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Relationship Between Organizational Trust, Communication, and Team Performance Within Virtual Teams

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This is to certify that the doctoral study by

Cornelius T. Session

has been found to be complete and satisfactory in all respects,
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Abstract

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MS, Colorado Technical University, 2009

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Doctor of Business Administration

Walden University

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Abstract

Virtual teams have become a cost-saving strategy for global collaboration and training, but trust and communication failures decrease overall performance. Business leaders who fail to understand the relationship between organizational trust, communication, and team performance undermine global virtual teams' full potential. Grounded in the life cycle of virtual teams' theory, the purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology (IT) industry. Data were collected from survey responses of 48 virtual IT business leaders who work in the Washington, D.C. metro area. The results of the multiple linear regression analysis indicated the model was statistically significant in predicting the relationship between organizational trust, communication, and virtual team performance, $F(2, 45) = 10796.37$, $p < .001$, $R^2 = .998$. Both predictors provided a significant contribution to the model, with organizational trust ($t = 74.218$, $p < .001$, $\beta = .703$) providing a higher contribution to the model than communication ($t = 39.319$, $p < .001$, $\beta = .372$). A key recommendation for high virtual team performance is for business leaders to create a thorough foundation of organizational trust with a succinct communication strategy during the initial stages of team development and training. The implications for positive social change include the potential for business leaders to understand how to use organizational trust, communication, and team performance metrics within virtual teams to create opportunities for their families and communities.

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Dedication

I dedicate this achievement to my parents (Cornelius Session, Jr. and Audie Session), who instilled the values of spirituality, gratitude, courage, and persistence. Without these values, I would have succumbed many years ago. Although they are not here physically, it was their everlasting wisdom that inspired me to not give up on this journey. I want to thank my wife, Hanifa, for her everlasting love and support and believing in me when I didn't believe in myself. Without her support and putting up with many sleepless nights, the completion of this journey would have been impossible. I hope this achievement will provide inspiration and endurance to my sister (Sheritta) and my daughters (Jada and Sofya) to never stop believing in yourself, and it's not how you start but how you finish.

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I would like to thank my Lord and Savior, Jesus Christ for continuous endurance throughout this journey. I am extremely thankful to my committee chair, Dr. Natalie Casale. I could not have completed this journey without your endless support, patience, and leadership. I am forever grateful to your mentorship. I would like to also thank Dr. Jaime Klein and Dr. Thomas Schaefer for your meticulous critique of my doctoral study. Your overview and guidance were preparation for my scholarly journey after the doctoral study.

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Section 1: Foundation of the Study

Virtual teams are continuously becoming an integral part of the workforce because of globalization and the advancement of communication technologies (Lojeski, 2015). Purvanova (2018) claimed virtual teams are beneficial to organizations because of increased productivity, greater operational efficiencies, and cost savings. Purvanova further added virtual teams are successful because they build knowledge capital by acquiring experts from multiple locations to complete tasks and projects. Virtual team members are valuable to an organization because they can work on multiple teams and projects simultaneously (Yao & Robert, 2017). Although the positive aspects of virtual teams are substantial for increasing knowledge capital, they are insufficient in building social capital (Purvanova, 2018). Moe et al. (2015) claimed virtual teams have extreme challenges that prevent them from achieving a high level of team performance, such as cultural and language barriers, lack of face-to-face communication, and the ability to build and maintain trust.

Background of the Problem

A high level of autonomy and collaboration amongst geographically dispersed team members are essential for successful global organizations (Moe et al., 2015). Virtual teams increase efficiency in functional areas such as research and development, knowledge management, learning and training, and manufacturing (Duran & Popescu, 2014). Business leaders create virtual teams to obtain globally talented employees, address and build complex technical infrastructure, and create a knowledge management system that has access to global resources (Alkhatib & Al-Humaidi, 2018). Dakrory and

Abdou (2009) claimed virtual teams allow team members with various skills to communicate and collaborate more efficiently.

Despite the advantages of virtual teams, there are still issues that prevent them from achieving a high level of team performance. Although virtual teams are necessary for global organizations with a diversified workforce, they still fall short in achieving a high level of team performance due to communication and trust issues (Derven, 2016). Lojeski (2015) claimed virtual teams have highly negative outcomes, such as an 83% decrease in trust, an 80% drop in employee engagement, and a 60% decline in time and budget performance.

Problem Statement

Virtual teams are a growing paradigm with business advantages, yet communication and trust issues still decrease overall performance (Zuofa & Ochieng, 2017). According to Basiouni et al. (2017), 67% of global virtual team members had communication and trust barriers such as language, scheduling, and physical isolation and claimed their virtual environment was insufficient. The general business problem was that trust and communication issues prevent virtual teams from achieving a high level of team performance. The specific business problem was that some business leaders in the information technology industry do not understand the relationship between organizational trust, communication, and team performance within virtual teams.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within

virtual teams in the information technology industry. The independent variables were organizational trust and communication. The dependent variable was team performance. The target population for this study were virtual employees in leadership positions within the information technology industry in the Washington, D.C. metro area. The implications for positive social change include the potential for business leaders to understand how to use virtual teams to create opportunities for their families and communities.

Nature of the Study

I used quantitative methodology for this study. Labaree (2016) stated researchers use quantitative research to determine if there is a relationship between independent variables and a dependent variable within a population. The quantitative methodology was appropriate for this study because I wanted to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. Researchers use the qualitative methodology as a method of inquiry to understand human behaviors, cultures, and themes in a variety of different settings (Taylor et al., 2016). I decided not to use the qualitative methodology because I did not observe human behaviors and cultures. Researchers use the mixed methods design to gain a better understanding of the similarities and differences between qualitative and quantitative data within the same study (Shorten & Smith, 2017). I decided not to use the mixed methods design because I wanted to study the relationship between variables.

For this study, I used the correlation design. Shaughnessy et al. (2000) stated researchers use the correlation design to evaluate the covariation among naturally occurring variables and identify the predictive relationships by using statistical techniques. I considered using experimental and quasi-experimental designs. White and Sabarwal (2014) stated researchers use experimental and quasi-experimental designs to test causal hypotheses between the variables. I did not use experimental and quasi-experimental designs because I wanted to understand the relationship between the variables, not causality between the variables. Therefore, the correlation design was the most appropriate because the main objective of this study was to identify the relationship between a set of predictor variables (organizational trust and communication) and a dependent variable (team performance).

Research Question

What is the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry?

Hypotheses

Null Hypothesis (H_0): There is no relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Alternative Hypothesis (H_1): There is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Theoretical Framework

Saunders (2000) developed the life cycle model of virtual teams. Saunders used this theory to describe how virtual teams operate and function towards achieving a high-level of performance and satisfaction. Saunders identified the following key constructs underlying the theory (a) inputs – design, culture, technical, and training, (b) socioemotional processes – relationship building, cohesion, and trust, (c) task processes - communication, coordination, and task/structure fit, and (d) outputs – performance and satisfaction. Although, Saunders developed the theory for the life cycle of virtual teams, Powell et al. (2004) first used the theory to evaluate virtual teams' performance.

Powell et al. (2004) supported Saunders' theoretical model for the life cycle of virtual teams by using the theory to provide a meta-analysis of 44 papers on virtual teams within academia and the technology industry. Powell et al. adopted Saunders' theory as the theoretical framework for evaluating virtual teams because of the idiosyncratic structural and contextual issues that surround virtual teams. Powell et al. stated the theory could determine if certain virtual teams were achieving a high level of team performance and which factors were responsible for increasing and decreasing team performance. In addition, the authors stated the theoretical model could serve as the platform for continuous future research in virtual teams because the theory's components provide a means for understanding and evaluating virtual teams. Using the life cycle model of virtual teams may help IT business leaders understand the relationship between organizational trust, communication, and team performance.

Operational Definitions

Organizational trust: Organizational trust is the ability for employees to treat each other with integrity, honesty, and justice (Starnes et al., 2015). In addition, organizational trust is the employees' belief in the integrity and character of leadership (Starnes et al., 2015).

Team performance: Team performance is a group's ability to achieve goals and objectives that lead to team satisfaction, positive outcomes, and unity (National Research Council, 2015).

Virtual teams: Virtual teams are employees from different geographical locations that use digital communication technologies to collaborate, complete projects, and achieve common goals (Dulebohn & Hoch, 2017).

Assumptions, Limitations, and Delimitations

Assumptions

Schoenung and Dikova (2016) stated assumptions are beliefs accepted as true without having evidence to confirm validity. According to Carver et al. (2004), researchers make assumptions about people, processes, and products. The first assumption of this study was the participants would meet the criteria and give honest answers. Researchers assume the participants will understand the scope of the study and respond truthfully (Carver et al., 2004). The second assumption was the participants would understand the data collection process. Carter et al. claimed researchers assume the participants will comprehend the data collection process and ask for assistance when needed. The third assumption was the researcher and participants would benefit from the

results of the study. Researchers assume the results or final product(s) from a study will be useful for further research and applicable to different industries (Carter et al., 2004).

Limitations

Limitations are weaknesses within a study the researcher cannot control (Chasan, 2014). The first limitation was the participants were from the Washington, D.C. metro area. According to Theofanidis and Fountouki (2018), a researcher may only have access to a certain geographical region, which does not provide a full scope of responses. The second limitation was the measuring instrument. The measuring tool may only be applicable to variables within a particular study (Theofanidis & Fountouki, 2018). The third limitation was the data analysis methodology. For quantitative studies, the researcher can use correlation methods to determine the relationship between variables, but cannot determine causation (Theofanidis & Fountouki, 2018).

Delimitations

According to Patterson (2014), delimitations are the constraints enforced by the researcher in executing the research study and defining the scope and boundaries of the study. Theofanidis and Fountouki (2018) claimed delimitations are limitations and boundaries the researcher sets to achieve the main objectives of a study. Theofanidis and Fountouki further claimed researchers use delimitations to focus primarily on the study's background, theoretical framework, objectives, research questions, and variables. A delimitation for this study was the study focused on understanding the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Significance of the Study

Contribution to Business Practice

Business leaders could use the findings from this study to effectively lead virtual teams to improve performance within the information technology industry. The results of this study may help IT leaders develop innovative technology to increase virtual team performance. The conclusions from this study may help business leaders develop an organizational management paradigm for understanding and improving leadership within virtual teams. Davis and Scaffidi (2016) claimed a thorough understanding of leadership and communication is needed to overcome virtual team challenges such as relationship and trust-building to achieve team goals.

Implications for Social Change

The implications for positive social change include the potential for business leaders to understand how to increase virtual team performance within their diverse workforce. Business leaders may use the findings from this study to create strategies for collaboration and diversity within virtual teams. The understanding of collaboration capability and functional diversity are essential components for virtual team leaders to increase social change and performance (Batarseh et al., 2018).

A Review of the Professional and Academic Literature

The purpose of this literature review is to explain the life cycle of virtual teams as the theoretical framework and compare information from previous studies about virtual teams, the independent variables (organizational trust and communication), and the dependent variable (team performance). Within the literature review, I provide a

thorough background on the life cycle of virtual teams and why it is the theoretical framework for this study, advantages and disadvantages of virtual teams, an understanding of organizational trust within virtual teams with results from previous studies, and an analysis of communication within virtual teams with results of earlier studies. Also, I explain team performance and performance management with a comprehension of balanced scorecards.

I used various journals, databases, books, and professional websites for the literature search in support of the problem statement and the research question. I also used databases from the Walden University, which included Business Source Complete, Academic Search Complete, ProQuest Central, Sage Premier, and ScienceDirect. In addition, I used sources from ResearchGate and Google Scholar. I used the following keywords to search the databases: *virtual teams, organizational trust, communication, team performance, performance management, balance scorecards, information technology, life cycle of virtual teams, leadership,* and *management.* The majority of the sources in the literature review were within 5 years of my anticipated graduation date of 2021. The frequency and percentages of these resources are in Table 1.

Table 1

Frequency and Percentage of Resources

Resources	2016-2020	Prior to 2016	Total	Percentage
Books	3	4	7	8%
Dissertations	0	0	0	0%
Peer-reviewed articles	54	26	80	84%
Other resources	5	2	7	8%
Total	62	32	94	100%

Life Cycle of Virtual Teams Theory

The life cycle of virtual teams has three sections: inputs, processes, and outputs. Powell et al. (2004) stated the inputs of virtual teams are resources, skills, and abilities needed to initiate the work. Inputs have four categories: design, culture, technical expertise, and training (Powell et al., 2004). The design of virtual teams is how leaders use communication and interaction between team members to achieve goals (Powell et al., 2004). Cultural differences are familiar with virtual teams, but the differences create opportunities for collaboration and relationship-building (Dakrory & Abdou, 2009). Technical expertise has a significant impact on virtual team members and can determine the level of performance based on user experience (Powell et al., 2004). Reliable and consistent training among virtual team members increases collaboration and performance (Dakrory & Abdou, 2009).

Processes create the action to make the inputs proceed in the life cycle of virtual teams. The process components are socioemotional and task. According to Powell et al. (2004), virtual leaders must use the socioemotional and task groups to create continuous interaction between team members. In the socioemotional group, there are three

categories: relations, cohesion, and trust (Saunders, 2000). Dakrory and Abdou (2009) claimed the socioemotional process is the relationship-building between team members, in which each participant feels that their contributions are valuable to the team. Cohesion is the attraction and closeness of team members working toward common goals built on the development of trust (Fiore et al., 2015). Organizational trust is the foundation of the relationship between leaders and the subordinates of an organization that decreases opportunistic behaviors and organizational dysfunction (Mincu, 2015). Trust building starts at the leadership level, where leaders are responsible for setting the standards for empathy, reliability, competence, honesty, and vulnerability (Muhl, 2014). For continuous positive interaction, virtual leaders create tasks for team members to understand and complete goals.

The task component of processes has three categories: communication, collaboration, and task-technology fit. Communication is a significant function in virtual team processes because team members must choose the correct communication technologies to match the virtual environment (Dakrory & Abdou, 2009). Collaboration is the level of communication and partnership made between team members for knowledge management and goal completion (Dakrory & Abdou, 2009). The task-technology fit is the participants' selection of the appropriate technologies to complete the tasks (Dakrory & Abdou, 2009). The outputs section rates the performance of the inputs and processes for the life cycle of virtual teams.

Last, performance is the final measurement used to determine the success of the sections totally and individually. According to Dakrory and Abdou (2009), the

performance score is the definitive representation of the different parts and complete output of all sections for the life cycle model of virtual teams. Some business leaders may use the scores to determine if there are relationships between the variables (Dakrory & Abdou, 2009). I decided to use the life cycle of virtual teams as the theoretical framework for this study because the theory points to organizational trust and communication as primary factors that may have a relationship with virtual team performance.

For this study, I considered other theoretical frameworks to understand the relationship between organizational trust, communication, and team performance within virtual teams. Schiller and Mandviwalla (2007) performed a study to analyze 25 virtual team theories by using the life cycle model of virtual teams as the measuring criteria for performance. Based on the results, Schiller and Mandviwalla concluded the adaptive structuration and media richness theories were most frequently used to measure virtual team performance.

IT leaders use the adaptive structuration theory (AST) to improve communication and technological processes for virtual team development and performance (Rains & Bonito, 2017). The main aspect of AST is to understand the relationship between communication technologies and virtual team performance (Rains & Bonito, 2017). Schiller and Mandviwalla (2007) argued AST has a high correlation with the life cycle of virtual teams for contextual inputs, communication, and task performance, but not specifically with organizational trust. Although, AST has the same structure as the life cycle of virtual teams, the process component entails social interaction, rather than

organizational trust. Therefore, I did not use AST as the theoretical framework for this study.

Similar to AST, IT leaders use the media richness theory to determine which communication medium has a positive correlation with task and performance outcomes (Ishii et al., 2019). Hornung (2015) claimed video communication is the most effective medium for interaction between team members. According to Schiller and Mandiwalla (2007), the media richness theory has a high correlation with communication, social interaction, and task performance, but a much lower relationship with organizational trust. Ishii et al. (2019) identified two problematic aspects of media richness theory: (a) not sharing pertinent information due to lack of trust and (b) using the wrong communication technologies for performance. Because the issues of trust and communication were key to this study, I did not use the media richness theory as the theoretical framework.

Virtual Teams and Performance

Business leaders create virtual teams to add flexibility and agility to their organizations. Virtual teams are groups of geographically dispersed workers brought together through the use of information and communication technologies to accomplish and complete organizational projects and tasks (Powell et al., 2004). Schaubroeck and Yu (2016) claimed virtual teams offer organizations the flexibility to tackle problems and pursue new opportunities autonomously. According to Scott and Wildman (2014), virtual teams have become increasingly more prevalent as organizations continue to expand globally and culturally. Scott and Wildman further added that the virtual expansion of

organizations creates an agile organization that is prepared to capitalize on global opportunities. The flexibility and autonomy of virtual teams create many advantages and opportunities for companies.

Advantages

Virtual teams have a variety of advantages in comparison to traditional work teams, such as increased participation through communication technologies and the ability for workers to make invaluable contributions with a flexible schedule (Shen, Lyytinen, & Yoo, 2014). Hoch and Kozlowski (2014) argued different styles of leadership, such as shared leadership are more effective within virtual teams compared to hierarchical leadership because team members are able to participate in collaborative decision-making. Hoch and Dulebohn (2013) claimed shared leadership within virtual teams has a strong relationship with collaborative behavior that leads to positive organizational outcomes. Morley et al. (2015) claimed virtual teams have advantages, such as increased pools of knowledge and contacts and different perspectives for managing work and internal issues. According to Gilson et al. (2014), virtual teams are highly useful within the workforce because of innovative communication technologies, radical changes in organizational design and culture, and the use of multicultural employees from different locations. Virtual business leaders can use different styles of leadership and communication technologies to recruit experts with a variety of skills.

Dakrory and Abdou (2009) stated virtual teams are a continuous trend that allows participants from different locations with variations of skills to communicate and collaborate more effectively and efficiently. Business leaders that develop virtual teams

create organizations that are cost-efficient and autonomous because of the elimination of physical office space (Grober & Baumol, 2017). Alsharo et al. (2017) claimed organizations that develop virtual teams are able to recruit experts from diverse backgrounds to complete complex tasks and projects. Dulebohn and Hoch (2017) added virtual teams help organizations reduce operating costs by decreasing business travel expenses and provide the ability for geographically dispersed workers to create a knowledge management system that encompasses a wide array of skills. Virtual teams are a cost-saving benefit to organizations and increase job satisfaction for employees.

Liao (2017) claimed virtual teams can benefit employees by giving them the flexibility to work remotely, which may help increase their overall job satisfaction. Liao (2017) further added virtual teams are beneficial because employees can work with external experts. Bhat et al. (2017) claimed virtual teams pose advantages, such as a diverse workforce, flexible organizational structure, and the access to innovative resources. Bhat et al. further added virtual teams have greater innovation potential than traditional face-to-face teams. Virtual teams have advantages compared to traditional work teams, but there is still room for improvement.

Disadvantages

Team performance is still a significant issue within virtual teams. According to Carter et al. (2015), the evolution of virtual teams within a business environment causes problems with succession, teamwork processes, and overall strategies. Dulebohn and Hoch (2017) claimed virtual teams have many disadvantages, such as lower team engagement due to the reliance on communication technologies, difficulties creating trust

and shared responsibility amongst team members, and issues with managing the tasks and workloads of team members. These disadvantages have a tremendous impact on communication, collaboration, and trust.

Cohesion is a primary issue with using technology as the primary source of communication within virtual teams. Miles and Hollenbeck (2014) stated when teams depend on virtual technologies as the main source of communication; there is a considerable loss of communication richness compared to collocated teams. Kirkman et al. (2013) argued the use of virtual technologies within virtual teams as the primary means of communication is inferior compared to face-to-face communication because of the participants' ability to communicate non-verbally. Schaubroeck and Yu (2016) stated skill differentiation with communication technologies within virtual teams creates significant challenges that affect team performance. De Paoli and Rapo (2015) claimed virtual teams must have a combination of digital and physical face-to-face interaction to achieve a high level of team performance. Furthermore, virtual team members had difficulties with seeing the full picture of a project, collegiality, reliance on technology, and the overall feeling of isolation (Solomon, 2016). Not only do team members have difficulties, but business leaders also have challenges with virtual environments.

Business leaders have difficulty creating a management system to address the complexities and dynamics of virtual teams. Gibbs et al. (2016) claimed virtual team leaders must possess strong and unique leadership skills to increase team performance due to geographical dispersion and reduced socio-emotional cues. The main challenges for leaders of virtual teams are trust creation and maintenance, distance and time-related

issues, and cultural/diversity issues (Lilian, 2014). According to Plazas (2013), project managers had the following issues when managing projects and personnel virtually: building trust, inspiring team members, building a team culture, and understanding cultural diversity. To overcome virtual challenges, business leaders must create a management paradigm that understands the relationship between communication, organizational trust, and team performance.

Organizational Trust and Team Performance

Several researchers (Mincu, 2015; Muhl, 2014; Tschannen-Moran, 2014) have put forth definitions and explanations for organizational trust. The building of organizational trust is a major component of creating and leading an organization towards adaptability and sustainability (Tschannen-Moran, 2014). Mincu (2015) stated organizational trust is the foundation of the relationship between leaders and the subordinates of an organization that attempts to minimize opportunistic behaviors and organizational dysfunction. Muhl (2014) claimed trust building starts at the leadership level, where leaders are responsible for setting the standards for empathy, reliability, competence, honesty, and vulnerability. Muhl further claimed honesty is the most important standard for leaders to portray because it decreases the possibility of opportunistic behavior. Trust is a major factor for creating a positive workforce culture and knowledge management system in organizations.

Organizational Trust

Khesal et al. (2013) claimed good knowledge management initiatives can create a foundation of trust between employers and employees that breaks down cultural barriers

and increases knowledge sharing. Khesal et al. further added the four components of trust that lead to a knowledge sharing culture are care, support and guidance, confidence, and long-term relationship building. Collins and Chou (2013) claimed there is a positive correlation between interpersonal trust and team productivity. Collins and Chou also claimed employees must have trust in management and their team members for effective teamwork within virtual teams. Trust in management and leadership leads to a productive and dynamic workforce.

According to Işık et al. (2015), there is a significant and positive relationship between teamwork and organizational trust. Işık et al. stated the development and management of organizational trust has a substantial impact on globalization, workplace diversity, cultural awareness, and democracy within the workplace. An environment of trust can create open communication, knowledge sharing, and collaborative decision-making between employees (Işık et al., 2015). Organizational trust is a significant factor for increasing team performance in traditional and virtual teams.

Organizational Trust and Virtual Team Performance

The development of trust has a positive correlation with the relationship-building process of team members. This correlation makes trust an invaluable component in virtual teams that is buildable and destroyable (Benetyte & Jatuliaviciene, 2013). However, Jarvenpaa et al. (1998) stated the reliance on communication technologies in virtual teams hampers the feelings of trust, such as warmth, attentiveness, and other interpersonal feelings. Jarvenpaa and Leidner (1998) stated time commitment and conflicting schedules were major barriers that prevented trust building in virtual teams.

Trust and communication barriers are major issues for increasing virtual team performance.

Despite the barriers that prevent organizational trust in virtual teams, there are researchers that have put forth ideas to improve and/or implement trust within virtual teams. Jarvenpaa et al. (1998) claimed timely responses, open communication, and giving/receiving feedback are major factors in building trust in virtual teams. Berry (2011) claimed virtual team effectiveness through the development of trust is dependent on the resolution of conflict, distribution of adequate and competent team roles for team members, and continuous emphasis on good communication. Jarvenpaa and Leidner (1998) claimed trust is the combination of communication behaviors and team member actions. For the early development of trust, there must be social and enthusiastic communication that ignites team members to cope with technical uncertainty and individual initiative (Jarvenpaa & Leidner, 1998). Business leaders are responsible for creating organizational trust and communication standards within virtual teams.

To develop and maintain trust within virtual teams, team leaders must ensure communication is predictable with substantial and timely responses (Jarvenpaa & Leidner, 1999). Jarvenpaa and Leidner (1999) further added that the effective combination of trust and communication within virtual teams leads to positive leadership and team performance. Benetyte and Jatuliaviciene (2014) performed a quantitative study in 2012 with 58 participants based on Shockley-Zalabak et al. (2010) components of trust: competence, identification, fairness, concern for stakeholders, and openness and honesty. Based on the results, Benetyte and Jatuliaviciene confirmed competence was the

most important component, and openness and honesty was the least important component of trust. Benetyte and Jatuliaviciene also agreed with Jarvenpaa and Leidner who claimed predictable communication and timely responses within virtual teams lead to positive leadership and team performance. Virtual business leaders can increase team performance by understanding the important components of organizational trust and ensuring succinct communication.

Dorr and Kelly (2011) claimed communication and trust are the most important variables for successful virtual team meetings and collaboration. In addition, Dorr and Kelly argued face-to-face interaction combined with succinct and effective communication technologies will increase organizational performance. Espinosa et al. (2015) agreed with Dorr and Kelly's theory on the importance of communication technologies within virtual teams. Espinosa et al. added proper use of communication technologies will enhance relationships between members, but the timing of communication has to be conducive to members that are in different locations and time zones. Effective communication builds trust and increases organizational performance within virtual teams.

For many studies, regarding the success of virtual team effectiveness, trust is either a contributing factor as an independent variable or the final factor as a dependent variable. Altschuller and Benbunan-Fich (2010) stated the ideal goal for virtual teams is to have trust combined with superior performance. In their study, trust was the dependent and intermediate variable between virtual co-presence and performance. Based on the findings, Altschuller and Benbunan-Fich concluded virtual co-presence contributed to

trust positively and trust had a positive correlation with performance. Pierce and Hansen (2013) claimed all three forms of trust (personality, cognitive, and institutional) as independent variables had a significant influence on virtual team effectiveness, but through the development and maintenance of team trust. Pierce and Hansen also confirmed personality traits of virtual team leaders have a significant influence on team effectiveness, but through the development and maintenance of team trust. Different forms of trust are important for superior virtual team performance, but communication is also a vital factor.

Communication and trust have a direct and indirect relationship with virtual team performance. Morgan et al. (2014) suggested various methods of communication may have an impact on team effectiveness and trust is a psychological trait influenced by communication. Based on their findings, Morgan et al. concluded trust is only increased in virtual teams when the participants have the opportunity to meet face-to-face and develop interpersonal relationships. Morgan et al. also concluded communication methods are not a major contributor to a team's effectiveness. Cheng et al. (2016) performed a qualitative study with a manufacturing company in China to evaluate how individual trust within virtual teams develops over time. Cheng et al. stated individual trust has six sub-factors: risk, benefit, utility value, interest, effort, and power. Cheng et al. concluded these factors were primarily responsible for developing business collaboration and increasing team performance within virtual teams. Although communication and trust are factors for increasing virtual team performance, business leaders create the foundation to make the factors work.

Within a virtual environment, the leader's style and character may determine relationship success with subordinates. Guinalíu and Jordán (2016) performed a quantitative study to understand the relationship between physical attributes (attractiveness), behavioral characteristics (justice and empathy), and virtual leadership. Guinalíu and Jordán claimed the independent variables: attributes and behavioral characteristics determine if the subordinates will develop trust in the virtual team leader. Guinalíu and Jordán stated the leadership style (transformational or transactional) of the virtual leader could also be a factor in developing trust with subordinates. Based on the findings, Guinalíu and Jordán concluded a higher capacity for attractiveness, justice, and empathy by the subordinates towards the virtual team leader would increase trust. The leadership style of the virtual team leader did not play an important role in the development of trust between the virtual team leader and the subordinates (Guinalíu & Jordán, 2016). The leader's attributes and characteristics are essential for trust-building, but leaders should also have a thorough understanding of organizational trust components.

Organizational trust components such as ability, integrity, communication, training, risk, and work engagement can influence virtual team performance (Mansor et al., 2012). Mansor et al. (2012) used data from previous studies to prove effective communication and training were the most critical factors in developing organizational trust within virtual teams. Although communication was an essential component for developing organizational trust, further research is needed to understand other factors that might affect trust and team performance.

Teamwork behaviors and emotional authenticity may impact trust and team performance. Connelly and Turel (2016) performed a quantitative study to determine if team-level trust and teamwork behaviors mediate the relationship between team emotional authenticity and team performance. Connelly and Turel used the structural equation modeling analysis as the statistical formula for analyzing the data. Connelly and Turel used data from 191 sophomore students at an American university. Connelly and Turel concluded team emotional authenticity did not affect team performance, but team emotional authenticity had an effect on team trust. Team trust had a positive relationship with team emotional authenticity, teamwork behaviors, and team performance (Connelly & Turel, 2016). Some researchers point to dimensions of trust as critical factors for communication and collaboration within virtual teams.

Kauffmann and Carmi (2017) suggested cognitive and affective trust are the mediation variables between communication and collaboration within virtual teams. Kauffmann and Carmi used quantitative analysis to determine if there was a relationship between the independent variables (task communication and relationship communication), the mediators (cognitive trust and affective trust), and the dependent variable (collaboration). Kauffmann and Carmi concluded there was a significant correlation between communication, trust, and collaboration. Also, Kauffmann and Carmi found trust played an essential role in mediating the relationship between communication and collaboration within virtual teams. Trust has a positive relationship with communication and collaboration, but other factors might influence overall team performance within virtual teams.

Factors such as cultural differences, language problems, time-zone differences, team size, technical problems, lack of sufficient training, and communication technologies may affect virtual team performance. To determine which factor(s) have an effect on virtual team performance, Gheni et al. (2016) performed a quantitative study with information technology companies in Malaysia. Gheni et al. concluded insufficient training was the highest factor that affected virtual teams' performance. The other high-ranking factors were cultural differences and language problems (Gheni et al., 2016). Trust was not a significant factor in this study (Gheni et al., 2016). Although trust did not have a substantial impact on virtual team performance in this study, trust remains a significant factor in other studies.

Pangil and Chan (2014) claimed three different types of trust (personality-based trust, institutional-based trust, and cognitive-based trust) have a significant relationship with virtual team performance. Pangil and Chan conducted the study with the Malaysian division of a multinational information technology company that had issues with virtual workers. Pangil and Chan used questionnaires to gather data from the participants, regarding three different types of trust: personality-based trust, institutional-based trust, and cognitive-based trust.

Personality-based trust is the level of trust between a leader and subordinate, in which the subordinate feels a connection to the leader based on the personality and trustworthiness of the leader (Pangil & Chan, 2014). Institutional-based trust is when individuals conform and follow the rules and regulations of a firm, which creates a high level of trust between the individuals (Pangil and Chan, 2014). Cognitive-based trust is

the level of interaction between team members, which determines if the team members will trust each other (Pangil and Chan, 2014). Pangil and Chan (2014) concluded three different types of trust had a significant relationship with virtual team performance. Personality-based trust and institutional-based trust had a substantial relationship with knowledge sharing (Pangil & Chan, 2014). Different types of trust have a significant connection with virtual team performance, but further research is needed to determine if the relationship applies to creative work performance.

Chae (2016) supported Pangil and Chan (2014) about trust and virtual team performance but wanted to determine if cognitive-based trust and affective-based trust had a relationship with creative performance. Chae used data from Parayitam and Dooley (2009), Barczak and Lassk (2010), and Chua and Morris (2012). Parayitam and Dooley claimed cognitive-based trust influences relationships towards creative performance, but affective-based trust does not affect relationships towards creative performance. Barczak and Lassk noted cognitive-based trust positively influences team creativity, and affective-based trust does not have an influence on team creativity. Chua and Morris stated cognitive-based trust and affective-based trust positively impacts creative collaboration. Chae concluded cognitive-based trust positively influences team performance, but affective-based trust is not pivotal for team performance. For increased virtual and creative performance, trust is the positive interaction and transaction between leaders and subordinates. Virtual leaders are responsible for creating trust, but feedback from subordinates could affect team trust.

Team feedback and learning are functions within virtual teams that may increase trust and performance. To determine if these factors have a relationship with trust and performance, Peñarroja et al. (2015) performed a quantitative study at a university in Spain with 212 students. Based on the findings, Peñarroja et al. concluded a high level of team trust within virtual teams occurred when there was the indirect effect of team feedback on team learning through group information elaboration. Peñarroja et al. also concluded there was a positive relationship between group information elaboration and team learning within virtual teams. High levels of trust indicate communication is a factor for team feedback and learning between virtual team members.

Types of trust such as impersonal and interpersonal may have an impact on communication within virtual teams. Lohikoski et al. (2016) claimed impersonal trust is essential for interpersonal trust and communication within virtual teams. Lohikoski et al. also claimed impersonal trust is more significant within virtual teams than in traditional teams. Impersonal trust is the main factor that is responsible for interpersonal trust development, and communication in the early stages on team development (Lohikoski et al., 2016). Although team trust is a major factor for communication and team performance within virtual teams, cohesion may also be a factor.

Paul et al. (2016) claimed there is a positive relationship between individual trust and team cohesion. Effective coordination within virtual teams improves team and project performance (Paul et al., 2016). Individual trust is high when team members play an active role in team-building, team collaboration, and knowledge sharing (Paul et al., 2016). Cohesion is the high level of individual and impersonal trust between team

members (Paul et al., 2016). Although individual trust and impersonal trust have a positive relationship with cohesion and performance within virtual teams, some researchers wanted to understand how trust works in a different virtual environment.

Lee et al. (2014) conducted a study to determine if there was a relationship between two different groups types (utilitarian and hedonic) and two different types of trust (trust in team members and trust in service members) in using technology within virtual communities. Lee et al. used the technology acceptance model (TAM) as the theoretical framework for the study. Lee at al. claimed TAM is a theory specifically tailored to model the user's acceptance and use of technology within an environment. Rauniar, Rawski, Yang, and Johnson (2014) stated researchers use TAM to forecast the participants' voluntary use and adoption of technology. Based on the findings, Lee et al. discovered there were positive relationships between the utilitarian group and trust in members (interpersonal trust) and between the hedonic group and trust in service members (impersonal trust). There is a strong relationship between interpersonal trust, impersonal trust, and virtual performance. Further research is needed to determine if there is a difference in trust methods between virtual and collocated teams.

Breuer et al. (2016) used data from existing studies to determine if there is a difference in team trust between virtual and collocated teams. Breuer et al. proposed there was a positive relationship between team trust and team effectiveness within virtual teams. Based on the findings, Breuer et al. concluded there was a positive relationship between team trust and team effectiveness in virtual teams and the relationship was stronger in comparison to collocated teams. Breuer et al. discovered there was not a

positive relationship between the documentation of team interactions and team effectiveness. Breuer et al. noted the documentation of team interaction did not play a major role in building team trust towards team effectiveness. Team trust is a major factor for team effectiveness in virtual teams, but understanding the relationship between trust, knowledge sharing, and behaviors are also important.

Chen et al. (2014) conducted a study with Taiwanese virtual teachers to explore how community trust and altruism impacted knowledge sharing intention and behaviors. Chen et al. discovered community trust influenced knowledge sharing intention, which increased knowledge sharing behavior. Chen et al. also claimed altruism increased the relationship between community trust and knowledge sharing intention. Furthermore, Chen et al. noted a positive relationship between community trust and knowledge sharing intention when the participants perceived a high level of altruism. Altruism is important for trust and collaboration, but strategy is also critical for virtual team success.

Ford et al. (2017) suggested strategies for improving virtual team performance, such as technological enhancement, human resource policies, team leader preparation, team mission and needs, and direct leadership. Although these strategies are crucial for virtual team improvement, leaders must create an environment of trust with team members (Ford et al., 2017). The authors noted leaders could implement trust by selecting team members based on prior virtual team performance, group collaboration, and initiative. Virtual leaders should also create an onboarding culture that addresses organizational culture, policies, procedures, roles, and responsibilities (Ford et al., 2017).

Serrat (2017) agreed with Ford et al. about the importance of trust within virtual teams but claimed understanding different types of trust is also critical.

Serrat (2017) stated deterrence-based trust, calculus-based trust, knowledge-based trust, and identification-based trust are challenges in virtual environments. Deterrence-based trust is a behavior system that addresses compliance with organizational trust (Serrat, 2017). Calculus-based trust is a reward system that focuses on rewards for obedience and punishment for disobedience (Serrat, 2017). Serrat noted knowledge-based trust is the continuous process of information sharing and consistent communication between team members. Identification-based trust is the understanding and support of team members, in which team members endorse and work together to achieve common goals (Serrat, 2017). To overcome trust-building barriers in virtual teams, Serrat suggested leaders create clear and concise goals, promote knowledge sharing and team collaboration, identify culture and identity, and solve ongoing problems.

Developing trust within virtual teams is challenging due to leadership methodologies. Jaakson et al. (2019) performed a quantitative study with 71 participants to investigate how trust impacted virtual team performance. Jaakson et al. concluded negative feedback from leadership has a weak effect on trust and performance. To increase trust and performance, Jaakson et al. suggested virtual business leaders focus on positive reinforcement and recognition for short-term goals. Trust is a vital and complex function within virtual teams, but communication is also necessary for increased team performance.

Communication and Team Performance

Communication is a factor for trust and performance in traditional and virtual teams. Communication is the essence of how humans express feelings, convey emotions, and transfer information to each other (Juneja, 2017). Phutela (2015) stated communication is the process in which people verbally and/or non-verbally share information and ideas with each other. Juneja (2017) stated there are three types of communication: verbal (words, speeches, presentations), nonverbal (facial expressions, gestures, hand movements), and visual (displays, banners, maps). Although verbal and visual communication are important, non-verbal communication plays a major role in the workplace. According to Tiwari (2015), team members use non-verbal communication processes such as facial expressions and body language to send and receive wordless messages between each other. Leathers and Eaves (2016) stated non-verbal communication transmits meanings and intentions that are usually free of deception and distortion. Within the workplace, non-verbal communication is the prime element of interactions between the leader and the subordinate (Gkorezis, Bellou, & Skemperis, 2015). Clear methods of communication in the workplace create a positive relationship between employees and leaders.

Communication and Leadership

Leaders are responsible for defining a team and personal goals, evaluating the team's communication effectiveness, and understanding variables that affect productivity and performance (Adler et al., 2013). Mikkelson et al. (2015) claimed business leaders that used effective communication and relationship-focused leadership had a high level of

satisfaction, motivation, and organizational commitment from their employees. Although business leaders are responsible for establishing effective communications, they still have cross-cultural problems such as anxiety, uncertainty, stereotyping, and ethnocentrism (Jenifer & Raman, 2015). With the workforce becoming more globalized and virtual through the use of communication technologies, business leaders must develop a better understanding of decision making, intercultural negotiation, and cross-cultural communication (Mba, 2015). Although there are communication choices for leaders, challenges increase in virtual environments.

Communication and Virtual Team Performance

For virtual teams, the lack of nonverbal of communication is difficult for team members to establish valuable connections and relationships. Solomon (2016) claimed communication failures within virtual teams play a major role in low team performance due to the lack of face-to-face contact. Communication within virtual teams is more challenging because of cultural barriers (Dorr & Kelly, 2011). Communication failures within virtual teams decrease team performance.

Despite the flexibility of innovative communication technologies within virtual teams, members still have issues creating the same kind of warmth and connection as collocated teams. In a study performed by Unify, 44% of the participants found virtual communication to be as productive as face-to-face interaction, and 43% felt confused and overwhelmed by communication technologies (Ferazzi, 2014). Another report by RW3 LLC claimed 46% of virtual team workers had never met their cohorts, and only 30% met

their counterparts in person once a year (Dorr & Kelly, 2011). The communication challenges within virtual teams can provide opportunities for new ideas.

Developing effective communication strategies for virtual teams is a formidable task, but some researchers put forth ideas to overcome the difficulty. Solomon (2016) claimed virtual teams should still have face-to-face meetings, along with the use of communication technologies to establish trust and build relationships amongst team members. Beslin and Reddin (2004) claimed leaders should create self-assessment surveys that allow team members to rate their communication skills and abilities. The results from the surveys could help leaders formulate communication strategies that coincide with the mission and vision of their organization (Beslin & Reddin, 2004). Innovative communication strategies may be used to understand and improve virtual team performance.

A communication factor such as team learning behavior might have an impact on productivity and quality within virtual teams. Andres and Shipps (2010) examined how team learning behaviors affect task outcomes between collocated teams and media distributed teams. Andres and Shipps concluded technology-mediated collaboration experienced higher instances of communication breakdowns, misunderstandings, and task execution difficulty as compared to face-to-face conditions. Andres and Shipps claimed face-to-face settings make it easier for team members to fix problems and create an environment for exploration and alternative ideas. Andres and Shipps discovered active collaboration from team members in a collocated or virtual environment with the use of communication technology had a positive influence on team learning processes, higher

productivity, and interaction quality. Using communication technology for collaboration may have a positive impact on productivity, but further research is needed to determine if technology has a positive effect on performance and satisfaction.

Marlow et al. (2016) claimed the lack of clarity in virtual teams is the ambiguity of communication. Marlow et al. used data from previous studies to support their theory that communication is the most vital component for influencing virtual team performance and satisfaction. Marlow et al. proposed a communication process framework for virtual teams, which encompassed the following components: inputs (team diversity), communication (frequency, quality, and content), emergent states (trust and cognition), and outputs (validity, performance, and satisfaction). Within this framework, the Marlow et al. argued that subcomponents of communication (frequency, quality, and content) must be fully developed and managed, in order to have a positive relationship with emergent states (trust and cognition), and outputs (validity, performance, and satisfaction). Communication is an important factor for building trust and increasing performance within virtual teams, but other aspects of communication should be examined.

Leonard et al. (2015) claimed the main four themes for understanding relationships and communication within virtual teams are social presence, online identity, openness, and interactivity. Leonard et al. used the four themes to examine the pattern of relationships between the participants by developing a virtual training program through the use of simulation. Leonard et al. concluded social presence and online identity were the two most important factors for developing consistent communication within virtual

teams. Social presence and online identity were the most important factors, but other factors may have an impact on communication within virtual teams.

Cross-cultural themes such as uncertainty avoidance, power distance, in-group collectivism, and gender egalitarianism might influence communication within virtual teams. Weems et al. (2015) performed a study to determine if the themes had an impact on virtual communication. Weems et al. claimed the development and understanding of culture are the main factors for positive communication within virtual teams. Weems et al. concluded the increased management of the four themes of cross-cultural collaboration will create swifter adaptation and more effective communication within virtual teams. The common factors between Marlow et al. (2016), Leonard et al. (2015), and Weems et al. are team diversity, social identity, presence, and culture. These factors are important prerequisites for effective communication within virtual teams. Communication and cultural themes have a significant relationship with performance within virtual teams, but communication styles may also be significant.

To determine if communication styles impact performance, Sarhadi (2016) performed a study with virtual and collocated employees in the project management industry. Sarhadi's goal was to determine if there was a correlation between communication styles of team members and team performance. The communication styles were supportive style, reflective style, director style, and emotive style (Sarhadi, 2016). Based on the findings, Sarhadi concluded there was a relationship between communication styles and team performance. High performance teams had equal levels of communication styles and low performance teams had unequal levels of

communication styles (Sarhadi, 2016). Sarhadi also concluded equal levels of communication styles meant the participants established a shared sense of culture that had the ability to flourish. With unequal levels of communication styles, the participants were either undervaluing or overvaluing certain communication styles, which decreased the overall performance of certain teams (Sarhadi, 2016). Communication is an important factor for increasing virtual team performance, but there should be an understanding of communication tools.

Kramer et al. (2016) agreed with Sarhadi (2016) about the importance of communication in virtual teams but argued the selection of communication tools is a primary factor for high performance. Kramer et al. claimed virtual team members should collectively choose the best communication tools that coincide with the environment and skill level of the participants, in order to increase work productivity and performance. Kramer et al. claimed incorporating feedback from team members into the selection process of communication technologies may help build a knowledge management system that understands cultural differences. Communication technologies are critical for increased virtual team performance, but other factors may have an impact on communication and performance.

Factors such as cohesion, collaboration, and leadership might have a correlation with communication and performance within virtual teams. To determine if there is a correlation between the factors, communication, and team performance, Saafein and Shaykhian (2014) used data from telecommunication professionals in leadership positions. Based on the findings, Saafein and Shaykhian concluded cohesion and

collaboration were more important factors than leadership for virtual team performance, but reliable communication tools with cohesion were the most significant performance factors. Gonçalves et al. (2014) agreed with Saafein and Shaykhian about the importance of virtual communication technologies but wanted to determine if there is a difference between direct communication architecture (DCA) and virtual communication architecture (VCA).

DCA is the use of videoconferencing technology, in which the participants communicate face-to-face in real time through dedicated hardware and/or specific computer software (Gonçalves et al., 2014). VCA is the use of virtual simulation technology to create immersive and engaging learning experiences through the use of avatars in real-time (Gonçalves et al., 2014). Based on the findings, Gonçalves et al. (2014) concluded VCA and DCA had the same level of team performance within virtual teams, but VCA was more effective in coping with the new organizational environments because of role playing in different situations. The flexibility of role-playing gives participants the opportunity to change perspectives and adapt to changes in their workplace (Gonçalves et al., 2014). Communication technology has a positive effect on virtual team performance, but further investigation is needed to understand the emotional impact.

Understanding the emotional aspects of communication technologies may increase trust and virtual team performance. Stawnicza (2014) investigated how technologies create a feeling of oneness and unity amongst team members. Stawnicza used data from several interviews and concluded the level of communication plays a

major role in developing trust and oneness between dispersed team members. Communication, trust, and oneness were the three main factors responsible for influencing team performance between dispersed team members (Stawnicza, 2014). The participants claimed using alternative communication methods, such as social media channels, enhance trust and strengthen unity because the channels can focus on good memories of projects (Stawnicza, 2014). The participants also believed social digital channels create harmony and unity amongst team members (Stawnicza, 2014). Using various communication methods within virtual teams are beneficial, but choosing the right technology is essential.

Challenges such as language problems, overusing direct messaging, and unbalanced activity decrease virtual team performance (Stray et al., 2019). Stray et al. (2019) used data from 30 technology leaders to determine if Slack communication technology worked best in their environment. Based on their findings, Slack was an efficient tool for team awareness and knowledge sharing, but training and thorough leadership are pivotal for overcoming communication challenges (Stray et al., 2019).

With the continuous growth of virtual teams, choosing practical communication tools are still problematic. Aritz et al. (2017) performed a quantitative study with 262 participants to determine which communication methods were most effective in a virtual environment. Based on their findings, 91% preferred Google Docs for file sharing, 83% preferred general email, and 72% claimed Facebook was effective for social networking (Aritz et al., 2017). Surprisingly, only 51% of the participants used Skype or Google Hangouts for video conferencing (Aritz et al., 2017). The authors noted high-performing

virtual teams use social networking and communication channels more efficiently for building relationships and project completion. Friedrich et al. (2016) agreed with Aritz et al. about the importance of communication in virtual teams.

Friedrich et al. (2016) used the virtual team maturity model (VTMM) to analyze data from 80 IT experts. According to Friedrich et al., VTMM has 11 processes: (a) get-to-know-each-other, (b) agree rules, (c) set goals, (d) perform task management, (e) feedback, (f) decision-making, (g) conduct meeting management, (h) engage in trust-building, (i) information management, (j) rewards and recognition, and (k) arrange ramping-down. Based on their findings, communication was the primary factor in making the processes work. To improve virtual team performance, business leaders must implement communication methods that encompass training and cohesion (Friedrich et al., 2016). With improved and concise communication processes, virtual teams can match traditional teams (Friedrich et al., 2016). The selection of communication technologies is critical for increased performance, but business leaders must understand virtual leadership.

Ibrahim (2015) argued virtual leadership is responsible for the relationship between intra-team communication and performance. Ibrahim analyzed the relationship with Malaysian virtual education leaders. Ibrahim concluded virtual leadership contributed positively to intra-team communication and intra-team communication contributed positively to job performance. In addition, virtual leadership contributed positively to job performance, but intra-team communication was not a major factor in the relationship between virtual leadership and job performance (Ibrahim, 2015). There is

a positive relationship between virtual leadership, communication, and team performance, but a further understanding of performance measurement is crucial.

Team Performance

Understanding team performance and performance measurement are essential for business operations and decision-making. According to the National Research Council (2015), team performance is a group's ability to achieve goals and objectives. Positive team performance is a result of team satisfaction, relationship-building, and members flourishing together (National Research Council, 2015). Performance measurement is a critical function in business, which has components such as financial measures, productivity, equipment, customer relationships, and team effectiveness (Gawankar et al., 2015). Evaluating team performance through methods such as balanced scorecards is beneficial to business leaders.

Balanced scorecards are useful for understanding the factors needed to increase team and organizational performance. Ivanov and Avasilcai (2014) claimed business leaders use the balanced scorecard to translate their mission and strategy into performance indicators for a performance management system. The indicators are the balance between internal indicators such as critical processes, innovation, learning and development, and external indicators for stakeholders such as vision and strategy (Ivanov & Avasilcai, 2014). Some organizations use the balanced scorecard approach for strategic management, marketing, process management, and employee management (Erkollar & Oberer, 2015). Business leaders also have the flexibility to use balanced scorecards to understand internal resources.

The balanced scorecard is useful for internal resources such as financial analysis, strategic management, employee growth, and knowledge management. Gawankar et al. (2015) stated the four aspects of the balanced scorecard are learning and growth, business processes, customer-focused, and financial. Leaders use the balanced scorecard approach to ensure the organization's strategic goals are defined and understood by the employees (Gawankar et al., 2015). To create a practical, balanced scorecard approach, leaders must determine the elements, identify performance drivers, identify performance measures, communicate, operationalize, train, evaluate, and review (Gawankar et al., 2015). For virtual business leaders, balanced scorecards are also useful for measuring team performance.

Measuring Virtual Team Performance

Balanced scorecards help virtual leaders understand the relationships between different team factors and work variables. Using the balanced scorecard to assess virtual team performance is a successful strategy to help virtual leaders understand which methods are working and which ones need improvement (Fitzpatrick, 2019). Business leaders use the virtual team scorecard to evaluate and monitor growth, profitability, process improvement, and customer satisfaction (Fitzpatrick, 2019). Oberer and Erkollar (2013) claimed business leaders use virtual team scorecards for team dynamics, partnerships, stakeholder relationships, and performance. Oberer and Erkollar also claimed the virtual team scorecard is useful for managing strategic factors of team dynamics. The use of balance scorecards in a virtual environment has a positive influence on team performance.

Transition

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. In Section 1, I presented the background of the problem, problem statement, purpose statement, nature of the study, research question, hypotheses, theoretical framework, operational definitions, assumptions, limitations, and delimitations, the significance of the study, and a review of the professional and academic literature. The review of the existing literature indicates that communication and trust are the most important variables in understanding team performance within virtual teams. In Section 2, I will restate the purpose statement and discuss the role of the researcher, participants, research method, research design, population and sampling, ethical research, instrumentation, data collection technique, data analysis, and study validity. In Section 3, I will present the findings of the study, along with the application to professional practice, implications for social change, recommendations for action and further research, and the reflections on the study.

Section 2: The Project

In this section, I restate the purpose statement and discuss my role as a researcher. I explain the process for finding the participants, clarify the research method and design, and exemplify the methods used to ensure ethical research. This section also includes a discussion of the population and sampling, instrumentation, data collection technique, data analysis, and study validity.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The independent variables were organizational trust and communication. The dependent variable was team performance. The target population for this study were virtual employees in leadership positions within the information technology industry in the Washington, D.C. metro area. The implications for positive social change include the ability for virtual workers to receive opportunities to make valuable contributions to their families and communities.

Role of the Researcher

As the quantitative researcher for this study, adhering to ethical guidelines is important. According to Kang et al. (2017), a quantitative researcher's role is to select the research design, manage the research process, collect and evaluate data, follow ethical guidelines, and publish the study. Zhong et al. (2016) claimed quantitative researchers use measuring instruments to collect data from the participants. My role was to explain the study to the participants, address any concerns before they complete the survey, and

collect and analyze the data without bias. Although I have experience as a virtual employee, I did not have prior experience as a researcher for this topic. Therefore, understanding how bias may affect the data collection process was crucial.

Taking a neutral stance in the data collection process is extremely important for mitigating bias. According to Fusch and Ness (2015), researchers should collect and use data that is void of their personal opinions and beliefs. Zyphur and Pierides (2017) stated quantitative researchers must understand and overcome their biases when collecting and evaluating data. To overcome any personal bias, I received my Collaborative Institutional Training Initiative (CITI Program) certificate, which is a mandatory requirement by Walden University for student researchers. In order to perform any research for my study, I completed 7 intensive modules, which entailed unanticipated problems with data collection, history and ethical principles, assessing risk, and informed consent.

To further avoid bias and ethical issues, I used the three principles of the *Belmont Report*: beneficence, justice, and respect for persons. Mikesell et al. (2013) stated researchers use principles from the *Belmont Report* to help the researcher and participants understand the ethical guidelines of a study. According to the U.S. Department of Health & Human Services (2016), the *Belmont Report* is a statement of guidelines and principles the researcher should use to resolve possible ethical and conduct issues in a study. By using an anonymous survey for the data collection, I prevented ethical issues and adhered to the main principles of the *Belmont Report*.

Participants

Gaining access to perform research on participants is a difficult task because some individuals may be sensitive to outside scrutiny (Monahan & Fisher, 2015). The researcher must create strategies to gain access to organizations and participants, such as joining professional networking groups and attending industry conferences (Monahan & Fisher, 2015). To gain access to the potential participants, I used my memberships with the Harvard Business School Online (D.C. Chapter), Fredericksburg Chamber of Commerce, Project Management Institute, and the Communications Media Management Association. I also used social media platforms such as LinkedIn to recruit participants. According to Gelinas et al. (2017), social media platforms are useful for recruiting participants because they offer a high degree of physical separation and anonymity. These strategies provided access to finding a large pool of participants, who may be directors, managers, chief technology officers, chief digital officers, team leaders, business owners, or consultants working full-time or part-time in a virtual environment in the Washington, D.C. metro area.

To create a working relationship with the participants, I sent an introduction email. Using email to recruit and establish trust with the participants is an effective method for collecting data (Lenters et al., 2014). Taylor et al. (2015) claimed researchers use introductory letters to explain how the study can benefit the researcher and participants. Within the email introduction, I explained the study and how it could benefit the participants. Judging by the participants' responses, I determined whether to include them in the study. If the participant's response was positive, they received another email

with the informed consent format and a direct link to complete the study. By moving forward to the survey, the participants gave their consent to be in the study. Their participation was voluntary and they could withdraw at any time.

Research Method

There are three research methodologies: qualitative, quantitative, and mixed methods (Edmonds & Kennedy, 2017). According to Myers (2013), researchers use the qualitative methodology to understand the social and cultural environments of how the participants engage and interact with each other. Researchers use the qualitative methodology to gain insights into the participants' feelings and thoughts (Sutton & Austin, 2015). Yin (2014) claimed researchers use qualitative research to understand a phenomenon through participant experiences and observations. Developing and understanding personal relationships between the participants was not the goal for this study. Therefore, qualitative methodology was not suitable for this study.

A mixed method is a combination of qualitative and quantitative methodologies within a single study (Taguchi, 2018). Cameron (2015) claimed researchers use the mixed methods approach to maximize the strengths and reduce the limitations of qualitative and quantitative research methods. According to Caruth (2013), a mixed method is an insightful approach for using qualitative and quantitative research collectively but requires more resources and time to develop relationships with participants. Since this study primarily focused on understanding the relationship between variables and not interpersonal relationships, the mixed method approach was not suitable.

According to Babbie (2010), researchers use the quantitative methodology to gather and generalize numerical data across groups of people or to explain a particular phenomenon. Labaree (2016) stated researchers use quantitative research to determine if there is a relationship between the independent variables and a dependent variable within a population. Researchers use the quantitative methodology to perform substantial scale research, eliminate high costs, lower time consumption, and calculate the degree of association between variables (Queirós et al., 2017). Using the quantitative methodology allows the researcher to use statistical data to test the hypotheses and explore relationships between variables (Paul & Garg, 2014). Since I collected the data anonymously from participants without having personal relationships, the quantitative methodology was the most suitable approach for this study.

Research Design

McDonnell (2015) stated researchers use research design to develop a strategy for avoiding the pitfalls of suggesting solutions too quickly without considering a wide range of possibilities. Novice designers have a minimal characterization of a design task and converge too quickly to limit its scope (McDonnell, 2015). Still, experienced designers develop a conceptualized notion and representations of the design problem (McDonnell, 2015). McDonnell noted highly regarded designers understand the demanding requirements and make use of the tension that can exist in a research study to stimulate design innovation.

For the quantitative methodology, there are three designs: quasi-experimental, experimental, and correlation (White & Sabarwal, 2014). According to Kontopantelis et

al. (2015), researchers use a quasi-experimental design to estimate causal effects using observational approaches for natural experiments in real-world settings. White and Sabarwal (2014) claimed researchers use a quasi-experimental design to identify a comparison group that is similar to the treatment group and to test how well an intervention achieves its objectives. White and Sabarwal further added researchers use quasi-experimental design with a comparison group when it is not possible to randomize individuals to treatment and control groups. The quasi-experimental design was not appropriate because this study did not involve comparison, treatment, and control groups.

Researchers use experimental design to illuminate causal reference between variables (Shadish et al., 2002). Rovai et al. (2014) stated the primary purpose of experimental design is for the researcher to investigate the possible cause and effect relationships by exposing the experimental group(s) to the treatment and then comparing the results to the control group. Researchers use experimental design to control and manipulate variables for cause and effect, instead of examining the relationships between variables (Brouwers et al., 2016). The experimental design was not suitable because this study does not focus on causality between variables.

According to Queirós et al. (2017), researchers use a correlation design to determine if there is a relationship between two or more variables. Asamoah (2014) stated researchers use correlation design to assess the covariance among naturally occurring variables, without any attempt to influence or manipulate them. Queirós et al. claimed researchers use correlation design to calculate the degree of association between two variables and to gather and explore information from different domains. The

correlation design was suitable for this study because the main goal was to determine if there is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Population and Sampling

Researchers use the population and sample strategy to investigate the problem within a population (Acharya et al., 2013). According to Sa'id and Madugu (2015), the population of a research study is elements, subjects, and observations that relate to a particular phenomenon. Sa'id and Madugu claimed the sampling method helps researchers obtain quicker results compared to studying a whole population within a research study. The population for this study was virtual business leaders in the information technology industry who work in the Washington, D.C. metro area.

According to Acharya et al. (2013), sampling methods are probability and non-probability. Probability methods ensure each person within a population has an equal chance to be in a study (Acharya et al., 2013). Researchers use nonprobability methods for studies that entail a specific and targeted population (Stern, Bilgen, & Dillman, 2014). A non-probability method was suitable for this study because the population was virtual business leaders in the information technology industry who work in the Washington, D.C. metro area.

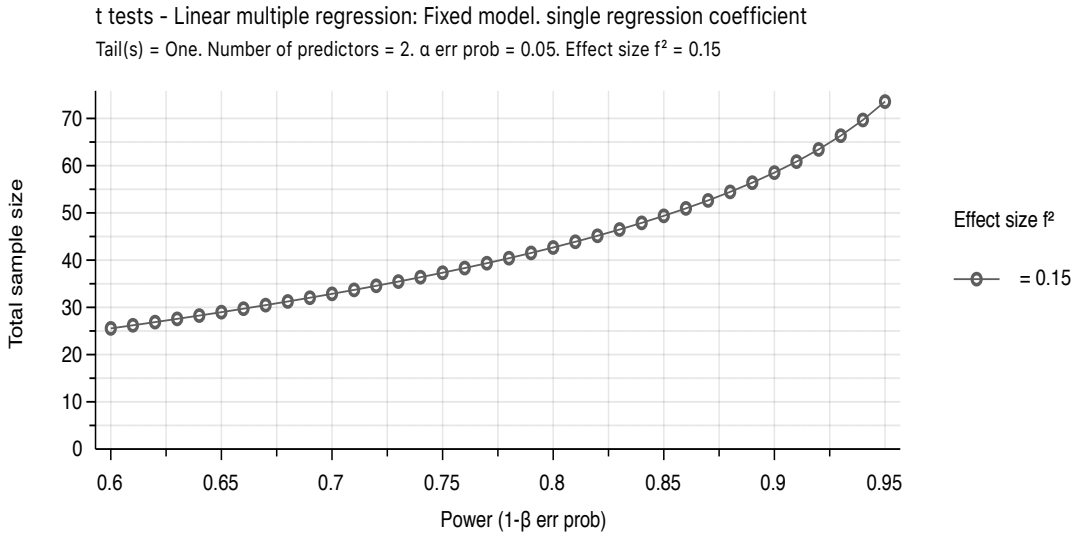
Acharya et al. stated convenience and purposive sampling are common non-probability methods. Researchers use convenience sampling to select participants that are easily accessible and have relevant knowledge of the research study (Acharya et al., 2013; Sa'id & Madugu, 2015). Researchers use purposive sampling to find participants

from a certain group or with particular characteristics that meet the criteria of a study (Etikan, Musa, & Alkassim, 2016). For this study, I used convenience sampling because the participants were accessible due to my professional memberships and network of communications and information technology leaders.

I used the G*Power software to calculate the sample size for this study. Weil et al. (2015) stated researchers use the priori analysis feature to determine the sample size at a specific level of significance when using regression analysis as the statistical test. Field (2013) claimed researchers use priori analysis to evaluate the variance of the dependent and independent variables that require statistical power, alpha level, and effect size. To calculate the sample size, I used the G*Power software with the priori analysis feature with a medium effect size of .15 ($f^2 = .15$), an alpha level of 0.05 (a = 0.5), and the statistical power of .80 and .95. The results from the calculations concluded the minimum sample size for the participants is 43 and the maximum sample size is 74. Therefore, the total sample size for this study was between 43 and 74 participants (see Figure 1).

Figure 1

A Graph Showing Power and Sample Size



Ethical Research

Mouton et al. (2015) claimed researchers use consent forms to ensure the participants understand the study and any potential harm. The use of consent forms ensure ethical and legal responsibility (Anderson et al., 2017). Researchers use consent forms to explain how the study can benefit the researcher and participants (Kass et al., 2015).

For this study, I used Walden University's Research Ethics & Compliance consent form to comply with the ethical guidelines for the researcher and the participants. Within the informed consent (see Appendix A), I included the following: invitation and introduction to the study, background, procedures, voluntary nature of the study, risks and benefits, payment, privacy, questions, and obtaining consent. The participants who agreed to be in the study could withdraw at any time without repercussions. They did not

receive any financial incentives for their participation. Researchers can avoid ethical and conduct issues by not rewarding or giving incentives to the participants (Klitzman, 2013).

To further comply with ethical standards, I included my Walden University IRB approval number: 09-21-20-0646318. The IRB is a constructed group that monitors and reviews research involving human subjects, in which the group has the authority to approve, require changes, or disapprove the research study (U.S. Food and Drug Administration, 2016). Cugini (2015) stated the IRB ensures the researcher complies with the requirements, regulations, and ethical standards of a study.

For the protection of the participants, their names and personal information were not in the study. Esponda et al. (2016) claimed quantitative researchers use online surveys to protect the participant's privacy and identity with anonymity. To ensure further protection, the participants' data will be safeguarded in a digital storage space and deleted 5 years after the study. According to Morse and Coulehan (2014), researchers should destroy data and other pertinent information after the 5-year waiting period to ensure security and ethical protection to the participants.

Data Collection Instruments

I used two existing measuring instruments for this study. To measure organizational trust, I used an instrument created by Paliszkiewicz and Koohang (2013), which has a total of 15 questions. I used all 15 questions (see Appendix B) because they were suitable for this study. I received permission (see Appendix C) from the authors to use the organizational trust instrument. To measure communication and team performance, I used the TeamSTEPPS 2.0 performance tool, which was created by the

Agency for Healthcare Research and Quality (AHRQ). The AHRQ creates tools and uses data to help policymakers make better healthcare decisions for Americans (AHRQ, 2017). Both instruments use a Likert-scale to measure ordinal data.

Paliszkiewicz et al. (2014) used the organizational trust instrument with 286 managers in Poland and a 5-point Likert scale (5 = *strongly agree*, 4 = *agree*, 3 = *neither agree nor disagree*, 2 = *disagree*, and 1 = *strongly disagree*) for reliability and validity. The Cronbach's alpha for the instrument was .90 and passed with high results for convergent validity, discriminant validity, and criterion-related variability (Paliszkiewicz et al., 2014). Paliszkiewicz et al. corroborated the test-retest reliability by using the instrument in further studies without any problematic constructs. Therefore, this instrument was suitable and reliable for measuring organizational trust for this study.

To determine reliability and validity of the TeamSTEPPS instrument, Zhang et al. (2015) conducted a study with 72 medical practitioners. Based on the results, the authors concluded the instrument was reliable and valid. The test-retest reliability was .70, inter-rater reliability was .73, and the Cronbach was 0.92 for internal consistency (Zhang et al., 2015).

For this study, I modified the TeamSTEPPS tool to fit the life cycle model of virtual teams. Two out of the five factors (communication and leadership) were identical to the original TeamSTEPPS instrument. Other factors in the instrument such as team structure, situation monitoring, and mutual support were not applicable to the life cycle model of virtual teams. Therefore, I removed these factors from the instrument for this study. Additionally, I combined two factors (communication and leadership) into one

communication factor for 10 questions (see Appendix D). To determine the reliability and validity of the revised instrument, I used Cronbach's alpha function in the SPSS software for a pilot test with 10 IT leaders. The score was .95, which concluded the instrument was reliable and valid. The TeamSTEPPS instrument uses a balanced scorecard format with a Likert scale from 1 to 5 (1 = *Very Poor*, 2 = *Poor*, 3 = *Acceptable*, 4 = *Good*, and 5 = *Excellent*) to create a team performance score (AHRQ, 2017). I received permission (see Appendix E) from the authors to use the instrument even though it is free for public use.

Data Collection Technique

I used an online process for data collection through Survey Monkey. Online surveys such as Survey Monkey allow researchers to utilize and analyze surveys without technical expertise (Regmi et al., 2016). Black and Reynolds (2013) claimed Survey Monkey is a useful online survey tool that allows researchers to collect, protect, and safeguard data from the participants. The survey had 25 questions with a Likert scale from 5 to 1 (5 = *Strongly Agree,* 4 = 3 = *Neither Agree nor Disagree*, 2 = *Disagree*, and 1 = *Strongly Disagree*). The participants received a link to the online survey by email within the consent form.

Jones et al. (2013) stated online surveys have many advantages such as larger targets, visual aids, quicker responses, and fast data compilation. According to Rice et al. (2017), researchers use online surveys to access broader populations, while cutting expenses in time and cost. Although online surveys are cost-effective and less time-consuming, there are still some disadvantages. Issues with erroneous data can occur if the

data was self-reported (Wright, 2005). Also, some online communities do not require participants to give their email addresses or other contact information (Wright, 2005).

To minimize the disadvantages of online surveys, I sent multiple introduction emails to participants who are members of professional organizations. This method increased the probability of obtaining participants who wanted to be in the study. Wright (2005) claimed researchers should conduct multiple online surveys with similar communities to get a reliable understanding of the participants. Wright also noted researchers should obtain participants from online communities who may find the study valuable to their group.

Although finding the right participants was important, using the right measuring instrument was crucial. I used a pilot study to test the instrument for reliability and validity. Some researchers use pilot studies to refine the survey and eliminate potential issues with data collection (Saunders et al., 2007). Regmi et al. (2016) noted researchers use pilot studies to ensure the questions are adequate and the instructions are concise. For this pilot study, the participants were friends, family members, and business associates who have virtual work experience. The participants' data from the pilot study was not in the final study.

Data Analysis

For this study, the primary purpose of data analysis was to answer the following research question and hypotheses:

Research question: What is the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry?

H_0: There is no relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

H_a: There is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Researchers use different analysis methods to understand the relationship between variables (Yang et al., 2016). Some researchers use Pearson's correlation coefficient to analyze the relationship between two variables (Sedgwick, 2012). Other researchers use regression analysis to measure the strength of prediction between two or more variables (Yang et al., 2016). Business leaders use regression analysis to make crucial decisions about business operations and future opportunities (Gallo, 2015). Chen et al. (2014) claimed multiple linear regression is the best statistical method for determining if there is a correlation between the predictor variables and the dependent variable. Since I wanted to determine if there is a relationship between the predictor variables (organizational trust and communication) and the dependent variable (team performance), I used multiple linear regression for data analysis.

I considered other statistical methods such as chi-square tests and analysis of variance (ANOVA). Rana and Singhai (2015) claimed researchers use chi-square tests to check independence between two variables and see how the distribution of data matches the expected distribution. Researchers use ANOVA to analyze the differences between

variances and means within a sample (Kim, 2017). The chi-square tests and ANOVA were not suitable because examining data distribution and mean differences between samples were not the main goals of this study.

Data cleaning is an important process for ensuring accuracy with data collection and analysis. According to Chapman (2005), data cleaning is the process of discovering inaccurate data through validation checks and remodifying the procedures to avoid future errors. Researchers use data cleaning to remove values that do not match the data set (Slater et al., 2017). To avoid data collection errors, I used Survey Monkey to collect data from the participants. Using Survey Monkey decreased the possibility of entering data manually for collection and analysis. Online survey platforms offer data protection and ease of transferability into data analysis programs (Regmi et al., 2016).

Ernst and Albers (2017) stated quantitative researchers must understand assumptions such as linearity, normality, homoscedasticity, and independence when using multiple linear regression. Quantitative researchers that do not understand the assumptions might use alternative procedures with less mathematical power that cause erroneous and inaccurate predictions (Ernst & Albers, 2017). To test assumptions in the data, I used the following procedures in SPSS: Scatterplots to determine if there is a linear or curvilinear relationship between the variables and to check that the residuals are independent from the variables, QQ plot tests such as the Kolmogorov-Smirnov and Shapiro-Wilk for normality, and t-tests to ensure the sets of data are independent of each other. I used the bootstrapping method to further ensure there were no violations of data

assumptions. Hesterberg (2015) stated the researcher uses the bootstrapping method for estimating standard errors and bias, and to obtain confidence intervals.

To achieve statistical certainty, I used confidence intervals and *p*-values within the SPSS software. According to Patino and Ferreira (2015), researchers use confidence intervals to describe the main findings of a study. Patino and Ferreira noted confidence internals have a strong relationship with the p-value. The *p*-value is the probability of observing the test statistic value under the null hypothesis (Ferreira & Patino, 2015). Ellingson (2013) stated a 95% confidence interval with a *p*-value of .05 indicates a high-level of statistical certainty. I will reject the null hypothesis if the *p*-value for the correlation is less than .05 with a confidence interval of 95%.

Brezavscek et al. (2014) claimed SPSS software is an effective tool for performing data analysis. SPSS is a statistical software researchers use to perform a comparison and correlational tests (Puteh & Ong, 2017). I used multiple linear regression in SPSS to determine if there is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

Study Validity

Luft and Shields (2014) claimed quantitative researchers create study validity when they use instruments and statistical methods that ensure validity. However, quantitative researchers may still encounter threats to validity that compromise the mathematical conclusions of a study (Luft & Shields, 2014). Internal validity and external validity are the two main threats to study validity (Khorsan & Crawford, 2014).

According to Crano et al. (2015), internal validity is the possibility to infer cause-effect or causal relationships between the independent and dependent variables. Crano et al. also claimed internal validity is the central concern in experimental design studies because the manipulation of one or more variables happens. Since this study was a correlation design, internal validity was not a factor because the goal of this study was to determine if there is a relationship between the variables, not causation. However, I considered statistical conclusion validity as a threat.

Statistical Conclusion Validity

Lachmann et al. (2017) claimed statistical conclusion validity is the use of pertinent statistics to make inferences about the relationship between variables. To ensure statistical conclusion validity, I addressed Type I and Type II errors. Neall and Tucky (2014) claimed Type I and Type II errors are threats to statistical conclusion validity because the researcher makes inferences based on the presentation of data. Type I and Type II errors occur when the researcher rejects the null hypothesis when it is true (Neall & Tucky, 2014). Using statistical significance tests is the best way to reduce the chances of Type I and Type II errors (Rothman, 2014). To reduce the threat of Type I and Type II errors for this study, I used a p-value of 0.5 or less and a 95% confidence interval as the acceptable value for statistical significance. Although using p-value and confidence intervals are effective for addressing Type I and Type II errors, other issues may affect statistical conclusion validity. Reliability of the instrument, data assumptions, and sample size are additional factors that can impact statistical conclusion validity.

Reliability of the Instrument

According to Peterson and Kim (2013), researchers use Cronbach's alpha test to determine the reliability of the measuring instrument. Moghaddam et al. (2014) claimed Cronbach's alpha values demonstrate reliability at .7 or higher. For this study, I used Cronbach's alpha value of .7 or higher for the reliability of the measuring instruments. To determine the reliability of the measuring instruments for this study, I performed a pilot study with 10 business leaders. The total reliability score was .95 or higher for each question. Therefore, the measuring instruments were very reliable for this study.

Data Assumptions

Bias results can occur when the researcher does not use accurate tests for data assumptions (Uyanik & Guler, 2013). To avoid data assumptions, I used SPSS software to test for homoscedasticity, linearity, and normal distribution. Nimon (2012) stated scatterplots are useful for testing homoscedasticity. Researchers also use scatterplots to test for linearity (Jeong & Jung, 2016). Ghasemi and Zahediasl (2012) claimed the Shapiro-Wilk test is best for normal distribution testing.

Sample Size

To determine the sample size, I used the G*Power software. Weil et al. (2015) stated G*Power statistical software is a useful software tool for determining the sample size of a study. To calculate the sample size, I used the priori analysis feature with a medium effect size of .15 (f2= .15), an alpha level of 0.05 (a = 0.5), and the statistical power of .80 and .95. The results from the calculations concluded the minimum sample size for the participants is 43, and the maximum sample size is 74. Cumming (2014) stated a larger sample size would provide a higher level of statistical conclusion validity.

External Validity

External validity is the degree to which study results apply to other settings and demographics (Whitley & Kite, 2013). Factors such as physical setting, researcher characteristics, and participant attributes can affect external validity (Whitley & Kite, 2013). According to Devroe and Wauters (2019), there are two threats to external validity: population validity and ecological validity. Since there is no experiment in this study, ecological validity is not a threat. To minimize potential threats to population validity**,** the researcher should ensure the sample population is heterogeneous (Ioannidis et al., 2014). For this study, I ensured the sample population was heterogeneous by selecting participants from different organizations. The participants for this study were virtual business leaders in the information technology industry from the Washington, D.C. metro area. The participants were directors, managers, chief technology officers, chief digital officers, team leaders, business owners, or consultants who work full-time or part-time in a virtual environment.

Transition and Summary

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. In Section 2, I restated the purpose statement and discussed my role as a researcher. I explained the process for finding the participants, clarified the research method and design, and exemplified the methods used to ensure ethical research. The section also included a discussion of the population and sampling, instrumentation, data collection technique, data analysis, and study validity.

Section 3 includes a presentation of the findings from the study and addresses how business leaders can apply the results to their practice and the information technology industry. Section 3 also contains how the results from the study may contribute to positive social change. Furthermore, Section 3 includes recommendations for further action based on the results, as well as recommendations for further study within the topic and the information technology industry.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The independent variables were organizational trust and communication. The dependent variable was team performance. The null hypothesis was that there is no relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The alternative hypothesis was that there is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. Based on the inferential results, there was a significant relationship between organizational trust, communication, and team performance within virtual teams. Therefore, the null hypothesis was rejected and the alternative hypothesis was not rejected.

Presentation of the Findings

In this subsection, I include descriptive results, test the assumptions, present inferential results, provide an analysis summary, and conclude with a theoretical explanation of the findings. For the descriptive results, I included the mean, standard deviation, normal quantile-quantile (Q-Q) plot with other normality tests, a T-test for independence, and scatterplots for linearity. To test the assumptions of residuals, I used the normal probability plot (P-P) and scatterplot. For inferential results, I used multiple linear regression.

Descriptive Statistics

I collected data from 48 participants for analysis. Each participant completed the survey without skipping any questions. Table 2 depicts the mean and standard deviation for each variable.

Table 2

Means and Standard Deviations for Quantitative Study Variables

Variable	*M*	*SD*
Organizational Trust	81.88	12.87
Communication	89.38	9.60
Team Performance	84.92	10.77

Note: $N = 48$

I tested normality for each variable with Q-Q plot tests. According to Das and Imon (2016), researchers use Q-Q plot tests to compare percentiles of a data distribution with the percentiles of a standard distribution from a specific group of variables. Based on the results from Figures 2, 3, and 4, there was normal distribution for each variable.

Figure 2

Normal Quantile-Quantile Plot (Q-Q) of Communication Distribution

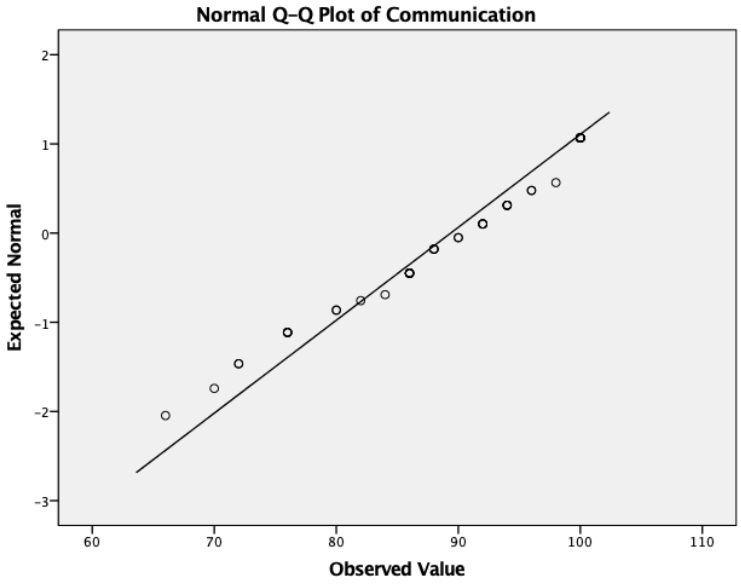


Figure 3

Normal Quantile-Quantile Plot (Q-Q) of Organizational Trust Distribution

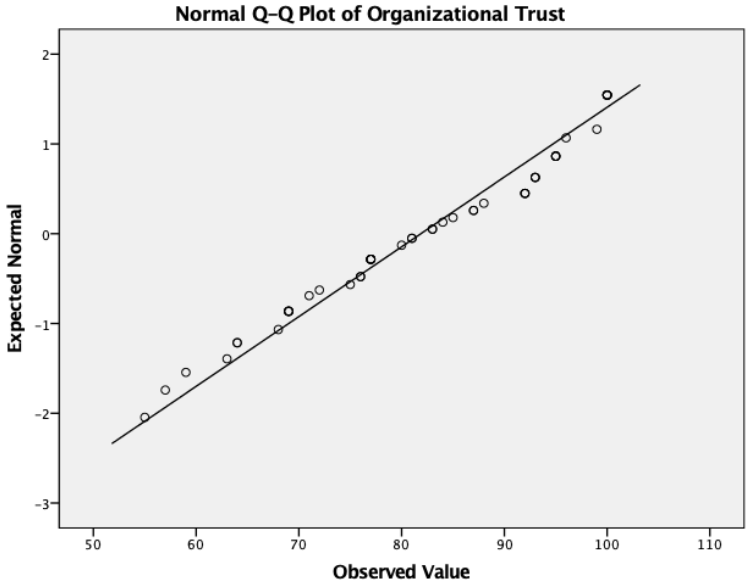
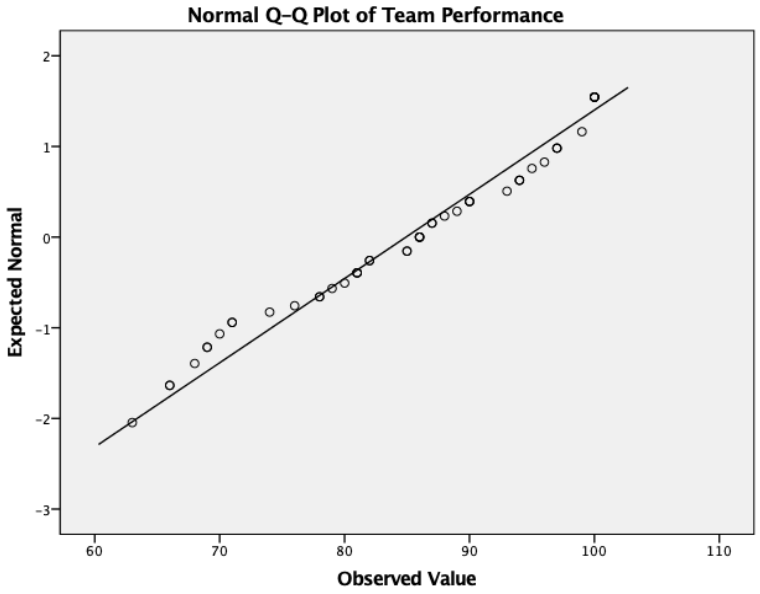


Figure 4

Normal Quantile-Quantile Plot (Q-Q) of Team Performance Distribution



To further examine normality, I used the Shapiro-Wilk test. Das and Imon claimed Shapiro-Wilk tests are useful for testing normality. Based on the results from Table 3, the level of significance was less than .05. Therefore, there was normal distribution for each variable.

Table 3

Shapiro-Wilk Test for Normality

Variable	Statistic	*df*	*p*
Communication	.906	.48	.001
Organizational Trust	.949	.48	.038
Team Performance	.947	.48	.031

To ensure independence of the data sets, I used a T-test to examine the independent variables: communication and organizational trust. Quantitative researchers

use t-tests to determine if the means of two populations are different from the independent samples of each population (Skaik, 2015). To perform t-tests correctly, the samples must be from two separate populations or one population divided into two groups (Skaik, 2015). Based on the results from Table 4, the data from communication and organizational trust groups were highly independent with a significant level of 0.

Table 4

One-Sample t-test for Communication and Organizational Trust

Variable	*t*	df	*p*
Communication	64.518	47	.000
Organizational Trust	44.086	47	.000

To measure linearity, I used a scatterplot to exam the linear relationship between the predictor variables (organizational trust and communication) and the dependent variable (team performance). Researchers use scatterplots to show the relationship between two variables for the same participants (Moore et al., 2013). Based on the results from Figures 5 and 6, the predictor variables (organizational trust and communication) have a linear relationship with the dependent variable (team performance).

Figure 5

Scatterplot of Linearity Between Organizational Trust and Team Performance

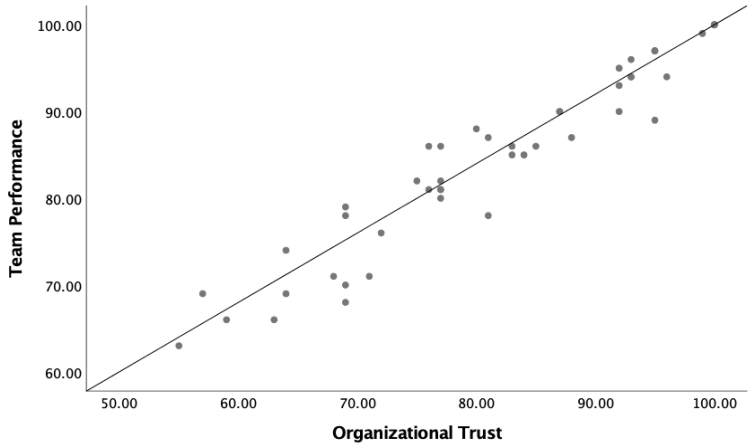
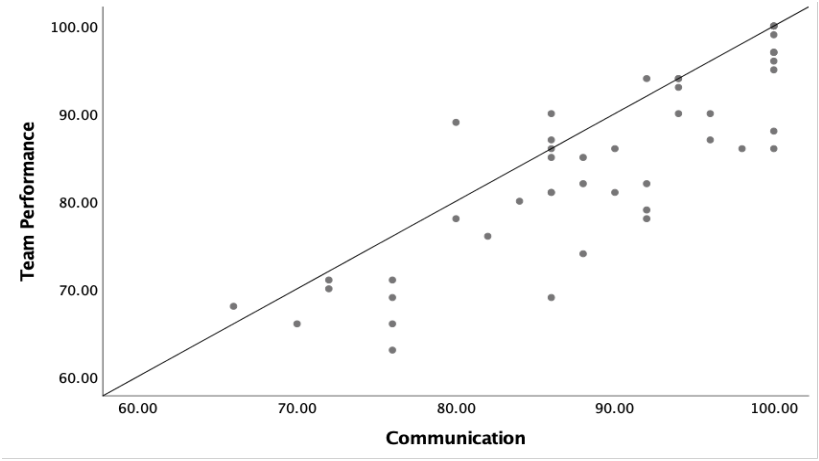


Figure 6

Scatterplot of Linearity Between Communication and Team Performance



Tests of Assumptions

To determine violation of assumptions, I tested multicollinearity, normality, linearity, homoscedasticity, and independence of residuals. I used the correlation coefficients test to evaluate multicollinearity. Based on the results from Table 5, the

bivariate correlations were significantly below .80. Therefore, there was no violation of multicollinearity.

Table 5

Correlation Coefficients for Independent Variables

Variable	Communication	Organizational Trust
Communication	1.0	-0.696
Organizational Trust	-0.696	1.0

Note. $N = 48$.

To evaluate normality, linearity, homoscedasticity, and independence of residuals, I used the normality probability plot (P-P) and a scatterplot within multiple linear regression analysis. Based on the results from Figures 7 and 8, there were no violations of assumptions. The points on the normality probability plot (P-P) indicate normality and linearity (Figure 7). Kozak and Piepho (2018) claimed a reasonably straight line from the bottom left to the top right is a strong indication of normality and linearity. The scatterplot showed no violations of homoscedasticity and independence of residuals because there was no systematic pattern (Figure 8).

Figure 7

Normal Probability Plot (P-P) of the Regression Standardized Residuals

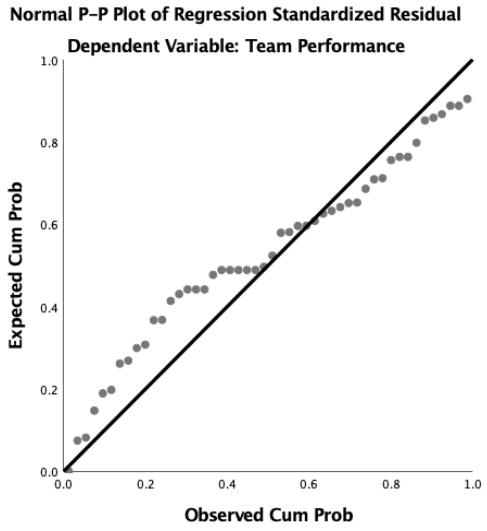
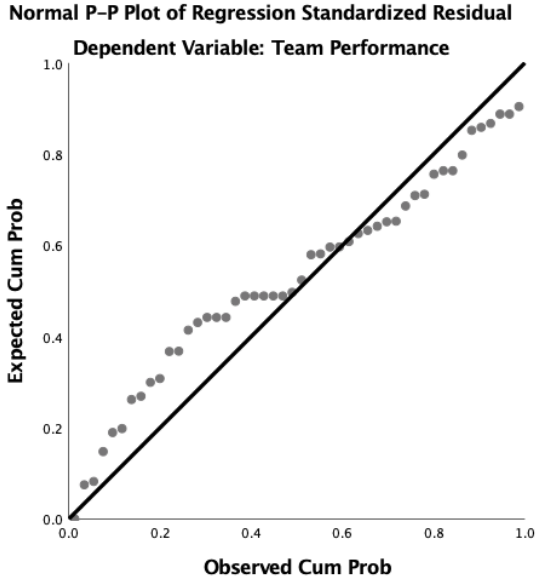


Figure 8

Scatterplot of the Standardized Residual.



Inferential Results

I used multiple linear regression, a = .05 (two-tailed) to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The independent variables were organizational trust and communication. The dependent variable was team performance. The null hypothesis was that there is no relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The alternative hypothesis was that there is a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry.

The overall model significantly predicted the dependent variable (team performance), $F(2, 45) = 10796.37$, $p < .001$, $R^2 = .998$. The $R^2 = .998$ indicates that approximately 99.8% of variations in team performance was attributable to the linear combination of the independent variables (communication and organizational trust). Communication ($b = 0.418$, $p = 0.00$) and organizational trust ($b = 0.588$, $p = 0.00$) contributed significantly to team performance within virtual teams. Although both independent variables had a significant relationship with team performance, organizational trust was a higher factor for virtual team performance. The final predictive equation was: team performance = -.564 + .418(communication) + .588(organizational trust).

Communication ($b = 0.418$): The positive value for communication as a predictor indicated a 0.418 increase in team performance for each additional unit in

communication. In other words, for each 1.0% increase in communication, there was a 0.418 increase in team performance. With a p-value of 0.00, communication had a significant relationship with team performance within virtual teams.

Organizational Trust (b = .588): The positive value for organizational trust as a predictor indicated a 0.588 increase in team performance for each additional unit in organizational trust. In other words, for each 1.0% increase in organizational trust, there was a 0.588 increase in team performance. With a p-value of 0.00, organizational trust also had a significant relationship with team performance within virtual teams. Although both predictors (organizational trust and communication) had a significant relationship with team performance, organizational trust was a more significant factor.

Table 6

Regression Analysis Summary for Independent Variables

Variable	*B*	*SE B*	*β*	*t*	*p*	*B* 95% Bootstrap CI
Communication	.418	.011	.372	39.319	.000	[.396, .816]
Organizational Trust	.588	.008	.703	74.218	.000	[.572, .604]

Note. N = 48.

Analysis Summary

The purpose of this quantitative correlational study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. I used multiple linear regression to study the relationship between the variables. The regression model was able to

significantly predict a relationship between communication, organizational trust, and team performance within virtual teams, $F(2, 45) = 10796.37$, $p < .001$, $R^2 = .998$.

The study results indicated that there was a highly positive and significant relationship between communication, organizational trust, and team performance within virtual teams. Other researchers claimed communication and organizational trust were significant factors for increased virtual team performance. McLarnon et al. (2019) stated communication has a positive correlation with virtual team performance when peer feedback is continuous and frequent between team members. Their findings point to peer feedback as a primary strategy for team improvement and process coordination within virtual teams. Hacker et al. (2019) claimed trust is the most crucial factor for overcoming problems and improving performance within virtual teams. Based on their findings from prior research, an organizational trust system is pivotal for virtual team success and evolution.

Application to Theoretical Framework

The theoretical framework I used for this study was the life cycle of virtual teams. The theory was ideal to explain the relationship between organizational trust, communication, and team performance within virtual teams. Also, the theory pointed to organizational trust and communication as primary factors that may affect virtual team performance. Based on the study results, I rejected the null hypothesis that there is not a relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The results of the study showed a

highly significant relationship between organizational trust, communication, and team performance within virtual teams.

Application to Professional Practice

The purpose of this study was to examine the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. The study findings support a highly significant relationship between organizational trust, communication, and team performance within virtual teams. The results of this study are relevant because information technology leaders can use the findings to improve virtual team performance. Although communication and organizational trust are significant factors for virtual team performance, leadership is also critical. Flavian et al. (2019) stated leadership traits such as personality, empathy, and organizational commitment are crucial for developing organizational trust within virtual teams. Flavian et al. (2019) also support organizational trust as the foundation for effective communication and increased virtual team performance. Communication and organizational trust are significant factors within virtual teams, but leaders should include a succinct organizational trust system to overcome challenges and improve performance.

Implications for Social Change

The results of this study can provide opportunities for positive social change. Understanding the relationship between organizational trust, communication, and virtual team performance can help business leaders in different markets create positive social change. According to Stephan et al. (2016), there are four potential business markets for positive social change: environmental, socioeconomic inclusion, health and well-being,

and civic engagement. Within these markets, leaders can use this study's findings to create diverse virtual teams that focus on specific social causes such as poverty, civil rights, racial discrimination, gender inequality, and childhood obesity.

Recommendations for Action

The findings from this study indicate a statistically significant relationship between organizational trust, communication, and team performance within virtual teams. Based on the study results, I recommend that virtual business leaders create a foundation of organizational trust to help choose communication technologies that match the team's dimensions. With organizational trust and the appropriate communication technology in a virtual environment, team performance is high. Morrison and Smith (2020) suggested that the early development of trust within virtual teams directly leads to positive collaboration and more robust performance.

The publication of this study will add knowledge to the existing body of literature about virtual teams. Researchers could use the results to examine further the relationship between organizational trust, communication, and team performance within virtual teams. I plan to present this study's findings at professional conferences, seminars, lectures, community events, and virtual discussions. I will publish this study in the ProQuest dissertation database. Also, I intend to find peer-reviewed journals to disseminate the results of the study.

Recommendations for Further Research

For this study, I examined the relationship between organizational trust, communication, and team performance within virtual teams in the information

technology industry. A limitation of the study was that the participants worked in the Washington, D.C. metro area. Researchers with access to participants from a specific region or industry may not collect enough responses to thoroughly examine a problem (Theofanidis, & Fountouki, 2018). Recommendations for further research include the possibility for researchers to collect data from participants who work in different regions of the U.S.A. By collecting data from participants in different regions and industries, future researchers can provide a more thorough virtual team performance analysis. Another recommendation for future researchers is to examine how virtual and traditional work teams have changed since the COVID-19 pandemic.

Reflections

Before this study, I did not understand which factors affected virtual team performance. As a communication specialist, I assumed communication was the most pivotal factor for high virtual team performance. The results of the study concluded communication and organizational trust are primary factors for successful virtual teams. Further examination pointed to organizational trust as the most significant factor for virtual team success. To ensure my personal beliefs did not influence the study findings, I used an anonymous survey to collect data. The anonymous survey was a combination of communication and organizational trust questions. This process was successful in eliminating personal bias and preventing personal relationships with the participants. I plan to use this study's knowledge and results to help leaders increase virtual team performance for business and social causes.

Conclusion

For this study, I examined the relationship between organizational trust, communication, and team performance within virtual teams in the information technology industry. I collected data from 48 participants who worked in the Washington, D.C. metro area. The study results indicated a significant relationship between organizational trust, communication, and team performance within virtual teams. Organizational trust and communication were primary factors for high virtual team performance, but organizational trust was a more significant factor. This study's findings may help virtual business leaders create a succinct foundation for organizational trust and use communication technology that correlates with their overall mission and trust system. The implications for positive social change include the potential for leaders to create high-performing and diversified virtual teams that address major societal issues locally, nationally, and globally.

References

Acharya, A., Nigam, A., & Prakash, A. (2013). Sampling: Why and how if it? *Indian Journal of Medical Specialties, 4,* 330-333. https://doi.org/10.7713/ijms.2013.0032

Adler, R., Elmhorst, J., & Lucas, K. (2013). *Communicating at work: Strategies for success in business and the professions* (11th ed.). McGraw-Hill.

Agency for Healthcare Research and Quality (2017). *TeamSTEPPS 2.0. Team Performance Observation Tool.* https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/education/curriculum-tools/teamstepps/instructor/reference/tmpot.pdf

Alkhatib, G., & Al-Humaidi, O. (2018). Innovative virtual teams on demand: HBDI-based paradigm. *Procedia Computer Science, 131,* 139-147. https://doi.org/10.1016/j.procs.2018.04.196

Alsharo, M., Gregg, D., & Ramirez, D. (2017). Virtual team effectiveness: The role of knowledge sharing and trust. *Information & Management, 54,* 479-490. https://doi.org/10.1016/j.im.2016.10.005

Altschuller, S., & Benbunan-Fich, R. (2010). Trust, performance, and the communication process in ad hoc decision-making virtual teams. *Journal of Computer-Mediated Communication, 16,* 27-47. https://doi.org/10.1111/j.1083-6101.2010.01529.x

Andres, H., & Shipps, B. (2010). Team learning in technology-mediated distributed teams. *Journal of Information Systems Education, 21,* 213-221. https://pdfs.semanticscholar.org

Anderson, E., Newman, S., & Matthews, A. (2017). Improving informed consent: Stakeholder views. *AJOB Empirical Bioethics, 8,* 178-188. https://doi.org/10.1080/23294515.2017.1362488

Aritz, J., Walker, R., & Cardon, P. (2017). Media use in virtual teams of varying levels of coordination. *Business and Professional Communication Quarterly, 81,* 222-243. https://doi.org/10.1177/2329490617723114

Asamoah, M. (2014). Re-examination of the limitations associated with correlational research. *Journal of Educational Research and Reviews, 2,* 45-52. http://sciencewebpublishing.net/jerr/

Babbie, E. (2010). *The practice of social research* (12th ed.). Wadsworth Cengage.

Barczak G., & Lassk, F. (2010). Antecedents of team creativity: An examination of team emotional intelligence, team trust and collaborative culture. *Creativity and Innovation Management, 19,* 332-345. https://doi.org/10.1111/j.1467-8691.2010.00574.x

Basiouni, A., Tan, K., Ali., H., Bahamdan, W., & Khalifi, A. (2017). A study on ranking key factors of virtual team effectiveness in Saudi Arabian petrochemical companies. *International Journal of Advanced Computer Science and Applications, 8*, 109-114. https://doi.org/10.14569/IJACSA.2017.080416

Batarseh, F., Daspit. J., & Usher, J. (2018). The collaboration capability of global virtual teams: Relationships with functional diversity, absorptive capacity, and innovation. *International Journal of Management Science and Engineering Management, 13*(1), 1-10. https://doi.org/10.1080/17509653.2016.1275865

Benetyte, D., & Jatuliaviciene, G. (2013). Building and sustaining trust in virtual teams within organizational context. *Region Formation & Development Studies, 10,* 18-30. https://doi.org/10.15181/rfds.v10i2.138

Berry, G. (2011). Enhancing effectiveness on virtual teams. Understanding why traditional team skills are insufficient. *Journal of Business Communication, 48*, 186-206. https://doi.org/10.1177/0021943610397270

Bhat, S., Pande, N., & Ahuja, V. (2017). Virtual team effectiveness: An empirical study using SEM. *Procedia Computer Science, 122,* 33-41. https://doi.org/10.1016/j.procs.2017.11.338

Black, J., & Reynolds, W. (2013). Examining the relationship of perfectionism, depression and optimism: Testing for mediation and moderation. *Personality and Individual Differences, 54,* 426-431. https://doi.org/10.1016/j.paid.2012.10.012

Breuer, C., Hüffmeier, J., & Hertel, G. (2016). Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators. *Journal of Applied Psychology, 101,* 1151-1177. https://doi.org/10.1037/apl0000113

Brezavscek, A., Sparl, P., & Znidarsic, A. (2014). Extended technology acceptance model for SPSS acceptance among Slovenian students of social sciences. *Organizacija, 47,* 116-127. https://doi.org/10.2478/orga-2014-0009

Cameron, R. (2015, July). Mixed methods research. *Mixed methods research workshop.* Symposium conducted at Deakin University for the Australian & New Zealand Academy of Management, Melbourne, Australia.

https://docplayer.net/58126838-Mixed-methods-research-workshop-2-nd-july-2015-deakin-university-melbourne-dr-roslyn-cameron-co-convenor-of-mixed-methods-sig-anzam-research.html

Carter, D., Seely, P., Dagosta, J., DeChurch, L., Zaccaro, S. (2015). Leadership for global virtual teams: Facilitating teamwork processes. In J. Wildman & R. Griffith (Eds.), *Leading global teams: Translating multidisciplinary science to practice* (pp. 225-252). Springer. https://doi.org /10.1007/978-1-4939-2050-1_10

Caruth, G. (2013). Demystifying mixed methods research design: A review of the literature. *Mevlana International Journal of Education, 3,* 112-122. https://doi.org/10.13054/mije.13.35.3.2

Carver, J., Van Voorhis, J., & Basili, V. (2004). Understanding the impact of assumptions on experimental validity. *Proceedings of the 2004 International Symposium on Empirical Software Engineering, USA.* https://doi.org/10.1109/ISESE.2004.1334912

Chae, S. (2016). Perceived proximity and trust network on creative performance in virtual collaboration environment. *Procedia Computer Science, 91,* 807-812. https://doi.org/10.1016/j.procs.2016.07.084

Chapman, A. 2005. *Principles and methods of data cleaning: Primary species and species-occurrence data.* Copenhagen, DE: Global Biodiversity Information Facility.

Chasan, L. (2014). *Writing dissertation and grant proposals: Epidemiology, preventive medicine, and biostatistics.* CRC Press.

Chen, H., Fan, H., & Tsai, C. (2014). The role of community trust and altruism in knowledge sharing: An investigation of a virtual community of teacher professionals. *Educational Technology & Society, 17,* 168–179. http://www.jstor.org/stable/jeductechsoci.17.3.168

Chen, J., Li, D., Liang, H., & Wang, S. (2014). Semiparametric GEE analysis in partially linear single-index models for longitudinal data. *The American Statistician, 43*, 1682-1715. https://doi.org/10.1214/15-AOS1320

Cheng, X., Liu, J., & Huang, J. (2016). Investigating trust factors in global virtual collaboration: A case study of a manufacturing company in China. *49th Hawaii International Conference on System Sciences.* https://doi.org/10.1109/HICSS.2016.92

Chua R., & Morris, M. (2012). Collaborating across cultures: Cultural metacognition and affect-based trust in creative collaboration. *Organizational Behavior and Human Decision Processes, 118,* 116-31. https://doi.org/10.1016/j.obhdp.2012.03.009

Collins, N., & Chou, Y. (2013). Building team trust: A study in the Asian context. *The Journal of American Business Review, 1,* 181-188. https://researchbank.rmit.edu.au/view/rmit:22065

Connelly, C., & Turel, O. (2016). Effects of team emotional authenticity on virtual team performance. *Frontiers in Psychology*, *7*, 1-13. https://doi.org/10.3389/fpsyg.2016.01336

Crano, W., Brewer, M., & Lac, A. (2015). *Principles and methods of social research* (3rd ed.). Routledge.

Cugini, M. (2015). Successfully navigating the human subjects approval process. *The Journal of Dental Hygiene, 89,* 54-56. http://jdh.adha.org/

Cumming, G. (2014). The new statistics: Why and how. *Psychological Science, 25,* 7-29. https://doi.org/10.1177/0956797613504966

Dakrory, M., & Abdou, H. (2009). Virtual team processes: A conceptualization and application. *Problems and Perspectives in Management, 7*, 15-26. http://usir.salford.ac.uk/2594/

Das, K., & Imon, A. (2016). A brief review of tests for normality. *American Journal of Theoretical and Applied Statistics, 5,* 5-12. https://doi.org/10.11648/j.ajtas.20160501.12

Davis, D., & Scaffidi, N. (2016). Leading virtual teams: Conflict and communication challenges for leaders. In A. Normore, L. Long, & M. Javidi (Eds.), *Handbook of research on effective communication, leadership, and conflict resolution* (pp. 196-209). IGI Global. https://doi.org/10.4018/978-1-4666-9770-0.ch011

De Paoli, D., & Ropo, A. (2015). Open plan offices – the response to leadership challenges of virtual project work? *Journal of Corporate Real Estate, 17*, 63-74. https://doi.org/10.1108/JCRE-08-2014-0020

Derven, M. (2016). Four drivers to enhance global virtual teams. *Industrial and Commercial Training, 48*(1), 1-8. https://doi.org/10.1108/ICT-08-2015-0056

Devroe, R., & Wauters, B. (2019). *How to enhance the external validity of survey experiments? A discussion on the basis of an experimental study on political gender stereotypes.* Sage Research Methods Cases.

https://doi.org/10.4135/9781526469700

Dorr, M., & Kelly, K. (2011). Developing real skills for virtual teams. *UNC Kenan-Flagler Business School*. https://cdn0.onlinemba.unc.edu/

Dulebohn, J. & Hoch, J. (2017). Virtual teams in organizations. *Human Resource Management Review*, 1-6. https://doi.org/10.1016/j.hrmr.2016.12.004

Duran, V., & Popescu, A. (2014). The challenge of multicultural communication in virtual teams. *Procedia – Social and Behavioral Sciences, 109,* 365-369. https://doi.org/10.1016/j.sbspro.2013.12.473

Edmonds, W., & Kennedy, T. (2017). *An applied guide to research designs: Quantitative, qualitative, and mixed methods* (2nd ed.). Sage Publications.

Ellingson, K. (2013). Breaking down P values and 95% confidence intervals: What infection preventionists should know about statistical certainty. *American Journal of Infection Control, 41,* 1083-1084. https://doi.org/10.1016/j.ajic.2013.03.298

Erkollar, A., & Oberer, B. (2015). Employee connections. The multidimensional team management scorecard. *Procedia Economics and Finance, 26*, 942-945. https://doi.org/10.1016/S2212-5671(15)00911-9

Ernst, A., & Albers, C. (2017). Regression assumptions in clinical psychology research practice - A systematic review of common misconceptions. *PeerJ, 5,* e3323. https://doi.org/10.7717/peerj.3323

Espinosa, J., Nan, N., & Carmel, E. (2015). Temporal distance, communication patterns, and task performance in teams. *Journal of Management Information Systems, 32*, 151-191. https://doi.org/10.1080/07421222.2015.1029390

Esponda, F., Huerta, K., & Guerrero, V. M. (2016). A statistical approach to provide individualized privacy for surveys. *PLoS ONE, 11*(1), 1-14. https://doi.org/10.1371/journal.pone.0147314

Etikan, I., Musa, S., & Alkassim, R. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Ferreira, J., & Patino, C. (2015). What does the p value really mean? *Jornal Brasileiro de Pneumologia, 41,* 485. https://doi.org/10.1590/S1806-37132015000000215

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage Publications.

Fiore, S. M., Carter, D. R., & Asencio, R. (2015). Conflict, trust, and cohesion: Examining affective and attitudinal factors in science teams. In W. Vessey & A. Estrada (Ed.), *Team cohesion: Advances in psychological theory, methods, and practice research on managing groups and teams, 17,* 271-301. https://doi.org/10.1108/S1534-085620150000017011

Fitzpatrick, R. (2019). Challenges and interventions in monitoring and evaluating virtual team performance. https://www.kbresearch.com/concept-docs/Global_virtual_teams_-_file.pdf

Flavian, C., Guinalíu, M., & Jordan, P. (2019). Antecedents and consequences of trust on a virtual team leader. *European Journal of Management and Business Economics, 28,* 2-24. https://doi.org/10.1108/EJMBE-11-2017-0043

Ford, R., Piccolo, R., & Ford, L. (2017). Strategies for building effective virtual teams:

Trust is key. *Business Horizons, 60,* 25-34. https://doi.org/10.1016/j.bushor.2016.08.009

Friedrich, R., Bleimann, U., Stengel, I., & Walsh, P. (2016, March). *The virtual team maturity model (VTMM) for real virtual team performance.* Paper presented at the International Conference on Society and Information Technologies, Orlando, FL. Retrieved from https://www.researchgate.net/publication/308971615_The_Virtual_Team_Maturity_Model_VTMM_for_real_Virtual_Project_Team_Performance

Fusch, P., & Ness, L. (2015). Are we there yet? Data saturation in qualitative research. *The Qualitative Report, 20,* 1408-1416. https://nsuworks.nova.edu/tqr/vol20/iss9/3

Gallo, A. (2015). A refresher on regression analysis. *Harvard Business Review.* https://hbr.org/2015/11/a-refresher-on-regression-analysis

Gawankar, S., Kamble, S., & Raut, R. (2015). Performance measurement using balance scorecard and its applications: A review. *Journal of Supply Chain Management Systems, 4,* 6-21. https://doi.org/10.21863/jscms/2015.4.3.009

Gelinas, L., Pierce, R., Winkler, S., Cohen, I., Lynch, H., & Bierer, B. (2017). Using social media as a research recruitment tool: Ethical issues and recommendations. *The American Journal of Bioethics, 17,* 3-14. https://doi.org/10.1080/15265161.2016.1276644

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10,*

486-489. https://doi.org/10.5812/ijem.3505

Gheni, A., Yusmadi, Y., Marzanah, A., & Ali, N. (2016). Factors affecting global virtual teams' performance in software projects. *Journal of Theoretical and Applied Information Technology,* 92, 90-97. http://www.jatit.org/volumes/Vol92No1/12Vol92No1.pdf

Gibbs, J., Sivunen, A., & Boyraz, M. (2016). Investigating the impacts of team type and design on virtual team processes. *Human Resource Management Review*, 1-14. https://doi.org/10.1016/j.hrmr.2016.12.006

Gilson, L., Maynard, M., Young, N., Vartiainen, M., & Hakonen, M. (2014). Virtual teams research 10 years, 10 themes, and 10 opportunities. *Journal of Management,* 1-25. https://doi.org/10.1177/0149206314559946

Gkorezis, P., Bellou, V., & Skemperis, N. (2015) Nonverbal communication and relational identification with the supervisor: Evidence from two countries. *Management Decision, 53,* 1005-1022. https://doi.org/10.1108/MD-11-2014-0630

Glikson, E., & Erez, M. (2020). The emergence of a communication climate in global virtual teams. *Journal of World Business, 55*(6), 1-10. https://doi.org/10.1016/j.jwb.2019.101001

Gonçalves, P., Ferreira, L., Gonçalves, J., Putnik, G., & Cruz-Cunha, M. (2014). Direct communication versus virtual communication in virtual teams. *Procedia Technology, 16,* 3-10. https://doi.org/10.1016/j.protcy.2014.10.062

Grober, B., & Baumol, U. (2017). Why virtual teams work – State of the art. *Procedia Computer Science, 121*, 297-305. https://doi.org/10.1016/j.procs.2017.11.041

Guinalíu, M., & Jordán, P. (2016). Building trust in the leader of virtual work teams. *Spanish Journal of Marketing, 20,* 58-70. https://doi.org/10.1016/j.reimke.2016.01.003

Hacker, J., Johnson, M., Saunders, C., & Thayer, A. (2019). Trust in virtual teams: A multidisciplinary review and integration. *Australasian Journal of Information Systems, 23,* 1-36. https://doi.org/10.3127/ajis.v23i0.1757

Hesterberg, T. (2015). What teachers should know about the bootstrap: Resampling in the undergraduate statistics curriculum. *The American Statistician*, *69*, 371-386. https://doi.org/10.1080/00031305.2015.1089789

Hoch, J., & Dulebohn, J. (2013). Shared leadership in enterprise resource planning and human resource management system implementation. *Human Resource Management Review, 23*, 114-125. https://doi.org/10.1016/j.hrmr.2012.06.007

Hoch, J., & Kozlowski, S. (2014). Leading virtual teams: Hierarchical leadership, structural supports, and shared team leadership. *Journal of Applied Psychology, 99*, 390-403. http://psycnet.apa.org/

Hornung, J. (2015). *Revisiting media richness theory: Social cues impact on understanding in a textual world* (Doctoral dissertation). Retrieved from ETD Collection for Pace University. (AAI3664071).

Ibrahim, M. (2015). Model of virtual leadership, intra-team communication and job performance among school leaders in Malaysia. *Procedia - Social and Behavioral Sciences, 186,* 674-680. https://doi.org/10.1016/j.sbspro.2015.04.126

Ioannidis, J., Greenland, S., Hlatky, M., Khoury, M., Macleod, M., Moher, D., Schulz,

K., & Tibshirani, R. (2014). Increasing value and reducing waste in research design, conduct, and analysis. *The Lancet, 383,* 166-175. https://doi.org/10.106/S0140-6736(13)62227-8

Ishii, K., Lyons, M., & Carr, S. (2019). Revisiting media richness theory for today and future. *Human Behavior & Emerging Technology, 1,* 124-131. https://doi.org/10.1002/hbe2.138

Işık, M., Timuroğlu, M., & Aliyev, Y. (2015). The relationship between teamwork and organizational trust. *International Journal of Research in Business and Social Science, 4,* 133-149. https://doi.org/10.20525/ijrbs.v4i1.34

Ivanov, C. & Avasilcai, S. (2014). Performance measurement models: An analysis for measuring innovation process performance. *Procedia – Social and Behavioral Sciences, 124,* 397-404. https://doi.org/10.1016/j.sbspro.2014.02.501

Jaakson, K., Reino, A., & McClenaghan, P. (2019). The space between – linking trust with individual and team performance within virtual teams. *Team Performance Management, 25,* 30-46. https://doi.org/10.1108/TPM-03-2018-0024

Jarvenpaa, S., Knoll, K., & Leidner, D. (1998). Is anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems, 14,* 29-64. https://doi.org/10.1080/07421222.1998.11518185

Jarvenpaa, S., & Leidner, D. (1998). Communication and trust in global virtual teams. *Organization Science, 10,* 791– 815. https://doi.org/10.1111/j.1083-6101.1998.tb00080.x

Jeong, Y., & Jung, M. J. (2016). Application and interpretation of hierarchical multiple

regression. *Orthopaedic Nursing, 35*, 338-341. https://doi.org/10.1097/NOR.0000000000000279

Jenifer, R., & Raman, P. (2015). Cross cultural communication barriers in workplace. *International Journal of Management, 6,* 348-351. http://www.iaeme.com/IJM.asp

Jones, T., Baxter, M., & Khanduja, V. (2013). A quick guide to survey research. *Annals of The Royal College of Surgeons of England*, *95*, 5-7. https://doi.org/10.1308/003588413X13511609956372

Juneja, P. (2017). Different types of communication. *Management Study Guide.* https://www.managementstudyguide.com/different-types-of-communication.htm

Kim, T. (2017). Understanding one-way ANOVA using conceptual figures. *Korean Journal of Anesthesiology, 70,* 22-26. https://doi.org/10.4097/kjae.2017.70.1.22

Kang, G. J., Ewing-Nelson, S., Mackey, L., Schlitt, J. T., Marathe, A., Abbas, K. M., & Swarup, S. (2017). Semantic network analysis of vaccine sentiment in online social media. *Vaccine, 35,* 3621-3638. https://doi.org/10.1016/j.vaccine.2017.05.052

Kass, N., Taylor, H., Ali, J., Hallez, K., & Chaisson, L. (2015). A pilot study of simple interventions to improve informed consent in clinical research: Feasibility, approach, and results. *Clinical Trials, 12,* 54-66. https://doi.org/10.1177/1740774514560831

Kauffmann, D., & Carmi, G. (2017). E-collaboration of virtual teams: The mediating effect of interpersonal effect. *Proceedings of the 2017 International Conference*

on E-Business and Internet (pp. 45-49). ACM. https://doi.org/10.1145/3092027.3092039

Khesal, S., Samadi, B., Musram, H., & Zohoori, M. (2013). The impact of trust on knowledge sharing. *Interdisciplinary Journal of Contemporary Research in Business, 5,* 495-501. http://journal-archieves33.webs.com/495-501.pdf

Khorsan, R., & Crawford, C. (2014). External validity and model validity: A conceptual approach for systematic review methodology. *Evidence-Based Complementary and Alternative Medicine, 2014,* 1-12. https://doi.org/10.1155/2014/694804

Kirkman, B., Cordery, J., Mathieu, J., & Rosen, B., & Kukenberger, M. (2013). Global organizational communities of practice: The effects of nationality diversity, psychological safety, and media richness on community performance. *Human Relations, 66*, 333-362. https://doi.org/10.1177/0018726712464076

Klitzman, R. (2013). How IRBs view and make decisions about coercion and undue influence. *Journal of Medical Ethics, 39,* 224-229. https://doi.org/10.1136/medethics-2011-100439

Kontopantelis, E., Doran, T., Springate, D. A., Buchan, I., & Reeves, D. (2015). Regression based quasi-experimental approach when randomisation is not an option: Interrupted time series analysis. *Research Methods & Reporting,* 1-4. https://doi.org/10.1136/bmj.h2750

Kozak, M., & Piepho, H. (2018). What's normal anyway? Residual plots are more telling than significance tests when checking ANOVA assumptions. *Journal of Agronomy and Crop Science, 204,* 86-98. https://doi.org/10.1111/jac.12220

Kramer, W., Shuffler, M., & Feitosa, J. (2016). The world is not flat: Examining the interactive multidimensionality of culture and virtuality in teams. *Human Resources Management Review*, 1-17. https://doi.org/10.1016/j.hrmr.2016.12.007

Labaree, R. (2016). *Types of research designs. Organizing your social sciences research papers.* USC Libraries.

Lachmann, M., Trapp, I., & Trapp, R. (2017). Diversity and validity in positivist management accounting research - A longitudinal perspective over four decades. *Management Accounting Research, 34,* 42-58. https://doi.org/10.1016/j.mar.2016.07.002

Leathers, D., & Eaves, M. (2016). *Successful nonverbal communication: Principles and applications* (4th ed.). Routledge.

Lee, H., Ahn, H., Kim, H., & Lee, J. (2014). Comparative analysis of trust in online communities. *Procedia Computer Science, 31*, 1140-1149. https://doi.org/10.1016/j.procs.2014.05.370

Lenters, L., Cole, D., & Godoy Ruiz, P. (2014). Networking among young global health researchers through an intensive training approach: A mixed methods exploratory study. *Health Research Policy and Systems, 12,* 5-16. https://doi.org/10.1186/1478-4505-12-5

Leonard, L., Sherblom, J., Withers, L., & Smith, J. (2015). Training effective virtual teams. Presence, identity, communication openness, and conversational interactivity. *International Professional Communication Journal, 3,* 11-45. https://connexionsjournal.org/

Liao, C. (2017). Leadership in virtual teams: A multilevel perspective. *Human Resource Management Review, 27,* 648-659. https://doi.org/10.1016/j.hrmr.2016.12.010

Lilian, S. (2014). Virtual teams: Opportunities and challenges for e-leaders. *Procedia - Social and Behavioral Sciences, 110,* 1251-1261. https://doi.org/10.1016/j.sbspro.2013.12.972

Lohikoski, P., Kujala, J., Haapasalo, H., Aaltonen, K., & Ala-Mursula, L. (2016). Impact of trust on communication in global virtual teams. *International Journal of Knowledge-Based Organizations, 6*(1), 1-19. https://doi.org/10.4018/IJKBO.2016010101

Lojeski, K. (2015). Hidden traps of virtual teams. *Harvard Business Review.* https://www.researchgate.net/publication/286456988_The_Hidden_Traps_of_Virtual_Teams

Luft, J., & Shields, M. (2014). Subjectivity in developing and validating causal explanations in positivist accounting research. *Accounting, Organizations, and Society, 39,* 550-558. https://doi.org/10.1016/j.aos.2013.09.001

Mansor, N., & Mirahsani, S. (2012). Organizational trust towards virtual team effectiveness from HRM perspective. *Journal of Asia Pacific Business Innovation & Technology Management*, *2*, 111-118. www.isbitm.org/journal/2/volumes/30/articles/87/download

Mansor, N., & Mirahsani, S., & Saidi, M. (2012). Investigating possible contributors towards organizational trust in effective virtual team collaboration context. *Procedia – Social and Behavioral Sciences, 57*, 283-289.

https://doi.org/10.1016/j.sbspro.2012.09.1187

Marlow, S., Lacerenza, C., & Salas, E. (2016). Communication in virtual teams: A conceptual framework and research agenda. *Human Resource Management Review, 12,* 1-15. https://doi.org/10.1016/j.hrmr.2016.12.005

Mba, I. (2015). Conflicts encountered by multinational corporations in cross-cultural communication and its solutions. *Journal of International Business and Economics, 3,* 86-92. https://doi.org/10.15640/jibe.v3n1a10

McDonnell, J. (2015). Gifts to the future: Design reasoning, design research, and critical design practitioners. *Journal of Design Economics and Innovation,* 107-117. https://doi.org/10.1016/j.sheji.2016.01.007

McLarnon, M., O'Neill, T., Taras, V., Law, D., Donia, M., & Steel, P. (2019). Global virtual team communication, coordination, and performance across three peer feedback strategies. *Canadian Journal of Behavioural Science, 51,* 207-218. https://doi.org/10.1037/cbs0000135

Mikesell, L., Bromley, E., & Khodyakov, D. (2013). Ethical community-engaged research: A literature review. *American Journal of Public Health, 103,* e7-e14. https://doi.org/10.2105/AJPH.2013.301605

Mikkelson, A., York, J., & Arritola, J. (2015). Communication competence, leadership behaviors, and employee outcomes in supervisor-employee relationships. *Business and Professional Communication Quarterly, 78,* 336-354. https://doi.org/10.1177/2329490615588542

Miles, J., & Hollenbeck, J. (2014). Teams and technology. In M. Coovert, & L. F.

Thompson (Eds.), *Psychology of workplace technology* (pp. 99-117). Routledge.

Mincu, C. (2015). The impact of personal resources on organizational attitudes: Job satisfaction and trust in organization. *Procedia - Social and Behavioral Sciences, 187*, 685-689. https://doi.org/10.1016/j.sbspro.2015.03.127

Moe, N., Cruzes, D., Dyba, T., & Engebretsen, E. (2015). Coaching a global agile virtual team. *Proceedings of the 2015 IEEE 10th International Conference on Global Software Engineering, Spain*, 33-37. https://doi.org/10.1109/ICGSE.2015.26

Moghaddam, A., Khoshnevisan, F., Bondarianzadeh, D., Mohammadi, M., & Abkenar, H. (2014). Development of a food safety attitude and practice questionnaire for Iranian consumers. *International Journal of Consumer Studies, 38,* 367-373. https://doi.org/10.1111/ijcs.12102

Moore, D., Notz, W., & Flinger, M. (2013). (2013). *The basic practice of statistics* (6th ed.). W. H. Freeman and Company.

Morgan, L., Caceres, A., & Wright, G. (2014). Leading effective global virtual teams: The consequences of methods of communication. *Systemic Practice and Action Research, 27*, 607-624. https://doi.org/10.1007/s11213-014-9315-2

Morley, S., Cormican, K., & Folan, P. (2015). An analysis of virtual team characteristics: A model for virtual project managers. *Journal of Technology Management & Innovation, 10*, 188-203. https://doi.org/10.4067/S0718-27242015000100014

Morrison, S., & Ruiz, J. (2020). Challenges and barriers in virtual teams: A literature review. *SN Applied Sciences, 2*(1096), 1-33. https://doi.org/10.1007/s42452-020-2801-5

Mouton, F., Malan, M., Kimppa, K., & Venter, H. (2015). Necessity for ethics in social engineering research. *Computers & Security, 55,* 114-127. https://doi.org/10.1016/j.cose.2015.09.001

Muhl, J. (2014). *Organizational trust. Measurement, impact, and the role of management accountants.* New York, NY: Springer. https://doi.org/10.1007/978-3-319-04069-1

Myers, M. (2013). *Qualitative research in business and management* (2nd ed.). Sage Publishing.

National Research Council. (2015). *Enhancing the effectiveness of team science.* Washington, DC: The National Academies Press. https://doi.org/10.17226/19007

Neall, A., & Tuckey, M. (2014). A methodological review of research on the antecedents and consequences of workplace harassment. *Journal of Occupational and Organizational Psychology, 87,* 225-257. https://doi.org/10.17226/1900710.1111/joop.I2059

Nimon, K. (2012). Statistical assumptions of substantive analyses across the general linear model: A mini-review. *Frontiers in Psychology, 3*(322), 1-5. https://doi.org/10.3389/fpsyg.2012.00322

Oberer, B., & Erkollar, A. (2013). Management information systems: The virtual team scorecard (VTS). https://pdfs.semanticscholar.org/5a75/7d066a6a096d6298b6b9fe11fe37c548ef29.pdf

Olariu, C. & Aldea, C. (2014). Managing processes for virtual teams – A BPM approach.

Procedia - Social and Behavioral Science, 109, 380-384. https://doi.org/10.1016/j.sbspro.2013.12.476

Paliszkiewicz, J., Koohang, A., & Nord, J. (2014). Management trust, organizational trust, and organizational performance: Empirical validation of an instrument. *The Online Journal of Applied Knowledge Management, 2,* 28-39. http://www.iiakm.org/ojakm/articles/2014/volume2_1/OJAKM_Volume2_1pp28-39.pdf

Pangil, F. & Chan, J. (2014). The mediating effect of knowledge sharing on the relationship between trust and virtual team effectiveness. *Journal of Knowledge Management, 18,* 92-106. https://doi.org/10.1108/JKM-09-2013-0341

Parayitam S., & Dooley R. (2009). The interplay between cognitive-and affective conflict and cognition-and affect-based trust in influencing decision outcomes. *Journal of Business Research, 62,* 789-796. https://doi.org/10.1016/j.jbusres.2008.02.006

Patino, C., & Ferreira, J. (2015). Confidence intervals: A useful statistical tool to estimate effect sizes in the real world. *Jornal Brasileiro de Pneumologia, 41,* 565-566. https://doi.org/10.1590/s1806-37562015000000314

Patterson, C. (2014). *Determining methods for leaders to manage a multigenerational workforce* (Doctoral dissertation). Retrieved from ProQuest Digital Dissertations and Theses database. (UMI No. 3617456).

Paul, R., Drake, J., & Liang, H. (2016). Global virtual team performance: The effect of coordination effectiveness, trust, and team cohesion. *IEEE Transactions on Professional Communication, 59,* 186-202.

https://doi.org/10.1109/TPC.2016.2583319

Paul, H., & Garg, P. (2014). Organizational commitment of frontline sales professionals in India: Role of resilience. *International Journal of Business Insights and Information, 7,* 12-18. https://www.ijbit.org/pdfs/Archives.pdf

Peñarroja, V., Orengo, V., Zornoza, A., Sánchez, J., & Ripoll, P. (2015). How team feedback and team trust influence information processing and learning in virtual teams: A moderated mediation model. *Computers in Human Behavior, 48,* 9-16. https://doi.org/10.1016/j.chb.2015.01.034

Peterson R., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. *Journal of Applied Psychology, 98,* 194-198. https://doi.org/10.1037/a0030767

Phutela, D. (2015). The importance of non-verbal communication. *IUP Journal of Soft Skills, 9,* 43-49. https://www.iupindia.in/Soft_Skills.asp

Pinjani, P., & Palvia, P. (2013). Trust and knowledge sharing in diverse global virtual teams. *Information & Management, 50*, 144-153. https://doi.org/10.1016/j.im.2012.10.002

Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A review of current literature and directions for future research. *The DATABASE for Advances in Information Systems*, *35,* 6-36. https://doi.org/10.1145/968464.968467

Purvanova, R. (2018). Virtual teams. *The SAGE Encyclopedia of the Internet.* https://doi.org/10.4135/9781473960367.n265

Puteh, F., & Ong, M. (2017). Quantitative data analysis: Choosing between SPSS, PLS,

and AMOS in social science research. *International Interdisciplinary Journal of Scientific Research, 3,* 14-25. https://iijsr.org/data/frontImages/gallery/Vol._3_No._1/3._14-25.pdf

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European Journal of Education Studies, 3,* 369-387. https://doi.org/10.5281/zenodo.887089

Rains, S., & Bonito, J. (2017). Adaptive structuration theory. In C. R. & L. Lewis (Eds.), *International Encyclopedia of Organizational Communication* (pp. 1-9). Wiley Blackwell. https://doi.org/10.1002/9781118955567.wbieoc003

Rana, R. & Singhai, R. (2015). Chi-square test and its application in hypothesis testing. *Journal of Cardiovascular, 1,* 69-71. https://doi.org/10.4103/2395-5414.157577

Rauniar, R., Rawski, G., Yang, J., & Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: An empirical study on Facebook. *Journal of Enterprise Information Management, 27,* 6-30. https://doi.org/10.1108/JEIM-04-2012-0011

Regmi, P. R., Waithaka, E., Paudyal, A., Simkhada, P., & van Teijlingen, E. (2016). Guide to the design and application of online questionnaire surveys. *Nepal Journal of Epidemiology, 6,* 640–644. https://doi.org/10.3126/nje.v6i4.17258

Rice, S., Winter, S., Doherty, S., & Milner, M. (2017). Advantages and disadvantages of using internet-based survey methods in aviation-related research. *Journal of Aviation Technology and Engineering, 7,* 58-65. https://doi.org/10.7771/2159-6670.1160

Rothman, K. (2014). Six persistent research misconceptions. *Journal of General Internal Medicine, 29,* 1060-1064. https://doi.org/10.1007/s11606-013-2755-z

Rovai, A., Baker, J., & Ponton, M. (2014). *Social science research design and statistics: A practitioner's guide to research methods and IBM SPSS analysis* (2nd ed.). Watertree Press LLC.

Saafein, O., & Shaykhian, G. (2014). Factors affecting virtual team performance in telecommunication support environment. *Telematics and Informatics, 31,* 459-462. https://doi.org/10.1016/j.tele.2013.10.004

Sa'id, U., & Madugu, U. (2015). The imperative of population sampling in social science research. *Global Journal of Political and Science and Administration, 3,* 49-57. http://www.eajournals.org

Sarhadi, M. (2016). Comparing communication style within project teams of three project-oriented organizations in Iran. *Procedia – Social and Behavioral Sciences, 226,* 226-235. https://doi.org/10.1016/j.sbspro.2016.06.183

Saunders, C. (2000). Virtual teams: Piecing together the puzzle. In R. Zmud (Eds.). *Framing the domain of IT management: Projecting the future through the past* (pp. 29-50). Pinnaflex.

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students* (4th ed.). Financial Times Prentice Hall.

Serrat, O. (2017). Managing virtual teams. In O. Serrat (Eds.), *Knowledge solutions: Tools, methods, and approaches to drive organizational performance* (pp. 619-625). Springer. https://doi.org/10.1007/978-981-10-0983-9

Schiller, S., & Mandviwalla, M. (2007). Virtual team research: An analysis of theory use and a framework. *Small Group Research, 38,* 12-59. https://doi.org/10.1177/1046496406297035

Scott, C., & Wildman, J. (2015). Culture, communication, and conflict: A review of the global virtual team literature. In J. Wildman, & R. Griffith (Eds.). *Leading global teams* (pp. 13-32). Springer. https://doi.org/10.1007/978-1-4939-2050-1_2

Sedgwick, P. (2012). Pearson's correlation coefficient. *BMJ, 345.* https://doi.org/10.1136/bmj.e4483

Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference.* Houghton Mifflin.

Shaughnessy, J., Zechmeister, E., & Zechmeister, J. (2000). *Research methods in psychology* (9th ed.). The McGraw-Hill Companies.

Shen, Z., Lyytinen, K., Yoo, Y. (2014). Time and information technology in teams: A review of empirical research and future research directions. *European Journal of Information Systems, 24*, 492-518. https://doi.org/10.1057/ejis.2014.8

Shockley-Zalabak, P., Morreale, S., & Hackman, M. (2010). *Building the high-trust organization: Strategies for supporting the five key dimensions of trust.* Jossey-Bass.

Shorten, A., & Smith, J. (2017). Mixed methods research: Expanding the evidence base. *Evidence-Based Nursing, 20,* 74-75. https://doi.org/10.1136/eb-2017-102699

Skaik, Y. (2015). The bread and butter of statistical analysis "t-test:" Uses and misuses. *Pakistan Journal of Medical Sciences, 31,* 1558-1559.

https://doi.org/10.12669/pjms.316.8984

Slater, S., Joksimovic, S., Kovanovic, V., Baker, R. S., & Gasevic, D. (2017). Tools for educational data mining: A review. *Journal of Educational and Behavioral Statistics, 42,* 85-106. https://doi.org/10.3102/1076998616666808

Solomon, C. (2016). Trends in global virtual teams. Virtual teams survey report. *RW3 Culture Wizard*. http://cdn.culturewizard.com/PDF/Trends_in_VT_Report_4-17-2016.pdf

Starnes, B., Truhon, S., & McCarthy, V. (2015). A primer on organizational trust. *ASQ Human Development and Leadership Division*. http://rube.asq.org/hdl/2010/06/a-primer-on-organizational-trust.pdf

Stawnicza, O. (2014). Information and communication technologies – Creating oneness in globally distributed IT project teams. *Procedia Technology, 16,* 1057-1064. https://doi.org/10.1016/j.protcy.2014.10.060

Stephan, U., Patterson, M., Kelly, C., & Mair, J. (2016). Organizations driving positive social change: A review and an integrative framework of change processes. *Journal of Management, 42*, 1250-1281. https://doi.org/10.1177/0149206316633268

Stern, M. J., Bilgen, I., & Dillman, D. A. (2014). The state of survey methodology challenges, dilemmas, and new frontiers in the era of the tailored design. *Field Methods, 26,* 284-301. https://doi.org/10.1177/1525822X13519561

Stray, V., Moe, N., & Noroozi, M. (2019, May). *Slack me if you can! Using enterprise social networking tools in virtual agile teams.* Paper presented at the ACM/IEEE

Fourteenth International Conference on Global Software Engineering, Montreal, CA. https://doi.org/10.1109/ICGSE.2019.00031

Sutton, J., & Austin, Z. (2015). Qualitative research: Data collection, analysis, and management. *The Canadian Journal of Hospital Pharmacy, 68,* 226-231. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4485510/

Taguchi, N. (2018). Description and explanation of pragmatic development: Quantitative, qualitative, and mixed methods research. *System, 75,* 23-32. https://doi.org/10.1016/j.system.2018.03.010

Taylor, S., Bogdan, R., & DeVault, M. (2016). *Introduction to qualitative research methods: A guidebook and resource.* Wiley Publishing.

Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Preoperative Nursing, 7,* 155-163. https://doi.org/10.5281/zenodo.2552022

Tiwari, A. (2015). Non-verbal communication – An essence of interpersonal relationship at workplace. *Management Insight, 11,* 109-114. http://smsvaranasi.com/mgmt-insight-journal/

Tschannen-Moran, M. (2014). *Trust matters: Leadership for successful schools* (2nd ed.). Jossey-Bass.

U.S. Department of Health & Human Services. (2016). *The Belmont Report.* https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html

U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality. (2017). *A profile.* https://www.ahrq.gov/cpi/about/profile/index.html

U.S. Food & Drug Administration. (2017). *Institutional Review Boards frequently asked questions – Information sheet.* https://www.fda.gov/RegulatoryInformation/Guidances/ucm126420.htm

Weems, V., Rose, L., & Cook, V. (2015). Negotiating availability within global virtual teams (GVTs). *International Professional Communication Journal, 3,* 47-67. https://connexionsjournal.org/

Weil, A., Wolfe, C., Reyna, V., Widmer, C., Cedillos-Whynott, E., & Brust-Renck, P. (2015). Proficiency of FPPI and objective numeracy in assessing breast cancer risk estimation. *Learning and Individual Differences, 43,* 149-155. https://doi.org/10.1016/j.lindif.2015.08.033

White, H., & Sabarwal, S. (2014). Quasi-experimental design and methods. *Methodological Briefs: Impact Evaluation 8.* UNICEF Office of Research, Florence.

Whitley, B., & Kite, M. (2013). *Principles of research in behavioral science (3rd ed.).*Routledge.

Wright, B. (2005). Researching internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication, 10.* https://doi.org/10.1111/j.1083-6101.2005.tb00259.x

Yang, K., & Banamah, A. (2014). Quota sampling as an alternative to probability sampling? An experimental Study. *Sociological Research Online, 19,* 29-40. http://www.socresonline.org.uk

Yang, L., Liu, S., Tsoka, S., & Papageorgiou, L. (2016). Mathematical programming for piecewise linear regression analysis. *Expert Systems with Applications, 44*, 156-167. https://doi.org/10.1016/j.eswa.2015.08.034

Yao, X., & Robert, L. (2017). Leveraging the benefits of multiple-team membership in virtual teams. *Proceedings of the 38th International Conference on Information Systems.* Seoul, Korea. https://deepblue.lib.umich.edu/handle/2027.42/138127

Yin, R., (2014). *Case study research: Design and methods (5th ed.).* Sage Publications.

Zhang, M., Fan, D., & Zhu, C. (2014). High-performance work systems, corporate social performance and employee outcomes: Exploring the missing links. *Journal of Business Ethics, 120*, 423-435. https://doi.org/10.1007/s10551-013-1672-8

Zhang, C., Miller, C., Volkman, K., Meza, J., & Jones. K. (2015). Evaluation of the team performance observation tool with targeted behavioral markers in simulation-based interprofessional education. *Journal of Interprofessional Care, 29,* 202-208. https://doi.org/10.3109/13561820.2014.982789

Zhong, Y., Tian, F., Hu, H., Grey, D., & Gilmont, M. (2016). Rivers and reciprocity: Perceptions and policy on international watercourses. *Water Policy, 18,* 803-825. https://doi.org/10.2166/wp.2016.229

Zuofa, T., & Ochieng, E. (2017). Working separately but together: Appraising virtual project challenges. *Team Performance Management, 23,* 227-242. https://doi.org/10.1108/TPM-06-2016-0030

Zyphur, M. J., & Pierides, D. C. (2017). Is quantitative research ethical? Tools for ethically practicing, evaluating, and using quantitative research. *Journal of*

Business Ethics, 143, 1-16. https://doi.org/10.1007/s10551-017-3549-8

Appendix A: Organizational Trust Questionnaire

* The participants will answer these questions when they start the survey through informed consent via email.

Use this rating system (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, and 1 = strongly disagree) to answer the questions below:

1. There is an atmosphere for honest cooperation among employees.
2. Clear expectations connected with results and aims from all employees.
3. Employees are willing to share knowledge.
4. Employees openly admit and take responsibility for their mistakes.
5. Employees avoid participating in gossip and unfair criticism of others.
6. Employees are willing to take part in training.
7. Periodic meetings take place between employees and management.
8. In general, work responsibilities are established and clear.
9. The criteria for promotion are clear in every position.
10. Evaluation of employees is fair.
11. The relationship between employees is good.
12. All employees are treated fairly.
13. The interests of workers are taken care of.
14. Teamwork is encouraged and preferred.
15. Employees are encouraged to take part in decision-making.

Appendix B: Organizational Trust Questionnaire Authorization Email

Cornelius "Neil" Session, MSM, MA 1:28 PM
Hello Dr. Paliszkiewicz. Hope you're doing well. I'm a doctoral candidate that is very fond of your research and writings. I would like to use your measurement instrument for organizational trust within virtual teams. My study will be very beneficial to fellow researchers. Have a great day.

Cornelius "Neil" Session, MSM, MA 1:31 PM
Thank you so much for accepting my invitation.

Joanna Paliszkiewicz 6:01 AM
You are welcome. If you need more information about instrument let me know.

Cornelius "Neil" Session, MSM, MA 10:38 AM
Good morning. Thank you so much for responding. I really appreciate it. In the attached document, you and your colleague, Koohang used 15 items to measure organizational trust in your study. I wanted to get permission to use the same instrument in my doctoral study. The name of my study is the "Relationship Between Organizational Trust, Communication, and Team Performance Within Virtual Teams." I look forward to hearing back from you. Have a great day!

Joanna Paliszkiewicz 4:55 PM
yes, you can use it

Joanna Paliszkiewicz 4:57 PM
http://www.iiakm.org/ojakm/articles/2015/volume3_2/OJAKM_Volume3_2pp19-35.pdf here is another instrument
and here is the example of research with this instrument
https://www.emeraldinsight.com/doi/full/10.1108/IMDS-02-2016-0072

Cornelius "Neil" Session, MSM, MA 6:18 PM
Thank you very much. I really appreciate it. When I done with my study, I will send it to you.

Joanna Paliszkiewicz 8:58 AM
ok, thank you

Appendix C: Communication Questionnaire

TeamSTEPPS 2.0 Team Performance Observation Tool (TPOT)*

* The participants will answer these questions when they start the survey through informed consent via email.

Use this rating system (1 = Very Poor, 2 = Poor, 3 = Acceptable, 4 = Good, and 5 = Excellent) to answer the questions below:

1. Provides brief, clear, specific, and timely information to team members
2. Seeks information from all available sources
3. Uses check-backs to verify information that is communicated
4. Identifies team goals and vision
5. Uses resources efficiently to maximize team performance
6. Balances workload within the team
7. Delegates tasks or assignments, as appropriate
8. Conducts briefs, huddles, and debriefs
9. Uses call-outs and handoff techniques to communicate effectively with team members.
10. Role models teamwork behaviors

Appendix D: TeamSTEPPS 2.0 TPOT Authorization Email

Re: Regarding Using TeamStepps
Inbox

(a) obc-questions <obc-questions@tslms.org> Wed, Aug 8, 2018, 1:59 PM
to me, Bryan

Hi Cornelius,

As TeamSTEPPS, to include the measurement tools, is in the public domain, you may use the tool as you work to complete your dissertation. As you may already know, all measurement tools may be found
here: https://www.ahrq.gov/teamstepps/instructor/index.html

Regards,
Your TeamSTEPPS Support Team

From: Bryan Jansen <Bryan.Jansen@ahrq.hhs.gov>
Sent: Wednesday, August 8, 2018 1:35 PM
To: obc-questions
Subject: FWD: Regarding Using TeamStepps

The following incident has been forwarded to you by:
Bryan Jansen(Bryan.Jansen@ahrq.hhs.gov)

Sender's Comment

Hi,

Can you help with this query sent to the AHRQ mailbox?

If you can help, please reply and please Cc me or let me know when you've answered so I can count this query as closed.

Contact Information

Email Address: corneliussession@gmail.com

First Name: Cornelius
Last Name: Session
Type:
Title:

Reference #180808-000000

Summary: Regarding Using TeamStepps
Rule State: AHRQ routing
Category Level 1: For Professionals
Category Level 2: Education & Training
Date Created: 08/08/2018 08:28 AM
Last Updated: 08/08/2018 01:35 PM
Status: Unresolved
Assigned:
Name: Cornelius Session
Telephone Number: [redacted]

Mailing Address

[redacted]

Discussion Thread

Auto-Response - 08/08/2018 08:28 AM
The following answers might help you immediately. (Answers open in a separate window.)
Answer Link: How can I find quality tools on a specific topic?
(https://info.ahrq.gov/app/answers/detail/a_id/237)
Answer Link: What is TeamSTEPPS and how can it improve patient safety in organizations?
(https://info.ahrq.gov/app/answers/detail/a_id/419)
Answer Link: How can I find out more information about the PSO program?
(https://info.ahrq.gov/app/answers/detail/a_id/604)

Customer By Web Form (Cornelius Session) - 08/08/2018 08:28 AM
Good morning. I am a doctoral candidate working on my dissertation and I would like to use the TeamStepps 2.0 performance measuring tool for my study. The tool has been extremely helpful in the healthcare industry and I would like to use it for my study which focuses on improving virtual team performance in the information technology industry. I truly hope that I am able to use the measuring tool for my study because the results may be extremely helpful for improving virtual teams in the healthcare industry. I look forward to hearing back from you. Have a great day.