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# Effect of emotional intelligence, collaboration technology, team climate, and intrinsic motivation on virtual team effectiveness: A study of team member perceptions

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Effect of Emotional Intelligence, Collaboration Technology, Team Climate, and Intrinsic

Motivation on Virtual Team Effectiveness: A Study of Team Member Perceptions

by

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Abstract

The pervasiveness of technology has caused a paradigm shift from collocated teams working in the office 9–5 to virtual teams working anywhere, anytime. As such, there is a growing body of literature related to virtual teams; however, there is limited research specific to the relationship between virtual team effectiveness and emotional intelligence, collaboration technology, team climate, and intrinsic motivation. This study used a descriptive, correlational research design. The sample consisted of 119 virtual team members from information technology consulting organizations. The data were collected using a survey instrument containing demographic questions followed by five intact scales with proven reliability and validity to measure emotional intelligence, collaboration technology, team climate, intrinsic motivation, and virtual team effectiveness. Four research questions and 18 hypotheses were tested using either correlation or multiple moderated regression. The results found a statistically significant relationship between virtual team effectiveness and emotional intelligence, self-awareness, empathy, relationship management, collaboration technology, team climate, vision, participation safety, task orientation, innovation, intrinsic motivation, and integrated regulation. Furthermore, the relationship between team climate and virtual team effectiveness was found to be stronger in males than females. These research results will provide organizations with a better understanding of the relationships between these dimensions, which in turn can help organizations better understand and manage their virtual teams. Finally, recommendations for future research are presented.

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# Chapter 1: Introduction

## Background

Virtual teams "are comprised of geographically-dispersed employees who use technology to accomplish organizational tasks" (Pitts, Wright, & Harkabus, 2012, p. 21). They can cross time, distance, and organizational boundaries and can be divided into seven basic types of virtual teams: networked, parallel, project/product development, work/functional/production, service, management, and action (Duarte & Snyder, 2006). These classifications vary based on their goals, deliverables, duration, and so on.

Virtual teams differ from traditional teams in that they lack verbal and nonverbal cues, and they typically have decreased social interaction, communication, and emotional expression. Compared to face-to-face teams, virtual teams communicate less and develop relationships more slowly. Virtual team effectiveness relies on effective communication; therefore, it is important to identify the means that drive effective communication (Pitts et al., 2012).

In a virtual team, communication is critical for success; however, body language and other visual cues are missing from most electronic communication, which creates unique challenges (Lin, Standing & Liu, 2008). In addition, virtual team effectiveness is also driven by the value and swiftness of the communications (Jones, Oyung & Pace, 2005).

According to Jones et al. (2005),

The single most critical component that makes teamwork possible is effective communication. Again, if you are working in an independent group of people, you don't need to communicate with each other to be successful. But if you are working in an interdependent team, communication is critical—you need to know what the other person is going to do, when they will do it, and how you will work together. (p. xviii)

Virtual teams evolved from the needs of businesses looking for ways to get their work done faster, cheaper, and better while remaining competitive. Improvements in communications technology combined with a rapidly changing business context have provided organizations the ability, opportunity, and demand for virtual teams (Brandt, England, & Ward, 2011). Organizations can have individuals from around the globe working together as a team "for core processes including knowledge management, R&D and product development, software development, customer service, and strategic analysis" (Caya, Mortensen, & Pinsonneault, 2013, p. 1).

Jones et al. (2005) stated:

As early as 900 B.C., the first postal service for government use was developed in China. Later, smoke signals, drumbeats, carrier pigeons, and semaphore flag signaling were used as communication tools. These were the tools that enabled long-distance teamwork and, to some extent, the first virtual teams. (p. xviii)

Broadly, virtual teams can be defined as "individuals collaborating in geographically dispersed work groups" (Klitmoller & Lauring, 2013, p. 398). Furthermore, virtual teams can have different structures. They can be geographically dispersed, distributed, or remote, with team members spread across physical locations as well as across departments, organizations, and companies. The virtual team members collaborate to produce specific goods or services (Jones et al., 2005).

Virtual team members have minimal or no face-to-face interaction; therefore, they have unique benefits and challenges compared to traditional teams. The benefits expected with a virtual team include a competitive advantage, improved responsiveness, increased resource allocation, and enhanced performance (Caya et al., 2013). Organizations can gain a competitive

advantage because the lack of geographic restrictions gives virtual teams greater flexibility and responsiveness than traditional teams (Jang, 2009). Virtual teams offer many potential payoffs to organizations including reduced travel costs, flexibility to form teams quickly without concern for location, and a diverse team with innovative ideas from a variety of cultures (Steinfield, 2002).

Virtual teams can also provide economic benefits to an organization. For example, they save time and money by bringing together the best talent without having to pay for offices or travel expenses. Also, for global teams or teams across time zones, they can speed up completion time by having 24-hour relay coverage if the team members hand off work to their teammates in other parts of the country/world when they are off work or asleep, which saves the organization money (Jimenez, Boehe, Taras & Caprar, 2017).

Additionally, organizations can benefit from the diversity brought about by geographically dispersed virtual teams. Diverse teams will have "a greater diversity of perspectives which, in turn, allows for tapping a wider range of information sources, feeding off more networks, and thus aiding creativity and problem solving" (Jimenez et al., 2017, p. 342). Diversity in virtual teams can also generate task/constructive conflict because it often brings out minority ideas, which actually motivates discussion, alternatives, solutions, creativity, innovation and performance within the team (Jimenez et al., 2017).

Virtual team members also personally benefit from virtual teams when given challenging tasks that demand new skills, which in turn improves motivation and job satisfaction. In a virtual team environment, team members benefit from having greater independence and a task-based work environment (Jimenez et al., 2017).

Some of the challenges with virtual teams relate to managing coordination, collaboration, and communication activities while having team members with various cultures, languages, and time zones. Effective management is needed to establish trust, manage cultural differences, manage communication, establish a team with appropriate social skills, and gain goal clarity from all members of the team (Brandt et al., 2011).

Eisenberg (2018) identified the following themes of challenges pertaining to virtual collaborations: trust and relationships, communication and knowledge sharing, perceptions and decision-making, leadership, and diversity. Virtual teams typically have weaker relationships than face-to-face teams because of the limited social interactions. Communication is more challenging in virtual teams because of the lack of nonverbal cues, including smiles, eye rolls, and headshakes. In addition, collaboration technologies may actually hinder the decision-making process if they are not used properly. Virtual team members working remotely can also experience some negative consequences of virtual teams, including feelings of isolation, loneliness, detachment, alienation, and a lessened identification with the organization (Eisenberg, 2018).

**Importance of Study**

This study is important because virtual teams are still relatively new, emerging in the 1990s but quickly "becoming the vehicles by which organizations conduct business today" (Maes & Weldy, 2018). Yet, according to Maes and Weldy (2018), virtual team members often receive no training or instructions on how to establish productive and effective virtual teams. More theory and research are needed to understand the factors that relate to virtual team effectiveness so that organizations can realize the maximum benefits of virtual teams.

There is extensive literature on traditional workplace teams, but far less on virtual teams. The existing literature on virtual teams appears to focus on a few popular themes: communication, leadership, and trust; however, there are several other less popular themes that are important to investigate and analyze if they have a significant relationship. The independent variables selected for this research—emotional intelligence, collaboration technology, team climate, and intrinsic motivation—are important to study because there is currently not a significant amount of literature available showing the relationships with virtual team effectiveness. The answers found in this research will add to existing literature, help guide future virtual team research, and also help organizations develop best practices for virtual teams as they navigate this changing business environment.

**Problem Statement**

This study will examine the effects of emotional intelligence, collaboration technology, team climate, and intrinsic motivation on virtual team effectiveness. The study will further examine the impact of gender on the above relationships.

**Nature and Significance of the Problem**

Increasingly, organizations are combining their people, processes, and technology in a way that will capitalize on the opportunities provided from highly flexible and effective virtual teams (Brandt et al., 2011). Trends indicate that virtual teams continue to grow in popularity in response to globalization and the information revolution (Lepsinger & DeRosa, 2010). According to Schaefer and Erskine (2012), "More than 50% of companies employing more than 5,000 employees use virtual teams, and more than 60% of professional workers belong to virtual teams" (p. 778). More recent statistics show that the numbers continue to rise. A 2016 report noted that 85% of the 1,372 corporate respondents from 80 countries reported that they worked

on virtual teams; however, only 22% received training on creating virtual team effectiveness (Maes & Weldy, 2018). In addition, collocated teams often function like a virtual team and use some of the collaboration technology even though they are not separated by distance (Schaefer & Erskine, 2012).

Virtual teams typically operate within highly competitive environments and need to collaborate effectively in order to maximize their effectiveness (Peters & Manz, 2007). The problem is that while the growth and acceptance of virtual teams continues, organizations are not always managing them properly in order to maximize their investment in the virtual team collaboration (Lepsinger & DeRosa, 2010).

Virtual team projects can fail if organizations do not address the challenges inherent to working together from a distance (Pinjani & Palvia, 2013). Managing communication in a virtual team is challenging "due to lack of channel richness and to the delayed feedback inherent in some communication technologies" (Klitmoller & Lauring, 2013, p. 399). Communicating by means of technology can result in messages being misinterpreted "due to absence of body language and tone of voice and slow or missing feedback" (Klitmoller & Lauring, 2013, p. 398).

It is important to research the impact of communication in virtual teams because the knowledge generated will be used to help organizations maximize their investment in these teams. By understanding how various components of communication impact virtual team effectiveness, organizations can properly plan and manage the people, processes, and technology used in virtual team collaborations.

This research will contribute to the discipline by producing data specific to the relationships between collaboration and virtual team effectiveness. The information gleaned from this research can have significant implications for the management of virtual teams.

Currently, there is not a significant amount of conclusive material published pertaining to the relationships among emotional intelligence, collaboration technology, team climate, intrinsic motivation, and virtual team effectiveness.

**Objective of the Study**

The objective of this study was to examine the effects of team member emotional intelligence, the collaboration technology fit, the team climate, and the team member's intrinsic motivation on team member perceptions of virtual team effectiveness. The study further examined the impact of the gender on the above relationships. Figure 1 displays a graphical view of the variables studied.
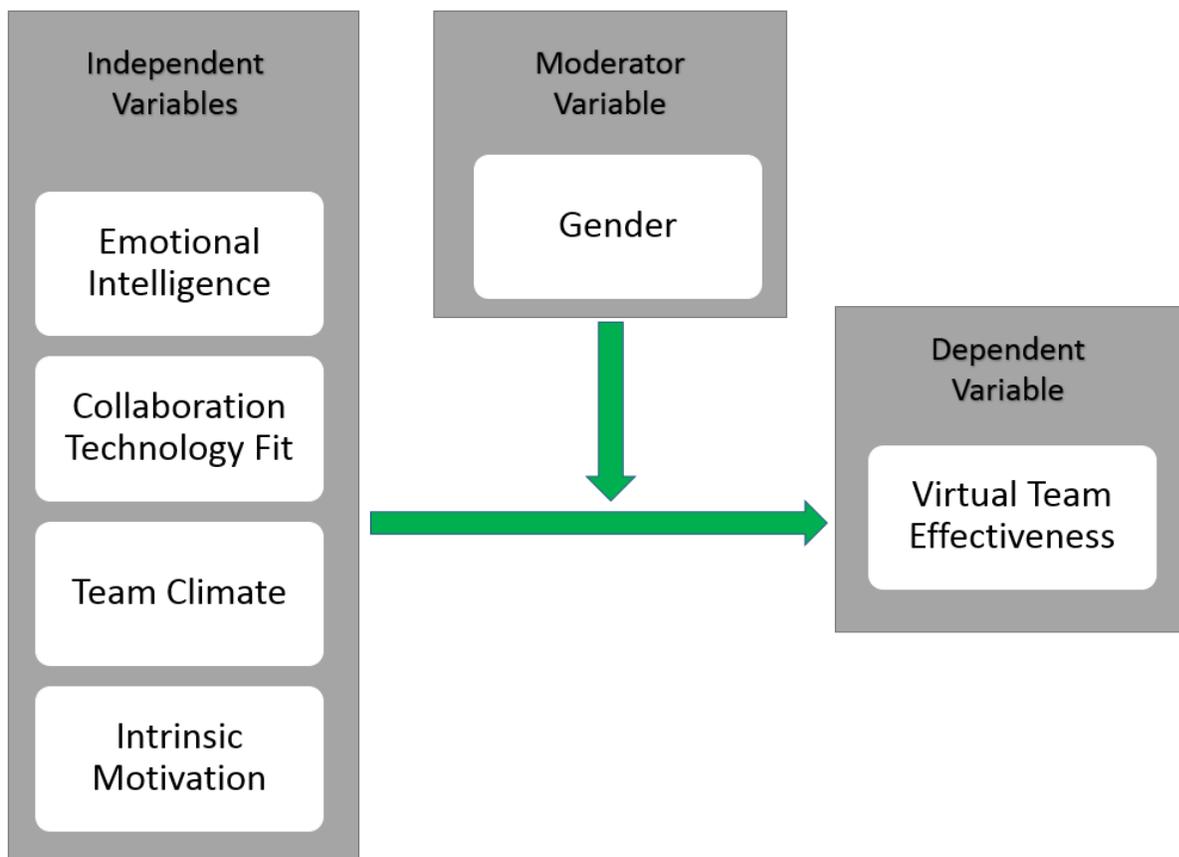


*Figure 1*. Relationship between variables studied.

**Definitions**

*Collaboration technology*: Tools and systems comprised of hardware and software, designed to enable and facilitate group work, communication, and collaboration (Duarte & Snyder, 2006).

*Emotional intelligence*: The capacity to identify, understand, and manage the emotions of oneself and of others (Pitts et al., 2012).

*Intrinsic motivation*: Engaging in behavior because the activity is naturally satisfying and gives internal rewards (Gagne & Deci, 2005).

*Team climate*: An implied framework at the team level that forms the shared behaviors, practices, procedures, and attitudes of the team (Xue, Bradley & Liang, 2011).

*Virtual team*: Individuals who work across time, space, and organizational boundaries using technology to accomplish organizational tasks (Pitts et al., 2012).

*Virtual team effectiveness*: The ability of a virtual team to meet requirements, accomplish goals, and work together in the future (Stubbs & Wolff, 2008).

**Research Questions**

This research project sought to answer four research questions:

RQ1: To what extent does gender of the team member moderate the relationship between team member emotional intelligence and team member perceptions of virtual team effectiveness?

RQ2: To what extent does the gender of the team member moderate the relationship between the collaboration technology fit and team member perceptions of virtual team effectiveness?

RQ3: To what extent does the gender of the team member moderate the relationship between the team climate and team member perceptions of virtual team effectiveness?

RQ4: To what extent does the gender of the team member moderate the relationship between the intrinsic motivation of the team member and team member perceptions of virtual team effectiveness?

These research questions were chosen because it was desirable to understand whether and how gender would moderate the relationship between virtual team effectiveness and each of the independent variables tested: emotional intelligence, collaboration technology, team climate, and intrinsic motivation. A moderator variable is one that varies the direction and/or strength of the relationship between two variables (Stone-Romero, 2007). It was important to learn about how the relationships between the independent and dependent variables studied vary by gender. A review of the literature did not find any existing literature that studied these exact research questions, and it is believed that the information gleaned from the research will be helpful to researchers and businesses alike.

**Hypotheses**

On the basis of the literature reviewed, the following 18 null hypotheses were developed and tested to conclude whether we can reject the null with 95% confidence (alpha < .05). The task-technology fit theory led to the development of hypothesis H1. The construct of the popular task-technology fit theory refers to "the match between a task and a technology" (Howard & Rose, 2019, p. 56). This theory proposes that when the technology matches the task, then performance outcomes are positively impacted (Howard & Rose, 2019).

Hypotheses H2 through H6 were driven by the Goleman-Boyatzis model of emotional intelligence. This model has four categories of emotional intelligence: self-awareness, self-management, social-awareness/empathy, and relationship-management (Livesey, 2017). These hypotheses are not theory-based; however, they were formed based on existing research that has

shown that emotional intelligence has a positive relationship with team effectiveness of traditional, face-to-face teams (Pitts et al., 2012).

Hypotheses H7 through H11 were motivated by a four-factor theory of team climate for work group innovation, developed by Neil Anderson and Michael West. With this theory, the four main dimensions of team climate are vision, participative safety, task orientation, and support for innovations, which are predictive of team innovativeness (Agreli, Peduzzi, & Bailey, 2017).

Hypotheses H12 through H18 were driven by the self-determination theory, which is a theory of work motivation. This theory differentiates between intrinsic and extrinsic motivation and proposes that motivation is related to an individual's psychological needs of autonomy, competence, and relatedness (Gagne & Deci, 2005).

The hypotheses for this study were as follows:

H1: There is no statistically significant relationship between collaboration technology fit and the respondents' perceptions of virtual team effectiveness.

H2: There is no statistically significant relationship between total emotional intelligence of the respondents and the respondents' perceptions of virtual team effectiveness.

H3: There is no statistically significant relationship between the emotional intelligence self-awareness subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H4: There is no statistically significant relationship between the emotional intelligence empathy subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H5: There is no statistically significant relationship between the emotional intelligence relationship subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H6: There is no statistically significant relationship between the emotional intelligence self-management subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H7: There is no statistically significant relationship between the team climate and the respondents' perceptions of virtual team effectiveness.

H8: There is no statistically significant relationship between the team climate vision subdimension and the respondents' perceptions of virtual team effectiveness.

H9: There is no statistically significant relationship between the team climate participation safety subdimension and the respondents' perceptions of virtual team effectiveness.

H10: There is no statistically significant relationship between the team climate task orientation subdimension and the respondents' perceptions of virtual team effectiveness.

H11: There is no statistically significant relationship between the team climate innovation subdimension and the respondents' perceptions of virtual team effectiveness.

H12: There is no statistically significant relationship between the total work motivation of the respondents and the respondents' perceptions of virtual team effectiveness.

H13: There is no statistically significant relationship between the intrinsic motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H14: There is no statistically significant relationship between the integrated motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H15: There is no statistically significant relationship between the identified motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H16: There is no statistically significant relationship between the introjected motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H17: There is no statistically significant relationship between the external regulation motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

H18: There is no statistically significant relationship between the amotivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.

**Assumptions**

This study made the following assumptions:

1. Respondents will answer the survey accurately and honestly.

2. The data collected will be an accurate representation of the entire population.

3. The survey instrument used for this study will be valid.

4. Virtual team effectiveness scores will vary among respondents.

**Limitations and Delimitations**

**Limitations.** Limitations for this study include the following:

1. Many people use slightly different definitions and terms when referring to virtual teams and their effectiveness. This may result in different interpretations and results that vary depending on the individual's own perceptions.

2. The timing of the study is another limitation. Business and technology are constantly evolving; therefore, it is important to understand the context and the timeframe of the study. The data for this study were collected in May/June 2019.

3. Participation in the study was voluntary; therefore, we may not be capturing every team member's perceptions.

**Delimitations.** Delimitations for this study include the following:

1. The results may not be generalizable to all virtual teams since there could be significant differences with virtual teams in other industries. The population was limited to two Midwest consulting companies focusing on information technology projects in the financial software industry.

2. This study did not distinguish roles among the team members (i.e., project manager vs. analyst vs. developer).

## Conclusion

The expansion of virtual teams has created organizational challenges that expose the need for additional theory and research (Dulebohn & Hoch, 2017). The independent variables selected for this research—emotional intelligence, collaboration technology, team climate, and intrinsic motivation—are important to study because there is currently not a significant amount of literature available showing the relationships with virtual team effectiveness, and there is a need to continue to study factors that affect virtual team effectiveness. This research aims to understand the factors that relate to virtual team effectiveness so that organizations can better manage virtual teams.

# Chapter 2: Literature Review

## Purpose of Chapter

The purpose of this chapter is to review the existing literature relating to the following: virtual team effectiveness, emotional intelligence, collaboration technology, team climate, and intrinsic motivation.

## Virtual Team Effectiveness

**Virtual team effectiveness.** Team effectiveness is composed of three dimensions: productivity, viability, and member development. Productivity is the degree to which the team's output quantity, quality, efficiency, swiftness and innovation satisfy customer standards. (Caya et al., 2013). Viability refers to the team's capacity to work together as a unit, both now and in the future (Caya et al., 2013). And finally, member development is the degree to which the team members' learning experiences on the virtual team satisfy their personal and professional goals (Caya et al., 2013).

There are many factors that drive virtual team effectiveness. The literature indicates that many of the factors affecting virtual team effectiveness relate to relationships. Specifically, the "diversity of the team, team cohesiveness, team status, and communication within the team are all seen as important" (Lin, Standing, & Liu, 2008, p. 1031). Furthermore, "net-centricity, team member expertise, extraversion of team members and group interaction styles" also impact team effectiveness (Lin et al., 2008, p. 1031). Leaders of virtual teams need to develop trust and cohesion among the team, in addition, to "clarify team member roles, specify appropriate behaviors, structure work processes, provide feedback, and enunciate direction" (Eissa et al., 2012, p. 16).

The factors that drive traditional/collocated team effectiveness may not be the same factors that affect virtual team effectiveness. Group interactions can positively or negatively affect the team member outcomes. The research by Potter and Balthazard (2002) found that interaction styles impact the ability to deliver quality solutions on collaborative tasks, consistent with how interaction styles impact the performance of face-to-face teams.

Trzcielinski and Wypych-Zoltowska (2008) identify six factors of virtual team's effectiveness related to the people, process, and technology. These factors include the selection, location, and training of the technology, meeting structure, performance management, and meeting training in a virtual environment (Trzcielinski & Wypych-Zoltowska, 2008).

Gilson, Maynard, and Bergiel (2013) conducted an experiential activity to identify ways to teach people how to become effective virtual team members. While studies have shown that virtual teams that have at least one face-to-face meeting perform better than those who do not ever meet, there are strategies to make the team more cohesive without such meetings (Gilson et al., 2013). The initial communication is critical because it lays the foundation for future interactions. They also found that detailed descriptions help to manage expectations and that virtual teams struggle with tasks that are open-ended, requiring creativity with little structure (Gilson et al., 2013).

Caya et al. (2013) developed an integrative framework for understanding the antecedents of virtual team effectiveness. According to this framework, the initial team design is critical because it "provides the initial team context that shapes the future direction of teams and allows, facilitates, constrains, or prevents the subsequent emergence of processes and states" (Caya et al., 2013, p. 6). The team design affects the processes and states, which subsequently influences

team effectiveness.  As shown in Figure 2, each layer of the framework is delineated by the three

key team components: interpersonal, information technology (IT), and task (Caya et al., 2013).
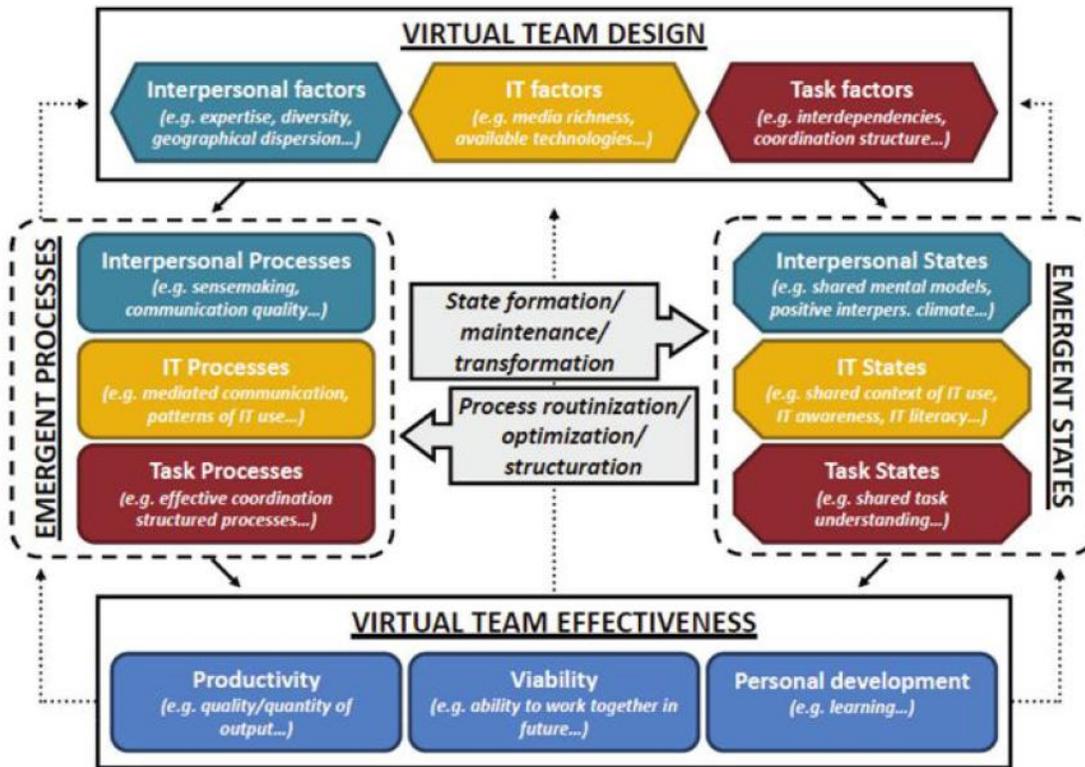


*Figure 2*. Virtual team effectiveness framework. Adapted from "Virtual Teams Demystified: An

Integrative Framework for Understanding Virtual Teams," by O. Caya, M. Mortensen, & A.

Pinsonneault, 2013, *International Journal of e-Collaboration, 9,* p. 6. Copyright 2013 by IGI

Global.

**Emotional Intelligence**

  **Emotional intelligence.** The term *emotional intelligence* was first introduced by John

Mayer and Peter Salovey in 1990 as an extension of personal intelligences. Mayer and Salovey

believe that emotional intelligence is the aptitude to improve intellectual and emotional

development and progression by perceiving, generating, understanding, and regulating emotions

(Petrovici & Dobrescu, 2014). Emotional intelligence is defined as the capacity to identify,

understand, and manage the emotions of oneself and of others (Pitts et al., 2012). Furthermore, emotional intelligence encompasses using emotions and emotional knowhow to improve reasoning and thinking (Mayer, Roberts, & Barsade, 2008).

One of the widely supported integrative models of emotional intelligence is the four-branch model developed by Salovey and Mayer. Within this model, the four components are perceiving and appraising emotions, facilitation of emotions, understanding emotions, and managing emotions (Pitts et al., 2012). It is believed that these skills develop and grow from early childhood into adulthood. In addition, a growth of skills in one area will often result in a growth of skills in another area (Mayer et al., 2008).

Another widely supported integrative model of emotional intelligence is the Bar-On model of Emotional-Social Intelligence (ESI) developed by Reuven Bar-On. This model "stresses the importance of emotional expression and views the outcome of emotionally and socially intelligent behavior in Darwinian terms of effective adaptation" (Bar-On, 2006, p. 15). Bar-On has a slightly different definition of emotional intelligence than that of Salovey and Mayer. He describes it as abilities, competencies, and skills that impact the ability of a person to adapt to their environment. Bar-On identifies five categories of emotional intelligence: intrapersonal, interpersonal, adaptability, stress management, and general mood (Petrovici & Dobrescu, 2014).

Emotional intelligence competencies are important "in cognitive tasks where the individual is under stress and in tasks where individuals are interdependent on one another" (Koman & Wolff, 2008, p. 56). According to the emotional intelligence theory by Richard Boyatzis and Daniel Goleman, emotional intelligence competencies include self-awareness, self-management, social awareness, and relationship management. Examples of emotional

intelligence at the individual level include "understanding spoken and unspoken feelings, interests, concerns, strengths, and weaknesses of team members" (Koman & Wolff, 2008, p. 58). In addition, emotional intelligence includes the ability to have open discussions with other team members, particularly when issues arise (Koman & Wolff, 2008).

Research has shown that emotional intelligence has a positive relationship with team effectiveness of traditional, face-to-face teams (Pitts et al., 2012). One study in 2012 sought to address the role of emotional intelligence in virtual teams. The study was a simulation involving 57 four-person virtual teams completing a variety of tasks that required the team members to exchange information with each other. Their research concluded that there is a significant relationship between emotional intelligence and team viability, as well as between emotional intelligence and quality of team communication (Pitts et al., 2012). There were several limitations noted in this 2012 study, including a short lifespan of the virtual teams (less than 2 weeks); there was only one form of communication used (instant messaging); the sample was limited to undergraduate students; and team effectiveness was based on team members' perceptions as opposed to an objective measure of effectiveness (Pitts et al., 2012).

Koman and Wolff (2008) conducted a study to examine the relationship between emotional intelligence of the team leader, emotional intelligence of the entire team, and team performance. They collected data from 81 teams in a military organization and found that "team leader emotional intelligence is significantly related to the presence of emotionally competent group norms on the teams they lead, and that emotionally competent group norms are related to team performance" (Koman & Wolff, 2008, p. 55). They concluded that organizations can improve team performance by developing emotionally intelligent managers, developing

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emotionally intelligent work groups, and establishing leaders who will promote emotional intelligence throughout the organization (Koman & Wolff, 2008).

Petrovici and Dobrescu (2014) studied the relationship between emotional intelligence and interpersonal communication skills. They evaluated 250 students and concluded that we use emotional intelligence to communicate efficiently in order to create a positive interaction. They found that the women studied were more expressive emotionally than men and also concluded that developing interpersonal skills supports personal development and enhances emotional intelligence (Petrovici & Dobrescu, 2014).

**Collaboration Technology**

**Collaboration technology.** Virtual teams depend on technology for communication, collaboration, and knowledge sharing (Duranti & Almeida, 2012). Technology improvements have enabled the growth and adoption of collaboration technology, which are "tools for information exchange, communication, coordination, shared authoring or collaborative learning" (Hertel, Geister, & Konradt, 2005, p. 78). Examples of collaboration technology include email, text chat, voice/video call, web conferencing, file sharing, wikis, shared calendars, and many other tools for collaborating on a team.

Collaboration technology is used to facilitate interactions, negotiations, coordination, and communication among team members (Janson, Austin, & Hynes, 2014). Collaboration technology "can improve communication, structure problem-solving processes, and maintain an alignment between personal and group goals" (Hertel et al., 2005, p. 79).

Team performance can be improved with the use of collaboration technology; however, the capabilities of the communication media need to align with the task at hand (Duranti & Almeida, 2012). There are numerous communication media available; however, the latest

technology will not fit every team, project, or culture (Schaefer & Erskine, 2012). The communication method selected will affect the flow of the conversation, so it is extremely important to fit the technology with the task. Moreover, it has been shown that synchronous communication channels are more effective then asynchronous communication channels when tasks are multifaceted and demand instant feedback and collaboration exchange (Hambley, O'Neill, & Kline, 2007).

When selecting a collaboration technology tool for collaboration in a virtual team, it is important to consider "group history, group member status and expertise, type and complexity of task, desired objectives, and organizational requirements" (Schaefer & Erskine, 2012, p. 781). The technology selected for collaboration in a virtual team "should have the capabilities to communicate crucial information and be perceived as inclusive and appropriate" (Schaefer & Erskine, 2012, p. 779). In virtual teams, there is a tendency on the part of members to perceive themselves as somewhat anonymous and equal among other group members, which can lead to more idea generation and sharing (Schaefer & Erskine, 2012). On the other hand, collaborating in a virtual environment can also lead to team member frustration caused by reduced communication, miscommunication, misunderstanding, technology failure, and feelings of exclusion (Schaefer & Erskine, 2012).

There are two commonly used theoretical frameworks for comparing the effects of different communication technologies. Media synchronicity theory identifies communication interactions as synchronous or asynchronous. Synchronous communication is real-time, simultaneous communication. Examples include face-to-face, phone, instant messaging chat, teleconferencing, and videoconferencing discussions (Hambley et al., 2007). Conversely,

asynchronous communication is intermittent, and not real-time. Examples include e-mail, threaded discussions, and text messaging (Hambley et al., 2007).

Virtual team members are likely to judge the effectiveness of technology based on the speed and richness. Furthermore, it is common to choose a collaboration technology that has the most bells and whistles without regard to the desired objectives; however, the media synchronicity theory argues that is not always the best approach (Schaefer & Erskine, 2012). This theory suggests the importance of selecting an appropriate technology based on the communication need and the task at hand (Schaefer & Erskine, 2012).

Media richness theory classifies communication according to its level of richness. Rich communication media include verbal and nonverbal cues, natural language, immediate feedback, and the transmission of feelings and emotions. Oral communications are the richest media, including face-to-face, in person presentations, and telephone calls, followed by leaner media such as instant messaging chat, e-mail, and print communications (Hambley et al., 2007). This theory also measures interactivity, which is how fast the feedback is received, and social presence, which is the perceived closeness of the participants (Duranti & Almeida, 2012). This theory argues that "richer mediums should be used with complex problems when multiple interpretations of information might occur, whereas less rich mediums are appropriate for more routine problems" (Schaefer & Erskine, 2012, p. 780).

The premise of the collaboration technology fit is the task-technology fit theory, which asserts that "technologies positively impact performance outcomes when they are utilized and match a task" (Howard & Rose, 2019, p. 1). The foundation of this theory is that teams can have better performance when there is a good fit between the task, the technology, and the team

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(Fuller & Dennis, 2009). It has been shown that teams with good-fitting technology perform better than teams with poor-fitting technology (Fuller & Dennis, 2009).

**Team Climate**

**Team climate.** Team climate is the typical way that members describe their team (Sun, Xu, & Shang, 2014). Climate relates to the perceptions of the supported behaviors, practices, and procedures that are shared among the members of a team. Team climate plays a significant role in situations involving vague or unusual circumstances because it provides guidelines for the team members' actions (Maruping & Magni, 2012). Furthermore, team climate "has long been known as one of the most important sources of social influence that affects individual behavior in the team environment" (Xue, Bradley, & Liang, 2011, p. 300).

A positive team climate in a virtual team is characterized by high team cohesion and high trust in team members, which results in team members working together to reach common goals. Conversely, a negative team climate is exemplified by low team cohesion and low trust between the team members, which results in conflicts, disputes, and overall poor team performance (Brahm & Kunze, 2012). Individual team member tendencies and abilities have been shown to significantly contribute to an innovative team climate (Açıkgöz & Günsel, 2016).

In a team setting, climate can be broken down into three components: affiliation, trust, and innovation. Affiliation, or cohesion, in a team is the sense of closeness among the team members that impacts the members' willingness to help one another. Trust in a team is a measure of the confidence in the team's proficiency, veracity, and munificence. Team innovation is the level of emphasis on learning, creativity, and change (Xue et al., 2011). Social influences in work teams are stronger than those in other social networks that may influence their behavior. Individual team members are more inclined to conform to the team norms because they are more

likely to identify with their work team. Team climate has also been shown to impact individuals' opinions, attitudes, and their use of technology (Xue et al., 2011).

Team climate is unique in virtual teams because of the communication and collaboration challenges in a virtual environment. The reliance on technology-mediated communication can limit communication, which can constrain the development of team climate and overall performance of the team (Cordes, 2017). One study concluded that virtual teams with a team climate characterized as having psychologically safe communication "helped mitigate many of the potential process losses associated with virtual team working" (Cordery & Soo, 2008, p. 495). Furthermore, the study found that establishing and building personal relationships between virtual team members has been shown as a crucial aspect of developing a psychologically safe team climate. Participants of the virtual team study provided the following statements, which further support these conclusions:

> It was important to establish personal relationships within the group early on. I think if we had relied on just a group of people who hadn't really met to work through issues via conference calls and e-mails, it probably wouldn't have worked for us.
> Ideas travel via people . . . if your people in the critical positions have a sound network, know the best people in the organization and in the world and have a personal relationship with them, then you get transfer of ideas. (Cordery & Soo, 2008, p. 495)

Neil Anderson and Michael West developed the Team Climate Inventory, which is a four-factor model of team climate focusing on vision, participative safety, task orientation, and support for innovations. The premise of this model is that the teams are more likely to develop new ideas and systems when the team members have clear, realistic and agreed upon goals, are

enabled to equally participate in decision making, are committed to exceeding quality standards, and have full backing for change and innovation (Strating & Nieboer, 2009).

**Intrinsic Motivation**

      **Intrinsic motivation.** Workforce motivation is important to understand and study in virtual teams because "a motivated workforce represents both a competitive advantage and a critical strategic asset in any work environment" (Tremblay et al., 2009, p. 213). To be motivated means to be energized, inspired, or moved to act or do something. The type, or orientation, of motivation refers to the principal drivers for the motivation (Ryan & Deci, 2000).

      Researchers view work motivation as a crucial component in the development of theories on work effectiveness (Tremblay et al., 2009). The self-determination theory is often referenced as a theory of work motivation. This theory differentiates between amotivation (lack of motivation) and motivation, which is then discerned between intrinsic and extrinsic motivation. Figure 3 displays a graphical view of the self-determination theory expressed as a continuum. Intrinsic motivation involves doing an activity because of its innate satisfaction (Ryan & Deci, 2000). People who are intrinsically motivated do an activity because they find it fun, interesting, and challenging and get fulfillment from doing the activity (Gagne & Deci, 2005). Conversely, extrinsic motivation involves doing an activity because of external forces, consequences, or rewards in order to obtain a particular outcome (Ryan & Deci, 2000). For example, a student who is extrinsically motivated will do homework to get a good grade or the approval of a parent.

      The self-determination theory has been shown to be useful for predicting optimal performance, with intrinsic motivation lending itself to the most positive performance outcomes and amotivation lending itself to the most negative performance outcomes, with the others falling in between those on the spectrum (Tremblay et al., 2009).
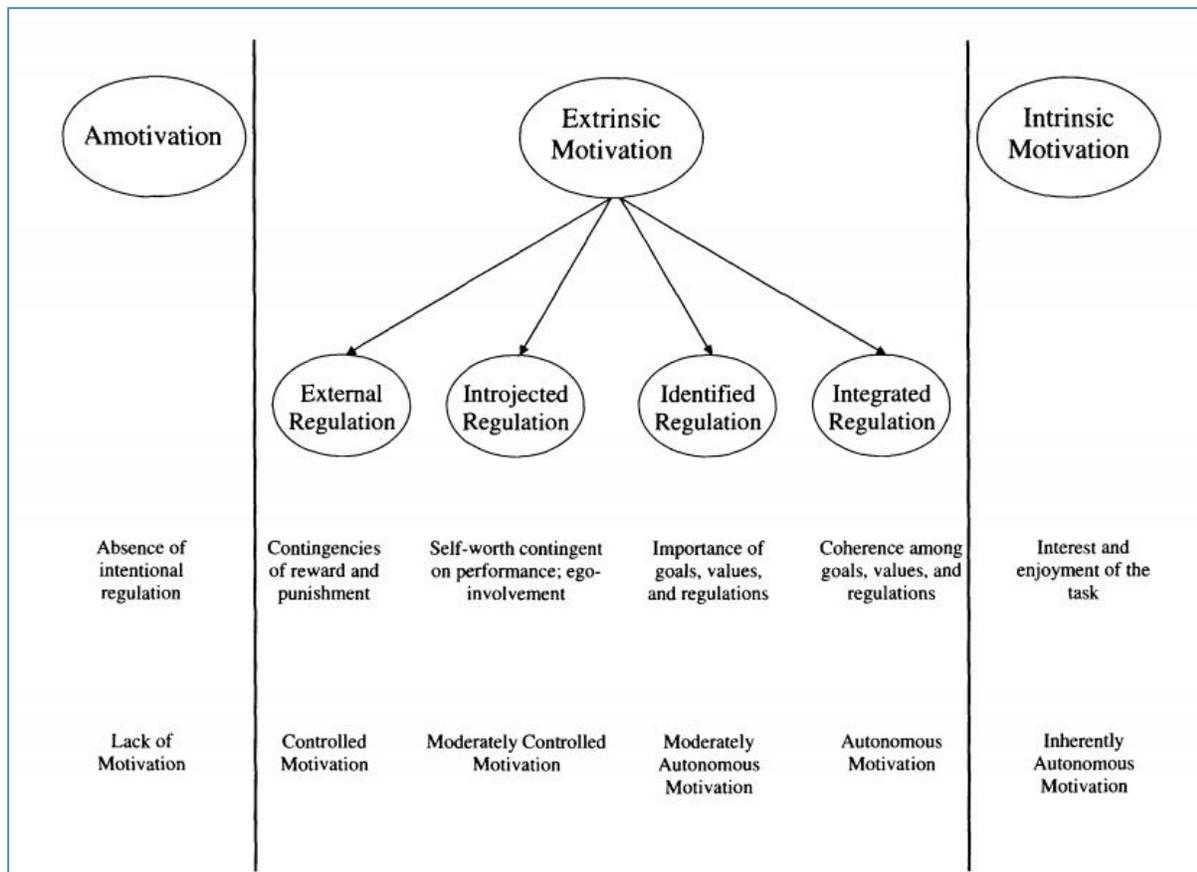
*Figure 3*. Self-determination theory continuum. Adapted from "Self-Determination Theory and Work Motivation," by M. Gagne & E. Deci, 2005, *Journal of Organizational Behavior, 26,* p. 336. Copyright 2005 by John Wiley & Sons, Ltd.

The Work Extrinsic and Intrinsic Motivation Scale (WEIMS) is a six-factor model of work motivation grounded in self-determination theory. The WEIMS has six subscales that parallel the six types of motivation: intrinsic, integrated, identified, introjected, external regulations, and amotivation. This scale gives a single score known as the work self-determination index (W-SDI) to identify individuals as self-determined or non-self-determined, with the Intrinsic Motivation subscale carrying the highest positive weight (Tremblay et al., 2009, p. 216).

Virtual teams are composed of people who are "functionally, cognitively, and culturally different"; therefore, they have different work-related needs and different work motivations (Day

& Burbach, 2015, p. 86). Virtual teams present a unique challenge to organizations because the team members need to be able to work independently but must also be able to collaborate with one another. Organization and team leaders must understand how motivation impacts virtual team effectiveness and what characteristics of the work bring the team members joy and satisfaction. For example, some people will want to participate in designing or decision-making activities to feel engaged, whereas other people will need more encouraging feedback from others to improve self-assurance. Furthermore, some people are motivated by enjoyment, independence, empowerment, or opportunities to improve skills. Organizations are challenged with creating an optimal environment that motivates everyone to operate at their maximum effectiveness (Day & Burbach, 2015).

A study by Day and Burbach (2015) focused on how work motivation influences the relationship between work satisfaction and virtual team effectiveness. Their results showed a positive correlation between work satisfaction and virtual team effectiveness attributes, with the relationship being stronger for virtual team members who had low external motivation. Goal internalization is based on the need to pursue something because of one's beliefs, values, and ideals. In this study, the participants with moderate or high goal internalization "tended to find virtual team work more satisfying than did participants assigned to the low goal internalization pattern" (Day & Burbach, 2015, p. 15). The authors concluded that a "better alignment of rewards with performance goals may be needed in some organizations to improve goal commitment and team effectiveness" (Day & Burbach, 2015, p. 21). Other key findings of this study include the importance of virtual team leadership having intercultural skills and the significance of having a commitment to team goals to promote knowledge sharing and trust among virtual team members (Day & Burbach, 2015).

**Conclusion**

  In conclusion, there are several potential factors that could affect virtual team effectiveness. A review of the existing literature related to virtual team effectiveness, emotional intelligence, collaboration technology, team climate, and intrinsic motivation emphasized the importance of these variables and how they have been shown to be significant in other studies.

# Chapter 3: Methodology

**Purpose of Chapter**

The purpose of this chapter is to provide an overview of the research methodology used to examine the impact of team member emotional intelligence, collaboration technology, team climate, and intrinsic motivation on virtual team effectiveness. This chapter will also elaborate on the population, sample, instruments, and data collection components of the study.

**Research Method**

The study used a descriptive, correlational research design. The data were collected using a survey. A survey was the preferred type of data collection procedure for this study because it was a quick and easy way to capture numeric or quantitative information about the sample to better understand virtual team effectiveness.

The survey was cross-sectional in nature, which involves the collection and analysis of data from one point in time (Creswell, 2014). Qualtrics was used to develop and administer the online survey. This delivery method was selected because of its advantages, including low cost (no postage), convenience (can be completed at a time and location of their choice), and data availability (results are available nearly instantly). The population being studied already use technology and online tools; therefore, there was minimal risk that a participant would not be able to participate due to a lack of access to the survey. Threats to internal validity were minimized by using consistent procedures related to selecting participants, providing clear instructions, and administering the survey consistently to all participants.

**Population and Sample**

The population for this study consisted of virtual team members from two information technology consulting organizations who work on virtual project teams or virtual product

development teams. These are virtual teams that have a well-defined project or final product, exist for an extended period of time, and whose team members are not co-located (Duarte & Snyder, 2006). These two organizations have a combined total of approximately 440 information technology consultants.

The Ohio-based organization is privately owned and has a culture that can be described as people-focused and one "in which people share knowledge openly, take pride in their colleagues' accomplishments, and genuinely want each other to succeed" (Finit Solutions, LLC, 2019). This organization places a strong emphasis on work-life balance and treats everyone with compassion. The Michigan-based organization is partially owned by a private equity firm and describes itself as having a "corporate culture that promotes fanatical customer service and support. We are driven by our mission to deliver 100% customer success and that every customer is a reference" (OneStream Software, LLC, 2019). This organization's culture recognizes the employees as the lifeblood of the company and its commitment to customer satisfaction (OneStream Software, LLC, 2019).

A convenience sampling procedure was used by sending the survey email to every information technology consultant in both organizations with the support of email distribution lists. This procedure was selected to improve the external validity and generalizability of the results and conclusions outside the context of the study. One hundred and nineteen virtual team members completed the online survey used in this study, resulting in an overall response rate of 27%.

An information technology consulting organization was selected because it often has several virtual teams in various service lines working on projects with well-defined team members, outcomes, and dates. This was ideal for capturing the information needed to answer

the research questions previously described, including measuring virtual team members'
perceptions of effectiveness.

**Instruments**

An online survey instrument was used to collect data for this study. It contained six main
sections. The first section contained questions that gathered demographic information including
gender, age, education, and size of the virtual team. The remaining five sections contained scales
to measure emotional intelligence, collaboration technology fit, team climate, intrinsic
motivation, and virtual team effectiveness.

**Virtual team effectiveness scale.** This study used a scale to measure the perceptions of
virtual team effectiveness. It is an intact instrument developed by Pearce and Sims (2002) with
questions related to output, quality, change, organization and planning, interpersonal, and value.
The instrument contains 26 items with five anchors and five scale points, and it uses a 5-point
Likert response scale with the following responses: (1) *never*, (2) *rarely*, (3) *sometimes*, (4) *often*,
and (5) *all of the time*.

**Reliability of the virtual team effectiveness scale.** The Pearce and Sims study resulted
in an internal consistency reliability of .85 for team self-ratings using this team effectiveness
scale (2002). When evaluated for managerial ratings as well as internal customer ratings, both
had a reliability of .98 (Pearce & Sims, 2002).

**Validity of the virtual team effectiveness scale.** This scale has been shown to have
construct validity when compared with the other rating sources (managerial ratings and internal
customer ratings), which confirms that it actually describes what it intends to describe. In the
Pearce and Sims (2002) study, three sources responded to the same questionnaire: managers,
internal customers, and team self-ratings. All three sources were significantly and positively

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correlated with each other, which indicates agreement between rating sources (team-manager, $r =$ 38, $p < .01$; team-internal customer, $r = .52$, $p < .01$; and manager-internal customer, $r = .45$, $p <$ .01; Pearce & Sims, 2002). Furthermore, an exploratory factor analysis was completed and determined that there was only one factor present, which is consistent with another study by Ancona and Caldwell (2002).

**Collaboration technology fit scale.** Collaboration technology fit was measured using an existing task-media fit scale used by Suh (1999) and others (e.g., Wheeler, Valacich, & Alavi, 1995). This instrument consists of eight items, each with a 7-point Likert response scale ranging from *strongly disagree* to *strongly agree*. This scale was designed to measure how the media used for communication affects task performance based on the individual's perceptions.

**Reliability of the collaboration technology fit scale.** The Cronbach's Alpha score of this measure, according to Suh (1999), is .86; therefore, this scale is considered reliable. It is expected that this instrument will give similar reliability results in this study.

**Validity of the collaboration technology fit scale.** This scale has been shown to have construct validity when comparing four types of communication (face-to-face, video, audio, and text). Results from an ANOVA test indicated that these four media types were significantly different for a given task ($p < .01$; Suh, 1999). The ANOVA test that was performed in the Suh study was comparing four groups: subjects communicating via e-mail, subjects communicating via telephone, subjects communicating via video teleconference, and subjects communicating face to face. The face-to-face group scored 4.71, the video group scored 4.36, the audio group scored 3.95, and the text group scored 3.46. They also indicated that all four media groups were significantly different from each other via Duncan's multiple range test (Suh, 1999). This confirms that the scale actually describes what it intends to describe.

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**Emotional intelligence scale.** The survey contained a scale to measure emotional intelligence. It is an intact instrument called the Emotional Intelligence Questionnaire, which was developed by Dr. Al Bellamy in 2006. This instrument consists of 21 items, each with five anchors and five scale points. This instrument uses a 5-point Likert response scale with options ranging from *never like me* to *always like me*. The scale contains four composite scales: self-awareness, empathy, relationship management, and self-management.

**Reliability of the emotional intelligence scale.** In a study by Bellamy, Gore, and Sturgis (2005), the results indicated an overall internal consistency reliability of .82 for the posttest. The subdimensions of this scale had alpha reliabilities ranging from .62 (self-management) to .79 (relationship-management).

**Validity of the emotional intelligence scale.** In the aforementioned study by Bellamy et al. (2005), the emotional intelligence tool was found to show construct validity. There were correlations between each of the emotional intelligence subdimensions. Furthermore, the study found a correlation between locus of control internalism and each of the emotional intelligence subdimensions, with the greatest correlation being with the self-awareness subdimension. This is important because it conceptually aligns with the idea that "a person who believes that they are in control of their lives (internalism) is also likely to be one who understands their life (self-awareness)" (Bellamy et al., 2005, p. 68).

**Team climate.** The survey contained a scale to measure the team climate of the virtual team. It is short version of an intact instrument called the team climate inventory (TCI-14), which was developed by Kivimaki and Elovainio. This instrument consists of 14 items, each with five anchors and five scale points. This instrument uses a 5-point Likert response scale with options ranging from *strongly disagree* to *strongly agree*. The TCI-14 contains four composite

scales: vision, participative safety, task orientation, and support for innovation (Strating &

Nieboer, 2009).

**Reliability of the team climate scale.** This scale has been proven to be reliable with an

overall alpha coefficient ranging from .79 to .86 (Loo & Loewen, 2002), alpha coefficients of the

four subscales ranging from .73 to .80, and positive correlations between subscales (Strating &

Nieboer, 2009).

**Validity of the team climate scale.** This scale has been shown to have construct validity.

A confirmatory factor analysis was conducted and the results indicated a good fit, with the

Incremental Fit Index (IFI)—.98 for sample T0 and .99 for sample T1 (Strating & Nieboer,

2009). This confirms that it actually describes what it intends to describe.

**Intrinsic motivation scale.** The survey contained a scale to measure the intrinsic

motivation of the virtual team members. It is an intact instrument called the Work Extrinsic and

Intrinsic Motivation Scale (WEIMS). This instrument consists of 18 items, each with three

anchors and seven scale points. This instrument uses a 7-point Likert response scale with options

ranging from *does not correspond at all* to *corresponds exactly*. The WEIMS contains six

subscales: intrinsic motivation (IM), integrated (INTEG), identified (IDEN), external regulations

(EXT), introjected regulations (INTRO), and amotivation (AMO; Tremblay et al., 2009). A

single score work self-determination index (W-SDI) is calculated based on these subscales, with

a positive score indicating self-determined and, conversely, a negative score indicating not self-

determined. The formula is W-SDI = [+3 x IM] + [+2 x INTEG] + [+1 x IDEN] + [-1 x INTRO]

+ [-2 x EXT] + [-3 x AMO] (Tremblay et al., 2009).

**Reliability of the intrinsic motivation scale.** This scale has been shown to have high levels of reliability based on previous studies. The WEIMS Cronbach's alpha coefficient was .84 (Tremblay et al., 2009).

**Validity of the intrinsic motivation scale.** A confirmatory factor analysis of the Work Extrinsic and Intrinsic Motivation Scale was conducted and resulted in a comparative fit index (CFI) of .958 (Tremblay et al., 2009). This is a satisfactory fit of construct validity.

## Data Collection

Approval for this research was required from the Eastern Michigan University Human Subjects Review Committee, which was received in May 2019 (see Appendix A for the approval letter). Furthermore, the researcher completed CITI training in October 2014 and a refresher course in December 2017 (see Appendix B for the CITI certificate).

Virtual team members of two information technology consulting companies were sent an email asking for their participation in the online survey, which was estimated to take 20 minutes (see Appendix C for the solicitation email). Participation in the study was voluntary and not required by the researcher or employer. Those individuals who did participate were required to accept the informed consent form (see Appendix D), which disclosed the purpose, procedures, data collected, benefits, risks, and confidentiality of the study. This form also provided assurance that their individual responses were confidential. Upon accepting the informed consent, the participants had access to the full questionnaire (see Appendix E).

## Data Analysis

**Descriptive statistics.** A descriptive analysis for all independent and dependent variables in the study has been conducted and is reported in Chapter 4. This includes identifying means, standard deviations, and ranges for the variables (Creswell, 2014).

**Reliability statistics.** Existing scales were used for each of the independent and dependent variables, using reverse coding where necessary. All scales used in this study were tested for reliability by conducting a Cronbach's Alpha test to check for the internal consistency of the scale (.7 or above). Results are reported in Chapter 4.

**Inferential statistics.** The research questions and hypotheses were evaluated using Pearson's correlation and regression tests. The independent and dependent variables are ordinal; therefore, correlation was used to measure the strength and direction of the relationships. The moderator variable, gender, was also analyzed using moderated regression to determine whether it affects the direction or strength of those relationships.

**Hypothesis testing.** The 18 hypotheses in this study were stated/tested as a null. In order to ensure a minimum of 95% confidence, the null was rejected if the p value for a given hypothesis test fell below .05.

The results were interpreted and conclusions were drawn specific to how the results answered the research questions and whether or not the null hypotheses would be rejected. Significance levels, confidence intervals, and effect sizes were factored into conclusions. The conclusion also included the implications for practice in virtual teams as well as for future research. Finally, the data analysis results were summarized and presented in tables.

**Pilot Study**

A small pilot study was conducted to assess whether the survey instrument was too long or too burdensome for participants to complete. It was sent to the entire internal operations team of one of the consulting organizations sampled. This internal operations team is considered to be a virtual team because they are co-located across the United States and they work on a variety of internal information technology projects. They reported that it took them 15–20 minutes to

complete the survey, and that seemed reasonable. No changes were made to the survey as a result

of this pilot study.

# Chapter 4: Data Analysis

## Purpose of Chapter

The purpose of this chapter is to provide an overview of the data analysis results from the data collected in this study. This chapter will also summarize the sample population, data-generating process, statistics calculated/used, and answers to the research questions and hypotheses.

## Summary of the Sample Population and Data-Generating Process

The sample population for this study consisted of virtual team members from two information technology consulting organizations who work on virtual teams. The two consulting organizations sampled are headquartered in Ohio and Michigan; however, their consultants reside in locations throughout the United States. All 119 survey responses were gathered via an online survey.

## Descriptive Statistics

Below are tables that summarize the counts and descriptive statistics gathered from the survey responses. Table 1 contains counts and descriptive statistics for age, sex, years of education, years as consultant, and number of core team members. Table 2 contains $N$, minimum, maximum, mean, and standard deviation for age, years of education, years as consultant, and number of core team members, as well as all scales and subscales, including virtual team effectiveness, collaboration technology fit, emotional intelligence, team climate, and intrinsic motivation.

Table 1

*Count Data—Sample and Respondent Characteristics*

|  | # of Responses | Percentage |
|---|---|---|
| *Age of team member* |  |  |
| <=29 | 18 | 15.13% |
| 30-39 | 43 | 36.13% |
| 40-49 | 35 | 29.41% |
| >=50 | 23 | 19.33% |
|  |  |  |
| *Sex of team member* |  |  |
| Male | 81 | 68.07% |
| Female | 36 | 30.25% |
| Prefer not to reply | 2 | 1.68% |
|  |  |  |
| *Years of education of team member* |  |  |
| <13 | 4 | 3.36% |
| 13-16 | 45 | 37.82% |
| 17-20 | 65 | 54.62% |
| 21+ | 5 | 4.20% |
|  |  |  |
| *Years as consultant* |  |  |
| <5 | 23 | 19.33% |
| 5-9 | 32 | 26.89% |
| 10-14 | 27 | 22.69% |
| 15-19 | 18 | 15.13% |
| 20+ | 19 | 15.97% |
|  |  |  |
| *Number of core team members* |  |  |
| <5 | 42 | 35.29% |
| 5-9 | 50 | 42.02% |
| 10-14 | 17 | 14.29% |
| 15+ | 10 | 8.40% |

Table 2

*Descriptive Statistics—Sample and Respondent Characteristics and Scales*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Age of team member | 119 | 21 | 60 | 39.84 | 9.439 |
| Years of education of team member | 119 | 4 | 26 | 17.13 | 2.794 |
| Years as consultant | 119 | 1 | 33 | 10.94 | 7.139 |
| Number of core team members | 119 | 1 | 100 | 8.30 | 13.020 |
| | | | | | |
| *Virtual Team Effectiveness (VTE)* | 102 | | | | |
| VTE_TOT | 102 | 67 | 110 | 93.19 | 11.175 |
| VTE_Output | 104 | 9 | 15 | 13.01 | 1.451 |
| VTE_Quality | 103 | 4 | 15 | 12.42 | 2.144 |
| VTE_Organizing | 104 | 12 | 20 | 16.70 | 2.356 |
| VTE_Interpersonal | 104 | 10 | 20 | 16.38 | 2.637 |
| VTE_Value | 104 | 8 | 15 | 13.22 | 1.838 |
| VTE_Overall | 104 | 9 | 15 | 12.59 | 1.658 |
| | | | | | |
| *Collaboration Technology (CT)* | 99 | | | | |
| CT_TOT | 99 | 23 | 56 | 41.30 | 7.254 |
| | | | | | |
| *Emotional Intelligence (EQ)* | 67 | | | | |
| EQ_TOT | 67 | 55 | 97 | 81.42 | 9.223 |
| EQ_Self-Awareness | 101 | 10 | 25 | 19.14 | 3.184 |
| EQ_Empathy | 77 | 13 | 25 | 19.94 | 2.341 |
| EQ_Relationship | 100 | 14 | 30 | 22.87 | 3.612 |
| EQ_Self-Management | 82 | 13 | 23 | 18.11 | 2.211 |
| | | | | | |
| *Team Climate (TC)* | 97 | | | | |
| TC_TOT | 97 | 15 | 70 | 57.97 | 90.36 |
| TC_Vision | 100 | 5 | 20 | 16.73 | 2.304 |
| TC_ParticipationSafety | 100 | 4 | 20 | 16.84 | 2.824 |
| TC_TaskOrientation | 98 | 3 | 15 | 12.10 | 2.166 |
| TC_Innovation | 101 | | 15 | 12.20 | 2.604 |
| | | | | | |
| *Intrinsic Motivation (IM)* | 96 | | | | |
| IM_TOT | 96 | -12 | 64 | 30.31 | 19.393 |
| IM_IM | 99 | 9 | 21 | 17.35 | 3.058 |

Table 2 *continued*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| IM_INTG | 100 | 6 | 21 | 14.66 | 3.822 |
| IM_IDEN | 98 | 6 | 21 | 15.29 | 3.686 |
| IM_INTRO | 98 | 3 | 21 | 13.52 | 5.128 |
| IM_EXT | 100 | 6 | 21 | 7.03 | 4.925 |
| IM_AMO | 97 | 3 | 21 | 7.03 | 4.925 |

These results show that most of the respondents were in the 30–39 age range, followed by 40–49 and 50–59. The ages range from 21 to 60, with a mean age of 39.84 and standard deviation of 9.439. This tells us that most of the respondents are likely in the middle of their careers, with smaller number of respondents at the beginning or end of their careers.

Of the participants who answered the gender/sex question, 81 are male and 36 are female. This gives a 69% male and 31% female split; therefore, there were more male than female participants. This is consistent with prior research that shows there are fewer women than men in computing fields. Women accounted for 19% of all Computer and Information Sciences (CIS) degrees completed in 2017 in the United States (Dubow & Kaminsky, 2019).

Participants were asked how many years of school have they completed, including grade school. The results ranged from 4 to 26, with a mean of 17.13. The largest range was the 17–20 years with 65 respondents, followed by the 13–16 years with 45 respondents. This tells us that most of the respondents are highly educated, with several years of education beyond grade school, presumably graduate and post-graduate college degrees.

Participants were asked how many years have they worked as a consultant of information technology projects. The results ranged from 1 to 33, with a mean of 10.94. The 5–9 years as a

consultant group had the most respondents with 32, followed closely by the 10–14 years with 27

respondents and the < 5 years with 23 respondents.

**Cronbach's Alpha**

Below are data that summarize the Cronbach's Alpha reliability for each scale used in the

study. Table 3 shows the reliability for all scales and subscales, including virtual team

effectiveness, collaboration technology fit, emotional intelligence, team climate, and intrinsic

motivation.

Table 3

*Cronbach's Alpha Reliability and Factor Analysis Results*

| | Cronbach's Alpha | Standardized Factor Loading |
|---|---|---|
| *Virtual Team Effectiveness (VTE)* | | |
| VTE_TOT | .954 | |
| VTE_Output | .801 | .877*** |
| VTE_Quality | .858 | .842*** |
| VTE_Organizing | .802 | .874*** |
| VTE_Interpersonal | .892 | .783*** |
| VTE_Value | .926 | .794*** |
| VTE_Overall | .883 | .864*** |
| | | |
| *Collaboration Technology (CT)* | | |
| CT_TOT | .764 | |
| The technology with which we collaborated helped us to better understand each other. | | .823*** |
| When we disagreed, the collaboration technology made it more difficult for us to come to an agreement. [item deleted] | | - |
| The technology with which we collaborated slowed down our communications. [item deleted] | | - |
| When we disagreed, our collaboration technology helped us come to a common position. | | .685*** |

Table 3 *continued*

| | Cronbach's Alpha | Standardized Factor Loading |
|---|---|---|
| The technology with which we collaborated helped us share our opinions. | | .865*** |
| I could easily explain things with the collaboration technology used on this project. | | .880*** |
| The collaboration technology used helped us exchange communications quickly. | | .827*** |
| There were ideas I couldn't relate to the other party because of the collaboration technology used. [item deleted] | | - |
| | | |
| *Emotional Intelligence (EQ)* | | |
| EQ_TOT | .813 | |
| EQ_Self-Awareness | .725 | .782*** |
| EQ_Empathy | .609 | .657*** |
| EQ_Relationship | .831 | .890*** |
| EQ_Self-Management | .633 | .626*** |
| | | |
| *Team Climate (TC)* | | |
| TC_TOT | .947 | |
| TC_Vision | .805 | .883*** |
| TC_ParticipationSafety | .896 | .916*** |
| TC_TaskOrientation | .806 | .909*** |
| TC_Innovation | .891 | .892*** |
| | | |
| *Intrinsic Motivation (IM)* | | |
| IM_TOT | .887 | |
| IM_IM | .898 | .524*** |
| IM_INTG | .733 | .824*** |
| IM_IDEN | .742 | .784*** |
| IM_INTRO | .787 | .784*** |
| IM_EXT | .743 | .738*** |
| IM_AMO | .904 | .441*** |
| | | |
| ***Significant at p<.001 (two - sided) | | |

These Cronbach Alpha results show that all composite scales are reliable, with alpha coefficients ranging from .764 to .954. Virtual team effectiveness and team climate both had an alpha > .90, which is excellent reliability; intrinsic motivation and emotional intelligence both had an alpha > .80, which is good reliability; and collaboration technology had an alpha > .70, which is fair reliability (Miller & Lovler, 2016). Furthermore, all subscales were measured for internal reliability and all were > .70 except two subscales of emotional intelligence. Empathy had an alpha score of .609, and self-management resulted in an alpha score of .633.

In addition, a principal component factor analysis was conducted on the virtual team effectiveness, collaboration technology, emotional intelligence, team climate, and intrinsic motivation factors. The standardized factor loadings for each item are included in Table 3. The results indicate that there was only one factor present for each test, and all items loaded significantly ($p < .001$) on their corresponding factor, with factor loadings ranging from .441 to .916.

**Research Questions**

**RQ1. To what extent does gender of the team member moderate the relationship between team member emotional intelligence and team member perceptions of virtual team effectiveness?** The first research question was analyzed using multiple regression with an interaction comparing the emotional intelligence (EQ) to the virtual team effectiveness scale with an interaction of Gender*EQ. Results are shown in Table 4. The moderated regression results have a p-value of .194, which suggests that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on emotional intelligence with gender as the moderator.

Are women more emotionally intelligent than men, or are men more emotionally intelligent than women? Stereotypes abound that women are more emotional than men (Fernández-Berrocal, Cabello, Castillo, & Extremera, 2012). It is often said or assumed that women are more emotionally intelligent than men, but is that statistically proven? In fact, there have been several studies to address this relationship between gender and emotional intelligence. Not surprisingly, numerous empirical studies have concluded that women are superior in emotional intelligence, show more and better emotional abilities, have greater emotional understanding, are more sensitive to the others' emotions, and use emotions more aptly than men (Fernández-Berrocal et al., 2012). It has been statistically significantly shown that women score higher than men on total emotional intelligence and the four branches of emotional intelligence: perceiving emotions, facilitating thought, understanding emotions, and managing emotions (Cabello, Sorrel, Fernández-Pinto, Extremera, & Fernández-Berrocal, 2016). Even though the literature has indicated that women are more emotionally intelligent than men, the results of this study did not find a statistically significant moderating relationship when virtual team effectiveness was regressed on emotional intelligence.

**RQ2. To what extent does the gender of the team member moderate the relationship between the collaboration technology fit and team member perceptions of virtual team effectiveness?** The second research question was analyzed using multiple regression with an interaction comparing the collaboration technology fit (CT) to the virtual team effectiveness scale with an interaction of Gender*CT. Results are shown in Table 4. The moderated regression results have a p-value of .727, which suggests that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on collaboration technology fit with gender as the moderator.

The literature suggests that there are gender differences with the perception and adoption of communication technology (Park, Kim, Cho, & Han, 2019). There are reports of gender differences in the use of technology in the workplace; men tend to be more task-oriented than women, resulting in men and women having different views of technology (Tam & Oliveira, 2016). Another study found that the effect of perceived usefulness of technology on intention to use technology is greater for men (Park et al., 2019).

The effect of task technology fit on the perceived usefulness of the technology has been shown to be greater for males, which means that men are more likely to find the technology useful when there is a fit between task and technology. In addition, "Men are more likely to believe the technology can improve their performance when they find a fit between task and technology, and this belief would lead to their adoption of the technology" (Park et al., 2019, p. 294). Interestingly, another study found that women rely on using social cues more than men do when forming their attitude toward technology (Maruping & Magni, 2012). This is relevant for virtual teams because they lack social cues that are more common in tradition teams. Even though the literature has indicated some relationships between gender and technology use, the results of this study did not find a statistically significant moderating relationship when virtual team effectiveness was regressed on collaboration technology fit.

**RQ3. To what extent does the gender of the team member moderate the relationship between the team climate and team member perceptions of virtual team effectiveness?** The third research question was analyzed using multiple regression with an interaction comparing the team climate (TC) to the virtual team effectiveness scale with an interaction of Gender*TC. Results are shown in Table 4. The moderated regression results have a p-value of .000, which suggests that there is a statistically significant moderating relationship when virtual team

effectiveness was regressed on team climate with gender as the moderator. The beta coefficient of -.774 suggests that the relationship between team climate and virtual team effectiveness is stronger in male respondents than female respondents. Note that the gender data are coded so that 0 = male and 1 = female.

Figures 4 and 5 illustrate the two models (with and without interaction). You can see that when including the interaction effect, the slope of the males is greater than the slope of the females, which confirms that there is a stronger relationship in males vs. females based on this analysis.

The literature suggests that team climate affects men and women differently. One study found a significantly negative effect between team climate and intention to explore for women only, with no significant effect for men (Maruping & Magni, 2012). Additionally, it found team climate and gender to be important "drivers of technology feature exploration" (p. 80). The results of this study support these previous findings in the literature.
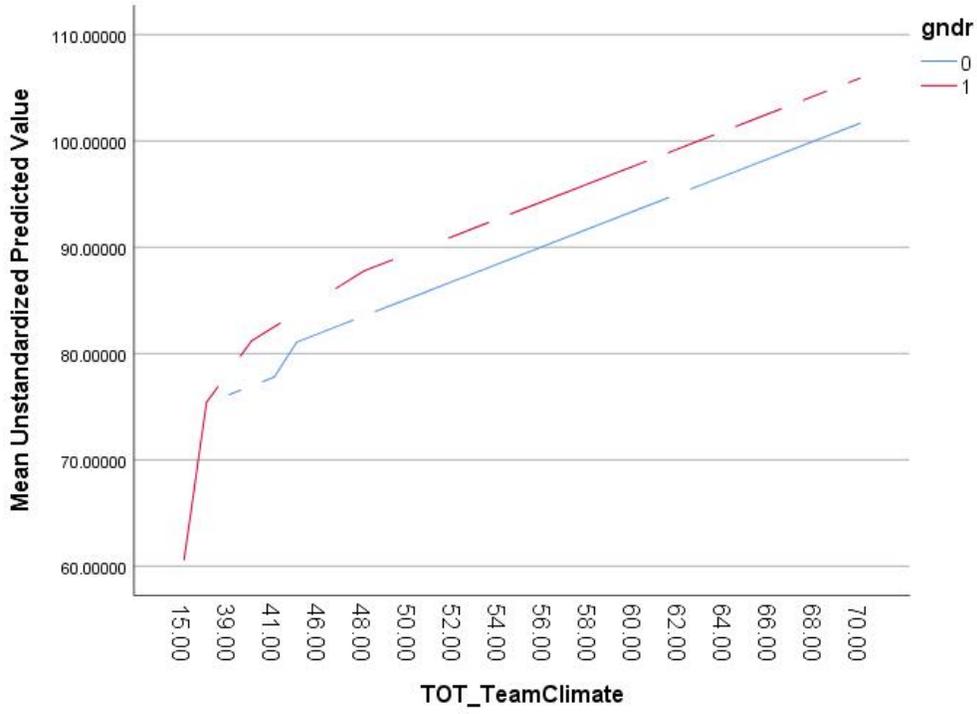
*Figure 4.* Predicted values from TC model without interaction effects.
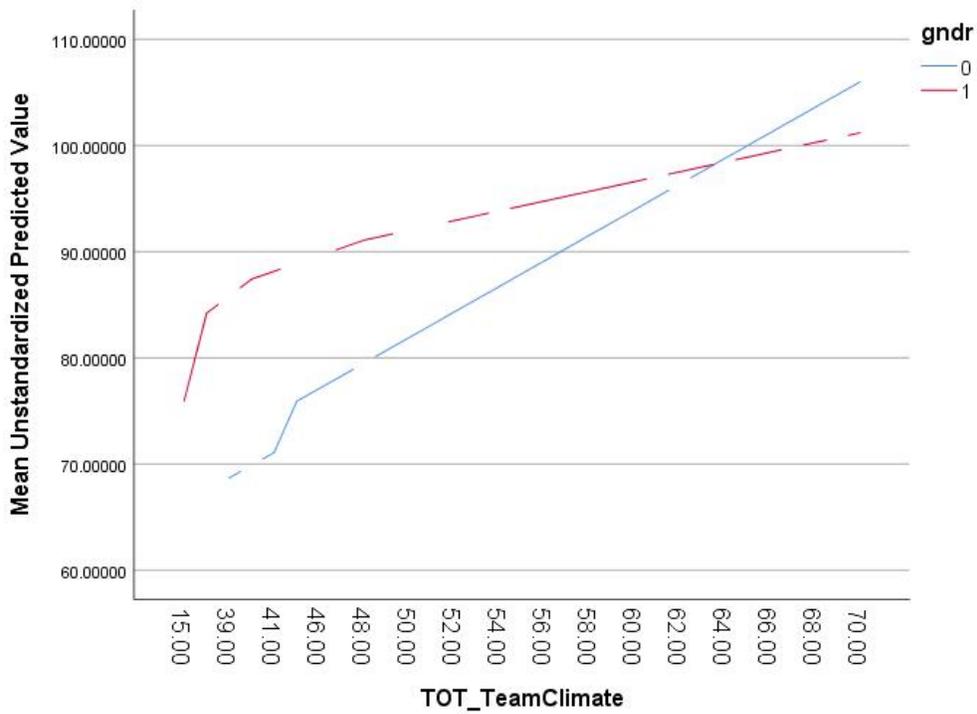
*Figure 5.* Predicted values from TC model including interaction effects (gender).

**RQ4. To what extent does the gender of the team member moderate the relationship between the intrinsic motivation of the team member and team member perceptions of virtual team effectiveness?** The fourth research question was analyzed using multiple regression with an interaction comparing the intrinsic motivation (IM) to the virtual team effectiveness scale with an interaction of Gender*IM. Results are shown in Table 4. The moderated regression results indicate that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on intrinsic motivation with gender as the moderator.

The literature does indicate some gender differences in intrinsic motivation studies. One study found that male employees had a stronger effect on intrinsic motivation than female employees (Chen, Ma, Jin, & Fosh, 2013). Another study found that male workers have a stronger relationship between illegitimate task reactions and perceived intrinsic motivation than female workers have (Omansky & Eatough, 2016). Even though the literature has indicated some relationships between gender and intrinsic motivation, the results of this study did not find a statistically significant moderating relationship when virtual team effectiveness was regressed on intrinsic motivation.

Table 4

*Moderated Regression Analysis Gender as the Moderating Variables*

| Model | Independent | Interaction | Dependent: Virtual Team Effectiveness | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Coefficients | | | Model Summary | | | |
| | | | Beta | t-value | Sig. | $R^2$ | $R^2$ Change | F Change | Sig. (P-value) |
| *Emotional Intelligence (EQ) * Gender* | | | | | | | | | |
| 1 | TOT_EQ | - | .349 | 2.418 | .019 | | | | |
| | Gender | - | 1.628 | 1.573 | .121 | | | | |
| | TOT_EQ * Gender | EQ * Gender | -1.383 | -1.311 | .194 | .182 | .023 | 7.725 | .194 |
| *Collaboration Technology (CT) * Gender* | | | | | | | | | |
| 2 | TOT_CT | - | .371 | 2.261 | .027 | | | | |
| | Gender | - | .294 | .473 | .638 | | | | |
| | TOT_CT * Gender | CT * Gender | -.220 | -.351 | .727 | .116 | .002 | .123 | .727 |
| *Team Climate (TC) * Gender* | | | | | | | | | |
| 3 | TOT_TC | - | .963 | 9.220 | .000 | | | | |
| | Gender | - | 1.919 | 4.412 | .000 | | | | |
| | TOT_TC * Gender | TC * Gender | -1.774 | -4.075 | .000 | .534 | .088 | 16.606 | .000 |
| *Intrinsic Motivation (IM) * Gender* | | | | | | | | | |
| 4 | TOT_IM | | .178 | 1.375 | .173 | | | | |
| | Gender | | .134 | .685 | .495 | | | | |
| | TOT_IM * Gender | IM * Gender | .025 | .118 | .907 | .061 | .000 | .014 | .907 |

Table 4 *continued*

| Model | Independent | Interaction | Dependent: Virtual Team Effectiveness | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Coefficients | | | Model Summary | | | |
| | | | Beta | t-value | Sig. | $R^2$ | $R^2$ Change | F Change | Sig. (P-value) |
| *Emotional Intelligence (EQ) * Age* | | | | | | | | | |
| 5 | TOT_EQ | - | .097 | .310 | .757 | | | | |
| | Age | - | -.659 | -.930 | .410 | | | | |
| | TOT_EQ * Age | EQ * Age | .469 | .591 | .556 | .133 | .005 | .350 | .556 |
| *Collaboration Technology (CT) * Age* | | | | | | | | | |
| 6 | TOT_CT | - | .143 | .351 | .727 | | | | |
| | Age | - | -.489 | -.985 | .347 | | | | |
| | TOT_CT * Age | CT * Age | .397 | .589 | .557 | .171 | .003 | .347 | .557 |
| *Team Climate (TC) * Age* | | | | | | | | | |
| 7 | TOT_TC | - | .347 | .925 | .358 | | | | |
| | Age | - | -.515 | -.929 | .356 | | | | |
| | TOT_TC * Age | TC * Age | .487 | .772 | .442 | .421 | .004 | .596 | .442 |
| *Intrinsic Motivation (IM) * Age* | | | | | | | | | |
| 8 | TOT_IM | | -.306 | -.742 | .460 | | | | |
| | Age | | -.467 | -2.375 | .020 | | | | |
| | TOT_IM * Age | IM * Age | .615 | 1.320 | .190 | .334 | .017 | 1.743 | .190 |

Table 4 *continued*

| Model | Independent | Interaction | Dependent: Virtual Team Effectiveness | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Coefficients | | | Model Summary | | | |
| | | | Beta | t-value | Sig. | $R^2$ | $R^2$ Change | F Change | Sig. (P-value) |
| *Emotional Intelligence (EQ) * YrsConsultant* | | | | | | | | | |
| 9 | TOT_EQ | - | .268 | 1.149 | .255 | | | | |
| | YrsConsultant | - | -.475 | -.352 | .726 | | | | |
| | TOT_EQ * YrsConsultant | EQ * YrsConsultant | .433 | .313 | .755 | .110 | .001 | .098 | .755 |
| *Collaboration Technology (CT) * YrsConsultant* | | | | | | | | | |
| 10 | TOT_CT | - | .407 | 2.176 | .032 | | | | |
| | YrsConsultant | - | .013 | .022 | .983 | | | | |
| | TOT_CT * YrsConsultant | CT * YrsConsultant | -.124 | -.198 | .844 | .143 | .000 | .039 | .844 |
| *Team Climate (TC) * YrsConsultant* | | | | | | | | | |
| 11 | TOT_TC | - | .621 | 4.054 | .000 | | | | |
| | YrsConsultant | - | -.137 | -.244 | .808 | | | | |
| | TOT_TC * YrsConsultant | TC * YrsConsultant | .073 | .128 | .898 | .414 | .000 | .016 | .898 |
| *Intrinsic Motivation (IM) * YrsConsultant* | | | | | | | | | |
| 12 | TOT_IM | | .162 | .846 | .400 | | | | |
| | YrsConsultant | | -.143 | -.678 | .499 | | | | |
| | TOT_IM * YrsConsultant | IM * YrsConsultant | .046 | .165 | .869 | .043 | .000 | .027 | .869 |

**Hypotheses**

On the basis of the literature reviewed, the following 18 null hypotheses were developed and tested:

**H1: There is no statistically significant relationship between collaboration technology fit and the respondents' perceptions of virtual team effectiveness.** The first hypothesis was analyzed using Pearson correlation comparing the collaboration technology fit scale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that collaboration technology fit and virtual team effectiveness are significantly and positively correlated with a positive correlation coefficient of .364 ($p < .01$); thus, when the collaboration technology fit increases, so does the virtual team effectiveness. Consequently, we can reject the null hypothesis. This is in line with expectations, attributable to the strong reliance on technology in virtual teams. It is so important to use technology tools that fit the tasks. For example, you can cut the lawn with a pair of scissors, but should you? No, there are other tools that would provide a better fit for a task such as cutting the lawn. This same analogy can be applied to collaboration technology, and these correlation results highlight the importance of the fit as it relates to virtual team effectiveness.

These results are consistent with the task-technology fit theory whereby team performance, including effectiveness and efficiency, is influenced by the fit of the task and the technology (Fuller & Dennis, 2009). These findings are also in alignment with previous studies that have concluded "that virtual collaboration outcomes depend on whether an appropriate collaboration tool is used to facilitate task accomplishment" (Zhang, Sun, Yang, & Wang, 2018, p. 1097).

**H2: There is no statistically significant relationship between total emotional intelligence of the respondents and the respondents' perceptions of virtual team effectiveness.** The second hypothesis was analyzed using Pearson correlation comparing the emotional intelligence scale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that emotional intelligence and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .347 ($p < .01$); hence, as the virtual team member's emotional intelligence increases, so does their perception of the virtual team's effectiveness. Consequently, we can reject the null hypothesis. The individual subscales of emotional intelligence are analyzed for correlation in later hypotheses; however, this current matrix analysis tells us that there is a positive relationship among the total emotional intelligence and the perception of virtual team effectiveness. This makes sense because as previously noted in the literature review, many of the factors that drive virtual team effectiveness relate to relationships. And those with a high emotional intelligence treat emotions of themselves and others as valuable data, which they use as a tool in the workplace to sustain and enhance relationships, circumnavigate various situations, and improve performance (Farh, Seo, & Teslu, 2012). These results are consistent with other findings in the literature that conclude emotional intelligence is a critical success factor for virtual team effectiveness (Pitts et al., 2012).

**H3: There is no statistically significant relationship between the emotional intelligence self-awareness subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The third hypothesis was analyzed using Pearson correlation comparing the self-awareness subscale of emotional intelligence to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that self-awareness showed a significant positive correlation with virtual team effectiveness with a positive correlation coefficient of .311 ($p < .01$), similar to the results found of the total emotional intelligence in H2. Therefore, we can reject the null hypothesis. Of the four subdimensions of emotional intelligence, self-awareness had the highest correlation coefficient. Self-awareness, which is being able to recognize, comprehend, and evaluate one's own feelings, has been shown to be the most important subdimension of emotional intelligence (Goleman, 1998). These results are consistent with other studies that concluded that increasing self-awareness among employees resulted in more effective virtual team members because it equipped them to handle virtual environment challenges (Pitts et al., 2012).

**H4: There is no statistically significant relationship between the emotional intelligence empathy subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The fourth hypothesis was analyzed using Pearson correlation comparing the empathy subscale of emotional intelligence to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that empathy showed a significant positive correlation with virtual team effectiveness with a positive correlation coefficient of .269 ($p < .05$), similar to the results found of the total emotional intelligence in H2. Thus, we can reject the null hypothesis. These results are also consistent with the literature, which suggests that virtual team members who exhibit a high degree of empathy are highly effective (Kayworth & Leidner, 2002). Empathy is focused on the emotions of others and being able to recognize and understand how someone else is feeling without them telling you (Mangubat, 2017). This is more challenging in a virtual environment situation because you can't see the non-verbal cues to really study the person.

**H5: There is no statistically significant relationship between the emotional intelligence relationship subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The fifth hypothesis was analyzed using Pearson correlation comparing the relationship management subscale of emotional intelligence to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that relationship management showed a significant positive correlation with virtual team effectiveness with a positive correlation coefficient of .275 ($p <$ .01), similar to the results found of the total emotional intelligence in H2. Consequently, we can reject the null hypothesis. These results are also in line with what we'd expect. Similar to empathy, relationship management is focused on the emotions of others through building great relationships. Examples include being a good communicator, being a good listener, avoiding offensive words, giving praise, and so on (Mangubat, 2017).

**H6: There is no statistically significant relationship between the emotional intelligence self-management subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The sixth hypothesis was analyzed using Pearson correlation comparing the relationship management subscale of emotional intelligence to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that self-management does not have a significant correlation with virtual team effectiveness, contrary to the results found of the total emotional intelligence in H2; thus, we cannot reject the null. A statistically significant relationship between self-management and total emotional intelligence cannot be inferred because the p-value of .153 for the self-management variable indicates that this model does not meet the .05 criterion for rejecting the null with 95% confidence.

As noted earlier in the literature review, self-management is the ability to manage your impulsive emotions, feelings, and behaviors. Perhaps this does not have a statistical correlation with virtual team effectiveness because your interactions with teammates are, by nature, less impulsive with a virtual team, since you can't just stop by someone's cubicle and strike up a conversation. Interactions with a virtual team are generally more planned and scheduled; therefore, there is less probability of needing to manage impulsive emotions, feelings, and behaviors.

**H7: There is no statistically significant relationship between the team climate and the respondents' perceptions of virtual team effectiveness.** The seventh hypothesis was analyzed using Pearson correlation comparing the total team climate scale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that team climate and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .640 ($p < .01$); hence, as the team climate increases, so does their perception of the virtual team's effectiveness. Consequently, we can reject the null hypothesis. As expected, based on findings in the literature, team climate is an important factor in the effectiveness of virtual teams. This is consistent with other studies that found that a positive team climate results in good team performance (Brahm & Kunze, 2012). Furthermore, virtual teams have unique challenges that are mitigated with a strong team climate, which can help explain the correlation with virtual team effectiveness. These challenges include building a collective team knowledgebase, collective sense of engagement, and collective team competence to drive performance effectiveness (Cordery & Soo, 2008).

**H8: There is no statistically significant relationship between the team climate vision subdimension and the respondents' perceptions of virtual team effectiveness.** The eighth

hypothesis was analyzed using Pearson correlation comparing the team climate vision subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that vision and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .559 ($p < .01$), similar to the results found of the total team climate in the previous H7 data analysis. Consequently, we can reject the null hypothesis. These findings are consistent with the literature, which asserts that a shared vision is at the core of the team's strategy and internal stability and is therefore critical in virtual team collaboration (Lin, Wang, Tsai, & Hsu, 2010). A shared vision is "a photograph of the team's future among team members, setting the priorities for their team planning and implying its critical determinant role in lessening malign competition" (Lin, Wang, Tsai, & Hsu, 2010, p. 1600). Last, virtual organizations risk conflict if they do not establish a shared vision (Lin et al., 2010).

**H9: There is no statistically significant relationship between the team climate participation safety subdimension and the respondents' perceptions of virtual team effectiveness.** The ninth hypothesis was analyzed using Pearson correlation comparing the team climate participation safety subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that participation safety and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .541 ($p < .01$), similar to the results found of the total team climate in the previous H7 data analysis. Therefore, we can reject the null hypothesis. This is also consistent with findings in the literature. Participation safety refers to feeling able to participate in the team, be innovative, and seize opportunities without fear of risk or failure (Dibble, Henderson, & Burns, 2019). One study found that

participatory safety was the strongest predictor of perceived effectiveness when compared with the four dimensions of team climate (Strating & Nieboer, 2009).

Virtual teams generally have a significant amount of uncertainty and risk because they not only have the demands of the project, but they also have added demands of trying to learn about their teammates without meeting in person. Research has indicated the importance of participation safety in enabling collaborative work as well as mitigating the challenges that virtual teams face with innovation (Dibble, Henderson, & Burns, 2019).

**H10: There is no statistically significant relationship between the team climate task orientation subdimension and the respondents' perceptions of virtual team effectiveness.** The 10th hypothesis was analyzed using Pearson correlation comparing the team climate task orientation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that task orientation and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .610 ($p < .01$), similar to the results found of the total team climate in the previous H7 data analysis. These findings do align with the expectations of this study that all facets of team climate are important to virtual team effectiveness. The task-orientation dimension of team climate is the notion that the team members are "committed to achieve the highest possible standards of task performance" (Strating & Nieboer, 2009, p. 126). Teams with a strong task orientation are "associated with evaluating and modifying performance, reflecting upon work methods and team performance, intra-team advice, feedback and cooperation, mutual monitoring, appraisal of performance and ideas, and a concern to maximize quality of task performance" (Ma & Corter, 2019, p. 3). These

traits are important in all teams; therefore, it is not surprising that there was a correlation with virtual team effectiveness.

**H11: There is no statistically significant relationship between the team climate innovation subdimension and the respondents' perceptions of virtual team effectiveness.** The 11th hypothesis was analyzed using Pearson correlation comparing the team climate innovation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that innovation and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .563 ($p < .01$), similar to the results found of the total team climate in the previous H7 data analysis. Thus, we can reject the null hypothesis. As noted, the literature supports this finding with other studies showing a significant positive correlation between innovation and the performance of teams (Ceschi, Dorofeeva, & Sartori, 2014). In addition, support for innovation has been shown to positively influence group learning and performance of decision-making (Ceschi, Dorofeeva, & Sartori, 2014). Unlike the current study, these previous studies were not specific to virtual teams.

**H12: There is no statistically significant relationship between the total work motivation of the respondents and the respondents' perceptions of virtual team effectiveness.** The 12th hypothesis was analyzed using Pearson correlation comparing the total motivation scale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that total work motivation and virtual team effectiveness are not significantly correlated; thus, we cannot reject the null hypothesis. A statistically significant relationship between total motivation and total virtual team effectiveness cannot be inferred because the p-value of .067 for the total motivation variable indicates that this model does not

meet the .05 criterion for rejecting the null with 95% confidence. The total work motivation scale was calculated using the Work Extrinsic and Intrinsic Motivation Scale (WEIMS), which is a six-factor model of work motivation grounded in self-determination theory (Tremblay et al., 2009). The formula used for calculating the total work motivation score was: (+3 X IM) + (+2 X INTG) + (+1 X IDEN) + (-1 X INTRO) + (-2 X EXT) + (-3 X AMO). Note that each subscale has different weights and signs, with the intrinsic subscales being positive and extrinsic subscales being negative (Tremblay et al., 2009). While there was not a significant relationship found between the total work motivation score and virtual team effectiveness, the individual subscales were also tested in the following hypotheses for possible correlations. Theory and research have found that the individual motivation types have varied effects on work performance; while intrinsic motivation is often linked to many positive work outcomes, the correlation with work performance is seen to be dependent on whether the person is interested in the work they are doing. Other studies have found a strong relationship between extrinsic motivation and performance (Zhang, Zhang, Song, & Gong, 2016).

**H13: There is no statistically significant relationship between the intrinsic motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 13th hypothesis was analyzed using Pearson correlation comparing the intrinsic motivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that intrinsic motivation and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .313 ($p < .01$); therefore, we can reject the null hypothesis. Intrinsic motivation (IM) is considered to be self-determined motivation types. As previously mentioned in the literature review, intrinsic

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motivation is when someone does an activity for the inherent satisfaction in it (Tremblay et al., 2009). The correlation results denote that as intrinsic motivation increases, so does the virtual team effectiveness. These results confirm other findings in the literature that suggest that intrinsic motivation is a strong predictor of outcomes in work performance (Ryan & Deci, 2000).

**H14: There is no statistically significant relationship between the integrated motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 14th hypothesis was analyzed using Pearson correlation comparing the integrated motivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that integrated motivation and virtual team effectiveness are significantly positively correlated with a positive correlation coefficient of .295 ($p < .01$); consequently, we can reject the null hypothesis. Integrated regulation (INTG) is also considered to be a self-determined motivation type. As previously mentioned in the literature review, integrated regulation is when someone integrates with an activity so much that it is as if it becomes a part of them (Tremblay et al., 2009). The correlation results denote that as integrated regulation increases, so does the virtual team effectiveness.

**H15: There is no statistically significant relationship between the identified motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 15th hypothesis was analyzed using Pearson correlation comparing the identified motivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that identified motivation and virtual team effectiveness are not significantly correlated; thus, we cannot reject the null. A statistically significant relationship

between identified motivation and virtual team effectiveness cannot be inferred because the p-value of .062 for the identified motivation variable indicates that this model does not meet the .05 criterion for rejecting the null with 95% confidence. Identified motivation (IDEN) is also considered to be a self-determined motivation type. The results of this study are similar to another study that found that "an increase in identified regulation was associated with improvements in work performance" (Zhang, Zhang, Song, & Gong, 2016, p. 2406). As previously mentioned in the literature review, identified motivation refers to "doing an activity because one identifies with its value or meaning, and accepts it as one's own" (Tremblay et al., 2009, p. 214).

**H16: There is no statistically significant relationship between the introjected motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 16th hypothesis was analyzed using Pearson correlation comparing the introjected motivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that introjected motivation and virtual team effectiveness are not significantly correlated; thus, we cannot reject the null. A statistically significant relationship between introjected motivation and total virtual team effectiveness cannot be inferred because the p-value of .576 for the introjected motivation variable indicates that this model does not meet the .05 criterion for rejecting the null with 95% confidence. Introjected regulation is not a self-determined motivation type and is defined as being motivated by self-worth, self-esteem, and guilt. The results of one study found that introjected regulations "were associated with emotional exhaustion, and physical and mental health problems" (Tremblay et al., 2009, p. 215).

**H17: There is no statistically significant relationship between the external regulation motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 17th hypothesis was analyzed using Pearson correlation comparing the external regulation motivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that external regulation motivation and virtual team effectiveness are not significantly correlated; thus, we cannot reject the null. A statistically significant relationship between external regulation and total virtual team effectiveness cannot be inferred because the p-value of .276 for the external regulation motivation variable indicates that this model does not meet the .05 criterion for rejecting the null with 95% confidence. External regulation is doing an activity to get something in return (e.g., reward; Tremblay et al., 2009). As mentioned in the literature review, a study by Day and Burbach (2015) focused on how work motivation influences the relationship between work satisfaction and virtual team effectiveness. Their results showed a positive correlation between work satisfaction and virtual team effectiveness attributes, with the relationship being stronger for virtual team members who had low external motivation. This study was different in that it was measuring work motivation as a moderator; however, the results of that study led the researcher to test this null hypothesis, and no significant relationship was found.

**H18: There is no statistically significant relationship between the amotivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The 18th hypothesis was analyzed using Pearson correlation comparing the amotivation subscale to the virtual team effectiveness scale. Correlation results are shown in Table 5.

This matrix indicates that amotivation and virtual team effectiveness are not significantly correlated; thus, we cannot reject the null. A statistically significant relationship between amotivation and total virtual team effectiveness cannot be inferred because the p-value of .464 for the amotivation variable indicates that this model does not meet the .05 criterion for rejecting the null with 95% confidence. These results differ from similar amotivation studies that found a negative correlation between amotivation and job satisfaction, and amotivation and organizational commitment (Tremblay et al., 2009).

Table 5

*Pearson Correlation Results Matrix*

| Collaboration Technology (CT) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CT_TOT | VTE_TOT | | | | | | |
| CT_TOT | 1 | | | | | | | |
| VTE_TOT | .364** | 1 | | | | | | |
| | | | | | | | | |
| Emotional Intelligence (EQ) | | | | | | | | |
| | EQ_TOT | EQ_SA | EQ_EMP | EQ_REL | EQ_SM | VTE_TOT | | |
| EQ_TOT | 1 | | | | | | | |
| EQ_SA | .799** | 1 | | | | | | |
| EQ_EMP | .720** | .416** | 1 | | | | | |
| EQ_REL | .847** | .643** | .476** | 1 | | | | |
| EQ_SM | .509** | .160 | .251* | .213* | 1 | | | |
| VTE_TOT | .347** | .311** | .269** | .275** | .145 | 1 | | |
| | | | | | | | | |
| Team Climate (TC) | | | | | | | | |
| | TC_TOT | TC_VIS | TC_PS | TC_TO | TC_INN | TOT_VTE | | |
| TC_TOT | 1 | | | | | | | |
| TC_VIS | .880** | 1 | | | | | | |
| TC_PS | .926** | .759** | 1 | | | | | |
| TC_TO | .902** | .726** | .788** | 1 | | | | |
| TC_INN | .897** | .702** | .748** | .764** | 1 | | | |
| TOT_VTE | .640** | .559** | .541** | .610** | .563** | 1 | | |
| | | | | | | | | |
| Intrinsic Motivation (IM) | | | | | | | | |
| | IM_TOT | IM_IM | IM_INTG | IM_IDEN | IM_INTR | IM_EXT | IM_AMO | TOT_VTE |
| IM_TOT | 1 | | | | | | | |
| IM_IM | .450** | 1 | | | | | | |
| IM_INTG | .160 | .350** | 1 | | | | | |
| IM_IDEN | .073 | .333** | .674** | 1 | | | | |
| IM_INTR | -.149 | .439** | .527** | .536** | 1 | | | |
| IM_EXT | -.272** | .171 | .515** | .607** | .454** | 1 | | |
| IM_AMO | -.751** | .051 | .280** | .253* | .321** | .263** | 1 | |
| TOT_VTE | .190 | .313** | .295** | .191 | .058 | .111 | .076 | 1 |
| | | | | | | | | |
| *. Correlation is significant at the .05 level (2-tailed). | | | | | | | | |
| **. Correlation is significant at the .01 level (2-tailed). | | | | | | | | |

Two final multiple regressions were run. The first compared all four of the independent

variables—emotional intelligence, collaboration technology, team climate, and intrinsic

motivation—to the dependent variable, virtual team effectiveness. Multiple regression was used

to determine the overall fit of the model and the relative contribution of each of the predictors

(emotional intelligence, collaboration technology, team climate, and intrinsic motivation) to the

total variance explained.

The multiple regression results are summarized in Table 6. The highly significant ($p <$

.001) F-ratio shows that the independent variables (EQ, CT, TC, IM) statistically significantly

predict the dependent variable (VTE). The adjusted R-square indicates that 38% of the variance

in virtual team effectiveness can be explained by the overall model. Next, the relative

contributions of each independent variable were analyzed for explaining the variance. Team

climate (TC) statistically significantly related to virtual team effectiveness with a beta of .558 ($p$

$< .001$). However, emotional intelligence (EQ), collaboration technology (CT), and intrinsic

motivation (IM) were found to be statistically insignificant for explaining the variance in virtual

team effectiveness.

Last, a hierarchical regression was run to see how much each independent variable

explains the change of variance in virtual team effectiveness. Model 1 begins with the three

control variables (gender, age, and years as consultant). Model 2 adds team climate (TC), Model

3 adds collaboration technology (CT), Model 4 adds emotional intelligence (EQ), and Model 5

adds intrinsic motivation (IM). The results are summarized in Table 6.

- Model 1: VTE = Intercept + Gender + Age + YearsConsult ($R^2$ = .032)

- Model 2: VTE = Intercept + Gender + Age + YearsConsult + TC ($R^2$ = .444, $\Delta R^2$
  = .412)

- Model 3: VTE = Intercept + Gender + Age + YearsConsult + TC + CT ($R^2$ = .446,
  $\Delta R^2$ = .002)

- Model 4: VTE = Intercept + Gender + Age + YearsConsult + TC + CT + EQ ($R^2$ = .455, $\Delta R^2$ = .009)

- Model 5: VTE = Intercept + Gender + Age + YearsConsult + TC + CT + EQ + IM ($R^2$ = .462, $\Delta R^2$ = .008)

These results indicate that Model 2 with team climate $R^2$ of .444 is a statistically significant model and explains 41% of the variance. Adding collaboration technology had a statistically significant model $R^2$ of .446 and explains < 1% of the variance. Adding emotional intelligence had a statistically significant model $R^2$ of .455 and explains < 1% of the variance. And last, adding intrinsic motivation had a statistically significant model $R^2$ of .465 and explains < 1% of the variance.

The following five assumptions of multiple regression were tested using Model 5:

1. Linear relationship was tested and confirmed using a scatterplot. See Figure 6.

2. Multivariate normality was tested and confirmed using a P-P Plot. See Figure 7.

3. No or little multicollinearity was tested and confirmed using VIF collinearity statistics. All VIF scores were below ten. See Table 7.

4. No auto-correlation was tested and confirmed. The model has a Durbin-Watson value of 2.226, which is within the range of 1.5 to 2.5.

5. Homoscedasticity was tested and confirmed using a scatterplot of residuals. There is no cone or fan shape. See Figure 8.

Table 6

*Multiple Regression Analysis*

| Model | Dependent | Independent | Beta | t-value | Sig | $R^2$ | Adj $R^2$ | F-value | Sig |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Model | |
| 1 | Virtual Team Effectiveness | Gender | .090 | .825 | .411 | .032 | - .003 | .924 | .433 |
| | | Age | -.179 | -1.225 | .224 | | | | |
| | | YrsConsult | .079 | .544 | .588 | | | | |
| 2 | Virtual Team Effectiveness | Gender | .218 | 2.563 | .012 | .444 | .417 | 16.575 | .000 |
| | | Age | -.044 | -.394 | .695 | | | | |
| | | YrsConsult | .008 | .073 | .942 | | | | |
| | | TC | .659 | 7.844 | .000 | | | | |
| 3 | Virtual Team Effectiveness | Gender | .216 | 2.535 | .013 | .446 | .412 | 13.197 | .000 |
| | | Age | -.052 | -.456 | .650 | | | | |
| | | YrsConsult | .006 | .051 | .960 | | | | |
| | | TC | .633 | 6.457 | .000 | | | | |
| | | CT | .050 | .519 | .605 | | | | |
| 4 | Virtual Team Effectiveness | Gender | .214 | 2.508 | .014 | .455 | .415 | 11.279 | .000 |
| | | Age | -.022 | -.188 | .851 | | | | |
| | | YrsConsult | -.016 | -.142 | .888 | | | | |
| | | TC | .599 | 5.870 | .000 | | | | |
| | | CT | .046 | .478 | .634 | | | | |
| | | EQ | .106 | 1.175 | .243 | | | | |
| 5 | Virtual Team Effectiveness | Gender | .222 | 2.594 | .011 | .462 | .415 | 9.813 | .000 |
| | | Age | -.039 | -.331 | .741 | | | | |
| | | YrsConsult | -.011 | -.099 | .922 | | | | |
| | | TC | .600 | 5.879 | .000 | | | | |
| | | CT | .024 | .247 | .806 | | | | |
| | | EQ | .089 | .962 | .339 | | | | |
| | | IM | .089 | 1.004 | .319 | | | | |
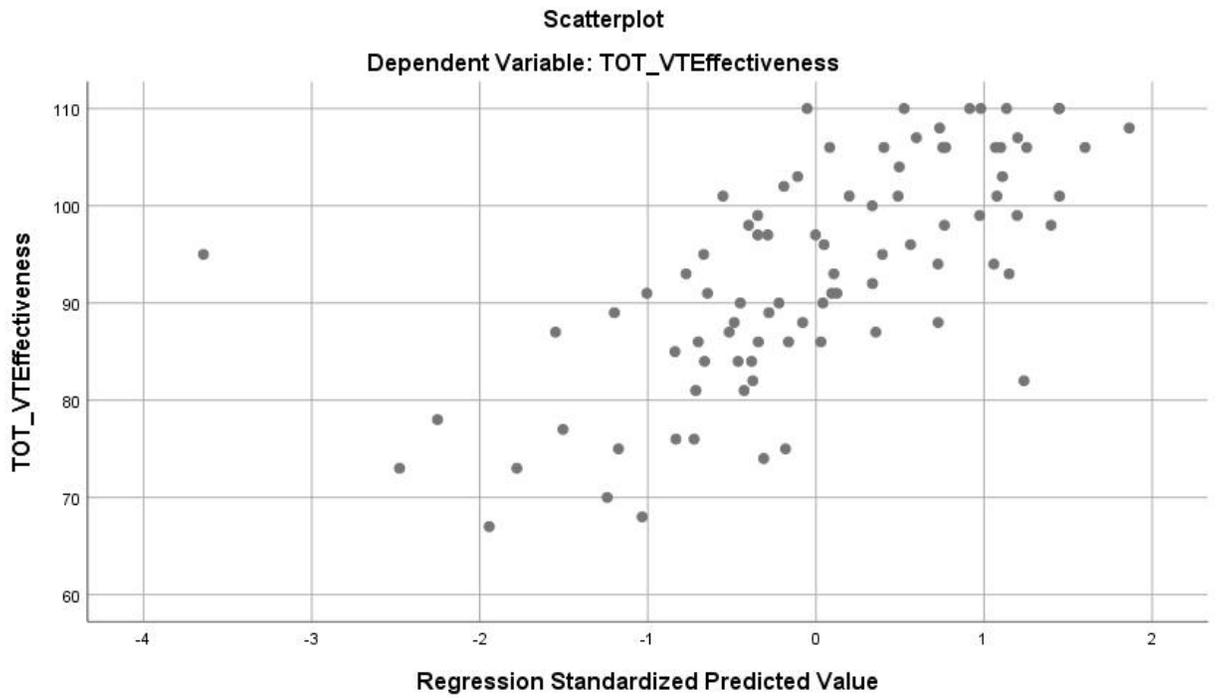
*Figure 6*. Linear relationship scatterplot.
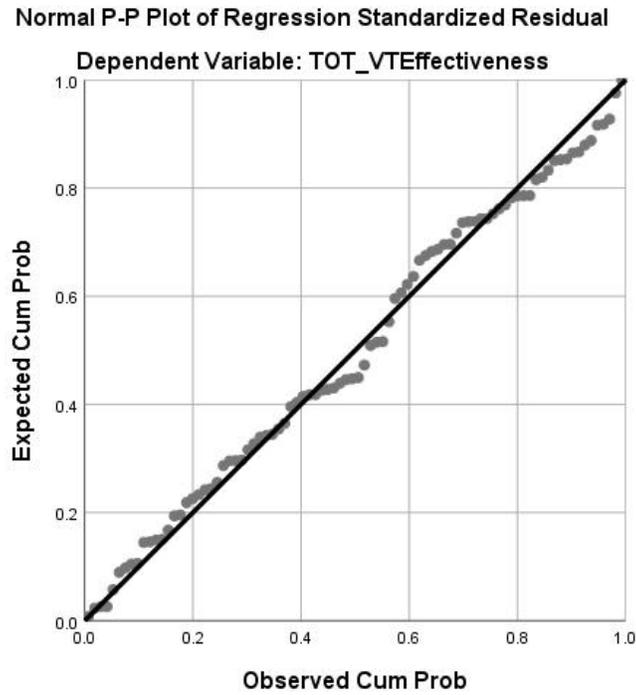


*Figure 7*. Multivariate normality P-P Plot.
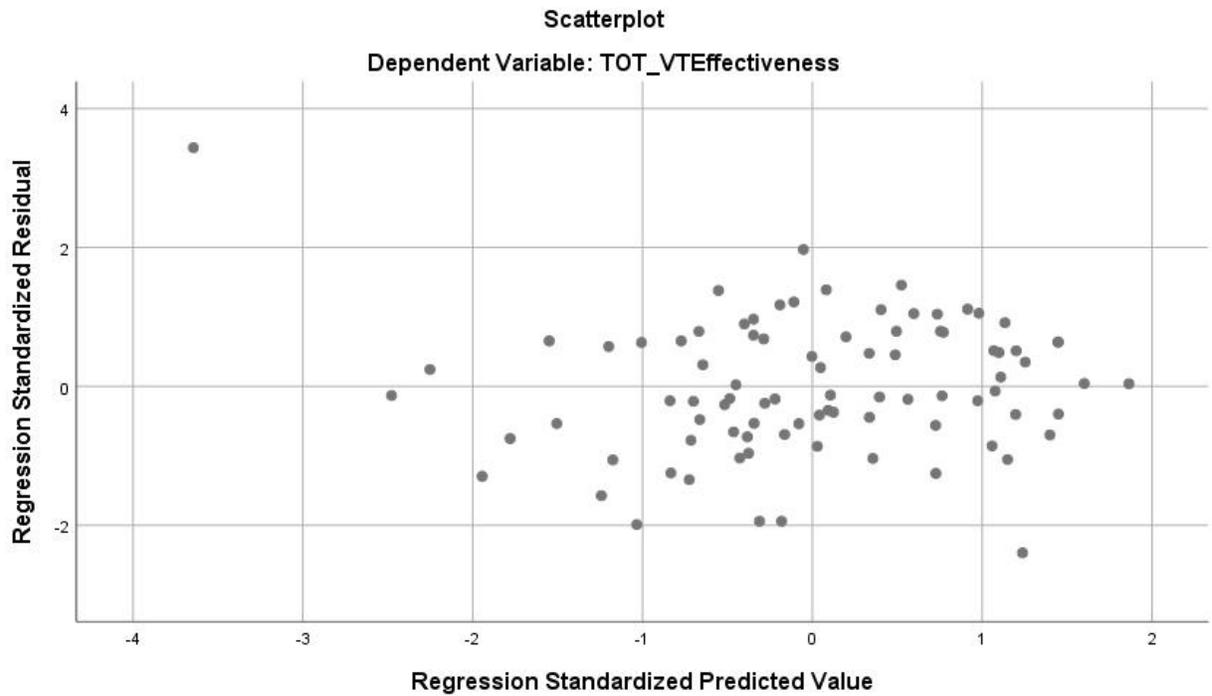
*Figure 8.* Homoscedastic scatterplot of residuals.

Table 7

*VIF Collinearity Statistics*

| Dependent | Independent | VIF |
|-----------|-------------|-------|
| VTE | Sex | 1.090 |
| VTE | Age | 2.080 |
| VTE | YrsConsult | 1.893 |
| VTE | TC | 1.549 |
| VTE | IM | 1.179 |
| VTE | CT | 1.462 |
| VTE | EQ | 1.260 |

**Conclusion**

The research data were analyzed and summarized using a variety of statistical methods, including descriptive statistics, Cronbach's alpha, Pearson correlation, and moderated regression. Furthermore, the four research questions were answered and 18 hypotheses were tested based on

that completed data analysis. In summary, total emotional intelligence and all but one of its subscales were found to be significantly, positively correlated with virtual team effectiveness. In addition, collaboration technology fit, team climate, and all of the subscales of team climate were also found to be significantly, positively correlated with virtual team effectiveness. Moreover, only two subscales of intrinsic motivation were found to be significantly, positively correlated with virtual team effectiveness. Last, several moderated regressions were run and found that gender does moderate the relationship between the team climate and virtual team effectiveness with a statistical significance. The other moderated regression tests did not find that gender moderated the relationship with a statistical significance.

**Chapter 5: Discussion**

**Purpose of Chapter**

The purpose of this chapter is to examine the key findings of the data analysis in the preceding chapter. This chapter summarizes the findings of this study, reviews the implications for practice, and offers recommendations for future research.

**Summary of Findings**

Following is a summary of each research question and hypothesis with a brief review of the findings for each item. Next, Table 8 recapitulates this information in a concise grid format.

**Research Question 1: To what extent does gender of the team member moderate the relationship between team member emotional intelligence and team member perceptions of virtual team effectiveness?** The moderated regression results suggest that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on emotional intelligence with gender as the moderator. These results were somewhat surprising, considering that the literature showed that gender does impact emotional intelligence. In addition, age and years as a consultant were also analyzed to see if they moderated the relationship between team member emotional intelligence and team member perceptions of virtual team effectiveness; however, the results were not statistically significant.

**Research Question 2: To what extent does the gender of the team member moderate the relationship between the collaboration technology fit and team member perceptions of virtual team effectiveness?** The moderated regression results suggest that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on collaboration technology fit with gender as the moderator. These results were not surprising, because there was nothing found in the literature that linked gender directly to collaboration

technology fit. Furthermore, age and years as a consultant were also analyzed to see if they moderated the relationship between collaboration technology fit and team member perceptions of virtual team effectiveness; however, the results were not statistically significant.

**Research Question 3: To what extent does the gender of the team member moderate the relationship between the team climate and team member perceptions of virtual team effectiveness?** The moderated regression results suggest that there is a statistically significant moderating relationship when virtual team effectiveness was regressed on team climate with gender as the moderator. The algebraic sign on the gender variable in this regression is negative, which suggests that the relationship between team climate and virtual team effectiveness is stronger in males than females. These results were not surprising, as they are supported by other findings in the literature. Also, age and years as a consultant were analyzed to see if they moderated the relationship between team climate and team member perceptions of virtual team effectiveness; however, the results were not statistically significant.

**Research Question 4: To what extent does the gender of the team member moderate the relationship between the intrinsic motivation of the team member and team member perceptions of virtual team effectiveness?** The moderated regression results suggest that there is not a statistically significant moderating relationship when virtual team effectiveness was regressed on intrinsic motivation with gender as the moderator. These results are somewhat expected as the findings in the literature were mixed and not exactly the same as how they were being compared in this study. Last, age and years as a consultant were analyzed to see if they moderated the relationship between intrinsic motivation and team member perceptions of virtual team effectiveness; however, the results were not statistically significant.

**H1: There is no statistically significant relationship between collaboration technology fit and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between the collaboration technology fit and team member perceptions of virtual team effectiveness. The correlation coefficient was positive, indicating that the relationship becomes stronger as the collaboration technology fit increases. These were the expected results and are consistent with similar studies.

**H2: There is no statistically significant relationship between total emotional intelligence of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between the emotional intelligence of the team member and team member perceptions of virtual team effectiveness. The correlation coefficient was positive, indicating that the relationship becomes stronger as the emotional intelligence increases. These were the expected results and are consistent with similar studies.

**H3: There is no statistically significant relationship between the emotional intelligence self-awareness subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between the emotional intelligence self-awareness subdimension and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H4: There is no statistically significant relationship between the emotional intelligence empathy subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between the emotional intelligence empathy subdimension and team member

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perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H5: There is no statistically significant relationship between the emotional intelligence relationship subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between the emotional intelligence relationship management subdimension and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H6: There is no statistically significant relationship between the emotional intelligence self-management subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The fourth subdimension of the emotional intelligence, self-management, did not show any significant correlation with team member perceptions of virtual team effectiveness. These results were surprising and not what was expected since the other subdimensions of emotional intelligence did correlate with virtual team effectiveness. Conceivably, this does not have a statistical correlation with virtual team effectiveness because interactions with a virtual team are generally more planned and scheduled; therefore, there is less probability of needing to manage impulsive emotions, feelings, and behaviors.

**H7: There is no statistically significant relationship between the team climate and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between team climate and team member perceptions of virtual team effectiveness. The correlation coefficient was positive, indicating that the

relationship becomes stronger as the emotional intelligence increases. These were the expected results and are consistent with similar studies.

**H8: There is no statistically significant relationship between the team climate vision subdimension and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between team climate vision and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H9: There is no statistically significant relationship between the team climate participation safety subdimension and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between participation safety and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H10: There is no statistically significant relationship between the team climate task orientation subdimension and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between task orientation and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H11: There is no statistically significant relationship between the team climate innovation subdimension and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between innovation and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H12: There is no statistically significant relationship between the total motivation of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is not a significant correlation between total motivation and team member perceptions of virtual team effectiveness. These results were not expected but also not surprising, given that the literature indicated mixed relationships between motivation and team effectiveness. Theory and research have found that the individual motivation types have varied effects on work performance; while intrinsic motivation is often linked to many positive work outcomes, the correlation with work performance is seen to be dependent on whether the person is interested in the work they are doing (Zhang et al., 2016).

**H13: There is no statistically significant relationship between the intrinsic motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between intrinsic motivation and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H14: There is no statistically significant relationship between the integrated motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is a significant correlation between integrated motivation and team member perceptions of virtual team effectiveness. These were the expected results and are consistent with similar studies.

**H15: There is no statistically significant relationship between the identified motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is not a significant correlation between identified motivation and team member perceptions of virtual team

effectiveness. These results were not expected but also not surprising, given that the literature indicated mixed relationships between motivation and team effectiveness.

**H16: There is no statistically significant relationship between the introjected motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is not a significant correlation between introjected motivation and team member perceptions of virtual team effectiveness. These results were not expected but also not surprising, given that the literature indicated mixed relationships between motivation and team effectiveness.

**H17: There is no statistically significant relationship between the external regulation motivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is not a significant correlation between external regulation motivation and team member perceptions of virtual team effectiveness. These results were not expected but again not surprising, given that the literature indicated mixed relationships between motivation and team effectiveness.

**H18: There is no statistically significant relationship between the amotivation subdimension of the respondents and the respondents' perceptions of virtual team effectiveness.** The Pearson correlation results suggest that there is not a significant correlation between amotivation and team member perceptions of virtual team effectiveness. These results were not expected and differ from similar amotivation studies that found a negative correlation between amotivation and job satisfaction, and amotivation and organizational commitment (Tremblay et al., 2009).

Table 8

*Summary of Research Question/Hypotheses Results*

| Number | Dependent | Independent/ Interaction | Statistically Significant | Reject the Null | Hypothesized Relationship | Actual Relationship |
|--------|-----------|--------------------------|---------------------------|-----------------|---------------------------|---------------------|
| RQ1 | VT Effectiveness | Emotional Intelligence * Gender | No | N/A | N/A | N/A |
| RQ2 | VT Effectiveness | Collaboration Technology * Gender | No | N/A | N/A | N/A |
| RQ3 | VT Effectiveness | Team Climate * Gender | Yes | N/A | N/A | (-) |
| RQ4 | VT Effectiveness | Intrinsic Motivation * Gender | No | N/A | N/A | N/A |
| H1 | VT Effectiveness | Collaboration Technology | Yes | Yes | (+) | (+) |
| H2 | VT Effectiveness | Emotional Intelligence | Yes | Yes | (+) | (+) |
| H3 | VT Effectiveness | Self-Awareness | Yes | Yes | (+) | (+) |
| H4 | VT Effectiveness | Empathy | Yes | Yes | (+) | (+) |
| H5 | VT Effectiveness | Relationship Management | Yes | Yes | (+) | (+) |
| H6 | VT Effectiveness | Self-Management | No | No | (+) | N/A |
| H7 | VT Effectiveness | Team Climate | Yes | Yes | (+) | (+) |
| H8 | VT Effectiveness | Vision | Yes | Yes | (+) | (+) |
| H9 | VT Effectiveness | Participation Safety | Yes | Yes | (+) | (+) |
| H10 | VT Effectiveness | Task Orientation | Yes | Yes | (+) | (+) |
| H11 | VT Effectiveness | Innovation | Yes | Yes | (+) | (+) |
| H12 | VT Effectiveness | Motivation | No | No | (+) | N/A |
| H13 | VT Effectiveness | Intrinsic Motivation | Yes | Yes | (+) | (+) |
| H14 | VT Effectiveness | Integrated | Yes | Yes | (+) | (+) |

Table 8 *continued*

| Number | Dependent | Independent/ Interaction | Statistically Significant | Reject the Null | Hypothesized Relationship | Actual Relationship |
|--------|-----------|--------------------------|---------------------------|-----------------|---------------------------|---------------------|
| H15 | VT Effectiveness | Identified | No | No | (+) | N/A |
| H16 | VT Effectiveness | Introjected | No | No | (-) | N/A |
| H17 | VT Effectiveness | External Regulations | No | No | (-) | N/A |
| H18 | VT Effectiveness | Amotivation | No | No | (-) | N/A |

**Key Findings**

The most intriguing finding of this study was that team climate and all of its subdimensions had the strongest correlations with virtual team effectiveness of all the variables studied. Team climate had positive correlation coefficients ranging from .541 to .640. Hence, team climate has the strongest implication for practice and future research. This is noteworthy because climate is often researched and measured at the organization level (Figl & Saunders, 2011); however, these results indicate that climate at the team level is significantly, positively related to virtual team effectiveness. Organizations with virtual teams can benefit from improving climate within their virtual teams, which in turn has a positive effect on virtual team performance (Glikson & Erez, 2019). More specifically, organizations should communicate team-related content in the first message sent to the virtual team, communicate relationally oriented content, not just task-oriented content, and overall help to increase familiarity with each other to reduce uncertainty levels and increase mutual trust and team knowledge sharing (Glikson & Erez, 2019).

The second most intriguing finding of this study was that collaboration technology had the second strongest correlation (.364 correlation coefficient) with virtual team effectiveness of all the variables studied. The researcher expected this to be one of the strongest correlations of all the variables studied because technology is the foundation upon which a virtual team exists. These results are very important in practice for organizations because the overall alignment and relationship between the team, task, and tool (technology) form the virtual team effectiveness (Zhang et al., 2018). Furthermore, tool usability and ease of use needs to be considered. Organizations should provide clear guidelines and training (when needed) for the technology used, which will strengthen the usability and overall task fit (2018).

**Implications for Practice**

The first distinct implication of this study is the strong positive correlation between team climate and virtual team effectiveness. Research shows that healthy team climates lead to higher job satisfaction, improved communication, a healthier workforce (both physically and mentally), higher retention, lower turnover, a more positive work environment, and improved outcomes (Figl & Saunders, 2011); therefore, healthy team climates have the potential to yield very positive results for companies. As such, consulting organizations with virtual teams could see even greater benefits from building and maintaining healthy team climates with the addition of "improving virtual team effectiveness" to the list of potential benefits. More specifically, consulting organizations with virtual teams could see effectiveness benefits by implementing the following suggestions pertaining to team climate:

- The team vision needs to be driven from the beginning and promoted in everyday activities (Eisenbeiss, Knippenberg, & Boerner, 2008). Teams are more likely to have a clear focus and develop successful outcomes when they are all on the same page with

regards to their team direction and goals (Kivimaki, Kuk, Elovainio, & Thomson, 1997). During the initial formation of a virtual team, have an exercise where the team members decide on vision, mission, objectives, and values for the team. This will help the team members feel like they are a part of the vision. Then post the vision somewhere electronically where all team members can see it so that it becomes woven into the everyday fabric of the team climate.

- Team members will perceive a higher effectiveness of their team if they feel safe to propose ideas, share information, and participate in team decisions (Strating & Nieboer, 2009). Therefore, another suggestion would be to set aside time at the end of each virtual team meeting/call for team learning where all team members share lessons learned, good and bad, so that everyone can learn from it without fear of shaming. This will encourage participation in a safe environment as well as promote knowledge sharing, which will help to build the strong team climate.

The second implication of this study is the strong positive correlation between emotional intelligence and virtual team effectiveness. Consulting organizations could evaluate the emotional intelligence of their employees and, for employees with low scores, provide them access to emotional intelligence training before assigning them to work on virtual teams. It has been established that emotional intelligence can be improved with emotional intelligence training as well as provide other benefits such as improving "coping skills, wellbeing, and stress management in a range of populations" (Vesely, Saklofske, & Nordstokke, 2016, p. 523).

The third implication of this study pertains to the strong positive correlation between collaboration technology and virtual team effectiveness. Virtual teams rely on technology for communication and collaboration; however, the results highlight the importance of using the

appropriate technology for the job at hand. The technology used by virtual teams has to "be adapted to the situation at hand and the objectives of the teamwork" (Gressgard, 2010, p. 114). Corporations could benefit by evaluating whether the current technologies are appropriate for the team and, if not, change them. They could survey the team to identify what they like, what they don't like, what they are struggling with, and so on, with regard to the collaboration technology tools. Then they should adjust the collaboration technology as needed based on the survey results. This would likely result in virtual team effectiveness benefits by creating a better alignment of the technology, which in turn makes the team more effective.

**Recommendations for Research**

There are eight opportunities identified for future research as a result of the findings in this research study, coupled with the accord that virtual teams are here to stay. First, this study was cross-sectional in nature and relied on team members' perceptions of effectiveness; therefore, it examined virtual team members' perceived effectiveness at one point in time. One recommendation would be to measure effectiveness based on actual outcomes, not just members' perceptions of effectiveness, and at multiple points in the project. It would be beneficial to researchers and organizations with virtual teams to understand whether the correlations change over time. Furthermore, it would be interesting to examine whether the perceptions of effectiveness vary from the actual measured outcomes of effectiveness.

Second, emotional intelligence was also shown to have a positive correlation with virtual team effectiveness; however, it is not understood whether emotional intelligence training would have an impact on the effectiveness of the virtual team. It would be beneficial to researchers and organizations with virtual teams to understand whether emotional intelligence training would

impact the virtual team effectiveness. Results from this future research could help organizations make decisions on whether or not to provide emotional intelligence training to its employees.

Third, the study found a positive correlation between collaboration technology and virtual team effectiveness. Another opportunity for future research would be to dig deeper into the collaboration technology and virtual team effectiveness relationship. While it appears that there is a correlation between these two variables, it is not clear what is the best collaboration technology to use and how to identify the best collaboration technology for the team. Further research is needed to examine and explore the different types of technologies used by the virtual teams related to the complexity of their tasks. Qualitative research would be appropriate for gathering and analyzing this information with a goal of providing a framework for virtual teams to use the collaboration tools that will help them to work together and collaborate effectively. Team members should be interviewed thoroughly to understand their technology needs. These results would be extremely helpful to organizations with virtual teams, as it would allow them to better understand how to choose what technologies to provide to their teams that would result in the best fit to make them the most effective.

Fourth, another recommendation for future research would be to include both virtual and traditional team members in the sample surveyed. This would enable the researcher to test whether the type of team moderates the relationship between the variables studied. The results can help organizations understand whether these findings apply only to virtual teams or to both virtual and traditional teams, and whether the strength of the relationships will vary based on the team type.

Fifth, there may be several other aspects of the team member and project demographics that were not included in this study but may impact correlations with virtual team effectiveness,

such as length of project, experience level with virtual teams, geographical sparsity of the team, time zone differences, cultural differences, and the degree of virtual-ness (some teams are split between sometimes virtual and sometimes collocated). Therefore, it could be of great benefit to consulting organizations to modify the current study to include these additional demographics and how they relate to virtual team effectiveness.

Sixth, the population for this study consisted of two information technology consulting organizations headquartered in Michigan and Ohio. Their primary market is the financial software industry, so it is recommended in the future to expand the sample to study other information technology consulting companies that focus on non-financial industries to determine whether the results are similar across industries.

Seventh, the strong correlational relationship between team climate and virtual team effectiveness is important and should be researched further. Even though team climate is impacted by all members of the team, it is unknown how the team managers and leaders impact virtual team effectiveness via the team climate. This study did not distinguish roles among the team members (i.e., project manager vs. analyst vs. developer); however, a future study could seek to understand how managers and leaders impact team climate and virtual team effectiveness. These findings could help organizations understand the qualities needed in virtual team managers and leaders.

Eighth, the current study did not identify whether participants had ever received formal virtual team training; therefore, a suggestion for future research would be to compare results, both with and without formal virtual team training, to see how the correlations would be impacted. Results from this future research could help organizations make decisions on whether or not to provide virtual team training to its employees.

**Conclusion**

The findings of this study show that strong positive correlations exist between several of the independent variables (team climate, collaboration technology, and emotional intelligence) and the dependent variable, virtual team effectiveness. Furthermore, the results show gender does moderate the relationship between team climate and virtual team effectiveness.

Several recommendations were given for how these research findings can be applied in practice and who will benefit from them. These findings also open doors for new areas of research. There were eight opportunities for future research identified as a result of the findings in this research study.

## Chapter 6: Conclusion

Globalization and rapid advances in technology have caused a paradigm of the work team, functioning through technology irrespective of time and location (Hambley, O'Neill, & Kline, 2007). Virtual teams have transformed the traditional workplace environment and are now considered to be an important structural component of many organizations (Maznevski & Chudoba, 2000).

The purpose of this study was to examine the impact of team member emotional intelligence, collaboration technology, team climate, and intrinsic motivation on team member perceptions of virtual team effectiveness. The ultimate goal was to use the results of the study to help organizations plan, design, and manage their virtual teams to maximize their effectiveness as well as identify opportunities for future research.

The online survey data were analyzed using a combination of correlation and multiple moderated regression, and the results suggest that there are statistically significant relationships between several of the independent and dependent variables. The results found a statistically significant relationship between virtual team effectiveness and emotional intelligence, self-awareness, empathy, relationship management, collaboration technology, team climate, vision, participation safety, task orientation, innovation, intrinsic motivation, and integrated regulation. Furthermore, the relationship between team climate and virtual team effectiveness was found to be stronger in males than females.

This research can be used to help organizations better understand their virtual teams and what drives their effectiveness. It can help organizations better prepare their virtual teams by building strong team climates, growing emotional intelligence, and equipping members with the

proper technology. In addition, these findings can be used by other researchers to expand the

growing body of literature related to virtual team effectiveness.

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**APPENDICES**

Appendix A: Human Subjects Approval Letter

From: human.subjects@emich.edu
Date: May 6, 2019 at 1:18:35 PM EDT
To: bkramer6@emich.edu, gjogaratn@emich.edu
Subject: UHSRC-FY18-19-306 - Initial: Initial - Exempt

May 6, 2019 1:18 PM EDT

Brandy Kramer
Eastern Michigan University, School of Tech Prof Services

Re: Exempt - Initial - UHSRC-FY18-19-306 Effect of Emotional Intelligence, Collaboration Technology, Team Climate, and Intrinsic Motivation on Virtual Team Effectiveness: A Study of Team Member Perceptions

Dear Brandy Kramer:

The Eastern Michigan University Human Subjects Review Committee has rendered the decision below for Effect of Emotional Intelligence, Collaboration Technology, Team Climate, and Intrinsic Motivation on Virtual Team Effectiveness: A Study of Team Member Perceptions. You may begin your research.

Decision: Exempt

Selected Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

Renewals: Exempt studies do not need to be renewed. When the project is completed, please contact human.subjects@emich.edu.

Modifications: Any plan to alter the study design or any study documents must be reviewed to determine if the Exempt decision changes. You must submit a modification request application in Cayuse IRB and await a decision prior to implementation.

Problems: Any deviations from the study protocol, unanticipated problems, adverse events, subject complaints, or other problems that may affect the risk to human subjects must be reported to the UHSRC. Complete an incident report in Cayuse IRB.

Follow-up: Please contact the UHSRC when your project is complete.

Please contact human.subjects@emich.edu with any questions or concerns.

Sincerely,

Eastern Michigan University Human Subjects Review Committee

Appendix B: CITI Certificate



CITI PROGRAM

Completion Date  14-Dec-2017
Expiration Date  13-Dec-2020
Record ID        23874710

This is to certify that:

**Brandy Kramer**

Has completed the following CITI Program course:

**Investigators, Students, and Faculty Mentors**  (Curriculum Group)
**Investigators, Students, and Faculty Mentors**  (Course Learner Group)
**2 - Refresher Course**                          (Stage)

Under requirements set by:

**Eastern Michigan University**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w322d5ea8-f783-4333-bcf6-d916e4af2920-23874710

Appendix C: Solicitation Email

I am conducting research in partial fulfillment of the PhD in Technology degree. The study is entitled Effect of Emotional Intelligence, Collaboration Technology, Team Climate, and Intrinsic Motivation on Virtual Team Effectiveness: A Study of Team Member Perceptions. The purpose of this research study is to understand factors that influence virtual team effectiveness.

You are invited to participate in this research. The estimated time for completion of this survey is approximately 15 to 20 minutes. Should you have any questions concerning the research study, please call me at 248-807-2399 or e-mail me at bkramer6@emich.edu.

For your convenience, the survey is designed for completion on the Internet. You may begin the survey at the Internet link here:

https://emucotgrad.co1.qualtrics.com/jfe/form/SV_8IBctsiEVb2Ay5D

Thank you for your valued contribution.

Sincerely,

Brandy L. Kramer
PhD Candidate
College of Technology
Eastern Michigan University
248-807-2399
Bkramer6@emich.edu

Appendix D: Informed Consent Form


Project Title: Effect of Emotional Intelligence, Collaboration Technology, Team Climate, and Intrinsic Motivation on Virtual Team Effectiveness: A Study of Team Member Perceptions
Principal Investigator: Brandy Kramer, Ph.D. Student
Faculty Advisor: Dr. Giri Jogaratnam, Professor of Hotel and Restaurant Management

**Purpose**: The purpose of this research study is to examine the effect of emotional intelligence, collaboration technology, team climate, and intrinsic motivation on virtual team effectiveness.

**Study Procedures**: Participation in this study involves completing an online survey. It should take between 15 and 20 minutes to complete the survey.

**Types of Data Collected**: We will ask questions about your emotional intelligence, your motivation, and your team's climate, technology, and effectiveness. We will also ask for information about your gender, age, education level, and years of experience.

**Risks**: The primary risk of participation in this study is a potential loss of confidentiality.  Some of the survey questions are personal in nature and may make you feel uncomfortable. You do not have to answer any questions that make you uncomfortable or that you do not want to answer.

**Benefits**: You will not directly benefit from participating in this research. Benefits to society include understanding factors that influence virtual team effectiveness.

**Confidentiality**: We will keep your information confidential by not collecting any identifiable information, including your name. Your information will be stored in a password-protected computer file. We will store your information for at least five years after the project ends, but we may store your information indefinitely so that we can use your information for future studies.

The principal investigator and the research team will have access to the information you provide for research purposes only. We may share your information with other researchers outside of Eastern Michigan University. If we share your information, we will remove any and all identifiable information so that you cannot reasonably be identified. De-identified information will be transferred by email.

The results of this research may be published or used for teaching. Identifiable information will not be used for these purposes.

**Compensation**: You not be compensated for participating in this research study.

**Contact Information**: If you have any questions about the research, you can contact the Principal Investigator, Brandy Kramer at bkramer6@emich.edu or by phone at 248-807-2399. You can also contact Brandy's adviser, Dr. Giri Jogaratnam, at gjogaratn@emich.edu or by phone at 734-487-0483.

For questions about your rights as a research subject, you can contact the Eastern Michigan University Office of Research Compliance at human.subjects@emich.edu or by phone at 734-487-3090.

**Voluntary participation**

Participation in this research study is your choice. You may refuse to participate at any time, even after signing this form, with no penalty or loss of benefits to which you are otherwise entitled. You may choose to leave the study at any time with no loss of benefits to which you are otherwise entitled. If you leave the study, the information you provided will be kept confidential. You can withdraw your consent by emailing the Principal Investigator listed above.

**Statement of Consent**

I have read this form. I have had an opportunity to ask questions and am satisfied with the answers I received. I click "continue" below to indicate my consent to participate in this research study.

Appendix E: Questionnaire

Q1. Statement of Consent: I have read this form. I have had an opportunity to ask questions and am satisfied with the answers I received. I click "continue" below to indicate my consent to participate in this research study.

Q2. Have you worked on a virtual team of an information technology consulting project in the last 12 months? For the purpose of this survey, "virtual team" is defined as a team where one or more core members are in different physical locations more than 50% of the time.
Yes
No (if "NO" please skip the rest of the survey)

Q3. What is your sex?
Female
Intersex
Male
Not Listed
Prefer not to reply

Q4. What is your age? (# Years)

Q5. How many years of school have you completed including grade school (e.g. graduated high school and completed a 4-year college degree would be 16 years)? (# Years)

Q6. How many years have you worked as a consultant of information technology projects?

Q7. How many core team members are working on your current (or most recent) virtual team consulting project?

Q8. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's output effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The team delivers its commitments.
___ The team delivers its commitments on time.
___ The team provides a volume of work consistent with established standards.
___ The team is highly effective at implementing solutions.
___ The team delivers important changes.

Q9. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's quality effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The quality of the team's output is very high.
___ The team performs duties accurately and consistently.

___ The team eliminates root problems, not just symptoms.

Q10. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's organizing and planning effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The team sets goals and priorities in a way that enables to the team to complete tasks efficiently.
___ The team develops workable plans.
___ The team works on important problems.
___ The team has its priorities straight.

Q11. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's Interpersonal effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The team communicates its progress to all stakeholders.
___ The team proactively communicates its progress to all stakeholders.
___ The team keeps all core team members informed on open issues.
___ The team keeps all core team members informed on its progress.

Q12. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's value effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The team's contributions to the company are very valuable.
___ The team's contributions make a positive impact on the business.
___ The team's contributions correlate to the needs of the stakeholders.

Q13. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team's overall effectiveness.

| Never | Rarely | Sometimes | Often | All of the Time |
|-------|--------|-----------|-------|-----------------|
| 1 | 2 | 3 | 4 | 5 |

___ The team is highly effective.
___ The team is making very good progress on the team's charter.
___ The team is productive.

Q14. For each of the following statements about the primary technology used to collaborate on your project, please indicate your agreement or disagreement by selecting the number that you feel the most appropriate.

| Strongly Disagree | Disagree | Somewhat Disagree | Neither Agree Nor Disagree | Somewhat Agree | Agree | Strongly Agree |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

___ The technology with which we collaborated helped us to better understand each other.

___ When we disagreed, the collaboration technology made it more difficult for us to come to an agreement.
___ The technology with which we collaborated slowed down our communications.
___ When we disagreed, our collaboration technology helped us come to a common position.
___ The technology with which we collaborated helped us share our opinions.
___ I could easily explain things with the collaboration technology used on this project.
___ The collaboration technology used helped us exchange communications quickly.
___ There were ideas I couldn't relate to the other party because of collaboration technology used.

Q15. Using the scale below, please indicate to what extent each of the following items corresponds to your self-awareness.

| Never Like Me | Occasionally Like Me | Sometimes Like Me | Frequently Like Me | Always Like Me |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___I have a good understanding of my emotions.
___I am good at expressing my feelings to others when they have done something that is disagreeable to me.
___I am comfortable about sharing my emotions with others.
___I understand why my emotions change.
___I am able to forgive others when they have offended me.

Q16. Using the scale below, please indicate to what extent each of the following items corresponds to your empathy.

| Never Like Me | Occasionally Like Me | Sometimes Like Me | Frequently Like Me | Always Like Me |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___When people discuss their problems with me, I am able to feel what that person is feeling.
___When people discuss their problems with me, I am able to understand their point of view by seeing things from their perspective.
___I am usually aware of other people feelings.
___I can tell when other people's feelings have been hurt.
___I tend to be very judgmental of other's mistakes. (REVERSE THE SCORE)

Q17. Using the scale below, please indicate to what extent each of the following items corresponds to your relationship management.

| Never Like Me | Occasionally Like Me | Sometimes Like Me | Frequently Like Me | Always Like Me |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___I help other people feel better when they are down.
___I am able calm people when they display anger.
___I am a good listener.
___I am good at understanding the nonverbal (such as body motion, gestures, etc.) messages that is sent by others.
___I am able to see myself through the eyes of others.
___I am able to anticipate how others will respond to me.

Q18. Using the scale below, please indicate to what extent each of the following items corresponds to your self-management.

| Never Like Me | Occasionally Like Me | Sometimes Like Me | Frequently Like Me | Always Like Me |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___I am able to control my emotions.

___I know when to express certain emotions in public and when not to.

___I stay upset for long periods of time when something has made me upset or angry. (reverse the score)

___I am not able to function well when something has made me upset. (reverse the score)

___I am usually hard on myself when I make mistakes.

Q19. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team vision.

| Strongly Disagree | Slightly Disagree | Neither Agree Nor Disagree | Mostly Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___ How far are you in agreement with your team's objectives?

___ To what extent do you think your team's objectives are clearly understood by other members of the team?

___ To what extent do you think your team's objectives can actually be achieved?

___ How worthwhile do you think these objectives are to the organization?

Q20. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team participation safety.

| Strongly Disagree | Slightly Disagree | Neither Agree Nor Disagree | Mostly Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___ We have a "we are in it together" attitude

___ People keep each other informed about work-related issues in the team

___ People feel understood and accepted by each other

___ There are real attempts to share information throughout the team

Q21. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team task orientation.

| Strongly Disagree | Slightly Disagree | Neither Agree Nor Disagree | Mostly Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

___ Team members are prepared to question the basis of what the team is doing

___ The team critically appraises potential weaknesses in what it is doing in order to achieve the best possible outcome

___ Members of the team build on each other's ideas in order to achieve the best possible outcome

Q22. Using the scale below, please indicate to what extent each of the following items corresponds to your virtual team support for innovation.

| Strongly Disagree | Slightly Disagree | Neither Agree Nor Disagree | Mostly Agree | Strongly Agree |
|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

___ People in this team are always searching for fresh, new ways of looking at problems
___ In this team we take the time needed to develop new ideas
___ People in the team cooperate in order to help develop and apply new ideas


Q23. Using the scale below, please indicate to what extent each of the following items corresponds to the reasons why you are presently involved in your work.

| Does Not Correspond at All | Corresponds A Little | Corresponds Slightly | Corresponds Moderately | Corresponds Significantly | Corresponds Extremely | Corresponds Exactly |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

___ Because this is the type of work I chose to do to attain a certain lifestyle.
___ For the income it provides me.
___ I ask myself this question, I don't seem to be able to manage the important tasks related to this work.
___ Because I derive much pleasure from learning new things.
___ Because it has become a fundamental part of who I am.
___ Because I want to succeed at this job, if not I would be very ashamed of myself.
___ Because I chose this type of work to attain my career goals.
___ For the satisfaction I experience from taking on interesting challenges
___ Because it allows me to earn money.
___ Because it is part of the way in which I have chosen to live my life.
___ Because I want to be very good at this work, otherwise I would be very disappointed.
___ I don't know why, we are provided with unrealistic working conditions.
___ Because I want to be a "winner" in life.
___ Because it is the type of work I have chosen to attain certain important objectives.
___ For the satisfaction I experience when I am successful at doing difficult tasks.
___ Because this type of work provides me with security.
___ I don't know, too much is expected of us.
___ Because this job is a part of my life.