results of the interview and small group discussion to identify patterns and themes that emerged. The data was analyzed using descriptive

statistics to examine the frequency and distribution, responses, and content analysis to identify common themes and patterns in responses.

The steps below were taken to analyze the data gathered through qualitative research, the method is adopted from Maguire & Delahunt, (2017):

- 1) The researcher became familiar with the data gathered by reading and re-reading the transcripts from interviews.
- 2) Coding was used to categorize data with similar meaning.
- 3) Once codes were identified, common themes that emerged across all interviews were identified by the researcher.
- 4) The themes identified were reviewed to make sure that all relevant information was included and not overlooked, while also ensuring that the themes identified added value to the research question.
- 5) Finally, the researcher discussed the findings by synthesizing the information gathered and comparing/contrasting each finding with literature.

The analysis of the conducted interview was carried out in a manner consistent with the principles of qualitative research, where data generation, analysis, and interpretation often happen simultaneously. During the interview process, analysis and interpretation began as the interviewer took notes and formed impressions about the interviewees' responses. These early impressions contributed to the final conclusions drawn from the data.

After the interviewing period came to an end, a more formal analysis was initiated, drawing from the qualitative data analysis framework of Miles & Huberman, (1994). Coding was chosen as the primary technique for analyzing the interview data. This involved dissecting the notes and transcriptions while preserving the connections between different pieces of information. To achieve this, the data was differentiated and combined according to the similarities and differences in meaning or characteristics.

The coding process involved assigning tags or labels to connect piles of information with the same or similar meanings or characteristics within the examined field. These codes served to organize and make sense of the data, allowing for patterns and themes to emerge. By applying this coding

technique, the researcher was able to identify key insights and draw conclusions about the impact of communication, leadership, trust, cultural differences, and various technologies on virtual team performance in NRECA International projects.

In conclusion, the meticulous process of reading the transcripts twice ensured that no potential relationships or correlations were overlooked. By organizing the coded parts according to their respective color themes, it facilitated the identification of interconnections between various aspects of the research. The subsequent synthesis of analyzed results from both the small group discussion (SGD) and interviews provided a comprehensive foundation for deriving meaningful findings and conclusions. This rigorous approach has significantly enhanced the credibility and validity of the research outcomes.

3.5 Validity and Reliability

To ensure the validity and reliability of the study, the questions were pretested with a small sample of virtual team members to identify and correct any potential issues. The questions were open ended and some redundant in a different form reduce respondent bias and increase response accuracy and integrity.

3.6 Interview Questions design

Bourque & Clark, (1992) listed three ways to design questions to determine data from samples. These are: (1) Developing your own questions. (2) Adapting from other questionnaires (3) Adopting from other questionnaires.

For this research, after developing virtual team performance dimensions from literatures, some questions were found at the end of the related papers which describes some attitudes about virtual team performance dimensions. Therefore, some questions are adapted and most developed by the researcher.

The data gathered from these questions can be analyzed to identify common themes and patterns, which can then be used to develop a framework for understanding virtual team success opportunities and gaps. This framework then is used to develop recommendations for improving virtual team success.

3.7 Research Ethics

In this study, the respondents were properly informed about the significance of the research and the role of their response. They are informed information collected will remain confidential unless written or oral permission is provided, and proper credit is given to those who collaborated during application. In General, the study upholds ethical principles and standards. Participants were informed of the study's purpose, procedures, and potential risks and benefits. Confidentiality and anonymity are maintained throughout the study.

Overall, this methodology for studying virtual team performance involved interviewing virtual team members, Small group discussion, analyzing the results to identify patterns and themes, and ensuring the study's validity and reliability through pre-testing in the interview questions.

Table 4 Overview of Method

Research purpose	Exploratory
Research strategy	Case study
Data collecting techniques	Qualitative
Data collection type	Interview/SGD
Questionnaire types	Semi- Structured interview
Sampling	None/Census
Designing questionnaire	Developing/Adapting
Data Analysis	Content analysis/descriptive statistics

CHAPTER 4: DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Summary of Findings

The interviews have been conducted in a semi-structured, but still informal way. The gained information considered relevant to the research questions is described in this chapter, while all the questions of the interviews are available as Appendix 1.

The study aimed to identify factors that contribute to the success of virtual teams at NRECA International. Based on interviews and group discussion, the most significant factors were found to be effective communication, strong leadership, trust among team members, cultural awareness, technical competence of team members, time management, and flexibility. A significant majority of participants (80%) preferred a virtual team setup, emphasizing the importance of clear and concise communication. Nearly 60% highlighted the role of strong leadership, and trust was considered critical by half the participants. Technical competence was universally agreed as essential, while time management, flexibility, and cultural sensitivity were also noted.

Participants identified challenges faced by virtual teams, such as lack of non-verbal cues, difficulties in building trust in a virtual environment, and technological issues, including unstable internet connections and power supply issues. Despite these challenges, the study found that the participants have developed strategies to overcome them, such as scheduling meetings at convenient times across different time zones, organizing informal virtual meetings to build trust, and investing in stable internet connections and power backup systems.

In summary, the success of virtual teams at NRECA International is influenced by several interconnected factors. While challenges exist, the organization and its team members have demonstrated resilience and adaptability in overcoming these issues. Continuous improvement in communication, leadership, trust-building, cultural sensitivity, and technological competence will further enhance the success of virtual teams in the organization.

4.2.1. Identified factors that contribute to virtual team success.

To answer the first research question, which is “Which factors contribute to virtual team success in the case of NRECA International?” 24 participants were interviewed, and four participated in

the SGD, shared their experiences and opinions on the factors that contribute to virtual team success within NRECA International.

A significant majority (80%) of the participants prefer a virtual team setup, while a smaller percentage favor traditional work environment, and the remaining participants have no preference. This researcher shares the preference for a virtual team setup as well.

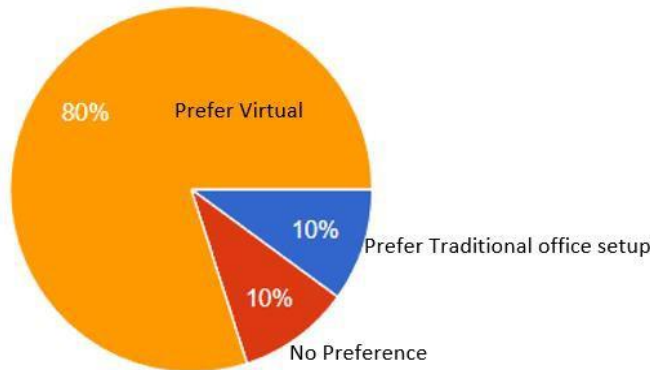


Figure 2 Participants team setup preference

More than 50% of participants emphasized the significance of effective communication in ensuring virtual team success. Project team member C recounted a personal experience, stating, *"I think effective communication is the most vital element for our virtual team. There was a time where you and I were in very time sensitive task, and we wanted to use the server capacity simultaneously which created lag on our progress. We discussed the issue and divided server usage time. Communicating helped us when we faced a major challenge in our project. Having open communication channels allowed us to stay connected, keep everyone informed about each other's progress, and address the issue quickly and efficiently."* Another interviewee, F, added, *"We need to ensure our communication is clear and concise to avoid misunderstandings and ensure smooth collaboration. In the past, we had a situation where miscommunication led to delays in our project, so we learned the importance of being clear in our messages."*

The significance of efficient communication, highlighted by over half of the participants, aligns with prior studies emphasizing communication as a critical factor in the success of virtual teams (Manzevski & Chudoba, 2000). Participants shared personal instances that demonstrated how

well-defined and concise communication helped overcome challenges and prevent misunderstandings. This finding supports the idea that effective communication is crucial for coordinating tasks, sharing information, and promoting collaboration in virtual teams (Depoo & Hyršlová, 2022).

This researcher has made it a point to communicate some challenges with the team, for example keeping colleagues informed about any potential disruptions or difficulties I may face due to the unreliable power supply. This open communication has helped to foster understanding and support from teammates and allowed the team to develop contingency plans.

Almost 60% of participants highlighted the importance of strong leadership in driving the success of their virtual teams. Project team member K mentioned, *"Good leadership is absolutely vital in a virtual team. Our team leader makes sure that everyone is on the same page and provides guidance and support when needed. When we had some conflicts among team members, our leader stepped in and resolved the issues effectively, ensuring the project stayed on track."* A project team member O shared, *"Our project manager '****' played a significant role in setting expectations, providing constructive feedback, and resolving conflicts in a timely manner during a particularly challenging phase of our project. If you remember during the DSSP project there was conflict on our data collection location, I admired the way he led the project considering the schedule his team members moral and safety"*. This researcher shares the belief that strong leadership is indeed important in ensuring the success of virtual teams. In line with this understanding, this researcher recognizes that NRECA has made efforts to equip their leaders with the necessary tools and skills to manage virtual teams effectively. However, as the nature of work continues to evolve and virtual collaboration becomes increasingly prevalent, it is essential for NRECA to ensure that its leaders receive continuous support and training to stay abreast of the latest developments and best practices in virtual team management.

One area that may require further attention this researcher thinks is virtual upgrade on collaboration platforms. As virtual teams rely heavily on technology to communicate, collaborate, and complete tasks, it is crucial for leaders to be well-versed in using these platforms. By providing leaders with the necessary training and resources, NRECA can ensure that they are able to effectively facilitate virtual collaboration and drive the success of their teams.

The focus on robust leadership, mentioned by almost all of participants, corresponds with existing literature that identifies leadership as a key driver of virtual team performance (Mysirlaki & Paraskeva, 2020). Participants praised their leaders for offering guidance, establishing expectations, and resolving conflicts while also acknowledging the impact of leadership on team morale and project success. This finding supports the notion that effective leadership is essential for managing virtual teams and ensuring their success (Curşeu et al., 2008).

Trust was identified as a critical element in virtual team performance by 12 participants. Participant D said, *"Building trust among team members is essential, as it fosters collaboration and improves overall team performance. In our team, it took some time to establish trust, but once it was there, we saw a noticeable improvement in our teamwork and project outcomes."* Another interviewee added, *"It takes time to build trust in a virtual environment, but once established, it can lead to better teamwork and better outcomes. I've personally experienced the positive impact of trust in our team's performance."*

Trust was recognized as a crucial element by 12 participants, which is consistent with research stressing the significance of trust in virtual team performance (Altschuld & Kumar, 2010). In reflecting upon these findings, the researcher recognizes the need for cultivating trust within virtual teams, as it plays a pivotal role in fostering collaboration, cohesion, and commitment among team members.

In NRECA, where team members may not have the opportunity to interact face-to-face, establishing trust can be particularly challenging. However, the researcher believes that by emphasizing effective communication, transparency, and accountability, trust can be built and maintained among members in NRECA. This will, in turn, create a positive atmosphere where team members feel comfortable sharing their ideas, taking risks, and working together to achieve common goals.

Five participants mentioned the impact of cultural awareness and sensitivity on their virtual teams' success. Project team member S shared a personal experience, saying, *"Understanding and respecting each other's cultures can help avoid misunderstandings and foster a positive working environment. I remember an incident where a team member's comment was misinterpreted due to cultural differences, but once we became aware of the situation, we were able to resolve it and move forward with a better understanding of each other's cultural backgrounds, values, and*

beliefs." SGD participant AA explained, "Being aware of and sensitive to cultural differences is crucial for effective collaboration in virtual teams. It helps in bridging gaps and creating an inclusive environment for everyone. Also knowing when the holidays of different team members could be crucial to know when to/ not to communicate."

The influence of cultural awareness and sensitivity on virtual team success, mentioned by five participants, is in line with research emphasizing the role of culture in virtual team collaboration (Moynihan et al., 2006). Participants shared experiences demonstrating the importance of understanding and respecting a variety of cultural backgrounds to avoid misunderstandings and foster a positive work environment. This finding reinforces the notion that cultural awareness is essential for bridging gaps and creating an inclusive atmosphere in virtual teams (Moynihan et al., 2006). This researcher thinks cultural awareness and sensitivity can offer valuable benefits to virtual teams. For instance, being culturally aware can help reduce misunderstandings and miscommunications that may arise from differing social norms and communication styles. Additionally, a culturally inclusive environment can empower team members to share unique perspectives and ideas, which can lead to more innovative and effective problem-solving.

Almost 100% of participants agreed that another factor contributing to the success of virtual teams in NRECA International projects was the technical competence of team members. Project manager J said, *"Having skilled and knowledgeable team members is essential for the successful completion of our projects. Their expertise and ability to handle complex tasks contribute significantly to the team's overall performance. I recall a project where our team's technical competence was crucial in overcoming various technical challenges that arose during the project."*

The near-unanimous agreement on the importance of technical competence supports existing research that emphasizes the role of team members' skills and expertise in virtual team performance (Griffith et al., 2003). Participants recognized the value of having skilled team members to handle complicated tasks and overcome technical challenges, which is consistent with the literature on the crucial role of technical competence in virtual team success (Griffith et al., 2003). This researcher also believes, In the context of NRECA International projects, highly skilled team members with relevant expertise are better equipped to understand the complexities of the tasks at hand, devise effective solutions, and ensure that projects are completed efficiently

and to a high standard. This directly translates to improved project outcomes, increased client satisfaction, and an enhanced reputation for the organization.

Six participants highlighted the importance of time management, while three participants pointed out flexibility as one of the factors that contribute to virtual team success. Interviewee W shared a personal story, saying, *"Managing time effectively and being flexible with each other's schedules can help ensure that tasks are completed on time and team members can collaborate effectively. For example, we had to adjust our schedules to the biweekly meeting to accommodate a team member who was in a different time zone. By doing so, we were able to include their valuable input and ensure that everyone had an opportunity to contribute to the project's success."*

The importance of time management and adaptability, mentioned by six and three participants respectively, aligns with research emphasizing these factors as essential components of successful virtual teamwork (Manzevski & Chudoba, 2000). Participants shared personal stories illustrating the importance of effective time management and adaptability in accommodating team members' schedules, which supports the idea that these factors contribute to efficient collaboration and project success in virtual teams (Manzevski & Chudoba, 2000). Participants reported being easily distracted by household chores or personal responsibilities, leading to difficulties in staying focused and completing tasks on time. These experiences resonate with the challenges faced by this researcher in managing their time and staying disciplined while working from home.

Table 5 Identified success factor by participants.

Identified Success factor	# Participants
Effective Communication	15
Strong leadership	17
Trust	12
cultural awareness	5
technical competence of team members	28
Time management	6
Flexibility	3

4.2.2. Identified challenges that NRECA International's virtual teams face.

15 participants mentioned lack of non-verbal cues as a significant challenge for their virtual teams. Participant X stated, *"I think lack of non-verbal cues often lead to misunderstandings, which can be frustrating and time-consuming to resolve. For example, in my experience working at NRECA,*

we had a situation where two team members from different countries misinterpreted each other's tone in an email exchange, causing unnecessary tension." participant O highlighted the issue of time zones by sharing their experience: *"Coordinating meetings across different time zones is always a challenge, as it's difficult to find a time that works for everyone. I remember, during the initial phase of remote work after COVID, our team had to schedule meetings at odd hours to accommodate colleagues in different regions."*

Lack of non-verbal cues is a big challenge for virtual teams, as mentioned in previous studies (Kankanhalli et al., 2007). Participants in this study talked about misunderstandings and tensions caused by misinterpreting email tones. Time zones were also noted as a challenge, which is consistent with research on global virtual teams (Akinlua, 2022). ." This is consistent with researcher experiences and acknowledges that it's through the effective communication limited company resources can be shared. Also, this researcher admits occasionally struggled to effectively collaborate with team members and convey ideas through digital platforms.

Many participants emphasized the importance of trust in virtual teams and the difficulty of establishing it. Participant L shared, *"In a virtual environment, trust is difficult to build since we don't have the opportunity to interact in person. We need to rely on each other's competence, and sometimes it's hard when you can't see someone's reactions or body language. At NRECA, when we switched to remote work after COVID, I think it took some time for everyone to adjust and build trust among team members."* Project manager A provided an example of how trust was built within their team: *"We started organizing weekly virtual coffee breaks where we could chat informally and get to know each other better, which I believe helped develop trust among our team members."*

Participants in this study said it was hard to build trust without in-person interactions. They also shared ways to build trust, like having weekly virtual coffee breaks, which matches up with research on trust-building in virtual teams (Ocker, 2008). This researcher witnessed firsthand the essential role trust plays in the overall effectiveness and success of a team. In *** project, the researcher was part of a team where most members were from *** and had never met face-to-face. At the beginning of the project, a significant trust deficit among the team members was evident. This lack of trust led to ineffective communication, hesitancy in sharing ideas, and an overall atmosphere of discomfort.

12 participants mentioned technological challenges as a significant barrier for virtual teams. participant L said, *"I think one of the major issues we faced at NRECA after COVID was the lack of a stable internet connection for some team members. It often led to delays in communication and affected the overall progress of the projects."* Participant P mentioned the difficulty related with power: *"During the transition to remote work, we had to stay home and work, and our houses power is not dependable and sometimes we lose power without sufficient charge on our laptops which impacted our daily performance."*

Technological challenges, like unstable internet connections and power supply issues, were mentioned by 12 of the participants. These findings align with earlier research on how technology plays a role in virtual team effectiveness (Mortensen et al., 2009). This researcher, who is based in Ethiopia, faces significant technology-related challenges that are quite common in the region. In addition to these ongoing difficulties, there have been instances of complete internet shutdowns in the country. These shutdowns have had a substantial impact on the researcher's Job performance, further highlighting the need for more reliable technological infrastructure in order to be effective and productive. The prevalence of such challenges underscores the importance of addressing these barriers to ensure that remote workers in Ethiopia can make a living out of global job market. The lack of a reliable power supply has been a significant challenge while working as a member of a virtual team. This issue has not only affected this researcher's ability to maintain stable internet connections but has also resulted in disruptions to day-to-day activities, such as attending important meetings. On multiple occasions, I, the researcher has missed crucial meetings with teammates, stakeholders, or project managers due to sudden power outages or unstable connections.

5 Participants also discussed the challenges of managing workload and setting expectations in a virtual team environment. Participant W shared their experience: *"I think one of the main challenges, especially after COVID, was to set clear expectations and deadlines for team members. Since we were not physically present in the same location, it was difficult to track progress and ensure that everyone was on the same page."* participant U mentioned the issue of work-life balance: *"Working remotely, it's easy to blur the lines between work and personal life. At NRECA, we had to make a conscious effort to set boundaries and ensure that our team members were not overburdened or overworked."*

Managing workload and setting expectations in a virtual team environment were talked about by 5 of the participants. These challenges relate to research on performance management and work-life balance in virtual teams (Gajendran & Harrison, 2007))

In addition to the interviews, small group discussions (SGD) were conducted to further explore the challenges faced by virtual teams. The SGDs provided a platform for participants to discuss their experiences and share insights on how they tackled the challenges in a group setting. The following challenges emerged from the SGDs:

Participants in the SGDs highlighted the difficulties of collaboration and decision-making in a virtual environment. Participant BB shared, *"In my experience at NRECA, I think collaborating on tasks and making decisions as a team was more challenging in a virtual setting. We had to rely heavily on technology, which sometimes led to delays and miscommunication."* Participant CC shared a solution their team adopted: *"We started using collaborative tools like Google Docs and Online Microsoft 360 to streamline our decision-making process and ensure that everyone's input was considered."*

Table 6 Challenges Identified by participants.

Identified challenges	# Participants
lack of non-verbal cues	15
difficulty of establishing trust	17
Technological draw backs	12
difficulty of managing workload	5
difficulties of collaboration and decision-making	28
less control over team members	6

How have these challenges been addressed so far?

The SGD participants also emphasized the importance of team bonding and social interactions for the success of virtual teams. Participant AA said, *"At NRECA, we realized that it was crucial to maintain a sense of connection among team members, especially after COVID. organizing virtual team-building activities, such as online games and quizzes, to foster a sense of camaraderie and belonging could help. But unfortunately, such activities have not been done so far."* Participant DD mentioned the role of virtual team leaders in facilitating social interactions, *"Our team leader*

was very proactive in ensuring that we had regular opportunities to interact informally, which helped us feel more connected and engaged with the team."

The SGD participants also discussed the challenges of adapting to change and managing stress in a virtual team environment. Participant BB shared, *"The sudden shift to remote work after COVID was quite stressful for many of us at NRECA. It took some time to adjust to the new way of working and dealing with the uncertainty of the situation."* Participant CC mentioned the importance of self-care and mental health support: *"Our organization should provide resources and support for mental health and stress management, which I believe was crucial in helping us adapt to the changes and cope with the challenges of working remotely."*

The participants in the SGDs also pointed out the challenge of nurturing creativity and innovation while working remotely. Participant DD said, *"I think brainstorming and coming up with innovative ideas was more difficult in a virtual setting, as we missed the spontaneous interactions and discussions that happen in a physical office space."* Participant AA shared how their team tackled this challenge: *"We use tools like google and Microsoft teams, to facilitate brainstorming sessions and encourage creative thinking among team members, which I believe helped us maintain our innovative edge despite working remotely."*

Another challenge that emerged from the SGDs is the perceived less control over team members in a virtual environment. Project manager AA participant shared, *"In a virtual setting, it becomes more difficult to monitor team members' work progress and hold them accountable. There's a sense of decreased control, which can lead to concerns about productivity and meeting deadlines."*

In conclusion, the findings from both the interviews and small group discussions highlight the multiple challenges faced by virtual teams, including communication barriers, building trust, technological issues, managing workload, collaboration, team bonding, adapting to change, and nurturing creativity. The participants also shared various strategies and tools that they implemented to overcome these challenges, emphasizing the importance of adaptability, effective communication, and strong leadership in fostering successful virtual teams.

Table 7 addressing challenges.

Identified mechanisms to address challenges
nurturing creativity and innovation
managing stress
brainstorming sessions using different tools
self-care and mental health support
Using collaborative tools

4.2.3. Extent of communication, leadership, trust, and cultural differences on the performance and outcomes of virtual teams in NRECA International projects

To address the third research question, Extent of communication, leadership, trust, and cultural differences on the performance and outcomes of virtual teams in NRECA International projects, participants were asked their perception, The results are presented under four main themes: (1) communication, (2) leadership, (3) trust, and (4) cultural differences.

Communication

Effective communication emerged as a crucial factor contributing to the performance and outcomes of virtual teams in NRECA International projects. Participants acknowledged the importance of clear and timely communication to ensure smooth cooperation among team members. Participant G stated, *"Good communication is the backbone of our team's success, especially since we are working remotely. I mean, without proper communication, we wouldn't be able to coordinate our efforts and understand each other's progress."*

Participant H, team member mentioned, *"I think our project's success is mainly due to the fact that we communicate frequently and effectively, which helps us stay on the same page. We use different tools like emails, instant messaging, and video calls to stay connected and share updates."*

However, some participants recognized challenges in communication, such as time differences and language barriers (accent), which occasionally led to misunderstandings. Project manager R said, *"Time zone differences can be a challenge, but we try to schedule meetings at a time that works for everyone. Sometimes, it means waking up early or staying up late, but it's worth it to keep everyone in the loop."*

Language barriers were also mentioned as a potential issue for some team members, but participants emphasized the importance of being patient and supportive to overcome these challenges. As one team member V shared, *"In the beginning, I struggled with understanding some of my colleagues due to language accents. But with patience and their willingness to explain things, I managed to overcome this hurdle."*

Leadership

Strong leadership was identified as a key element in the performance and outcomes of virtual teams. Participants highlighted the role of project managers in providing guidance, setting clear expectations, and monitoring progress. One project manager Q shared, *"It's my responsibility to ensure that the team's goals and objectives are clear and that everyone is working towards them effectively. I try to check in with each team member regularly to discuss their progress and address any issues."*

Team members also appreciated the support and encouragement from their project managers. As participant T noted, *"Our project manager listens to our concerns and helps us find solutions, which makes us feel valued and motivated. I remember a time when I faced a challenge acquiring the row data prior to the electrification analysis from the utility, and my project manager helped me contact the right persons who can provide the data, which was really helpful."*

Another team member I added, *"The project manager's leadership style is crucial in keeping the team focused and cohesive, even when we face challenges. For instance, when we encountered a significant obstacle due to internet shutdown, our project manager reassured us and refocused our efforts to overcome it, with whatever means is available on our disposal."*

Trust

Trust among team members was considered another essential factor in the performance and outcomes of virtual teams. Participants mentioned that trust is built through constant communication, accountability, and delivering on promises. Team member W explained, *"When we see that our colleagues are accountable and reliable, trust naturally develops. I remember when a colleague of mine took responsibility for a mistake and worked hard to fix it, which made me trust them even more."*

However, participants acknowledged that building trust could be more challenging in a virtual setting. A project manager J said, *"It's important to create opportunities for team members to get to know each other and build trust, even if it's through virtual team-building activities. We as NRECA lack organizing trust building activities."*

Cultural Differences

Cultural differences were recognized as both a challenge and an opportunity for virtual teams in NRECA International projects. Participants mentioned that working with colleagues from diverse cultural backgrounds could lead to misunderstandings and conflicts. team member M shared, *"At first, it was difficult to understand the communication style of some colleagues from different cultures specially the ones from ***, and we had some conflicts. But as we got to know each other better, we learned to respect and appreciate our differences."*

However, the same participant also mentioned that the team managed to overcome these challenges through open communication and mutual respect.

On the other hand, participants also highlighted the benefits of cultural diversity, stating that it brings fresh perspectives and innovative ideas to the team. Project manager AA said on the SGD, *"Our team's cultural diversity is an asset, as it allows us to approach problems from various angles and come up with creative solutions. For example, during one of our brainstorming sessions, a team member from a different culture suggested... which was a unique approach that we hadn't considered before, which led to a breakthrough in our project."*

In summary, the findings from both the interview and the FDG indicate that effective communication, strong leadership, trust among team members, and the ability to navigate cultural differences are the key factors influencing the performance and outcomes of virtual teams in NRECA International projects. Participants generally expressed positive experiences and highlighted the importance of these factors in ensuring the success of their virtual teams. To measure the extent of these factors, future research could consider using surveys or questionnaires to quantify the impact of communication, leadership, trust, and cultural differences on virtual team performance.

Cultural differences were acknowledged as both a challenge and an opportunity for virtual teams. This finding mirrors the research by Sridhar et al., (2008), who argued that cultural diversity can

lead to misunderstandings and conflicts but also brings fresh perspectives and innovative ideas to the team. The participants' emphasis on open communication and mutual respect as strategies to overcome cultural barriers is consistent with the recommendations of Stahl et al., (2010), who suggested that virtual teams should foster a culture of inclusiveness and respect for cultural differences to take advantage of the benefits of diversity.

In this study, both small group discussions (SGDs) and individual interviews were conducted to gather a comprehensive understanding of the factors influencing the performance and outcomes of virtual teams in NRECA International projects.

Based on the findings from both SGDs and interviews, the factors affecting virtual team collaboration and success can be ranked in the following order of their perceived importance:

Table 8 Perceived Rank of factors by participants

Identified mechanisms to address challenges
1. Effective communication
2. Strong leadership
3. Trust among team members
4. Cultural differences

Effective communication emerged as the most critical factor contributing to the performance and outcomes of virtual teams. Participants acknowledged the importance of clear and timely communication in ensuring smooth cooperation among team members. On the other hand, cultural difference among team members was ranked as the least important factor, although still significant for successful virtual team collaboration.

Reflecting on the experiences of this researcher in working with remote teams, certain aspects have played a significant role in determining the success of a project. For instance, in one remote team experience, good communication was crucial. This researcher was part of a team with members spread across various time zones and backgrounds, so ensuring that communication channels were clear and accessible was important. A combination of email, instant messaging, and video calls was used to keep everyone informed. This open communication made it much easier to address any issues or concerns immediately, leading to a successful project.

In another remote team experience, strong leadership was key to navigating the challenges of working from a distance. The team leader was adept at managing a diverse group of people and keeping them motivated and focused on shared goals. By setting clear expectations, regularly checking in with everyone, and providing constructive feedback, the leader created a positive and productive work environment. Under their guidance, the team overcame obstacles and completed the project successfully.

Trust between team members was another major factor that affected the ability to work well together in a different project. Initially, it was challenging for the team to build trust due to the lack of face-to-face interaction and varying levels of experience. However, by organizing regular virtual team-building activities and encouraging open, honest communication, the team was able to strengthen relationships and build a foundation of trust. This trust enabled the team to rely on each other's expertise and collaborate more effectively, ultimately leading to a successful project outcome.

In yet another project, the team initially faced challenges due to cultural differences among team members. Misunderstandings and miscommunications arose from different communication styles, decision-making processes, and attitudes towards time management. However, as the team became more aware of these differences and tried to accommodate everyone's perspectives, they were able to find common ground and work together more effectively. This experience taught this researcher the importance of recognizing and embracing cultural differences within remote teams to create a harmonious and inclusive work environment.

the personal experiences of this researcher in various remote teams have highlighted the importance of effective communication, strong leadership, trust among team members, and an awareness of cultural differences. By concentrating on these aspects, remote teams can enhance their collaboration, tackle the unique challenges of remote work, and achieve success in their projects.

4.2.4. Use of specific technologies and tools on effectiveness and efficiency of virtual teams in NRECA International

Team member K said on the interview, shared their personal experience, stating, *"You know, I think using videoconferencing has made a massive difference in our team's performance. It's like*

we're all in the same room, even though we're miles apart. It allows us to see each other's facial expressions and body language, which has been so helpful in understanding each other better and reducing miscommunications."

Participant B mentioned, *"In my opinion, project management software has been a game-changer for us. It has helped us stay organized, keep track of our progress, and maintain clear communication about tasks and deadlines. And with everyone having access to the same information, it's made collaboration so much easier."*

During a Small group discussion, participant BB remarked, *"Collaborative platforms like Google Docs and SharePoint have made it easier for us to work together on documents and share ideas in real-time. I mean, it has improved our efficiency and reduced the time spent on back-and-forth emails. It's like we're all on the same page now."*

However, some participants also expressed concerns about technology's limitations and potential pitfalls. Participant E said, *"While I agree that technology has improved our virtual team collaboration, there have been instances when technical issues or connectivity problems have disrupted our workflow and caused delays. I remember a time when we had a critical virtual meeting, and half of the team couldn't join due to internet issues. It was frustrating."*

Another participant CC, from an SGD added, *"It's important to remember that not all team members may be equally tech-heavy, so there's a learning curve involved. We need to ensure that everyone is comfortable with the tools we use and provide them with the necessary training and support. It took me a while to get the hang of some tools, but once I did, it made my work much more manageable."*

The majority of the 28 participants in both individual interviews and SGDs believed that the use of specific technologies and tools, such as videoconferencing, project management software, and collaborative platforms, could improve the effectiveness and efficiency of virtual teams in NRECA International. However, it is essential to address potential challenges related to technology adoption, including technical issues, connectivity problems, and team members' varying levels of technological expertise. By doing so, virtual teams can fully leverage the benefits of these technologies and tools to enhance their overall performance.

The advantages of collaborative platforms like Google Docs and SharePoint, as mentioned by the focus group participants, are in agreement with a study by Fuller & Dennis, (2009). They found that these tools help streamline work processes and strengthen teamwork in virtual environments. However, the participants' concerns about the limitations and potential pitfalls of technology, such as technical issues and connectivity problems, are also supported by research. For example, Gibson & Gibbs, (2006) found that technical difficulties can hinder virtual team performance and cause frustration among team members.

This researcher has observed how the use of various technological tools, such as videoconferencing, enables team members to connect with each other on a more personal level, despite geographical barriers. This not only strengthens team cohesion but also fosters a collaborative environment where everyone feels included and heard. Furthermore, the implementation of project management software and collaborative platforms has greatly streamlined our work processes and improved overall team efficiency. These tools have allowed us to keep track of project progress, delegate tasks effectively, and maintain transparent communication channels. They have also facilitated better organization and time management, which are crucial in ensuring the success of virtual teams.

4.2.5. The influence of organizational culture and structure of NRECA International on virtual team performance

Some participants expressed concerns about the organization's hierarchical structure and its impact on virtual team dynamics. Participant N mentioned, *"While our management is generally supportive, I feel that the hierarchical structure sometimes hinders open communication and collaboration. Team members may be hesitant to share their ideas or challenge the status quo, fearing potential repercussions."*

To address these concerns, several participants suggested implementing interventions to promote a more inclusive and collaborative environment. Participant M recommended, *"I think it would be beneficial to adopt a flatter organizational structure, where every team member feels empowered to contribute and engage in discussions. This could lead to more innovative ideas and better decision-making."*

Another theme that emerged was the need for effective leadership and support from management. Participants emphasized the crucial role of leaders in setting the tone for virtual team performance. Participant B said, *"Our team leaders play a significant role in promoting a positive work culture and ensuring that everyone feels valued and supported. Their guidance and encouragement have been instrumental in driving our virtual team's success."*

Interventions needed to optimize these factors.

To optimize these factors, some participants suggested providing additional training and resources for team leaders to enhance their skills in managing virtual teams. Participant E proposed, *"Investing in leadership development programs focused on virtual team management could be highly beneficial. This would equip our leaders with the necessary tools and knowledge to better support their teams and drive performance."*

Another key theme identified was the importance of enhancing technological infrastructure. Participant P shared experience, stating, *"I remember the *** project was almost beyond timeline and we were implementing extensive measure and crashing the project. But the necessary technological equipment's like the big server we have now were not available This was frustrating and took away from our productivity. I think investing in better technology would make a huge difference in our virtual team performance."*

The need for better technology infrastructure identified in this study is backed by existing research, which highlights the importance of technology in fostering communication, collaboration, and information sharing in virtual teams (Kankanhalli et al., 2007). Putting money into better technology can make a huge difference in virtual team performance (Manzevski & Chudoba, 2000).

This researcher has witnessed how a strong technological infrastructure can improve communication, information sharing, and teamwork among virtual team members. When the underlying infrastructure is reliable and efficient, team members can focus on their tasks and collaborate more effectively without worrying about technical difficulties or limitations. Furthermore, an advanced infrastructure can enable the integration of cutting-edge tools and technologies into the organization, fostering innovation and growth.

Enhancing technological infrastructure also means ensuring data security and protection, which is crucial in the age of cyber threats and data breaches. Organizations must continuously update and monitor their infrastructure to protect sensitive information and maintain the trust of their clients and employees.

Another important aspect was encouraging team-building activities. Participant X elaborated on this by saying, "*During the last virtual team-building event, I got to know my teammates on a more personal level, and it definitely made me feel more connected to them. I believe having more of these events can help bridge the distance and make us work better together.*"

Providing training on remote work best practices was also highlighted as a crucial factor. A team member D expressed, "*When I first started working remotely, I struggled with managing my time and staying focused. I wish we had more resources or training on how to work effectively in a virtual environment.*"

The positive impact of team-building activities on virtual team performance found in this study is supported by research that shows these activities can help build trust, improve communication, and enhance team cohesion (Gibson & Gibbs, 2006). Regular virtual events that cater to different interests can help team members feel more connected and engaged (Warkentin et al., 1997).

Considering the significance of promoting team-building exercises, this researcher believes that nurturing solid connections and a feeling of unity among colleagues is vital for NRECA. Nevertheless, it appears that NRECA might currently be deficient in adequate team-building exercises, which could restrict its potential for development and achievement.

At the point when NRECA doesn't focus on team-building exercises, workers may feel separated from their associates, particularly if they work in virtual groups or across various divisions. This can prompt correspondence obstructions and an absence of comprehension and compassion among colleagues. Without the chance to bond and work together through team-building exercises, workers may not build up the trust and compatibility essential for successful cooperation.

The shortfall of team-building exercises may likewise affect NRECA's capacity to viably oversee and incorporate its different labor force. As colleagues from various foundations probably won't have the opportunity to find out about one another's societies and points of view, they could pass

up the opportunity to construct a comprehensive and amicable group dynamic. This may bring about mistaken assumptions, miscommunications, or even clashes inside the association.

The need for implementing regular feedback mechanisms was brought up by a participant G who said, *"I appreciate it when my supervisor checks in and asks for feedback. It makes me feel valued and heard. I think having a more structured feedback system would be great for continuous improvement and learning within the team."*

Lastly, the importance of clarifying roles and responsibilities was emphasized. Participant I shared their perspective, stating, *"There was a project where our roles were not clearly defined, the *** project, and it led to confusion and delays. Ensuring everyone knows their responsibilities would greatly improve our virtual team's efficiency and collaboration."*

The emphasis on clarifying roles and responsibilities in this study is supported by the literature, which suggests that role ambiguity can lead to confusion, inefficiencies, and reduced collaboration in virtual teams (Mortensen et al., 2009). Ensuring clear roles and responsibilities can improve virtual team performance and collaboration. This researcher believes that the hierarchical structure of NRECA may need further examination and adjustment to better support the effectiveness of virtual teams. A more flexible and inclusive organizational structure could potentially facilitate improved communication, collaboration, and decision-making among remote team members. For example, adopting a flatter hierarchy or implementing a matrix structure might encourage greater participation and input from all team members, regardless of their position in the organization. This could lead to more diverse perspectives being considered and a more innovative and adaptive approach to problem-solving.

Reflecting upon the significance of delineating roles and responsibilities, this researcher recalls a personal experience that highlights the value of such clarity within a team setting. In the *** project, while everyone was enthusiastic and eager to contribute, we initially struggled to make significant progress due to a lack of clear understanding of each team member's designated responsibilities. As the project progressed, it became increasingly evident that the absence of well-defined roles and responsibilities was negatively impacting our team's efficiency and effectiveness. Team members were unsure of their specific duties, which led to duplicated efforts, miscommunications, and unaddressed tasks.

During the small group discussion (SGD), participants echoed similar sentiments and provided additional context to the points raised in the interviews. SGD acknowledged the positive impact of team-building activities. They discussed the potential for more frequent and diverse virtual events that cater to different interests and preferences, fostering a stronger sense of camaraderie and belonging among team members.

In the SGD, the need for training on remote work best practices were further emphasized. Participants shared their struggles with transitioning to remote work and expressed a desire for more resources, guidance, and support from the organization to help them adapt and thrive in the virtual work environment.

Table 9 interventions Identified by Participants

Identified Interventions	# Participants
Better hierarchical structure	10
Better leadership role	4
training and resources for team leaders	16
enhancing technological infrastructure	5
encouraging team-building activities	20
Regular feedback mechanisms	3

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study sought to delve into the factors that lead to the success of virtual teams within NRECA International, while pinpointing areas for growth and improvement. Adopting a qualitative research approach, Data collected via interviews and small group discussions with team members and project managers from NRECA International.

The research uncovered that effective communication, robust leadership, and trust are the most critical components for virtual team success in NRECA International projects. Additionally, the study underscores the significance of cultural awareness, technical competence, time management, and adaptability as key factors in ensuring fruitful collaboration within virtual teams.

Virtual teams at NRECA International encounter challenges such as communication hurdles, time zone disparities, and cultural differences. Tackling these obstacles could be achieved through utilizing specific technologies and tools like video conferencing, project management software, and collaborative platforms, which hold the potential to boost the efficacy and efficiency of virtual teams.

The study also brought to light several other challenges faced by NRECA International's virtual teams, including the absence of non-verbal cues, time zone differences, building trust, technological issues, managing workload, collaboration and decision-making difficulties, and maintaining team bonding and social interactions. The After COVID-19 pandemic, these challenges have only intensified, with additional concerns like unstable internet connections, power disruptions, and work-life balance issues coming to the forefront.

To address these challenges, NRECA International should prioritize seamless communication and collaboration among team members. Furthermore, the organization should concentrate on training and supporting team leaders so they can better foster trust, manage workload, and facilitate social interactions within their teams. Lastly, NRECA International should emphasize the significance of self-care and mental health support for its employees, recognizing the unique stressors faced by those working in a virtual team environment.

By implementing these measures, NRECA International can optimize the performance of its virtual teams, leading to greater success in its projects. This research contributes to the understanding of the challenges faced by virtual teams and offers valuable insights for organizations seeking to bolster the efficacy of their virtual team management strategies.

The findings revealed that effective communication plays a pivotal role in shaping the performance and outcomes of virtual teams. While the majority emphasized the significance of open and constant communication in overcoming challenges such as time differences and language barriers, the minority perspective highlighted the importance of considering cultural differences and potential conflicts. By incorporating both viewpoints, it becomes evident that fostering trust and effectively navigating cultural nuances through clear communication is essential for the success of virtual teams.

The importance of strong leadership in the success of virtual teams cannot be understated, with project managers being accountable for providing direction, establishing explicit expectations, and overseeing progress. Building trust within the team is crucial for achieving high performance and favorable outcomes, which can be accomplished through accountability, fulfilling commitments, and consistent communication.

The performance of virtual teams at NRECA International is influenced by the organization's culture and structure. To optimize the performance of these teams, the study recommends focusing on fostering cultural awareness, improving technical expertise, and nurturing trust among team members. This approach will enable the organization to concentrate its efforts in areas that directly impact the efficacy of virtual teams.

Small group discussions offered valuable insights into how NRECA International's virtual teams are addressing these challenges. Participants emphasized the importance of adaptability, effective communication, and strong leadership in overcoming these hurdles. They also shared strategies and tools they have implemented, such as using collaborative platforms and conducting brainstorming sessions, to streamline the decision-making process, nurture creativity, and manage stress.

The fourth research question investigated the influence of specific technologies and tools, such as video conferencing, project management software, and collaboration platforms, on the efficiency.

and effectiveness of virtual teams at NRECA International. While the majority of participants recognized the potential of these tools in improving virtual team performance and shared positive experiences using them, it is important to consider the minority perspective as well. Some participants have encountered challenges or limitations with these technologies and have preferred alternative tools or approaches for virtual collaboration. Thus, it is crucial to acknowledge and address the diverse experiences and preferences among team members when evaluating the impact of these technologies and tools on virtual team effectiveness and efficiency.

Participants also highlighted potential challenges and limitations of technology adoption, including technical issues, connectivity problems, and varying levels of technological expertise among team members. These challenges, if not addressed, can disrupt workflow and cause delays in project execution. Thus, it is essential for NRECA International to identify and mitigate potential technology-related issues to fully leverage the benefits of these tools and enhance the overall performance of their virtual teams.

5.2 Recommendations

The findings of this study underscore the importance of addressing certain key aspects to ensure the optimal performance of virtual teams and continued success in NRECA International's global projects. The recommendations put forth here focus on enhancing communication, leadership, cultural awareness, and technology infrastructure.

Firstly, it is of vital importance for NRECA International to make substantial investments in technology that enables efficient communication and collaboration among members of virtual teams. This encompasses the provision of stable internet connections, reliable power supplies, and cutting-edge collaborative tools, which will allow team members to work together seamlessly despite being geographically dispersed.

Secondly, cultivating strong leadership skills is indispensable for effectively steering virtual teams. As such, NRECA International should develop comprehensive training programs that emphasize leadership skill development, foster cultural awareness, and promote practices that build trust among team members. Equipping virtual team leaders with these essential skills will empower them to address the unique challenges of managing remote teams successfully.

Moreover, it is worth considering the implementation of flexible work arrangements and time management strategies to tackle the challenges posed by time zone differences and diverse work styles. Adopting such strategies will help to create a more inclusive and adaptable work environment, ultimately promoting greater collaboration and productivity within virtual teams.

While cultural differences may give rise to potential challenges such as misunderstandings and conflicts, they also present valuable opportunities for growth and innovation by bringing fresh perspectives and ideas to the table. Consequently, NRECA International should strive to encourage open communication and mutual respect among team members, thereby enabling them to effectively navigate cultural differences and capitalize on the advantages of diverse perspectives.

To further explore the impact of these factors on virtual team performance, future research could employ quantitative methods like surveys or questionnaires. Such an approach will yield additional insights into the key determinants of performance and outcomes for virtual teams in NRECA International projects, informing strategies for continuous improvement.

In conclusion, this study has shed light on the crucial role played by effective communication, robust leadership, trust, cultural adaptability, and the appropriate use of technology and tools in enhancing the performance and outcomes of virtual teams in NRECA International projects. By concentrating on these key factors and addressing potential obstacles, NRECA International can continue to fortify its virtual teams and achieve even greater success in its global pursuits.

The insights gleaned from this study not only contribute to the expanding body of literature on virtual teams but also offer valuable guidance for NRECA International and other organizations operating in similar contexts. By understanding and addressing the challenges and opportunities presented by virtual teams, organizations can effectively harness the potential of these teams to achieve their objectives and maintain a competitive edge in an increasingly globalized and interconnected world.

5.3 Limitations and Suggestions for Further Study

5.3.1 Limitations

Due to limited time and resources, this study involved only a small group of team members from NRECA International. This may not accurately represent all remote teams in similar organizations or industries.

While the qualitative research approach provided valuable insights into the experiences of NRECA International's remote teams, it didn't offer measurable data to evaluate the effectiveness of specific strategies or tools.

The study relied on the participants' data from participants, which might be subject to bias. Participants may have focused more on positive experiences and downplayed negative aspects of their remote team experiences.

This study used a one-time observation research design, which captures a single moment of the remote team experience. Consequently, it doesn't consider any changes or developments in team dynamics, technology, or organizational practices over time.

5.3.2 Implications for Further Study

Future research could include a larger and more diverse group of remote teams from various organizations and industries to improve the relevance of the findings.

Also, A long-term research design could be used to monitor the progress and development of remote teams over time, providing valuable insights into the effectiveness of specific strategies and tools in enhancing team performance.

In addition, Future studies could add quantitative data to measure the impact of specific strategies or tools on remote team performance, allowing for a more objective evaluation of their effectiveness.

Further research could also compare remote teams with traditional, co-located teams to determine the unique challenges and advantages of remote team settings.

A study focusing on the factors influencing the adoption of specific technologies and tools by remote teams could provide valuable insights into the barriers and facilitators of technology use in these settings.

Further research could explore the role of cultural factors in remote team performance, examining how different cultural backgrounds and communication styles affect collaboration and decision-making.

By addressing these limitations and expanding on the findings of this study, future research can continue to enhance our understanding of remote team dynamics and contribute to the development of best practices for managing and supporting remote teams in various organizational contexts.

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Appendix:

Disclaimer, this interview is for academic purposes only your participation in this survey is voluntary and your personal information will not be disclosed or used for any other purpose than academic research. Thank you for your participation.

Interview questions

1. Can you briefly describe your role and responsibilities within at NRECA International?
2. How long have you been working in virtual teams?
3. Do you prefer working in a traditional, or in a virtual team? Why?
4. What tools and technologies do you use for communication and collaboration within your virtual team?
5. Can you share any specific challenges that you have faced while working in a virtual team environment at NRECA International? How were these challenges addressed?
6. Do you think that a better IT understanding is necessary in order to work effectively in a virtual team? Do you regard this for example at the selection of project members?
7. How do you build trust and rapport with your virtual team members?
8. How does NRECA International support and facilitate virtual team collaboration? Are there any policies or practices that you find particularly effective or ineffective?
9. How do you handle conflicts or disagreements within your virtual team? Can you share any examples or experiences?
10. In your opinion, what are some of the benefits and disadvantages of working remotely in a virtual team?
11. In your opinion, what are the key opportunities for improvement in virtual team collaboration practices at NRECA International?
12. What is your opinion regarding data security in virtual environment?
13. Are there any specific training or development programs provided by NRECA International to enhance virtual team collaboration skills? If yes, can you share your experience and the impact of these programs on your team's performance?
14. How does NRECA International measure the success of its virtual teams? Are there any metrics or indicators used to evaluate team performance?

15. To what extent do you think communication, leadership, trust, and cultural differences affect the performance and outcomes of your virtual team in NRECA International projects?
16. How have specific technologies and tools, such as videoconferencing, project management software, and collaborative platforms, impacted the effectiveness and efficiency of your virtual team at NRECA International? Can you provide examples?
17. How do you perceive the organizational culture and structure of NRECA International in relation to virtual team performance and results? What changes or interventions do you think are needed to optimize these factors?
18. How does NRECA International encourage open communication and address cultural differences within virtual teams to ensure successful collaboration?
19. In your experience, how does leadership style and approach impact the performance and outcomes of virtual teams at NRECA International?
20. Have you experienced any specific interventions or changes within NRECA International that have positively impacted virtual team performance and results? Can you provide examples?

Small group discussion question

What do you think makes virtual teams successful? What experiences have you had that support your answer?

How do you stay in touch with your virtual team members? What communication tools have you found most useful?

How do you build trust with your virtual team members? Have you ever had any challenges in this area, and if so, how did you overcome them?

What qualities do you think make a good virtual team leader? Have you ever had a leader who was particularly effective in the virtual environment?

How do you navigate cultural differences in your virtual team? Have you ever learned anything new about another culture through your virtual team interactions?

What technology tools do you use to collaborate with your virtual team members? Have you discovered any new tools that have been particularly useful?

What tips do you have for staying productive and focused while working in a virtual team? Have you discovered any hacks or tricks that have helped you stay on task?

What do you enjoy most about working in a virtual team? Is there anything you find particularly challenging?

Color coding for the analysis of the interviews

Theme	Color
Communication	Blue
Channels of communication	Blue
Frequency of communication	Blue
Barriers to effective communication	Blue
Strategies for improving communication	Blue
Leadership	Green
Leadership styles	Green
Role of leaders in virtual teams	Green
Challenges faced by leaders in virtual teams	Green
Strategies for effective leadership in virtual teams	Green
Trust	Yellow
Building trust in virtual teams	Yellow
Factors affecting trust in virtual teams	Yellow
The impact of trust on team performance	Yellow
Strategies for maintaining trust in virtual teams	Yellow
Cultural Differences	Red
Cultural diversity in virtual teams	Red
Challenges arising from cultural differences	Red
Benefits of cultural diversity in virtual teams	Red
Strategies for managing cultural differences in virtual teams	Red
Technology	Purple
Technologies used in virtual team collaboration	Purple
The role of technology in facilitating communication and collaboration	Purple
Challenges in using technology in virtual teams	Purple
Strategies for selecting and implementing appropriate technologies for virtual teams	Purple