Team Cultural intelligence in virtual student teams at Radboud University Nijmegen

A quantitative study to explore the moderator role of team cultural intelligence within the relationship between team knowledge sharing, team trust and virtual team performance

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Abstract

Today, the increasingly diverse mix of global virtual teams in organizations has led to a strong focus on the role of cultural intelligence. While there are still some gaps in the literature regarding the under-studied concept of team cultural intelligence (CQ), the focus of business leaders and researchers has shifted towards this new concept due to the globalization trend. This research aimed to fill some of these gaps in the literature regarding the moderator role of team CQ and its effects on virtual team performance through a deductive-quantitative approach. The results show that knowledge sharing, team trust, and team CQ are significant predictors of virtual team performance among virtual student teams at Radboud University and ultimately positively influence team performance. Strikingly, however, team CQ neither moderates the relationship between knowledge sharing and team performance nor does team trust and virtual team performance. Future research may be helpful to reveal the intervening role of team CQ through mediation between variables. Altogether, related scientific and managerial implications can be derived from these findings regarding the training of intercultural student teams and future research opportunities to delve deeper into the context of cultural intelligence.

Key Words:

Virtual Teams - Knowledge Sharing - Team Trust - Cultural Intelligence - Team Cultural Intelligence (Team CQ).

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1. Introduction

Globalization has increased diversity in culture, which has created particular challenges for individuals and organizations (Ang, Van Dyne, Koh, Templer, Tay & Chandrasekar, 2007). Many organizations reacted to this transformation by introducing a new form of organizing: virtual teams (Ale Ebrahim, Ahmed, & Taha, 2009). Virtual teams, defined as geographically distributed collaborations that rely on technology to communicate and cooperate, are central to maintaining the increasingly globalized social and economic infrastructure (Morrison-Smith & Ruiz, 2020). Although research shows that virtual teams bring new opportunities, such as creative solutions and more innovation, they also create barriers work effectively together (Humes & Reilly, 2007; Chua, Morris, & Mor, 2012; Bücker & Korzilius, 2018). According to the rapid change of the work environment, there is an increasing consensus about the complexity of diverse teams (Ang and Inkpen 2008). The changing workplace becoming so reliant on virtual teams comes with management challenges, not entirely addressed by previous research. Despite the growing body of research on virtual teams, there are many opportunities for additional work to explore and examine factors that contribute to the performance of virtual teams (Pinsonneault & Caya, 2005; Hacker, Janine & Johnson, Michael & Saunders, Carol & Thayer, Amanda, 2019).

1.1 Research Problem

Previous research of Bücker and his colleagues (2014) demonstrated that cultural adaptation is an essential dimension of virtual team complexity and requires appropriate communication skills to create mutual understandings and reduce the distance and the uncertainty between people (Bücker, Poutsma, Furrer, & Buyens, 2014). As argued by Zakaria (2000), the advantage of a culturally diverse team is reached better if cultural communication competence is present in the team and conflicts are resolved. Attributes like cultural intelligence help increase cross-cultural communication effectiveness (Bücker et al., 2014; Earley & Ang, 2003, Thomas et al., 2008) and develop shared values (Adair, Hideg, & Spence, 2013). In most studies so far, cultural intelligence is measured at the individual level (Bücker, Furrer, & Weem, 2016). Recent theoretical developments have revealed the concept of team cultural intelligence (team CQ). Team CQ is "the ability of a team to effectively process information and behave responsively in a cross-cultural environment" (Bücker & Korzilius, 2018, p. 3).

Team culture intelligence is a relatively new concept that is understudied; therefore, many studies have indicated that it would make sense to explore the effect of CQ at the team level in culturally diverse teams (Adair et al., 2013; Janssens & Brett, 2006).

Backed by decades of scientific studies, it is without a doubt that successful teaming requires that team members agree on goals, roles, and rules for interaction (Alsharo, Gregg & Ramirez, 2017). Whereas this also applies to virtual teams, two of the essential factors influencing virtual teams' performance are trust and knowledge sharing (Alsharoa et al., 2017). Previous studies indicate that teams with cultural diversity develop their innovative knowledge sharing when working through miscommunications and conflicts (Mishra & Gupta, 2010; Swann, Kwan, Polzer, & Milton, 2003). The biggest challenge in nurturing a virtual team is the supply of knowledge, namely the willingness to share knowledge with other members (Chiu, Hsu, & Wang, 2006). As a high level of diversity often characterizes virtual teams - in culture, nationality, or otherwise - it can potentially increase the risk of ambiguity, value conflicts, reasoning differences, threatening harmony, and suffocating the exchange of information (Osita-Ejikeme & Uzoma, 2016). These heterogeneities within virtual teams raise knowledge exchanges' complexity, enhancing the potential for communication barriers.

Generally speaking, working in teams also requires coordination, sharing responsibilities, and participative decision-making (Keen, 1990). This emphasis on interpersonal and interdependent group dynamics has given rise to trust as a critical variable (Costa, 2003). In Lu et al., trust has been associated with virtual team performance. Previous research also showed that team CQ improves team cohesion concerned with interpersonal relationships between team members (Bossche, Gijselaers, Segers & Kirschner, 2006). Accordingly, when a certain level of cohesion has been established within a team, it will improve team learning due to a certain level of trust (Kayes, Kayes & Kolb, 2004). When people feel safe sharing their thoughts and expertise, they will learn from each other (Kayes et al., 2004). Scholars asserted that while multiple cultures in a team may lead to ineffective communication and conflict (Adair et al., 2013; Stahl, Tung, Kostova & Zellmer-Bruhn, 2016), team CQ can be considered a vital construct to describe cross-cultural competencies within teams (Bücker et al., 2014). Therefore, it can be argued that team members will engage more in knowledge-sharing activities and team trust in the presence of team CQ (Vegt & Bunderson, 2005).

To date, researchers have partially tested the relationship between individual-level culture intelligence and performance outcomes demonstrating its positive impact on teams (Iskhakova & Ott 2020). However, despite growing recognition of the cultural factor influencing knowledge sharing behavior (Chen and Lin, 2013), very few studies investigated the impact of team CQ on knowledge sharing behavior and trust among members of virtual teams (Zhang, De Pablos & Xu, 2014).

Exploring the role of team CQ on the team knowledge sharing, trust and performance can lead to better interpretation of a team cultural intelligence that best allows for team members to promote the open sharing of ideas (Butts, Trejo, Parks & McDonald, 2012). Hence, this study seeks to explore the moderator role of the understudied concept of team CQ and it will zoom in on this within the context described below.

1.2 Research Context

Various applications might be interesting to study team CQ and virtual team performance; however, this research aims for a relatively small-scale explorative study. Therefore, this thesis research attempts to explore the role of cultural intelligence on virtual team performance among master and pre-master students of Business Administration (BA) at the Radboud University Nijmegen. The student context is relevant for the following reasons. First, business students are a widely diverse group of international students with various nationalities and cultural backgrounds, providing a proper context to investigate the role of cultural intelligence on virtual team performance. Furthermore, rapid globalization makes it increasingly challenging to prepare students for a global workplace, as it involves technology, cultural awareness, and team experience (Burleson & Peters, 2021). Hence, it can be argued that organizations need more flexible employees who can work creatively, share and learn new skills, and adapt to diverse contexts and new environments (Şahin, Faruk, Gurbuz & Sait, 2014). Since students are the future organizational stakeholders in a globalized economy, it is essential to take the time to understand issues and ways of representing knowledge and skills within diverse teams.

As a result, students need experiences that reflect the demands of the workplace and provide them with experiences and skills to be better equipped when they move into the workplace (Burleson & Peters, 2021). Accordingly, many university programs that international students undertake involve team projects (Barton & Hartwig, 2017). Likewise, Business Administration students at Radboud University must also make practical assessments for each subject examination. Based on my experience as a student at RU, the practical

evaluation is often organized in a group project or group assignment, an exciting context to investigate team performance and cultural intelligence.

Additionally, studying student teams may also be beneficial in simplifying the research scope for this master trajectory since it provides us with accessible and available data.

1.3 Research Goal

The research goal is to contribute to the discussion about the understudied concept of team cultural intelligence by means of exploring the moderator role of team CQ in the relationship between knowledge sharing, team trust, and virtual team performance among virtual student teams. This goal will be reached by a small-scale explorative study in the context of virtual student teams at Radboud University Nijmegen.

1.4 Research Framework

This study consists of three main steps to reach the goals stated: building a model based on the literature, operationalizing the model based on the research context and gathering data, exploring and evaluating the model through analyzing data.

Step 1: The first step is to build a model based on literature, that is why determining relevant theories to further conduct a literature review and develop the conceptual model is needed. There are many theories frequently used in virtual team research, such as media richness theory (MRT), social information processing theory (SIP), and social presence (SPT) theory (Schiller et al., 2007). However, in this thesis study, the focus is on the theoretical foundations in knowledge-based view (KBV) and social cognitive theory (SCT), responding to the need to apply the most relevant theory according to the formulated research problem.

The knowledge-based view indicates that knowledge becomes internalized, accumulated, shared and used; and once this process is established, the competitive advantage is achievable (Hamilton & Philbin, 2020). The knowledge-based view is relevant because knowledge-related resources are more likely to contribute to attaining and sustaining superior performance than tangible resources (Bogner and Bansal, 2007).

In addition, earlier views of social cognitive theory, often labeled as social learning theories, emphasized the importance of social variables in human behavior (Usher & Schunk, 2018). As organizations globalize and the workforce becomes more diverse than traditional ones, knowledgeable workers have compelled this changing work pattern with the associated skill of emotional intelligence (Jordan and Lawrence, 2009). In teams, people “have to pool their knowledge, skills, and resources, provide mutual support, form alliances, and work

together to secure what they cannot accomplish on their own" (Bandura, 2002, p. 270). Since team CQ is previously studied within a social-cognitive theoretical framework in which cultural differences are at stake the social cognitive theory is relevant for the subject of this study (Bücker & Korzilius, 2020). Therefore, practicing an integrated approach, this study proposes that while communication through virtual platforms can hinder knowledge sharing and trust, strong team culture intelligence can help to overcome the limitations of diverse backgrounds to share knowledge, trust other team members and achieve better performance.

Step2: Next, this study aims to quantitatively collect data from Business Administration students. Based on this quantitative approach, an online survey is designed and distributed to students who were participated in virtual teamwork during 2020-2021. We invited Business Administration students to share their experiences regarding the selected variables, such as the degree of knowledge sharing, team trust, and team CQ within their team.

Step3: Finally, the gathered data will be analyzed through statistical tools to examine different relationships among the outlined variables and answer the research questions.

1.5 Research Questions

Based on the described research problem, to explore the moderator role of team CQ, it is assumed that to some extent, there will be a moderator effect of team CQ on the relationship between knowledge sharing, team trust, and virtual team performance. Because this personal attribute enables individuals to interact more effectively and adapt better within diverse cultural settings (Jyoti & Kour, 2017). Besides, it is assumed that knowledge sharing and trust within teams as essential antecedents of virtual team performance interact and in combination they can deliver a greater effect on the performance of virtual student teams. These assumptions lead to the following research questions consisting of one main and four sub-research question:

MQ: *To what extent does team cultural intelligence moderates the relationship between knowledge sharing, team trust, and team performance among virtual student teams?*

To answer the main question, we first need to investigate the direct and indirect effect of knowledge sharing and team trust on virtual team performance, leading to the first two sub-questions.

SQ1: To what extent does knowledge sharing influence team performance at virtual student teams?

SQ2: To what extent does team trust influence team performance at virtual student teams?

The second step to answer the main research question is to investigate the moderator role of team culture intelligence under the proposed relationships, leading to the next two sub-questions.

SQ3: To what extent does team CQ moderate the relationship between knowledge sharing and team performance at virtual student teams?

SQ4: To what extent does team CQ moderate the relationship between team trust and team performance at virtual student teams?

1.6 Research Overview

This thesis study structure is as follows. Chapter 2 contains the literature review and the conceptual model development, addressed as the first step in the research framework. Henceforward, chapter 3 outlines the research methodology, including data sampling, measurement scales, data analysis strategy, and research ethics, in line with the description of step 2. Further, the research findings are presented in chapter 4. Finally, chapter 5 covers this research framework's third and final step with discussion and conclusion, plus the final reflection on the research limitations.

2. Theoretical Background

Based on the deductive approach of this thesis, this chapter provides an overview of relevant literature on the related concepts and theories to develop a conceptual model and investigate the relationship between variables. In other words, the existing literature is reviewed regarding the direct and indirect effects of team CQ and its influence on knowledge sharing, team trust, and team performance, plus looking at the moderator role of team CQ. First, virtual team performance as the dependent variable is discussed. Next, knowledge sharing and team trust are presented as independent variables that can, directly and indirectly, influence virtual team performance. Then the concept of team CQ is elaborated as a moderator variable, which influences the relationship between the independent variables (knowledge sharing and team trust) and the dependent variable (virtual team performance). Finally, this chapter ends with a conceptual model reflecting the formulated hypotheses.

2.1 Virtual Team Performance (Outcome Variable)

In the beginning, the concept of a virtual team is defined through a literature review. Next, the concept of virtual team performance as an outcome variable in this study is introduced.

In general, a *team* is defined as at least two individuals who interact in an adaptive, interdependent, and dynamic way to achieve a common goal (Kozlowski & Ilgen, 2006). However, virtual teams do not have a uniform definition (Orhan, 2017; D'Souza & Colarelli, 2010). Backed in the 1990s, virtual teams were typically established to work on temporary projects mainly placed based on a need to gather necessary knowledge and expertise to solve non-routine problems (Alsharo et al., 2017). The transient nature of early virtual teams afforded limited opportunities to form social relationships. Though, nowadays, organizations are increasingly establishing virtual teams to work on ordinary routine tasks. Besides, organizations support employees to work virtually from their preferred location to benefit from a bigger talent pool. One definition affirmed by Lipnack and Stamps (1997) described a virtual team as people who communicate through interdependent tasks, guided by a common goal that works across space, time, and organizational boundaries, enhanced by communication technologies. Besides, virtual teams are often project-oriented; since they form when the need arises and dissolve when the task is completed (Simons, 1995).

Drawing on the existing conceptions of the virtual team, the term *virtual team* in this thesis shows the following characteristics: (1) a diverse group of people, which are (2) temporally grouped, (3) are physically dispersed and act virtually (4) to perform tasks. (Wong & Burton, 2000). In this respect, the virtual student team meets all of the above characteristics. Primary, BA students are a diverse collection of international students of different nationalities and cultural backgrounds who were brought together to temporarily participate in a team project. Finally, due to the lack of on-campus education caused by the Covid pandemic, they were physically dispersed and performed virtually to achieve the team goal.

Regarding the performance aspect there is no debate that team outcomes are defined and operationalized with different constructs. These constructs fall into three broad categories: achievement, member attitudes, and behavioral outcomes (Cohen & Bailey, 1997). Since managers using virtual teams claim to benefit more from performance than other expected outcomes (Cohen & Bailey, 1997), this study focuses on measuring outcomes on the performance of virtual teams rather than other constructs. Therefore, *Team performance* is defined as the extent to which a team achieves its goals or mission (Baruch & Lin, 2012). This also applies to virtual student teams as they must complete their tasks and meet their project requirements and deadlines to achieve the team goal. There is a great diversity of performance constructs in the literature, in which success factors for team performance are discussed in a traditional setting. However, this study is inspired by overall team performance, including team efficiency, effectiveness, and timeliness (Peters, Karren, 2009).

2.2 Knowledge Sharing

To answer the first sub-question of this research: "To what extent does knowledge sharing influence team performance in virtual student teams?" we need to assess the direct and indirect influence of knowledge sharing on the performance of virtual student teams. First, we examine the direct effect of knowledge sharing on the performance of virtual teams.

In general, knowledge sharing refers to the willingness of individuals in an organization to share the knowledge they have acquired or created with others (Gibbert and Krause 2002). Knowledge sharing is a multidimensional activity and involves different contextual, cognitive, and communication skills (Widén-Wulff & Ginman, 2004). Although knowledge sharing is generally used more often, researchers also use other terms such as knowledge transfer, knowledge exchange, and so forth. (Wang & Noe, 2010). Knowledge sharing differs from knowledge transfer and knowledge exchange; knowledge transfer involves sharing knowledge through the source and its acquisition and application by the recipient (Wang & Noe, 2010).

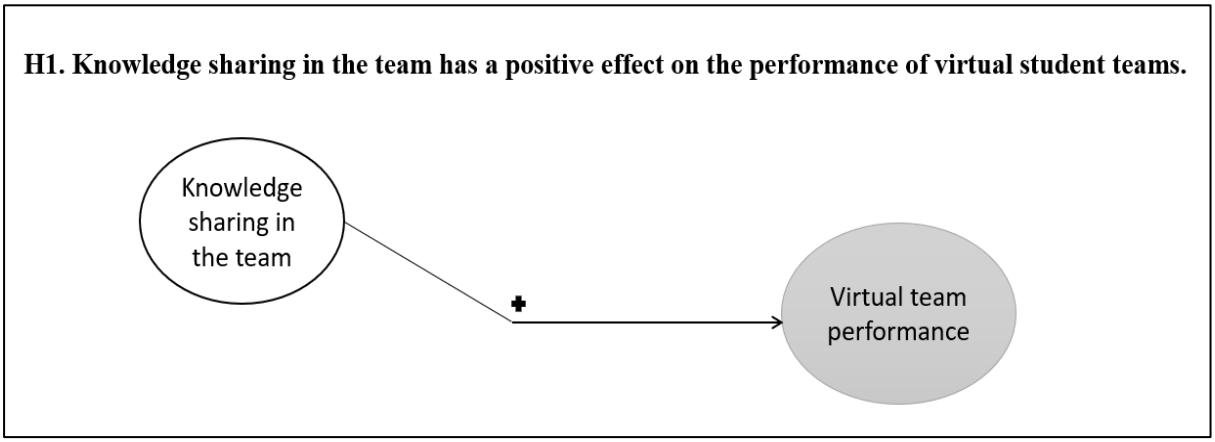
While, knowledge transfer has been used to describe the movement of knowledge between different units, divisions, or organizations rather than between individuals (Szulanski, Cappetta, & Jensen, 2004). In this research, the term knowledge sharing refers to preparing task information and know-how to help others and collaborate with others to solve problems or develop new ideas (Wang & Noe, 2010).

In a knowledge economy, knowledge assets are viewed as a strategically critical intangible resource that is increasingly important for competitive advantage (Bierly & Chakrabarti, 1996; Grant, 1996). Alavi and Tiwana (2002) also discussed that performance and profitability differences between organizations could be primarily attributed to asymmetries in applying knowledge-based assets. One of the intellectual strengths of the virtual team is its dispersed expertise and ability to combine different experiences to create and share knowledge (Pinjani & Palvia, 2013). Therefore, it is argued that knowledge-related resources are more likely to contribute to achieving and sustaining superior performance than tangible resources (Bogner and Bansal, 2007).

In line with the above argument, virtual teams depend on individuals sharing their knowledge to create value, and using the intellectual power of virtual teams becomes a prerequisite to compete successfully and improve team performance. More generally, when looking at how knowledge is approached in the literature, it is often seen as an intangible asset and must be managed through a cognitive approach (Widén-Wulff & Ginman, 2004). Currently, it has also become apparent that to make the image of information behavior and knowledge sharing coherent, the social aspects should also be considered (Widén-Wulff & Ginman, 2004). Therefore, contextual and cultural conditions are also essential to stimulate knowledge sharing and communication (Oppenheim, Stenson & Wilson, 2003). Hence knowledge sharing is seen as a critical behavior that virtual team members rely on (Alsharo et al., 2017); without good knowledge sharing, the performance of virtual teams can be negatively impacted (Reed and Knight, 2010).

Based on this, it can be argued that a higher degree of knowledge sharing within virtual student teams leads to higher performance among student teams. Therefore, the first hypothesis (H1), as shown in Figure 1, was formulated to investigate the extent of the positive influence of knowledge sharing on virtual team performance among students (see figure 1).

Figure 1: Hypothesis 1



2.3 Team Trust

The next formulated sub-question in this research examines the direct and indirect influence of team trust on the performance of virtual student teams as the second independent variable. First, we address the direct effect through a literature review.

The concept of trust has received much attention in organizational and applied psychological research in recent decades (Costa & Anderson, 2011). Most researchers agree that trust is a complex, multidimensional, and complex phenomenon, with distinct but related components (Mayer, Davis, & Schoorman, 1995; McAllister, 1995). Trust is often seen as an interpersonal and collective phenomenon and is revealed at three levels: the individual, the team, and the organization (Kramer, 1999). In particular, studying team-level trust has increased since organizations moved towards flatter and more team-based structures (Mathieu, Marks, & Zaccaro, 2001).

To have trust in teams, there must be psychological safety a shared belief that the team is safe from interpersonal risk-taking(Edmondson, 1999), in which members feel comfortable speaking and performing. While trust has long been considered an organizational asset, scientists have begun to study it beyond the individual level (Fulmer & Gelfand, 2012). The way trust works at the team level – can be seen as a simple definition of 'team trust' – is increasingly recognized as necessary for team performance. Nevertheless, little is currently known about how it develops and evolves during the expansion of virtual teams (Grossman & Feitosa, 2018). More generally, *team trust* can be defined as "a shared psychological state among team members consisting of a willingness to accept vulnerability based on positive expectations of a specific other or others" (Fulmer & Gelfand, 2012, p. 1174).

The literature review revealed that trust was found to impact perceptions of team effectiveness by its impact on cooperative attitudes and competitive conflict (Lin et al.,2010). The concept of trust has been recognized as an important construct in the organizational sciences, operating at multiple levels of analysis. However, the mutual declaration underlying various perspectives is that trust is a social characteristic that facilitates interactions (DeOrtentiis, Summers, Ammeter, Douglas & Ferris, 2013). For instance, if team members are not genuinely open with one another about their mistakes and weaknesses, building a foundation of trust is almost unachievable. The failure to build trust negatively impacts a team's ability to make a cohesive unit and engage with one another to discuss productively and share their knowledge (Lencioni, 2002). Hence team trust and its relation with performance and team effectiveness are more complicated than discussed and might suggest a moderator or other linkages in this relationship. Yet, little work has been done in this area to date.

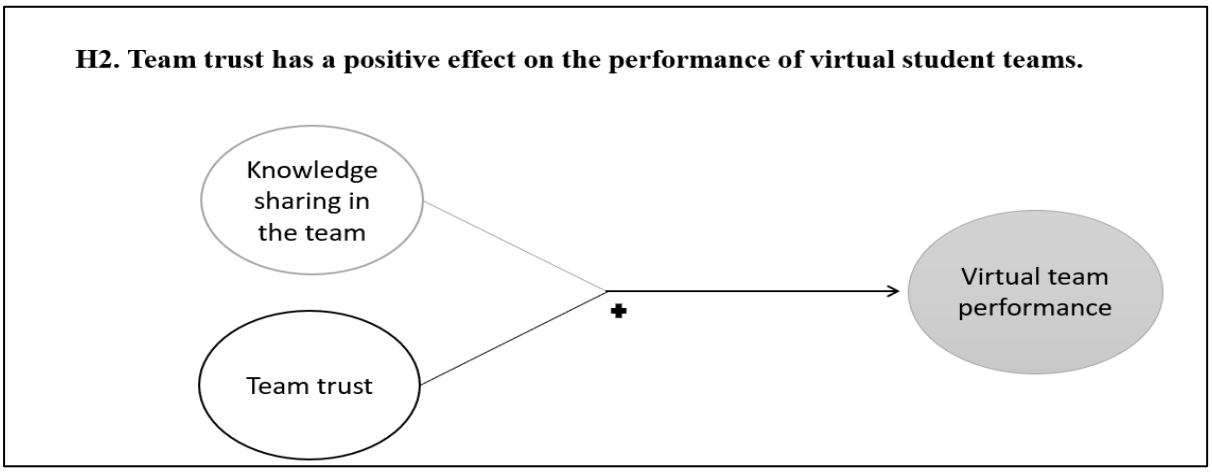
Besides, virtual team members rely on other behaviors to assess safety and compensate for the lack of physically observed behaviors unique to virtual environments. In a study on trust and knowledge sharing between virtual teams, Staples and Webster (2008) found more robust results when task interdependence was lower, suggesting that trust is most important when structural mechanisms are lacking which perfectly applies to the virtual context. In addition, Joshi et al. (2009) found that trust influences shared perceptions within teams. When studying virtual teams, trust was found to influence perceptions of team effectiveness through its impact on collective attitudes and competitive conflict (Lin, Wang, Tsai, & Hsu, 2010).

Many studies indicate that an increase in trust results in more positive behavior and attitudes, such as more open communication and information sharing leading to a better performance (Costa & Anderson, 2011). Moreover, previous research confirmed that trust could influence the development of shared mental models and subsequent levels of perceived team effectiveness (Fransen, Kirschner & Erkens, 2011). Within teams, trust is associated with improvements in communication, teamwork, and superior team performance (McAllister, 1995). In their research on trust in developing team performance, Erdem & Ozen (2003) indicate the importance of team trust in promoting teamwork. The research results of Erdem & Ozen show that a high level of team trust, both cognitive and affective, improves team performance because it demonstrates the quality of trust at the team level. Therefore, trust between members is critical for virtual teams to perform well (Wildman et al., 2012).

Based on the literature reviews, it can be argued that higher team trust leads to higher team performance within virtual student teams. The second hypothesis (H2), as shown in

Figure 2, was formulated to investigate the direct positive influence of team trust on the performance of virtual student teams (see figure 2).

Figure2: Hypothesis 2



2.3.1 The indirect effect of knowledge sharing and team trust on the performance of virtual teams

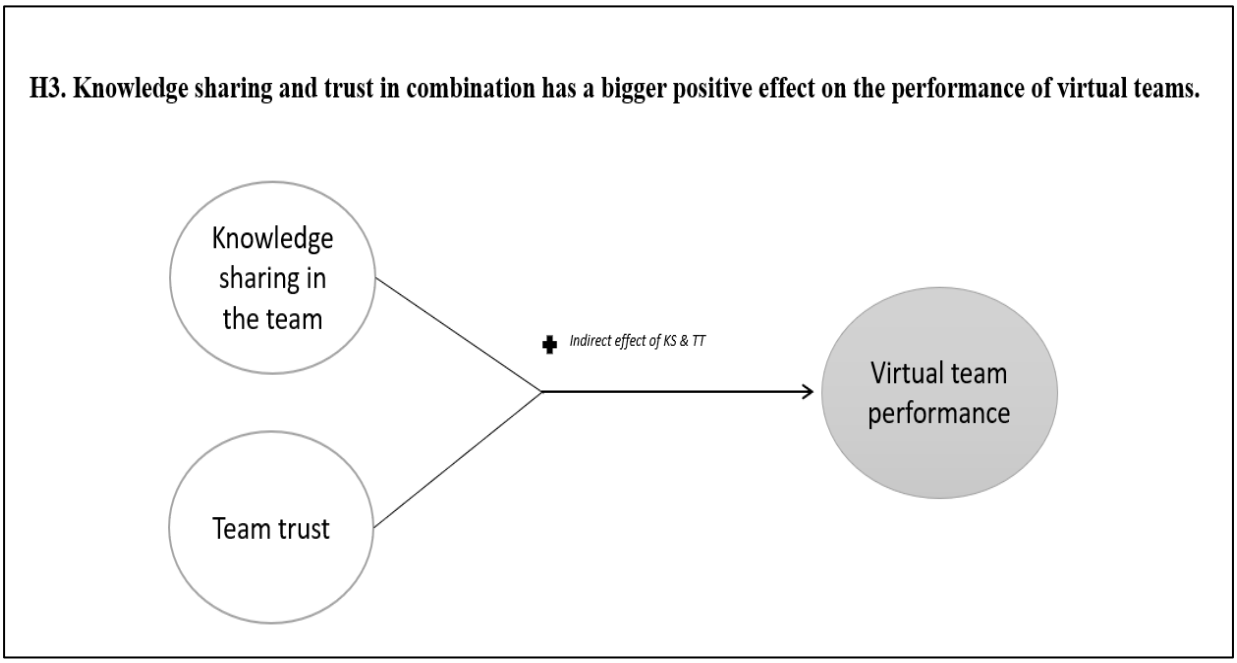
The above discussion has separately identified the direct effects of knowledge sharing and team trust on virtual team performance. This study also investigates the combination effect between knowledge sharing and team trust to address the indirect effect of these two variables on the performance of virtual student teams. The interaction effect shows the effect of two or more variables in combination on an outcome variable (Field, 2013). This study aims to understand whether there is a more positive effect when knowledge sharing and team trust are combined as independent variables. The research of Kanawattanachai and Yoo (2007) advanced the idea that teams should generally consist of members who can share knowledge to be effective. When people consider that others are willing and able to share their knowledge, they will also develop an obligation to share (Staples and Webster, 2008). As a result, team members will share knowledge to not violate that obligation, which can ultimately lead to mutual trust between members.

Knowledge sharing represents the fundamental way individuals can contribute to knowledge application, innovation, and ultimately the organization's competitive advantage (Wang & Noe, 2010). Accordingly, knowledge sharing is seen as a critical behavior that virtual team members can observe and rely on to build trust within their team (Alsharo et al., 2017).

Previous studies have also shown that trust positively influences knowledge sharing at the team level (Chowdhury, 2005; Mooradian, Renzl, & Matzler, 2006). Lin (2007) argued that virtual teams could reveal the extent of their knowledge by developing trust. In addition, people tend to believe in a familiar environment that their behavior will have beneficial consequences because others can work with them and provide assistance. Al-Alawi, Al-Marzooqi, and Mohammed (2007) found that factors such as trust and communication were positively related to the knowledge sharing practices. The importance of trust has been discussed in the literature as a predictor of traditional team performance. It is probably more critical in virtual teams because of the lack of traditional social control (Peters & Karren, 2009).

Therefore, it can be argued that knowledge sharing and team trust are positively related, hence, in combination, they are expected to have a bigger positive effect on the performance of virtual teams. Based on this, hypothesis three (H3) was formulated as shown in Figure 3 to investigate whether knowledge sharing and team trust in combination have a more significant influence on the performance of virtual student teams (see figure 3).

Figure 3: Hypothesis 3



2.4 Team CQ moderator role

2.4.1 Team CQ moderates the relationship between knowledge sharing and team performance

To answer the third sub-question of this study: "To what extent does team CQ moderate the relationship between knowledge sharing and team performance between virtual student teams?" the moderation effect of team CQ within this relationship is investigated. The moderating effect is characterized statistically as an interplay that affects the direction or strength of the relationship between dependent and independent variables (Field, 2013). Accordingly, a literature study is conducted to demonstrate what is understood based on existing studies.

Cultural intelligence (CQ) is defined as people's capability to effectively deal with situations characterized by cultural diversity (Earley & Ang, 2003). Cultural intelligence builds further on the multiple intelligence concepts (Ang et al., 2007). CQ is perceived as a form of intelligence that consists of cross-cultural skills, cultural metacognition, and cultural knowledge (Thomas et al., 2015). The importance of CQ at an individual level has been demonstrated in various studies in which the construct functioned as antecedent, mediator, and outcome (Ang et al., 2007). However, it is also essential to consider CQ at the team level because it represents a meaningful function (Bücker et al., 2016). Team CQ goes beyond individual-level CQ as it captures team members' interactions and dynamics (Bücker & Korzilius, 2020). The concept of team CQ describes the ability of a team to process information and behave responsively in a cross-cultural environment effectively (Bücker & Korzilius, 2020). The recent study of Iskhakova and Ott (2020) argued that team-level CQ could positively influence academic performance (Iskhakova & Ott, 2020). Therefore In line with the increasing diversity of classrooms and educational environments internationally, the study of cultural intelligence as a moderator of the performance of virtual student teams is believed to be relevant.

Moreover, the team CQ concept consists of how teams reflect on their available cultural knowledge, how teams deal with coexistence and meaningful participation, and how diversity issues are addressed. Team CQ contains the critical reflection necessary to understand and reflect on knowledge during intercultural interactions in teams (Crotty & Brett, 2012). For instance, openness to diversity improves the processing and sharing of knowledge. This means that team members want to acquire, share, refine, or combine task-relevant knowledge through

interaction, which positively influences performance and the quality of interpersonal relationships (Vegt & Bunderson, 2005, p. 534).

Furthermore, to build our theoretical argument on the moderating role of CQ, we attach the argument to the social cognitive theory, investigating why people perform knowledge-sharing behavior (Hsu, Ju, Yen, & Chang, 2007). In terms of people being a team, they have to combine their skills, knowledge, resources, provide mutual support, and work together to accomplish what they could not have done on their own (Bandura, 2002). Knowledge sharing in a team represents people's actions when they disseminate their acquired knowledge to others on the same team (Ryu, Ho, & Han, 2003). As the role of virtual teams in organizations becomes increasingly essential, teams need to identify and leverage team members' knowledge (Kanawattanachai & Yoo, 2007). However, little is known of how virtual team members come to recognize one another's knowledge, trust one another's expertise, and coordinate their knowledge effectively in a diverse environment (Kanawattanachai, & Yoo, 2007).

Presbitero and his co-worker (2018) stated that a particular form of intelligence is required to manage the demands of working cross-culturally (Presbitero & Attar, 2018). A high level of cultural intelligence implies that individuals in cross-cultural situations would interact and perform better in intercultural communication. Previous research findings illustrated how an intercultural capability such as CQ could improve communication effectiveness and positively influence knowledge sharing (Presbitero & Attar, 2018). In addition, Moynihan et al. (2006) present a model where working in multinational teams develops CQ at the team level, consequently improving team performance. They discussed that team CQ induces positive team dynamics, promoting team functioning and problem-solving skills, and improving the sharing and exchange of knowledge among team members. Moon (2013) further argued that the team CQ helps the effective functioning of culturally diverse teams by providing the necessary capabilities to deal with the difficulties of multicultural situations. He specifically examines the role of team-level CQ on team performance. He explains how the relationship between cultural diversity and performance is moderated by CQ so that higher CQ results in higher team performance.

Based on the discussion above, it is assumed that higher team CQ positively impacts the strength or direction of the relationship between knowledge sharing and team performance. Accordingly, hypothesis four-a (H4a) is formulated.

H4A: Team CQ positively moderates the relationship between knowledge sharing in the team, and performance of virtual student teams.

2.4.2 Team CQ moderates the relationship between team trust and team performance

To address the last sub-question of this study, "*To what extent does team CQ moderate the relationship between team trust and team performance among virtual student teams?"* the moderation effect of team CQ on the relationship between team trust and virtual team performance is investigated. Accordingly, the theoretical framework is developed through a literature review to understand what is delivered by previous research regarding this relationship. One central challenge for virtual teams seems to be developing and maintaining trust (Li, 2007).

Unlike individuals, team ability is derived from team members' social interactions through building collective beliefs in the group's ability (Kim & Shin, 2015). The literature study revealed trust as an essential element for teamwork based on individual members' emotional bonds and perceived competencies (Barczak et al., 2010). Many researchers asserted that trust is key to holding individuals together as a cohesive unit in the current organizational environment because of the declining power of reciprocal obligations and hierarchical controls (Barczak et al., 2010). Since team trust is related to high team effectiveness, trust-building strategies are important in many organizations(Breuer, Hüffmeier & Hertel, 2016). Some studies have revealed a positive relationship between team trust and team effectiveness (Jong & Elfring, 2010); others have found no association or negative correlations (Breuer et al., 2016). Therefore it can be argued that team CQ may play a role as a moderator of the strength and direction of this relationship within the virtual context.

Stahl et al. (2016) exposed that cultural diversity leads to task conflict and decreased social integration. Moreover, Lee, Veasna, and Wu (2013) have reported that diverse climate perceptions within the virtual team increase team performance. Kadam et al. (2020) also asserted that employees that were working in high diversity display positive, diverse climate perceptions, which positively correlate to higher performance. Further, Moon (2013) discussed that team CQ facilitates the effective operations of culturally diverse groups by providing the necessary capabilities to cope with multicultural situations and engage in cross-cultural interactions. Utilizing a social cognitive framework, team CQ can enable members to understand and respect partners' cultures, values, and norms and treat them as in-group members rather than out-group members (Afsar, Al-Ghazali & Umrani 2020). Accordingly, it can be argued that that leveraging team cultural intelligence may promote virtual collaboration and trust(Li and Tsai, 2015). Iskhakova & Ott (2020) have confirmed, team-level CQ is positively related to group cohesion and team trust (Iskhakova & Ott, 2020).

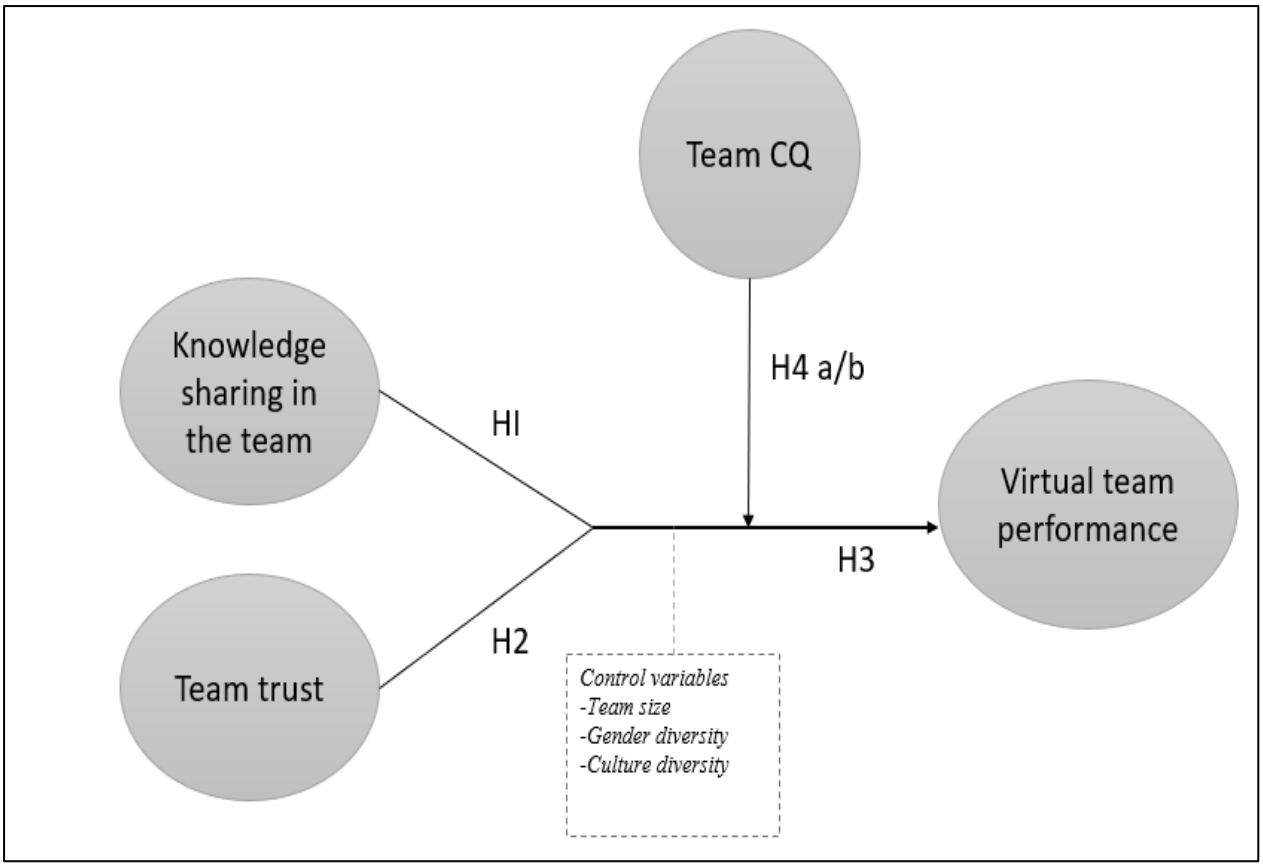
Based on the literature study, it is assumed that higher team CQ positively impacts the strength or direction of the relationship between team trust and team performance amongst virtual student teams. Therefore, hypothesis four-b (H4b) is formulated.

H4b: Team CQ positively moderates the relationship between Team Trust and virtual team performance.

2.5 Resulting Conceptual Model

All the hypothesized relationships are summarized in Figure 4. This conceptual model is composed of direct, interaction, and moderating effects among its variables. It will address the main effect of knowledge sharing on virtual team performance (H1), the direct impact of team trust on team performance (H2), and the interaction effect between knowledge sharing and team trust on virtual team performance (H3). Further, according to the moderator role of team CQ as the focal point of this research, it is expected that team CQ positively moderates the relationship between knowledge sharing, team trust, and virtual team performance (H4a/b).

Figure 4: Resulting conceptual model based on a team level framework



3. Methodology

This section describes and explains the selected methodology to answer the research questions. Discussion includes research strategy, sample, type of data, level of analysis, measurement scales, and ethics. In addition, data analysis strategy is discussed, including method, procedure, and types of technical analysis applied to analyze data.

3.1 Research Approach and Design

According to the proposed conceptual model, this research follows a quantitative deductive approach by reviewing the theoretical background. This approach refers to examining trends, patterns, and relationships using quantitative data. The main reason for this decision is that the research's primary constructs were previously measured quantitatively (Bücker & Korzilius, 2018; Peters & Karren, 2009; Faraj and Sproul, 2000; McAllister, 1995). Next, we also needed to determine whether this study will use a descriptive, correlational, or experimental design. Based on the proposed relationships between variables and formulated hypotheses, the correlational design fits this study, since it refers to how closely two or more variables are related. (Prematunga, 2012). In correlational analysis, the magnitude and direction of relationships between variables would be estimated and there is no control over the independent variables in this design since variables are measured as they exist; once a relationship has been established using correlation analysis, a model can be created to predict an outcome variable (Prematunga, 2012). To investigate the relationships and effects reflected in the conceptual model, methods such as regression analysis and analysis of variance are helpful tools (Hair, Black, Babin, & Anderson, 2019).

Within quantitative research, a survey is the most commonly used method of data collection. One reason is that a questionnaire is a convenient method of collecting data (Hair et al., 2019). In addition, due to the current coronavirus pandemic and limited opportunities for face-to-face meetings with respondents, a questionnaire that can be distributed online is probably the most appropriate data collection method. Utilizing a survey is suitable since it is ideal for collecting information on many research units (teams), aspects, and variables (Korzilius 2008, p. 9). Besides, it fits with the research questions, as many variables and their relationships need to be investigated. The survey is designed through **Qualtrics** an online survey tool and consists of three main parts. The first part concerns the respondent's consent following the privacy policy at Radboud University and a validation question regarding the inclusion criteria.

The second part calls on students to rate their team regarding team CQ, team trust, team knowledge sharing, and team performance, utilizing standard statements that describe the main research variables. The responses were recorded using 7-point Likert scales, resulting in an interval measurement level (Boone & Boone, 2012).

The last section contains some demographic information about the teams to check the outcome and explore the research context further. The survey questions can be found in Appendix B. Students have participated in data collection by sending out the anonymous link to the survey to their online network, such as email and messages through Brightspace. The survey data has been collected in June & July 2021.

3.2 Data Sample

The final sample of this research consists of 66 students from Radboud University. Students completed the survey about their experience of working virtually in a team during 2020-2021 as the internal purpose of this survey is to study virtual teams in a student environment. Knowing that sample size plays a critical role, there should be a balance regarding using too few or too many subjects in the sample (Hair et al., 2019). The recommended sample size >100 is generally preferred; however, smaller samples < 100 are acceptable depending on the research context (Hair et al., 2019). A sample size of 10:1 per variable is considered acceptable (Hair et al., 2019). Since this study has four main variables, a sample size of 66 respondents is deemed sufficient.

Following most quantitative studies, this research practiced the following steps regarding collecting data from the sample. In the first step, the target group is selected, applicable to Business Administration students. Therefore, the sample population includes Master's and Pre-Master's students from various specializations at Radboud University. The total population size is estimated at 670 individuals based on the number of registrations from previous years - it is assumed that the number of registrations is in the same range every year. However, not all students were exposed to the study.

The second step was about determining the accessible population. The accessible population is approached through survey distribution channels, including email and Brightspace announcements to Masters and Premasters BA students working on various team projects. The researcher sent an invitation email to approximately 180 fellow pre-master students. Furthermore, through a network of lecturers in different specializations, including

OD&D, International Business, and Strategic Human Resources Leadership, an invitation announcement and access link were shown for Master's students. Therefore, the accessible population for this study is approximately 480 individuals, estimated based on the total number of students exposed to the survey for each specialization.

Step three defined the qualification criteria to collect the required data from the sample. The sampling technique used in this study is convenience sampling, one of the most commonly used sampling methods (Acharya, Prakash, Saxena & Nigam, 2013). When applying this sampling method, the respondents who meet the study's inclusion criteria are asked to complete the questionnaire, which is appropriate for the third step. The inclusion criteria include:

1- Respondents must have participated in a virtual team at least once.
2- Teams must have at least two members.
3- The team composition must include at least one member from different background with an identified nationality.

This sampling method aligns with the research context as this research focuses on student teams performing virtually from culturally diverse backgrounds.

The last step, data collection, was performed by sending a closed, structured, and web-based questionnaire. It was necessary to demonstrate how many students responded to participating in the data collection step. One reason is to investigate whether the sample is representative of the research population. As argued by Carson & Mitchell (1989), for this purpose, a response is calculated as the number of questionnaires returned divided by the total sample initially received by the survey. Of the total accessible population of 480 students, 97 students answered the questionnaire. This shows a response of 20 percent, which is considered sufficient based on the rule of thumb. Response rates below 10% are usually biased and are expected to include only positive or negative respondents (Van Rossenberg, 2021). However, not all 97 respondents completed the survey, mainly due to not meeting the inclusion criteria and missing data caused by online issues. Therefore, a total sample size of 66 respondents is used in the final analyses, including only completed surveys. The characteristics of this research sample will be further presented in the descriptive statistics subchapter in the results section.

3.3 Validity and Reliability

In this thesis study, several items were used to measure constructs, such as team CQ and trust, to obtain the correct construct validity. These concepts are difficult to measure in practice,

but the scales have proven suitable construct validity. The component factor analysis was performed for all scales to check whether the scale structure used is valid in this study. Hair et al. (2019) defined validity as the "degree to which a measure or set of measures correctly reflects the concept of study (Hair et al., 2019). In contrast, reliability is defined as the degree to which a variable or set of variables is consistent in what it is expected to measure" (Hair et al., 2019). Reliability can be guaranteed by checking the Cronbach's alpha of the constructs used for the analyses (Hair et al., 2019). According to Hair et al. (2019), a Cronbach alpha of about 0.6 is acceptable. The constructs used all had a Cronbach's alpha of at least 0.6 to ensure reliability.

3.4 Measurement Scales

This study's measurement scales are based on developed constructs from previous studies whose validity has been tested. In some research, variables of interest are not directly measurable because these scales are not direct measures of the attribute; in other words, researchers cannot hold up a ruler to evaluate one's motivation or trust (McNeish & Wolf, 2020). Likewise, in this thesis study, we deal with constructs such as team trust, knowledge sharing, and team cultural intelligence. The concept of these variables is captured via several dimensions and a set of items from which a single score is calculated (McNeish & Wolf, 2020).

Bauer and Curran (2015) regarded that it is common to score scales by sum scoring, whereby the researchers add responses from multiple-item scales. Accordingly, as the foundational unit of statistical analyses, the researcher computed a sum score of all items to capture an average score for the variable of interest. However, this approach should not be considered an alternative to latent variable models but rather that sum scoring can be represented as a latent variable model (McNeish & Wolf, 2020).

Therefore, the author has reflected on some of the crucial considerations in this regard. First, It should be noted that the sufficiency of sum scores depends on the context and upon the stakes involved (McNeish & Wolf, 2020). Since this thesis study aims to explore the role of cultural intelligence among virtual student teams rather than the advanced application and investigation of psychometrics, the sum score as the foundational unit of statistical analyses for this research can be considered satisfactory. Besides comparing the associated Cronbach alpha in the previous study and reported alpha for each variable in this study show the scale's internal consistency, suggesting that sum scoring can be an acceptable practice. Hair et al. (2019) stated that a Cronbach alpha of about 0.6 could be considered acceptable, and if the coefficient value lies between ± 0.50 and ± 1, then it is assumed to be a strong correlation which is the case here.

Moreover, a relatively high correlation among a different set of items indicates that the sum of scoring all items as the foundational unit of statistical analyses occurs not to be problematic. Table 1 summarized constructs in sub-scales mean, standard deviation, and intercorrelations among sub-scale for each construct. All constructs are ranging from (1= strongly agree to 7=strongly disagree).

Table 1: Descriptive subscale and correlations *

Variable		M	SD	1	2	3
Knowledge sharing	No sub-scales	4.9	1.4	1		
Team trust	Cognitive trust	4.2	.57	-		
	Affective trust	4.3	.57	.077		
Team CQ	Team Openness to diversity	4.1	.79	-		
	Team coexistence meaningful participation	4.1	.87	.660	-	
	Team cultural metacognition	3.8	.91	.601	.502	-
Virtual team performance	Team efficiency	4.3	.95	-		
	Team effectiveness	4.2	1.0	.572	-	
	Team Timeliness	4.2	1.0	.479	.550	-

** The table shows for each variable the constructs (sub-scales) included and per sub-scale the mean and standard deviation and the sub-scales correlation for each construct.*

Finally, since this study's measurement scales have been derived from previous research and are multidimensional, a confirmatory factor analysis (CFA) fits this research context to ensure the suitability of items and sub-scales for this study. Hence, guided by theoretical consideration, this study seeks to report whether the factor solution/fit and loadings on various sub-scales approximately the same as reported by earlier studies. Therefore the initial factor solution is performed, and then the factor extraction method was adjusted based on the retrieved dimensions from previous studies. This is done by accessing the eigenvalue, scree plot, and cumulative percentage of total variance explained (Hair et al.,2019). To this end the researcher was required to check whether the factor analysis is an appropriate method applying the Kaiser-Meyer-Olkin measure and Bartlett's Test of Sphericity. The Kaiser-Meyer-Olkin (KMO) should display a value greater than 0.5, and Bartlett's significance level should be < 0.05 (Field, 2013). Since the assumptions of the CFA were satisfactory for all variables, a component factor analysis was performed using IBM SPSS.

3.4.1 Virtual team performance

In this research, virtual team performance measures the degree to which virtual student team members perform efficiently and effectively to meet the team goal at a favorable time. Accordingly, the virtual team performance measurement scale is retrieved from the previous research done by Peters & Karren (2009) initially developed by Henderson and Lee (1992). The 8-Item scale with three dimensions including (a) Efficiency: "the efficiency of team operations"; (b) Effectiveness: "the team's ability to meet the goals of the project"; and (c) Timeliness: "the team's ability to meet the goals as quickly as possible" (Henderson & Lee, 1992) using a 7-point Likert scale ranging from(1=strongly agree to 7=strongly disagree) to measure virtual team performance. A sample item is "The team can meet the goals as quickly as possible." Table 2 demonstrates a sufficiently reliable scales in terms of internal consistency of items and further shows results of reliability tests which is more or less the same representing the reliability of items and sub scales for this study.

Table 2: Reliability analysis Virtual team performance

Sub-scales of VTP Based on 8 items Muasured in the survey by Q37-Q44	Reported Cronbach Alpha by Peters & Karren (2009) (Previous research)	Reported Cronbach Alpha Reported Reliability Statistics (This research)
Efficiency / 3 Items	Cronbach Alpha= .79	Cronbach Alpha = .92
Effectiveness / 2 Items	Cronbach Alpha= .87	Cronbach Alpha = .82
Timeliness / 3 Items	Cronbach Alpha= .90	Cronbach Alpha = .94

Concerning results of factor analysis, the significance level of the Bartlett sphericity test (p=.000) and (KMO = 0.82) indicating the suitability of the data for factor analysis. First, the initial factor solution was performed, adjusted for the extraction method on three factors. The extracted factors explained 88% of the total variance of the data, which is relatively high. Although the third factor does not obtain an eigenvalue of 1, no items were removed because no commonality after extraction will be increased. Therefore all items had a factor loading of more than .30 see tables in appendix D1. To simplify the interpretation of the factor analysis, the researcher further employed the Varimax rotation method. Finally, since this study intends to measure team-level performance as the outcome variable, for this research the three separate dimensions were combined into a single measure of virtual team performance, to captures the average of all dimensions. This resulted in an overall coefficient alpha of .90 for the team-rated performance which represent a reliable scale.

3.4.2 Knowledge sharing

The variable knowledge sharing in this study intends to measures the degree of knowledge sharing behavior between virtual student teams. The findings of Faraj and Sproull (2000) on the factor analysis for expertise coordination revealed a four-item scale that measures knowledge sharing in the context of performance dimensions and recorded a high Cronbach alpha (α = .88); that shows high reliability (Faraj and Sproull, 2000). The items also assess the overall knowledge sharing in the team rather than assessing the individual's behavior regarding knowledge sharing. A sample item is: 'Members in my team share their special knowledge and expertise. The items were also measured using a 7-point Likert scale. The Likert scale ranged from(1=strongly agree to 7=strongly disagree). Therefore, the measurement scale for this study is adopted from the previous research of Faraj and Sproull (2000), because it appraises overall knowledge sharing in the team.

Table 3: Reliability analysis Knowledge Sharing

Scale of Knowledge Based on 4 Items Measured in the survey by Q22-Q25	Reported Cronbach Alpha by Faraj and Sproull (2000) (Previous research)	Reported Cronbach Alpha Reported Reliability Statistics (This research)
Efficient Knowledge sharing in the team	Cronbach Alpha= .88	Cronbach Alpha = .91

The SPSS results approved the one-dimensional construction of knowledge sharing, with a (KMO=.88) and Bartlett's test being significant at (p=.000). In addition, all four items of team knowledge sharing loaded sufficiently and on the one-dimensional construct of knowledge sharing in the team: Appendix D2 shows the eigenvalue and the associated variance of the factors. The first analysis indicates that there is 1 factor that explains a total of 79% of the data variance. Next, the factor extraction method was set to one factor, which showed that all items loaded more than 0.88 on one aspect. No items were removed because all items had a factor loading greater than 0.30 and no commonality could be increased after extraction (Hair et al., 2014). Ultimately, a new variable was created using the mean score of the four items to represent the scale knowledge sharing in the team for this study. The scale reliability is confirmed through testing for Cronbach alpha resulting in (α = .91) which is satisfactory according to Hair et al., 2019.

3.4.3 Team trust

The variable team trust in this study is designed to estimate how members of the virtual student team assess the quality of trust within their team. Previous research by Erdem & Ozen (2003) revealed that a high level of cognitive and affective trust improves team performance. Therefore, the measurement scale for team trust is retrieved from the previous research of Erdem & Ozen (2003), designed previously by McAllister (1995), mainly because it reflects the theoretical framework of this study. In addition to that, a relatively high Cronbach's alpha demonstrate the results of reliability tests which are more or less equivalent, representing the reliability of items and subscales (see table 4) . An 11-item scale of two dimensions (six relating to cognitive trust and five about affective trust) are ranked on a seven-point Likert scale (1=strongly agree to 7=disagree strongly). One sample item is "Team members strive to be honest to each other". Table 4 demonstrate the results of reliability tests that are more or less equivalent representing the reliability of item and sub scales.

Table 4: Reliability analysis Team Trust

Scale of Team Trust Based on 11 items Measured in the survey by Q26-Q36	Reported Cronbach Alpha by Erdem & Ozen (2003) (Previous research)	Reported Cronbach Alpha Reported Reliability Statistics (This research)
Cognitive trust / 7 Items	Cronbach Alpha= .80	Cronbach Alpha = .86
Affective Trust / 4 Items	Cronbach Alpha= .84	Cronbach Alpha = .86

Concerning the assumption of factor analysis Bartlett sphericity test showed to be significant at(p=.000) and (KMO= 0.75) indicated the suitability of the data for factor analysis (see Appendix C3). Then the initial factor solution is performed, and the factor extraction method was adjusted on two factors based on the retrieved dimensions. The extracted factors explain a total of 64% of the variance of the data. No commonality after extraction will be increased so that no items were removed because all items had a factor loading of more than .30, representing that all items are reliable to use in the context of this study. (Appendix D3). Pearson correlation for items on affective trust and cognition trust demonstrated zero correlation between these two dimensions. However, since this scale has only two dimensions whit quite the same mean score (Mean Cognitive trust=4.22, Mean Affective trust=4.30), it appears to be reasonable to compute a new variable using the mean score of the 11 items to represent the scale team trust for this study. The reliability of the computed scale resulted in (α = .81), which is pretty adequate.

3.4.4 Team CQ

The variable team CQ in this study attempts to measure team consciousness and awareness during social interactions, the degree of meaningful participation and openness to diversity (Adair et al., 2013; Iskhakova & Ott, 2020). Given that the team CQ construct developed by Bücker & Korzilius (2020) is relatively new and reflects well-developed constructs and high validity based on the reported overall Cronbach (α = .91), the measurement scale for team CQ for this study is adopted from their research. The higher-order multidimensional construct of team CQ is adapted to three main dimensions: team cultural metacognition, coexistence and meaningful participation, and openness to diversity (Bücker & Korzilius, 2020). In team CQ, metacognitive and openness to diversity dimensions are addressed as the mental capabilities that remain within the team and meaningful participation and coexistence as behavioral (Bücker & Korzilius, 2020). Items are measured on a seven-point Likert scale (1= strongly agree to 7= strongly disagree). An example item is: "The team is conscious of the cultural knowledge it applies to cross-cultural interactions" (Bücker & Korzilius, 2018, p.15). Based on the comparison table below the reliability of scale and subscales reported to be satisfactory.

Table 5: Reliability analysis Team CQ

Overall Team CQ based on 21 items Measured in the survey by Q1-Q21	Reported Cronbach Bücker & Korzilius, 2018 (Previous research)	Reported Cronbach Alpha Reported Reliability Statistics (This research)
Team Metacognition / 10 Items	Cronbach Alpha= .90	Cronbach Alpha = .92
Team Coexistence and /Meaningful participation / 7 Items	Cronbach Alpha= .86	Cronbach Alpha = .93
Team openness to diversity / 4 Items	Cronbach Alpha= .88	Cronbach Alpha = .94

Concerning the assumption of factor analysis Bartlett sphericity test showed to be significant at(p=.000) and (KMO= 0.88) indicated the suitability of the data for factor analysis (see Appendix C4). Then the initial factor solution is performed, and the researcher adjusted the factor extraction method on three factors described above. Based on the total variance explained, extracted factors explain a total of 72% of the variance. Since no commonality after extraction could be increased, no items were removed. All items had a factor loading of more than .30, representing that all items loaded on sub-scales are reliable to use in this study

(Appendix D4). Pearson correlation also demonstrated a relatively high correlation between these three dimensions. Therefore a new variable using the mean score of all 21 items is computed to represent the scale team trust for this study. The reliability of the computed scale resulted in (α = .95), which is pretty adequate.

3.4.5 Control variables

Control variables can increase the internal validity of the study by controlling for the influence of other external variables. It also can help to establish more clearly the relationship between the variables of interest. Some of control variables taken into account in this study are based on previous research in the field of cultural intelligence, which is considered important to use (Bücker & Korzilius, 2018). Besides, we control for meaningful differences between response groups based on some of team characteristics such as the degree of previous acquaintance among team members, team size, or only virtual or virtual and real relationships.

Team size as a factor is related to shaping group dynamics and group performance (Brewer & Kramer, 1986). When groups grow, there will be more problems related to communication and coordination (Blau, 1970), decreasing team performance. On the other hand, when groups consist of only two or three people, a lack of diversity can also hinder performance (Jackson, 1996). In this research, team size is measured in terms of the number of people per team. This control variable is measured in four categories that are finally controlled for using dummy variables in the regression analysis to see if team size affects our final model.

In addition Apesteguia, Azmat, and Iriberri (2012) stated that teams differ in gender composition, influencing their performance. The basis of sex differences, for example, in thinking and behavior, suggests why some underlying sex influences arise during the formation of knowledge sharing (Lin, 2007). As this study focuses on studying teams rather than individuals, it measures the composition of gender differences on a 5-point scale from 1 to 5, demonstrating the gender diversity in the virtual student teams. Further using the dummy function of SPSS, two main categories (low=1-3/high=4-5) are calculated to be controlled in the final model.

Another team characteristic is related to degree of cultural diversity, when cultural diversity is present in a team, people may divide themselves and not want to work with people who do not share the same values or beliefs (Stahl et al., 2016). Besides, cultural diversity was one of the inclusion criteria, so it lies at the heart of the hypothesized moderator effects. Hence,

this control variable can assist check whether such results are independent of the size or level of cultural diversity. Therefore, respondents of the survey are asked to assess the team in which they were participated on the degree of cultural differences. Cultural diversity is measured on a 5-point scale, and is grouped as (low=1-3 /High=4-5) and finally examined in the regression model.

3.5 Data Analysis Strategy

The data analysis strategy for this study is explained through three main steps, including data preparation, preliminary analysis, and hypothesis testing to interpret meaningful information from the data.

3.5.1 Data preparation

As the pre-step for data analysis, data preparation included cleaning and recoding data, such as missing values and reverse-coding. Given that the survey deadline was established at the latest 15 July 2021, The data set was exported from Qualtrics to IBM SPSS (Version 26.0) on 16 July 2021. Columns 1-6, including start and end time of questionnaire, status, progress, and distribution channel, were deleted since they are not relevant for analyzing data. The researcher has also changed the items' labels on the theoretical research framework to make the data understandable. Hence, the first step after collecting the data was to clean them. This process helped examine whether data from a survey has been correctly entered into a data matrix for statistical analysis.

To begin with, The researcher inspects data visually per respondent to control for missing or unusual data. Qualtrics recorded 97 response sets, in which 31 of the response sets displayed errors and missing values. The next step was to remove the errors and inconsistencies to prepare the data for the actual analyses. Two response sets were recorded as tests. This was due to an online issue-the researcher was informed by the respondent personally- and removed these two sets of data confidently from the data set. Besides, three of the response sets were not usable due to a lack of participants' consent. Therefore this data were also excluded from the data set to comply with the privacy policy. In total, 12 respondents stated that they do not adhere to the inclusion criteria of this study. One example is that they did not participate in virtual teamwork during 2020-2021. Since the inclusion criteria are essential for this study's context, the researcher did exclude those responses from the response set. Ultimately, the researcher removed all individual cases with missing data for the dependent variable virtual team performance. The reason was to avoid any false increase in relationships with independent variables (Hair et al., 2014).

Utilizing anonymous links as a distribution channel of Qualtrics further caused limitations in saving and recording responses (example error is shown in Appendix C2). Hence, the researcher eliminated 16 more response sets from the data, after which a final sample of 66 valid cases remained the departure point for statistical analysis. Only two individual cases were left with missing data on several items, possibly due to the lack of descriptive information of the respondent. The mean substitution was used to solve this, and gives all the individual cases complete information (Hair et al.,2019). Next, some values (e.g., the degree of cultural and gender diversity within teams) are recoded into categorical variables with three categories ranging from *Low* up to *High* to explore and interpret data more straightforward concerning team characteristics. A guiding table about cleaning, reverse-coding, and Dummy variables is presented in appendix C1.

3.5.2 Preliminary Analysis

The purpose of preliminary analysis as the second step was to describe the key features of the data. Topics covered include descriptive study, the test of normality and outliers, and basic statistics such as mean, standard deviation, and so forth. The first statistical consideration regarding normality and outliers was controlled using skewness and kurtosis values as the departure point of the researcher to examine the normality in data. According to Field (2013), these values should be between -3.29 and 3.29. However, a value between -1.96 and 1.96 is recommended in a small sample. Based on this study sample size, we chose to apply the threshold of $|2|$, a common practice with a sample size smaller than 100 (George & Mallery, 2010).

3.5.3 Hypothesis testing & exploring the role of team CQ

The hypotheses formulated in the second chapter are tested to present findings related to research questions using tests such as regression analysis, analysis of variance, etc. According to the main goal of this study to explore the moderator role of team CQ, this effect is assessed by creating a moderated regression model that explains whether a moderator alters the relationship's strength or/and direction between an antecedent (independent variable) and an outcome (Andersson et al., 2014; Baron & Kenny, 1986). The steps involved in exploring the moderator effect of team CQ were based on the Product Indicator Approach initially introduced by Busemeyer and Jones (1983) and Kenny and Judd (1984) concerning using interaction effects among latent variables (Henseler & Chin, 2010). This approach suggests building product terms using the latent independent variable indicators and the latent moderator variable indicators. These product terms work as indicators of the interaction term in the structural

model (Chin, Marcolin & Newsted, 2003). Therefore, the hypothesized relationship is tested through three regression models, further controlled for the influence of team size, gender, and culture diversity as control variables.

3.5.4 Data exploration

After examining the hypotheses and the conceptual model of the research, the researcher compared respondents views on the main variables of the study regarding- team size, the degree of cultural diversity, the degree of gender diversity, type of participation, satisfaction with teamwork, and previous acquaintance with team members- to investigate any significant variations in terms of different groups. Since the only dependent variable in this study is the performance of virtual student teams, the one-way ANOVA is used to explore differences between groups on the dependent variable.

3.6 Ethical Considerations

In outlining this research, ethical considerations have been taken into account, including informed consent and privacy. Authors must ensure that respondents will not be negatively impacted due to their participation (Bryman & Bell, 2011). Accordingly, since the only source of data collection for this research is a voluntarily web-based survey, there will be no data collection without the consent of participants. Besides, there is no obligation to answer the questionnaire, and respondents can decide how much information they want to share. Similarly, the researchers should not invade the privacy of any participants (Bryman & Bell, 2011).

Further, to avoid any outrage, this survey is conducted anonymously, and all names or any further information related to a specific respondent remain confidential. This ensures that none of the respondents can be identified. Subsequently, researchers should be honest with the objective of their research (Bryman & Bell, 2011). Hence a short introduction is provided to inform respondents before filling out the survey. Besides, respondents will have access to the researcher's contact by the email provided. Data and the researcher's consent are protected at all stages of the process, from collection to publication, and utilized only for this research study.

4. Results

After stating the goals and research question (Chapter 1), reviewing theoretical background (Chapter 2), and displaying the research method (Chapter 3), this chapter intends to present the research's findings. This chapter includes several sections. First, the results of psychometric analysis performed for the one-dimensional -the computed summary scales- will be presented. Next, a preliminary data analysis is provided, including descriptive statistics, the test of normality and outlier, etc. Lastly, the hypotheses constructed in chapter 2 are examined, and different produced regression models are compared through step-wise regression analysis.

4. 1 Psychometric analysis

After conducting an initial component analysis, the researcher performed another factor analysis without adjusting the number of factor extractions to ensure that all items load sufficiently on the researcher's calculated one-dimensional scale, which its results are added to Appendix D. As shown in Table 6, the results indicate that the factor loadings of all items based on computed sum scale were adequate, with a high Cronbach alpha demonstrating the reliability of the scales for this study.

Table 6: Reliability Analysis for Computed Summary Scales

Variable	Number of items	Cronbach's alpha
Team CQ: All factor loadings of the indicators of Team CQ are statistically significant, $p < 0.05$, ranging from 0.61 to 0.83, explaining 73% of the variance in the construct.	21	0.956
Knowledge Sharing: All factor loadings of the indicators of knowledge sharing are statistically significant, $p < 0.05$, ranging from 0.82 to 0.92; the four items explain 79% of the variance in the construct, which is moderately high.	4	0.913
Team Trust: All factor loadings of the indicators of Team trust were also statistically significant, $p < 0.05$, ranging from 0.19 to 0.86; the eleven items explain 64% of the construct variance.	11	0.811
Virtual team performance: All factor loadings of the indicators of virtual team performance are statistically significant, $p < 0.05$, ranging from 0.69 to 0.83, revealing 78% of the variance in the construct.	8	0.907

4.2 Preliminary Analysis

The preliminary analysis included descriptive statistics, test of normality and a quick reflection on the missing data analysis.

4.2.1 Descriptive statistics

First, the team demographics are shown in table 7. The majority of respondents have reported a high satisfaction regarding their teamwork experience, and 80 percent of teams have reported containing between 2-6 people. In general, sample teams have shown low gender diversity while moderate cultural diversity. Therefore, the first criteria concerning this research context regarding variety within virtual student teams are apparent through descriptive analysis. About 85% of respondents reported that they did no to little previous acquaintance with their team members addressing building trust within virtual teams.

Table 7: Descriptive statistic of the research sample-Team demographics

Variables	Valid	Frequency	Percent	Valid Percent
Gender diversity	Low	41	62	62.1
	Moderate	17	25	87.9
	High	8	12	100.0
Cultural diversity	Low	19	29	28.8
	Moderate	22	33	33.3
	High	25	38	37.9
Satisfaction with teamwork	Low	8	12	12.1
	Moderate	4	6	6.1
	High	54	82	81.8
Team members	Between 2 and 4 members	29	44	43.9
	Between 4 and 6 members	24	36	36.4
	Between 6 and 8 members	12	18	18.2
	More than 8 members	1	2	1.5
previous acquaintance	We did not know each other at all	29	44	83
	Some of us knew each other a little bit	27	41	74
	Some of us knew each other quite Good	10	15	100

Table 8 further shows the characteristics of the survey respondents as team members and the type of their collaboration within teams in terms of virtual or meeting in real. The diversity of nationalities shows that data is collected from people with different cultural backgrounds. However, the highest frequency belongs to the Dutch and European groups with about 50 percent of the sample; this is to be expected since we study student teams at Radboud University Nijmegen. In addition, 58 team members, about 88 percent of the total sample, reported that they only worked virtually, meaning that the second criterion of virtual teams, which is collaboration via online tools, is well met.

Table 8: Descriptive statistic of the research sample-Respondents demographics

Variables	**Valid**	**Frequency**	**Percent**	**Valid Percent**
Nationality	Latino or Spanish origin (e.g. Mexican or Mexican American, Puerto Rican, Colombian, etc.)	7	10.6	10.6
	Asian (e.g.: Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)	7	10.6	10.6
	Middle Eastern or North African (e.g.: Lebanese, Iranian, Egyptian, etc.)	5	7.6	7.6
	I prefer not to say	3	4.5	4.5
	Dutch	17	25.8	25.8
	Caucasian	3	4.5	4.5
	European (East, West or Central)	17	25.8	25.8
	Others	6	10.5	10.5
Type of collaboration	Only Virtual	58	87.9	87.9
	Virtual and real	8	12.1	12.1

Next table 9 demonstrates the descriptive statistic for variables measured on the Likert scale is reported by mean (M) and standard deviation (SD).

Table 9: Descriptive Statistics of main variables

	N	**Min**	**Max**	**Mean**	**Std. Deviation**	**Skewness**		**Kurtosis**	
		Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Team CQ	66	2.10	5.95	40.859	.73431	.228	.295	.378	.582
Knowledge Sharing	66	2.50	6.50	49.205	104.436	-.519	.295	-.495	.582
Virtual team performance	66	2.38	5.88	42.879	.82566	-.396	.295	-.200	.582
Team trust	66	3.27	5.09	42.521	.43694	-.395	.295	-.515	.582

In this study, virtual team performance is the only outcome variable. This variable has a mean score of 4.28, and the most frequent value in the data-set was 5. 47% of respondents rated their team performance above average. Based on a 7-point Likert scale, it can be interpreted that respondents rate the team performance efficiently, effectively, and on schedule 50% of the time. The standard deviation for this variable was 0.82, indicating that the scores differed on average approximately one point from the mean based on the 7-point Likert scale.

Knowledge sharing as an independent variable illustrates the highest mean among variables (M=49.2) ranging from 2.5 to 6.5, and vale 6 is the most frequent value on knowledge sharing data-set. More than 50% of respondents have rated the degree of knowledge sharing in their team higher than the mean score. A seven-point Lickert scale represents a high degree of virtual exchange of information and knowledge sharing among teams. This finding is also to be expected as student teams rely heavily on knowledge sharing to perform tasks. The standard deviation for this variable was 1.04, indicating that the scores differed approximately one point on average from the mean based on the 7-point Likert scale.

The second independent variable, team trust, represents a mean score of 4.25, and data is ranged from 3 to 5. About 52% of respondents have rated the quality of trust within their team above the average. Based on the 7-point Likert scale, these findings may draw that team members cannot assess the quality of trust within their team approximately half of the time. This is expectable as measuring trust is a complex process. One possible reason can be that student teams working together in a short time, such as two or three months during a semester. So, meaning that they may not have enough time and resources to evaluate trust within their teams, which can be considered one of the most hidden aspects of virtual student teams.

Team CQ's moderator variable consisted of 21 items and had a mean score of 4.08, and ranged from 2 to 6, in which only 46% of respondents rated their team culture intelligence above average. This indicates that the team holds cultural intelligence competence half of the time. The standard deviation for this variable was 0.73, showing that scores were not too deviated from the mean score of 4.2. This suggests that, on average, the positively worded statements intended to measure team CQ did not agree or disagree with the respondents. These findings show that there is still work to be done to increase cultural intelligence among student teams.

4.2.2 Tests for normality

The researcher tested the normal distribution of variables initially based on reported skewness and kurtosis (see table 9). An acceptable skewness and kurtosis are between +2 and -2 (Field, 2013). The observed skewness statistics for all research variables are in the range (2, -2). Meaning that, in terms of skewness, the distribution of the variables is symmetric. The Kurtosis amount of all research variables is also in the range (2, 2-). This indicates that the distribution of variables has a normal Kurtosis. Therefore, none of the variables needed to be transformed. Besides, the normality test is also done through the Explore function in SPSS, and none of them were significant at the alpha level of 0.05. This indicates that none of the variables are significantly deviating from the normal distribution, which also complies with the assumption of normality for conducting regression analysis.

4.2.3 Missing data analysis and outliers

In the final data set, 66 cases remained following removing all cases with missing data for virtual team performance to avoid any incorrect increase in relationships with independent variables (Hair et al., 2014). Therefore, it should be noted that there were no other significant missing values on other questions after this.

4.3 Hypothesis Testing & Comparing Models

4.3.1 Regression Assumptions

Before regression analysis can be performed, there are certain assumptions that the researcher must examine. These assumptions include normality, homoscedasticity, multicollinearity, and linearity (Field, 2013). All tables and Outputs can be found under Appendix H: Regression assumptions.

The normality of scores distribution is one of the regression assumptions, including the normality of residuals (Field, 2013). The criterion regarding the independent variables and their normality is mentioned above, so repetition is avoided. Regarding the dependent variable, visual inspection through histogram illustrates a normal distribution. It can be seen in Appendix H that the residual scores also follow the normal distribution. Besides Durbin – Watson statistics was used to evaluate the independence of error terms and test the serial independence of the induced noise of a linear regression model (Bercu & Proïa, 2013). The statistical test based on the Durbin–Watson statistic fit for linear regression models and its power was investigated by Tillman (1975). Watson statistics should range from 0 to 4. In total, this statistic should be between 1.5 and 2.5 (Tillman 1975). The author estimated results related to Watson

statistics in regression by entering all variables and obtained a value of 1.93, which indicates the independence of the remaining values or errors. In this regard, the necessary condition for regression is established.

Multicollinearity means that independent variables are highly correlated, making the model less accurate (Field, 2013). Multicollinearity was further tested by regression with the base model and looking at the VIF and tolerance values. The VIF value indicates whether a predictor has a strong linear relationship with the other predictor(s) (Field, 2013). The VIF values should be below 10 to rule out multicollinearity; because all independent values are within limits, the researcher believed there are no problems with multicollinearity.

The power of the linear relationship between the model's independent variables is measured by an index called Tolerance in table (see Appendix E). The tolerance values indicate that the variable under consideration is almost a perfect linear combination of the independent variables already in the equation. These values should be higher than 0.25 (Field, 2013), which is also the case. According to the obtained results, the amount of Tolerance statistic among the independent variables is more than (0.3) as the minimum criterion, and the minimum value of the Tolerance statistic is equal to 0.58. The results show that the degree of alignment between the independent variables is not a concern.

Linearity implies that the relationship between the predictors and the outcome variable is linear, while homoscedasticity assumes that the variance of the residuals is constant (Field, 2013). Both linearity and homoscedasticity can also be checked by examining the scatter plots of the residues. Homoscedasticity is considered to be met if there is no clear pattern in the scatter plot (Field, 2013), which is the case in this study- see Appendix E1-E4- hence, these assumptions are also met.

4.3.2 Testing Hypotheses

The assumed relationships in the conceptual model are examined employing stepwise Linear-regression analyses resulting in five regression models. Table 11 summarizes the regression results for different regression models with virtual team performance as the dependent variable. The first model address the direct and indirect effect of knowledge sharing and team trust on virtual team performance. Model 2a/b includes team CQ to estimate the moderator role of team CQ in the relationship between knowledge sharing and virtual team performance and also check for control variables. The model 3a includes the computed interaction term to assess the moderator role of team CQ within the relationship between team

trust and virtual team performance and model 3b includes the control variables for this relationship.

Table 11: Regression results regarding the effect of knowledge sharing team trust and the moderation role of team CQ on virtual team performance.

		Model 1			
Model 1 tests H1-H2-H3	Variable	Unstandardized B	SE		
Direct & Indirect effect of KS & TT on VTP	Knowledge sharing	0,939**	0,453		
*** = p < .01	Team Trust	1,225**	0,507		
** = p < .05	Inter-effect KS & TT	-0,111	0,107		
* = p<.1.					
R2		**0,753**			
ΔR2		**0,741**			
		Model 2a		**Model 2b**	
Model 2a/b tests H4a	Variable	Unstandardized B	SE	Unstandardized B	SE
	Knowledge sharing	0,385***	0,056	0,359***	0,058
Moderation effect of Team CQ on the relation between KS & VTP	Team Trust	0,442***	0,146	0,476***	0,150
	Team CQ	0,384***	0,089	0,386***	0,095
	Intereffect CQ*KS	-0,033	0,063	-0,031	0,067
*** = p < .01 ** = p < .05	Culture Diversity			-0,035	0,046
* = p<.1.	Gender Diversity			0,085	0,049
	Team size			-0,014	0,073
R2		**0,811**		**0,822**	
ΔR2		**0,798**		**0,801**	
		Model 3a		**Model 3b**	
Model 3a/b tests H4a	Variable	Unstandardized B	SE	Unstandardized B	SE
	Knowledge sharing	0,386***	0,056	0,358***	0,058
Moderation effect of Team CQ on the relation between KS & VTP	Team Trust	0,462***	0,137	0,499***	0,146
	Team CQ	0,363***	0,082	0,360***	0,095
	Intereffect CQ*TT	-0,118	0,138	-0,112	0,151
	Culture Diversity			-0,037	0,045
*** = p < .01 ** = p < .05	Gender Diversity			0,083	0,049
* = p<.1.	Team size			-0,004	0,074
R2		**0,812**		**0,823**	
ΔR2		**0,800**		**0,802**	

4.3.3 Comparing models

Comparison of the results in Table 11 shows that the main effect of knowledge sharing and team trust on the performance of virtual student teams at Radboud University is significant. Therefore, hypotheses H1 & H2 are supported; however, the inter-term of KS*TT is not significant indicating that there is no evidence of an extra effect resulting from the combination of these variables; hence H3 is rejected .Similarly, no evidence was found for the moderating effect of Team CQ on the relationship between knowledge sharing, team trust, and the performance of virtual student teams at Radboud University and therefore H4a & 4b are rejected as well. Although, team CQ still delivers a positive main effect on the performance of virtual student teams. The results of the stepwise linear regression models will be discussed below, resulting in the final model.

Model 1: Examining H1, H2 & H3

The first model includes knowledge sharing, then team trust, and finally, their interaction term as the independent variables through a stepwise process. The results of the ANOVA table showed that the value of F at the alpha level .05 is significant at F(1-64)=116.246, p<.001. This indicates that knowledge sharing has a significant impact on virtual teams performance which is also in line with descriptive statistic as knowledge sharing demonstrate the highest score among variables. Through the first step, hypothesis one is supported based on (b=.635, SE=0.059, t=10.782 P<0.01) as sufficient indication for the direct and positive effect of knowledge sharing on the performance of virtual student teams at Radboud University. Hence, it can be interpreted that knowledge sharing can explain 63% of changes in value for virtual teams performance

When team trust is added to the model to test for the main effect of team trust on the performance of virtual student teams, the model's exploratory power increased by 10% ((ΔR2 = 0.74). The results of the ANOVA table for the second independent variable showed to be also significant at F (2-63)=93.000, p<.001, while the relationship between knowledge sharing and virtual team performance remains significant at (b = 0.474, SE = 0.059, t=8.014, p< 0.01). Hence, hypothesis two is also supported specified by (b=.721, SE=0.141, t=5.105, P<0.01,) indicating that quality of trust affects the performance of virtual student teams at Radboud university.

Next, the computed inter-term for the interaction effect between knowledge sharing and team trust is added to the model to test the third hypothesis. The ANOVA table revealed to be

significant at F (3-62)=63.032, p<.001. However, when the interaction term is added to the model, the exploratory power of the model did not improve; Inspecting the coefficient table also showed that the interaction term is not significant based on (b=-.111, SE=0.107, t=-1.035, p=.305). Therefore, the third hypothesis is not supported due to the lack of evidence to state that knowledge sharing and team trust in combination have a more substantial effect on the performance of virtual student teams.

Model 2a/b: Examining H4a

Model 2a added first Team CQ and then the computed product term for the interaction between knowledge sharing and Team CQ. The ANOVA table showed a significant F value at (4-61)= 88.109, P< .001, indicating that the model as a whole is adequate. When Adding Team CQ to the model, the exploratory power of the model did improve by 6% while the main effect of knowledge sharing and team trust remained significant at (b=.385/.442, SE=.056/.146, t=6.902/3.022 & p<.001). Based on regression results we can conclude that Team CQ has a positive main effect on the performance of virtual student teams at (b=0.384, SE=0.89, t=4.301, p<.001). However, adding the computed inter-term of KS*CQ did not change the model's explanatory power; the coefficient table also showed that the interaction term is not significant based on (b=-.033, SE=0.063, t=-.532, p=.597). Therefore, the hypothesis 4a is not supported.

Model 2b further included team size, gender and culture diversity to the model in order to check for the impact of the control variables. The coefficient table revealed that none of the control variables were significant and therefore did not change the ΔR2 at .80(See Appendix F).

Model 3a/b: Examining H4b

Next, model 3a investigated the moderation effect of team CQ on the relationship between team trust and virtual team performance by adding the computed inter-term of CQ*TT. The ANOVA table showed a significant F value at (4-61)= 65.974, P< .000, indicating that the model as a whole is adequate. When Adding the interaction term of team trust and team CQ, the exploratory power of the model did not improve, while the main effect of knowledge sharing and team trust and team CQ remained significant respectively at (b=.383/.462/.363, SE=.056/.137/ .082 & p<.001). Base on the regression result hypothesis 4b is also not supported at (b=-0.118, SE=0.138 p=.397). Model 3b further included team size, gender, and cultural diversity in the model to monitor the impact of the control variables. Adding the control

variables did not change the ΔR2 at .80 since none of the control variables show a significant effect on the performance of virtual student teams (see Appendix F).

Finally, the researcher excluded all variables with no significant effect on the dependent variables from the model and performed a multiple regression analysis, including knowledge sharing, team trust, and team CQ as three independent variables. Table 12 further illustrates the model summary to report the strength of the relationship between the model and virtual team performance as the dependent variable.

Table12: Model summary based on three independent variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.900[c]	.810	.801	.36850

a. Predictors: (Constant), Knowledge. Sharing
b. Predictors: (Constant), Knowledge. Sharing, Team. Trust
c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ

Although data did not provide evidence to explore the moderation effect of team CQ, a noteworthy point is the positive and significant role of team CQ in explaining the virtual teams' performance. Given the value of R Square Change, it can be said that Team CQ can positively increase the model's explanatory power by 6%. Accordingly, it can be concluded that while Team CQ joining with variables, Knowledge sharing, and team trust can explain approximately 80% of the changes in the performance of virtual student teams at Radboud University, which is relatively large.

4.4 Exploring Data

In this section, the researcher intends to compare responses on the main variables of the research in terms of team characteristics such as team size, satisfaction with teamwork, virtual or real(face-to-face) relationships, and previous acquaintance among team members as categorical variables. The logic behind this is to examine if there is any significant difference between different groups of responses. One-Way-ANOVA and Post Hoc test were employed to investigate the research variables according to distinct categories.

Team size

The results show that there is no significant difference between the mean of Knowledge sharing, Team trust, and Virtual performance variables in terms of team members, but between the mean of Team CQ in terms of team members with respect to F (2-63)= 3.295 and p=.025 is a significant difference. All tables can be found in Appendix I. The Tukey post hoc test was used to examine which groups differed. The results of this test showed that the average Team CQ is higher in larger teams (with more members) than in smaller teams. The reason for this might be an association of higher diversity with the larger size which promotes higher degree of cultural intelligence.

Satisfaction with teamwork

After applying One-Way-ANOVA, the results display a significant difference between the mean of all variables in terms of satisfaction with teamwork (see Appendix I). The Tukey post hoc test was performed to investigate which groups differed. This test showed that teams with high satisfaction with collaboration score higher on average for all variables. One explanation can be that aside from originating motivation to share knowledge, team-related attributes such as team communication styles are also likely to motivate team members. In other words, it's not only the relationships among people that determine their willingness to commit to the common goal. But also the extent to which they are satisfied with their daily work—and feel that they are performing well in that work (Vries, van den Hoof & de Ridder, 2006).

Virtual or real relationship

To explore the further influence of the type of communication in the team, Independent-Sample T-Test was used to examine the research variables in terms of a virtual or real relationship. The results show no significant difference between the mean of any of the variables Knowledge sharing, team trust, Team CQ, and virtual performance. Further, the researcher observed that the number of respondents who chose option 2, related to collaboration both real and virtual, was limited (8 out of 66). This can be considered one of the reasons for not resulting in significant differences.

Previous acquaintance

One-Way-ANOVA also were utilized to examine the research variables in terms of a previous acquaintance of individuals with their team members. The results show that there is no significant difference between the mean of any of the variables knowledge sharing F (2-65)= 4.706 and p=.102, team trust F (2-65)= .416 and p=.661, Team CQ F (2-65)= 1.943 p=.152,

and Virtual performance F (2-65)= 2.424 p=.097, in terms of previous acquaintance, see Appendix I. One reason for the lack of significant difference can be related to the fact that approximately 80% of respondent did not have a high degree of acquaintance with team members and reported low to Non-previous familiarity with other team members.

5. Conclusion & Discussion

This final chapter includes a discussion base on the discussed theoretical framework and presents the conclusion of this study along with this study's contributions and limitations.

5.1 Discussion

As discussed before, this thesis study aims to add to the discussion about the understudied concept of team CQ by exploring the moderator role of team CQ on the performance of virtual student teams. Hence, a small-scale quantitative study in the context of virtual student teams at Radboud University was conducted to answer a set of sub-questions and ultimately answer the main research question. The opening two sub-questions concern the direct and indirect effect of knowledge sharing and team trust as the predictors of virtual team performance as follows.

SQ1.To what extent does knowledge sharing influence team performances in virtual student teams?

The findings of this study confirmed the theoretical model's relationship regarding knowledge sharing established in hypothesis 1. As argued in the literature review, knowledge-related resources are seen as an essential intangible resource; and are more likely to contribute to achieving and sustaining superior performance than tangible resources (Bogner and Bansal, 2007; Bierly & Chakrabarti, 1996). Respectively, the model summary demonstrated in table 12 of this study verifies that knowledge sharing in the team is the first confirmed predictor for the performance of virtual student teams and has a large share in determining the performance of virtual teams as reported in chapter 4. One way to interpret this is that a higher degree of knowledge sharing in the team is substantially associated with the higher performance of virtual student teams since a virtual team's strength is its ability to couple different skills & backgrounds to create and share knowledge (Pinjani & Palvia, 2013).

SQ2: To what extent does team trust influences team performance in virtual student teams?

Building on the theoretical framework, the research results are supporting the second hypothesis in this study. Based on the literature, how trust works at the team level is increasingly accepted as necessary for team performance since trust was found to influence perceptions of team effectiveness through its impact on collective attitudes (Grossman & Feitosa, 2018; Lin et al., 2010). By adding team trust into the model, the model's explanatory power increased by 10 percent, demonstrating the direct and positive influence of team trust on the performance of virtual teams.

Despite the relatively high correlation between variable knowledge sharing and team (N=66 r=.535) trust, the third hypothesis formulated to address the indirect effect of these two variables on the virtual team performance was not supported. Contrary to our assumptions, there is no evidence for a more substantial effect since adding the interaction effect to the model does not increase the model explanatory power. Future research may assist to understand what is the underlying mechanism of this high correlation.

SQ3: To what extent does team CQ moderates the relationship between knowledge sharing and team performance at virtual student teams?

The findings of this study did not provide any evidence regarding the moderator effect of team CQ in the relationship between knowledge sharing and team performance. As grounded in the social cognitive theory, people in a team need to combine their skills, knowledge, and resources to provide mutual support and work together. Although it is stated that a particular form of intelligence such as CQ could improve communication effectiveness and positively influence knowledge sharing (Presbitero & Attar, 2018), the results of this study do not support the moderator role of team CQ. Still, the result confirmed that team-level CQ does positively influence academic performance. However, in the present study this effect is merely generic. Although team CQ as an independent variables increases the model's explanatory power by 6%, indicating that team CQ has a positive direct effect on the performance of virtual student teams. One possible explanation for this finding can be related to the relatively small sample size of this research, which makes it more challenging to interpret the moderation effect.

SQ4: To what extent does team CQ moderates the relationship between team trust and team performance at virtual student teams?

Contrary to our assumption, this study's findings did not provide evidence to support hypothesis 4b regarding the moderation effect of team CQ in the relationship between team trust and team performance among virtual student teams. As Iskhakova & Ott (2020) stated, team-level CQ is positively related to group cohesion and team trust. The theoretical background also showed that one central challenge for virtual teams is developing and maintaining trust (Li, 2007, Li and Tsai, 2015). Therefore, future research focusing on how team CQ facilitates the effective operations of culturally diverse teams by providing trust as an ability to cope with multicultural situations may assist in understanding the underlying relationships between these variables.

Moreover, examining the research variables for the categorical variable concerning team demographics confirmed that team CQ displayed a significant difference between means in terms of team members. Based on the research findings, the average team CQ is higher in larger teams (with more members) than in smaller teams, proposing that larger teams can be potentially more diverse and, therefore, are more associated with team-level CQ. Regarding gender diversity, only knowledge sharing displayed a significant difference between groups showing that knowledge sharing is higher in teams with moderate gender diversity than teams with low gender diversity, which aligns with the theoretical assumption that diversity in gender may hinder the knowledge sharing process. However, results for culture diversity did not show any significant differences between groups of the respondent. The sampling frequency showed that the number of observations with a high or low cultural diversity was tiny, hence not showing any substantial differences. The Tukey post hoc test result regarding the differences in mean based on satisfaction of teamwork showed that teams with high satisfaction with teamwork score on average higher on for all variables. One possible explanation is that higher satisfaction from teamwork is associated with higher team performance showing more willingness to share knowledge and trust in a diverse team.

5.2 Conclusion

This research aimed to answer the following question: *To what extent does team cultural intelligence moderate the relationship between knowledge sharing, team trust, and team performance among virtual student teams?* The result of data analysis showed that next to knowledge sharing in the team and team trust, team CQ was proven to perform as a predictor of the performance of virtual student teams rather than a moderator. The final proposed regression model with an adjusted R Square of about .80 displays a high explanatory power. Accordingly, this study has reached its research goals since the researcher could contribute to the notion team CQ as a recently developed concept. Further, this research's results can have theoretical and practical implications, which are further elaborated upon in the following paragraphs.

5.3 Theoretical & Practical Implications

Regarding the theoretical contribution, this study's findings may contribute to the recent call to explore social-cognitive processes in virtual environments to understand what contributes to virtual team performance (Evans & Carson, 2005). However, triangulation of different approaches such as mixing quantitative and qualitative studies may provide more

profound results in interpreting the underlying mechanism of cognitive processes in a virtual environment. The finding of this study also may represent a step forward in investigating the intervening role of team CQ on the performance of virtual teams through unpacking the moderator role of team CQ among virtual student teams. The research findings show that team-level CQ impacts performance by taking other roles rather than a moderator role in virtual student teams. In addition, this study's results slightly helped to investigate the robustness of previous research results regarding knowledge sharing and team trust as important antecedents for team performance also applying to the virtual context. As explained in the second chapter, virtual teams depend on individuals sharing their knowledge to create value and using virtual teams' intellectual power, which is also supported by this research findings. Besides, as McAllister (1995) stated, within teams, trust is associated with improvements in communication, teamwork, and team performance, which is also valid based on this research findings.

In terms of the practical contribution, this study indicates how individuals, particularly students, can learn from each other when working in culturally diverse teams and then bring this knowledge with them when working in academic teams (Iskhakova & Ott, 2020). Based on the results, utilizing high-culturally diverse teams in business schools is suggested to develop skills and opportunities for team members to learn from each other (Iskhakova & Ott, 2020). In addition, since having experience with working in a culturally diverse group is beneficial for students as future employees or organizational stakeholders, learning how to interact effectively in a team and work properly together is of great importance (Yao, Rao, Jiang, & Xiong, 2020). The finding of this study can raise student awareness concerning the importance of cultural intelligence while working in diverse virtual teams since team-level culture intelligence is found to influence virtual student teams at RU. Concerning a broader possible relevance, learning more about how team CQ influences knowledge sharing behavior, team trust, and team performance may provide a better insight to track the mechanisms that affect team performance as it becomes more important day by day(Carton and Cummings, 2012).

5.4 Research Limitations

The major limitation of this research concerns the limited sample of 66 cases which could impact the power and generalizability of the results of this research. The limited sample size causes a less diverse set of response sets and, therefore, restrictions for statistical analysis and the proper interpretation of the data. Another limitation of this research concerns using one

data collection method to gain insights into the virtual teams' performance. As stated by Hair et al. (2014), triangulation of data (having more than one source of data collection) is a better approach since it adds additional sources such as interviews which gives more insight into the research topic. However, to comply with current hygienical rules caused by Covid-pandemic, the safest way to gather data for this research was a web-based survey that limited any unnecessary physical contacts.

The next research limitations are traced back to the data collection method and applying the Liker scale in the questionnaire. The first restriction is about the constraint with online surveys; for instance, the researcher should consider that the survey does not require more than 10 minutes of respondent time which brought some challenges in the questionnaire design. Next, using the Likert scale in the survey leads to central tendency bias caused by the respondent's avoidance of extreme response choices. Most respondents tended to go to the middle to avoid the outlying responses (Pimentel, 2019).

5.5 Recommendation for future research

The recommendations for future research are provided based on the results and limitations of this research. First, to defeat the data collection limitation in this research, future research with a combination of both qualitative and quantitative approaches can be more helpful. Combining quantitative and qualitative studies in the context of team CQ may provide better insight into how intellectual capabilities such as cultural intelligence affect and regulate the performance of virtual teams.

Besides, this research focuses on the individual perception of different aspects of teamwork, such as knowledge sharing, etc. However, choosing teams as the unit of analysis may provide a headstock to compare groups and incorporate multiple facets of team culture intelligence to learn about the influence of this subscale on the dynamic of virtual teams. Moreover, it would be interesting for future research to conduct studies about the effects of team CQ on other team outcomes next to performance, such as behavioral outcome, when considering the influence of team-level CQ (Iskhakova & Ott, 2020). Additional research is suggested to unpack the CQ construct into its constituent parts.

Further, the result showed that team CQ does not moderate the relationship between knowledge sharing and team trust, but it might also be interesting to check for the mediation effect. While the moderator variable influences the nature, magnitude, or direction of the impact of a predictor on an outcome variable, a mediator variable communicates all or part of

the effect of the antecedent on the outcome (Baron & Kenny, 1986). Therefore future research can zoom in on team CQ as a mediator for virtual team performance.

5.6 Reflection

As a student actively involved with virtual teamwork during the final year of my academic education, I developed an interest in understanding how individuals behave in a team, mainly when these teams are multicultural. Therefore I have chosen this topic for my thesis to develop my understanding on this subject. Of course, this master thesis trajectory has not been without obstacles. For instance, collecting data was challenging, given that approaching virtual teams has become more difficult because of the current pandemic restrictions. However, all these challenges helped me think more out of the box and take the initiative in this research process. Besides, the iterative process of this thesis trajectory taught me how to go back and forth through different steps to make a meaningful perception of a project.

In addition, the interpretation of the result was also challenging, given that data can be interpreted in different ways, and it couldn't be finalized without the support of my supervisor. Hereby, I want to thank my supervisor Dr. Michel Berkel for his precious feedbacks and assistance through this process and my second examiner, Eline de Jong, for her support and great feedbacks. I would also like to thank Ayse Saka-Helmhout and Armand Smits for using their network during the data collection. Next, I would like to thank all the virtual student team members who filled in the questionnaire. Lastly, I would like to thank my family, friends, and fellow students for their support. I hope that you enjoy reading this master thesis.

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Appendix

Appendix A: Development of measurement scale

A.1 Knowledge sharing in Teams - Faraj and Sproull (2000)
KS1.People in our team share their special knowledge and expertise with one another KS2. If someone in our team has some special knowledge about how to perform the task, he or she is not likely to tell the other member about it (R) KS3. There is virtually no exchange of information, knowledge, or sharing of skills among members (R) KS4. More knowledgeable team members freely provide other members with hard-to-find knowledge or specialized skills

A.2 Team trust - McAllister (1995)
CT1. Team members fulfil their undertakings successfully CT2. It cannot be said that the team members have necessary qualifications required for team performance CT3. I can trust the expertise of team members CT4. Team members' actions are congruent with his or her words CT5. Team members strive to be honest to each other CT6. If I make a mistake on this team, it is often held against me AT1. You cannot want help easily from team members AT2. Team members every time share all sources with other members AT3. Team members encourage each other to introduce different ideas and suggestions AT4. Team members respect each other's emotions and ideas AT5. Team members can ask for help from each other with their personal problems

A.3 Team Performance - Peters & Karren (2009)
TE1. The efficiency of team operations TE2. The amount of work the team produces TE3. The team's adherence to budgets TEF1. The quality of work the team produces TEF2. The effectiveness of the team's interactions with people outside the team TTL1. The team's adherence to schedules TTL2. The speed at which the team did its work given the level of quality TTL3. The team's ability to meet the goals as quick as possible

A.4 Team Cultural intelligence: Team-level CQ - Bücker & Korzillius (2020)

TCQ1. The team is conscious of the cultural knowledge it uses when interacting with people with different cultural backgrounds.
TCQ2. The team adjusts its cultural knowledge as it interacts with people from a culture that is unfamiliar to the team.
TCQ. 3The team is conscious of the cultural knowledge it applies to cross-cultural interactions.
TCQ4. The team checks the accuracy of the cultural knowledge it uses when interacting with people from different cultures.
TCQ5. The team uses a combination of norms or practices from different members' cultures.
TCQ6.The team tolerates members following their own cultural norms and practices
TCQ7. The team accepts that members from different cultures have different ways of expressing themselves.
TCQ8. The team uses some norms and practices from some members and some from others.
TCQ9. Team members participate in team discussions openly and freely
TCQ10. Each team member participates in decision-making.
TCQ11. All team members are encouraged to participate in team discussions
TCQ12. The team enjoys doing jobs with people despite language barriers
TCQ13. The team makes an extra effort to listen to people speaking different languages
TCQ14. The team is keen to learn from people even when language barriers slow down communication
TCQ15. The team is more unwilling to communicate when faced with people speaking a different language
TCQ16. In my team, members enjoy doing jobs with people of different ethnicity, gender, and/or age
TCQ17. In my team, members make an extra effort to listen to people of different ethnicity, gender, and age
TCQ18. In my team, members make an extra effort to listen to people who hold various work values and/or motivations
TCQ19. In my team, members are keen to learn from people who have different work values and/or motivations
TCQ20. In my team, members enjoy doing jobs with people from a different professional background and/or work experiences
TCQ21. In my team, members make an extra effort to listen to people from different professional backgrounds and/or work experiences.

All items measured on a 7-point response scale 1= Strongly disagree to 7= strongly agree

Reverse scored items denoted by (R).

Appendix B: Questionnaire team culture intelligence and team performance

Thank you for your interest in this study!

The goal of this master thesis study is to explore how cultural diversity affects the performance of student teams that operate in a virtual setting (using online and digital tools). To this end, we would like to ask you some questions regarding your experience working in a student team virtually.

The questionnaire is meant for you if you are a master or pre-master student that participated in at least one virtual student team (group project or team assignment) during the last academic year (2020-2021). Furthermore, another criterium is that the team was culturally diverse (e.g., different national or cultural backgrounds).

It takes you approximately 7-10 minutes to complete this questionnaire. Of course, your answers will be processed anonymously. In case you need more information, please do not hesitate to contact us.

Thank you very much for your valuable time and contribution!

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Consent form Please check all the boxes below to give your consent and then click on continue to fill in the survey. By continuing, I am aware that: All information I provide will be processed anonymously I can stop participating any time, without any need to give reasons I consent that the information gathered in this survey will be used for scientific research
This questionnaire starts with a question about your status within a group project assigned to you while taking a course in the academic year 2020-2021.
Sample validation In the academic year 2020-2021, did you work virtually in a group project or team assignment (two individuals or more) where at least one member had a different cultural background? * Please think about members with different nationalities, native languages, or other cultural characteristics that make the team culturally diverse. Yes No
What was the name of the course for which you have participated in a virtual student team that was culturally diverse?

* All the questions that follow now will be about this particular team for this course. In case there were more courses that apply and/or more teams in which you participated, please pick the one that had the highest cultural diversity.

How many team members (yourself included) did this team consist of?
Between 2 and 4 members
Between 4 and 6 members
Between 6 and 8 members
More than 8 members

How did you and your team members come together as a team? Could you choose to be part of this team, or did the course coordinator or lecturer set up the teams?
Team members could choose to be part of the team.
Team members could not choose to be part of a team, and teams were set up by the course coordinator or the lecturer.

The following four questions refer to your evaluation and judgment on different aspects of your team.

Please indicate to what extent you agree or disagree with the following statement.

Statement	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
1.The team enjoyed teamwork with people despite language barriers.							
2.The team made an extra effort to listen to people speaking different languages.							
3.The team was keen to learn from people even when communication is slowed down by language barriers.							
4.The team was less willing to communicate when faced with people speaking a different language.							
5.In my team, members were enjoying doing jobs with people of							

different ethnicity, gender, and/or age.							
6.In my team, members were making an extra effort to listen to people who hold different work values and/or motivations.							
7.In my team, members were keen to learn from people who hold different work values and/or motivations.	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
8.In my team, members were keen to learn from people who hold different work values and/or motivations.							
9.In my team, members were enjoying doing jobs with people from different professional backgrounds and/or work experiences.							
10.In my team, members were making an extra effort to listen to people from different professional backgrounds and/or work experiences.	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
11.The team used a combination of norms or practices from different members' cultures.							

12.The team has successfully tolerated members following their own cultural norms and practices.							
13.The team accepted that members from different cultures have different ways of expressing themselves.							
14.The team used a combination of norms and practices from different members.							
15.Team members participated in team discussions openly and freely.							
16.Each team member participated in decision-making.							
17.All team members were encouraged to participate in team discussions.							
18.The team was conscious of the cultural knowledge it uses when interacting with people with different cultural backgrounds.							
19.The team adjusted its cultural knowledge when interacting with people from a culture that is unfamiliar to the team.	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
20.The team was conscious of the cultural knowledge							

it applied to cross-cultural interactions.
21.The team controlled the accuracy of the cultural knowledge when interacting with people from different cultures (it is the self-reflection of the team if they have adequate cultural knowledge).

Please indicate to what extent you agree or disagree with the following statements about knowledge sharing in your team. The knowledge sharing addressed in this survey refers to the exchange of ideas and information between people.

Statement	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
1. In our team, members were able to share knowledge and expertise with one another.							
2. In our team, it was not likely that someone with special knowledge about task performance, share his/her knowledge with other members.							
3. In our team, there was no virtual exchange of information, knowledge, or sharing of skills among members.							
4. In our team, more knowledgeable team members							

freely provided other members with hard-to-find knowledge or skills.

Please indicate to what extent you agree or disagree with the following statements concerning the quality of trust within your team.

Statement	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
1. In our team, team members fulfilled their undertakings successfully							
2. In our team, team members did not have the necessary qualifications required for team performance							
3. The team could trust the expertise of the other team members							
4. In our team, team member's action was confirming their words							
5. In our team, team members strived to be honest with each other							
6. In our team, if someone makes a mistake, other team members used the mistake against her/him.							

7. In our team, we could not ask for help easily.	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
8. In our team, all sources were shared with other members all the time.							
9. In our team, team members encouraged each other to introduce different ideas and suggestions.							
10. In our team, we respected each other's emotions and ideas							
11. In our team, we could freely ask for help from other members concerning personal problems.							

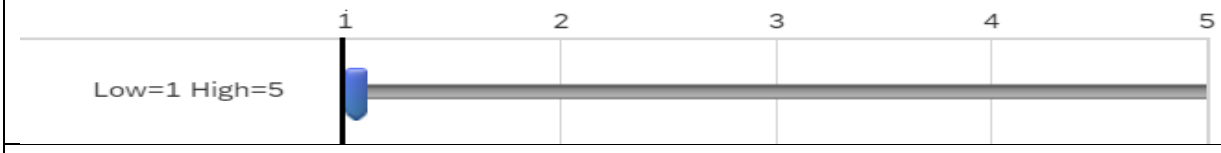
Please indicate to what extent you agree or disagree with the following statements about your experiences in your team concerning your team performance in terms of efficiency, effectiveness, and team's ability to meet the goals.

Statement	*Strongly agree*	*Agree*	*Somewhat agree*	*Neither agree nor disagree*	*Somewhat disagree*	*Disagree*	*Strongly disagree*
1. The team was able to efficiently operate the team's task							
2. The team was able to produce an efficient amount of work.							
3. The team was able to perform efficiently in terms of the team's adherence to the budget.							

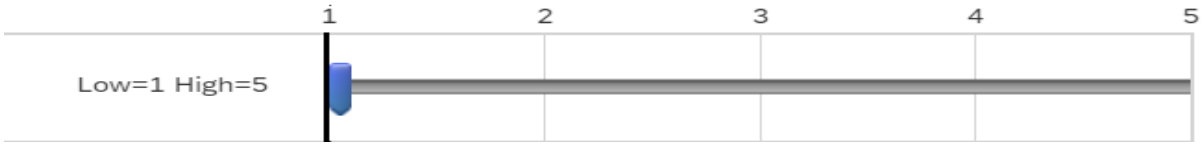
4. The team was able to produce high-quality work in terms of effectiveness.
5. The team was able to interact with people outside the team effectively.
6. The team was able to perform effectively in terms of the team's adherence to schedule.
7. The speed at which the team did its work, given the level of quality, was high.
8.The team was able to meet the goals as quickly as possible.

The questionnaire ends with some short questions regarding the demographics and your team composition. (Please note, this is still about the same virtual student team)

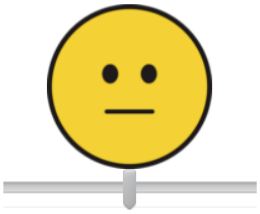
How would you define the level of cultural diversity within your team?



How would you define the composition of your team in terms of gender differences?



How would you best describe yourself?
Latino or Spanish origin (e.g. Mexican or Mexican American, Puerto Rican, Colombian, etc.)
Black or African American (e.g. African American, Nigerian, Ethiopian, Somalian, etc.)
Asian (e.g. Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)
American Indian or Alaska Native(e.g. Blackfeet Tribe, Mayan, Nome Eskimo Community, etc.)
Middle Eastern or North African (e.g. Lebanese, Iranian, Egyptian, etc.)
Native Hawaiian or Other Pacific Islander

I prefer not to say Other
If you chose other; please specify it in the text box below.
How did you like working in your team? Think about how pleasant your experience was. Drag the slider to the right side to see a happy face and to the left side for the sad face. 
Did you as a team for the purpose of this course meet only virtually (e.g., using zoom, FaceTime or Teams)? Yes, only virtually No, we also met in real
How well did you know members of this team before joining the team (e.g., from previous work together or even as friends)? We did not know each other at all Some of us knew each other a little bit Some of us knew each other quite good We all knew each other very good, from before
You reached the end of the questionnaire. Do you have any feedback or additional remarks? Please share them below.

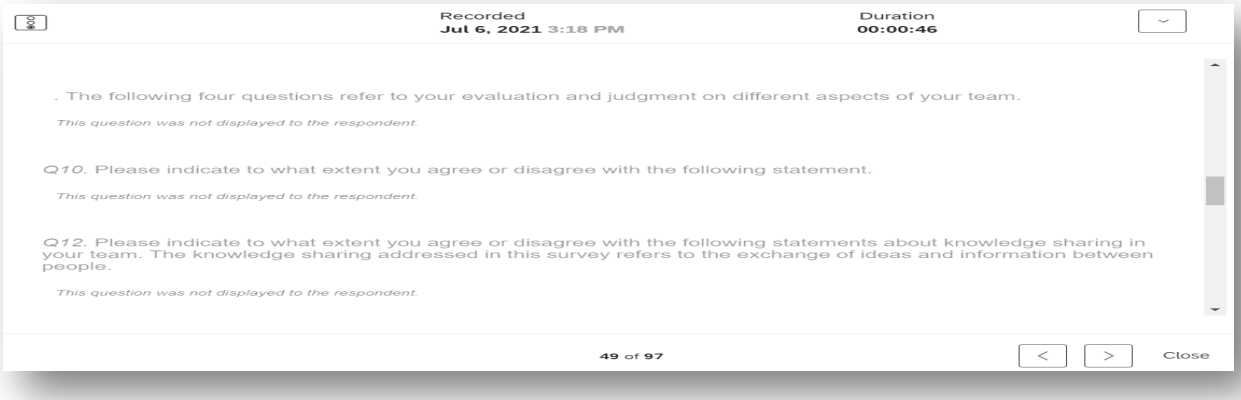
Appendix C: Data preparation

Table C1: Guide to the data cleaning process

Main variables					
Variables	Items	Modified items	Number of items	Number of dimensions	Reverse items
Team cultural Intelligence	Q10-1 to Q10-21	Q1-Q21	21 item scale	All 21 items converted to four dimension Q1-10 Team cultural metacognition Item 3 is reversed Q 11-17 Team coexistence & meaningful participation Q 18-21 Team Openness to diversity	item:Q4
Knowledge sharing	Q12-1 to Q12-4	Q22-Q25	4 items scale	One dimension	Q23 & Q24

Team trust	Q12-1.0 to Q12-11	Q26-Q36	11 item scale	Two dimension Cognitive trust Q26-32 Affective trust Q33-36	Q27 Q31 Q32
Virtual team performance	Q13-1 to Q13-8	Q37-Q44	8 item scale	Three dimension Team efficiency Q37-Q39 Team effectiveness Q40-41 Team Timeliness Q42-44	No
Team demographics					
Degree of Cultural diversity	Q15-1	Cultural diversity		Five point scale Value <2=Low cultural diversity Valu of 2 or 3=medium Value>3= High cultural diversity	
Degree of Gender diversity	Q16-1	Gender diversity		Five point scale Value <2=Low cultural diversity Valu of 2 or 3=medium Value>3= High cultural diversity	
Satisfaction with teamwork	Q19	Satisfaction with teamwork		Five point scale Value <2=Low cultural diversity Valu of 2 or 3=medium Value>3= High cultural diversity	
Virtual or real relationship	Q20	Virtual or real relationship		1=only virtual 2=Both	
Previous acquaintance	Q21	Previous acquaintance		Original 4 category	

Appendix C2: Example of error happened in Qualtrics



Appendix D: SPSS output Measurement Scales

D1: Virtual team performance

- Correlation Matrix Virtual team performance dimensions

		Team Efficiency	Team Effectiveness	Team Timeliness
Team Efficiency	Pearson Correlation	1	.572**	.479**
	Sig. (2-tailed)		.000	.000
	N	66	66	66
Team Effectiveness	Pearson Correlation	.572**	1	.550**
	Sig. (2-tailed)	.000		.000
	N	66	66	66
Team Timeliness	Pearson Correlation	.479**	.550**	1
	Sig. (2-tailed)	.000	.000	
	N	66	66	66
**. Correlation is significant at the 0.01 level (2-tailed).				

Rotated KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.826
Bartlett's Test of Sphericity	Approx. Chi-Square	475.983
	df	28
	Sig.	.000

Total variance explained items of virtual team performance

nponen	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squarec Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumula e %
	4.889	61.111	61.111	4.889	61.111	61.111	2.738	34.222	34.222
	1.401	17.511	78.622	1.401	17.511	78.622	2.652	33.149	67.371
	.823	10.286	88.908	.823	10.286	88.908	1.723	21.537	88.908
	.330	4.131	93.038						
	.236	2.951	95.990						
	.153	1.916	97.905						
	.107	1.344	99.249						
	.060	.751	100.000						

Component Matrix and Communalities

Rotated Component Matrix

	Team Timeliness	Team Efficiency	Team effectiveness
Q37	.212	.916	.206
Q38	.256	.913	.184
Q39	.165	.826	.302
Q40	.351	.312	.776
Q41	.194	.248	.890
Q42	.913	.245	.121
Q43	.889	.223	.286
Q44	.904	.169	.254

Communalities

	Initial	Extraction
Q37	1.000	.927
Q38	1.000	.933
Q39	1.000	.800
Q40	1.000	.822
Q41	1.000	.892
Q42	1.000	.908
Q43	1.000	.921
Q44	1.000	.910

Extraction Method: Principal Component Analysis.

- Reliability analysis computed scale of Virtual team performance based on items mean score

Case Processing Summary

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.907	8

Reliability analysis Team efficiency

Processing Summary

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.927	3

Reliability analysis Team effectiveness

Case Processing Summary

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.824	2

Reliability analysis Team Timeliness

Reliability Statistics

Cronbach's Alpha	N of Items
.949	3

Output second factor analysis based on all 8-items as one dimensional construct of virtual team performance

	Raw	
	Initial	Extraction
Q37	.959	.787
Q38	.877	.709
Q39	1.279	1.039
Q40	1.092	.674
Q41	1.299	.694
Q42	1.158	.995
Q43	1.207	1.109
Q44	1.132	1.021

Component Score Coefficient Matrix

	Component	
	1	2
Q37	.135	.296
Q38	.125	.249
Q39	.175	.415
Q40	.156	.049
Q41	.168	.145
Q42	.168	-.358
Q43	.187	-.348
Q44	.167	-.365

Extraction Method: Principal Component Analysis.

D2: Knowledge sharing

Correlation matrix Knowledge sharing in the team

Correlations

		Q22	Q23r	Q24r	Q25
Q22	Pearson Correlation	1	.652**	.773**	.696**
	Sig. (2-tailed)		.000	.000	.000
	N	66	66	66	66
Q23r	Pearson Correlation	.652**	1	.804**	.702**
	Sig. (2-tailed)	.000		.000	.000
	N	66	66	66	66
Q24r	Pearson Correlation	.773**	.804**	1	.717**
	Sig. (2-tailed)	.000	.000		.000
	N	66	66	66	66
Q25	Pearson Correlation	.696**	.702**	.717**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	66	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed).

- **Factor analysis assumption for Knowledge sharing**

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.814
Bartlett's Test of Sphericity	Approx. Chi-Square	180.733
	df	6
	Sig.	.000

- **Total variance explained items of virtual team performance**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.174	79.340	79.340	3.174	79.340	79.340
2	.350	8.752	88.092			
3	.316	7.892	95.984			
4	.161	4.016	100.000			

Component Matrix and Communalistes table

Component Matrix

	Knowledge sharing
Q22	.875
Q23r	.887
Q24r	.927
Q25	.872

Communalities

	Initial	Extraction
Q22	1.000	.766
Q23r	1.000	.787
Q24r	1.000	.859
Q25	1.000	.761

Extraction Method: Principal Component Analysis.

Reliability analysis Knowledge sharing

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.913	4

D3: Team Trust

Correlation matrix Team trust

Correlations

		Cognitive Trust	Affective Trust
Cognitive Trust	Pearson Correlation	1	.077
	Sig. (2-tailed)		.541
	N	66	66
Affective Trust	Pearson Correlation	.077	1
	Sig. (2-tailed)	.541	
	N	66	66

Assumption factor analysis Team Trust

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.758
Bartlett's Test of Sphericity	Approx. Chi-Square	406.139
	Df	55
	Sig.	.000

Total variance explained items of Team trust

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.134	37.581	37.581	4.134	37.581	37.581	4.101	37.279	37.279
2	2.958	26.889	64.470	2.958	26.889	64.470	2.991	27.190	64.470
3	.941	8.554	73.024						
4	.797	7.242	80.265						
5	.607	5.517	85.782						
6	.389	3.534	89.316						
7	.350	3.179	92.495						
8	.293	2.663	95.159						
9	.204	1.855	97.014						
10	.174	1.582	98.596						
11	.154	1.404	100.000						

Component Matrix

Component	
Cognitive trust	Affective trust

Q26	.683	.040
Q27r	.673	-.033
Q28	.758	-.262
Q29	.763	-.220
Q30	.818	-.185
Q31r	.860	-.173
Q32r	.733	.155
Q33	.193	.804
Q34	.134	.855
Q35	.183	.807
Q36	.153	.849

Component Matrix and Communalistes table

Communalities

	Initial	Extraction
Q26	1.000	.466
Q27r	1.000	.453
Q28	1.000	.574
Q29	1.000	.582
Q30	1.000	.669
Q31r	1.000	.740
Q32r	1.000	.538
Q33	1.000	.037
Q34	1.000	.018
Q35	1.000	.033
Q36	1.000	.024

Extraction Method: Principal Component Analysis.

Case Processing Summary

	N	%

- **Reliability analyses Affective**

Reliability analyses Cognitive trust

case Processing Summary

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.868	4

Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.865	7

Reliability analyses Team trust based on mean score of all 11 items

		N	%
Cases	Valid	66	100.0
	Excluded	0	.0
	Total	66	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.811	11

- **Output second factor analysis based on all 11-items as one dimensional construct of virtual team performance**

Component Matrix

	1	2
Q31r	.860	-.173
Q30	.818	-.185
Q29	.763	-.220
Q28	.758	-.262

Q32r	.733	.155
Q26	.683	.040
Q27r	.673	-.033
Q34	.134	.855
Q36	.153	.849
Q35	.183	.807
Q33	.193	.804

Communalities

	Initial	Extraction
Q26	1.000	.468
Q27r	1.000	.454
Q28	1.000	.643
Q29	1.000	.630
Q30	1.000	.703
Q31r	1.000	.770
Q32r	1.000	.562
Q33	1.000	.683
Q34	1.000	.750
Q35	1.000	.685
Q36	1.000	.744

D4 :Team CQ

Correlation matrix Team trust

Correlations

		Metacognition	Coexistence and meaningful participation	Openness to Diversity
Metacognition	Pearson Correlation	1	.660**	.601**
	Sig. (2-tailed)		.000	.000
	N	66	66	66
Coexistence and meaningful participation	Pearson Correlation	.660**	1	.502**
	Sig. (2-tailed)	.000		.000
	N	66	66	66
Openness to Diversity	Pearson Correlation	.601**	.502**	1
	Sig. (2-tailed)	.000	.000	
	N	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed)

Assumption factor analysis Team Trust

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.888
Bartlett's Test of Sphericity	Approx. Chi-Square	1253.031
	Df	210
	Sig.	.000

- **Total variance explained items of Team CQ**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.336	53.982	53.982	11.336	53.982	53.982	6.286	29.935	29.935
2	2.193	10.444	64.426	2.193	10.444	64.426	5.363	25.539	55.474
3	1.783	8.489	72.915	1.783	8.489	72.915	3.663	17.441	72.915

4	.907	4.317	77.232						
5	.719	3.424	80.656						
6	.523	2.491	83.147						
7	.487	2.318	85.465						
8	.481	2.290	87.755						
9	.378	1.800	89.556						
10	.359	1.711	91.267						
11	.310	1.477	92.743						
12	.296	1.412	94.155						
13	.235	1.120	95.275						
14	.213	1.013	96.288						
15	.168	.799	97.087						
16	.144	.686	97.773						
17	.138	.657	98.430						
18	.105	.498	98.928						
19	.098	.469	99.397						
20	.068	.324	99.722						
21	.058	.278	100.000						

- **Rotated component matrix Team CQ**

	Component		
	Team Openness to diversity	Team coexistence meaningful participation	Team cultural metacognition
Q1	.769	.276	.107
Q2	.720	.083	.219
Q3	.813	.301	.175
Q4r	.605	.261	.163
Q5	.641	.411	.359

Q6	.828	.104	.217
Q7	.810	.233	.248
Q8	.799	.325	.191
Q9	.724	.374	.287
Q10	.602	.477	.312
Q11	.451	.630	.235
Q12	.321	.785	.215
Q13	.240	.826	.140
Q14	.298	.699	.317
Q15	.166	.844	.079
Q16	.198	.836	.107
Q17	.225	.808	.201
Q18	.358	.177	.768
Q19	.288	.244	.828
Q20	.212	.235	.868
Q21	.212	.144	.884

- **Output second factor analysis based on all 21-items as one dimensional construct of virtual team performance**

Component Matrix

	Component		
	1	2	3
Q9	.838	-.137	-.159
Q5	.835	-.096	-.051
Q10	.826	-.008	-.063
Q8	.818	-.175	-.284

Q3	.807	-.194	-.307
Q7	.797	-.275	-.248
Q11	.780	.213	-.031
Q12	.775	.405	.036
Q14	.752	.308	.127
Q1	.732	-.169	-.338
Q6	.719	-.376	-.292
Q17	.717	.473	.081
Q13	.711	.503	.023
Q19	.701	-.246	.526
Q18	.683	-.309	.432
Q16	.674	.543	.021
Q20	.662	-.234	.011
Q15	.644	.575	.017
Q4r	.637	-.127	-.199
Q2	.635	-.344	-.229
Q21	.615	-.313	.091

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Appendix E: Regression assumption

Table E.1: Coefficients Statistic

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-1.114	.448		-2.487	.016		
	Knowledge. Sharing	.388	.055	.491	7.025	.000	.628	1.592
	Team. Trust	.470	.136	.249	3.455	.001	.592	1.690
	Team.CQ	.366	.082	.326	4.469	.000	.577	1.732

Table E.2: Normal distribution dépendent variable

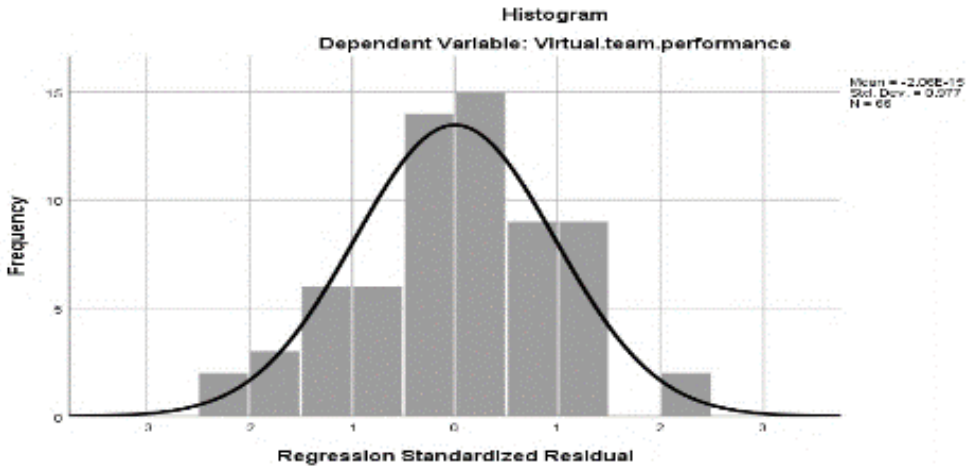


Table E.3: P-plot of residuals linearity assumption

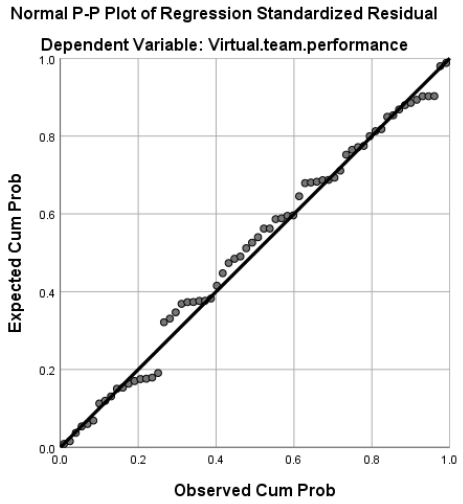
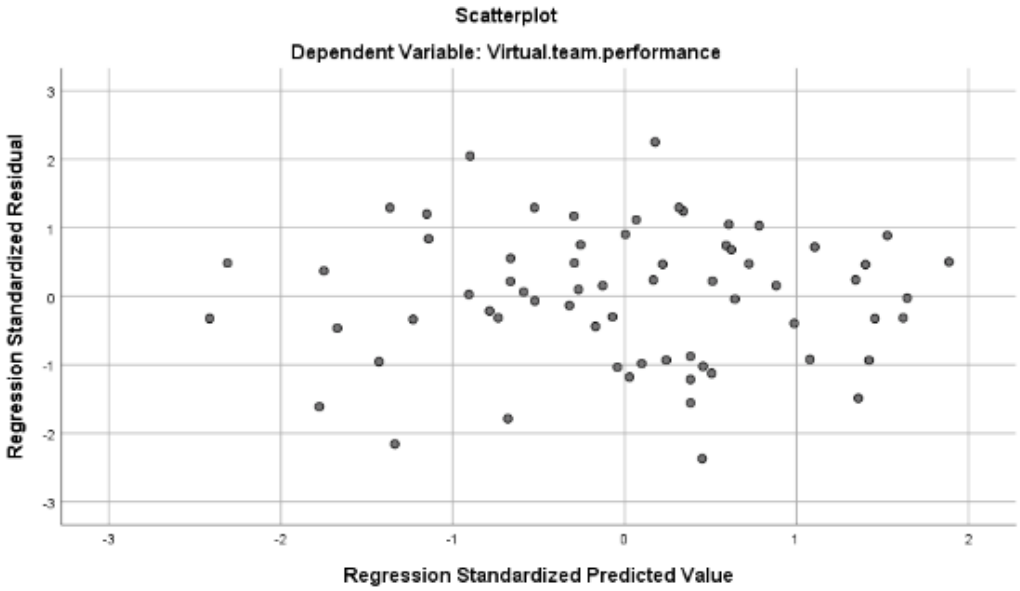


Table E.4: Scatterplot Regression Standardized Residuals & Predicted values



- Correlation matrix of all the scales

		Knowledge. Sharing	Virtual.team.performance	Team. Trust	Team.CQ
Knowledge. Sharing	Pearson Correlation	1	.803**	.535**	.551**
	Sig. (2-tailed)		.000	.000	.000
	N	66	66	66	66
Virtual.team.performance	Pearson Correlation	.803**	1	.702**	.742**

	Sig. (2-tailed)	.000		.000	.000
	N	66	66	66	66
Team. Trust	Pearson Correlation	.535**	.702**	1	.586**
	Sig. (2-tailed)	.000	.000		.000
	N	66	66	66	66
Team.CQ	Pearson Correlation	.551**	.742**	.586**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	66	66	66	66
**. Correlation is significant at the 0.01 level (2-tailed).					

Appendix F: SPSS output step-wise linear regression

- Model 1, Testing H1-H2-H3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.868[c]	.753	.741	.42009

a. Predictors: (Constant), Knowledge. Sharing

b. Predictors: (Constant), Knowledge. Sharing, Team. Trust

c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Intereffect.KS.TT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.578	1	28.578	116.246	.000[b]
	Residual	15.734	64	.246		
	Total	44.312	65			
2	Regression	33.181	2	16.591	93.906	.000[c]
	Residual	11.130	63	.177		
	Total	44.312	65			
3	Regression	33.370	3	11.123	63.032	.000[d]
	Residual	10.941	62	.176		
	Total	44.312	65			

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.164	.296		3.931	.000
	Knowledge. Sharing	.635	.059	.803	10.782	.000
2	(Constant)	-1.107	.511		-2.168	.034
	Knowledge. Sharing	.474	.059	.599	8.014	.000
	Team. Trust	.721	.141	.382	5.105	.000
3	(Constant)	-3.200	2.085		-1.535	.130
	Knowledge. Sharing	.939	.453	1.188	2.071	.043
	Team. Trust	1.225	.507	.648	2.415	.019
	Intereffect.Kn.Tt	-.111	.107	-.768	-1.035	.305

a. Dependent Variable: Virtual.team.performance

- Model 2a & 2b, Testing H4A
- Model 2a

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.900[c]	.810	.801	.36850
4	.900[d]	.811	.798	.37064

a. Predictors: (Constant), Knowledge. Sharing

b. Predictors: (Constant), Knowledge. Sharing, Team. Trust

c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ

d. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ, Intereffect KS*CQ

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.578	1	28.578	116.246	.000[b]
	Residual	15.734	64	.246		
	Total	44.312	65			
2	Regression	33.181	2	16.591	93.906	.000[c]

	Residual	11.130	63	.177		
	Total	44.312	65			
3	Regression	35.893	3	11.964	88.109	.000[d]
	Residual	8.419	62	.136		
	Total	44.312	65			
4	Regression	35.932	4	8.983	65.388	.000[e]
	Residual	8.380	61	.137		
	Total	44.312	65			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.164	.296		3.931	.000
	Knowledge. Sharing	.635	.059	.803	10.782	.000
2	(Constant)	-1.107	.511		-2.168	.034
	Knowledge. Sharing	.474	.059	.599	8.014	.000
	Team. Trust	.721	.141	.382	5.105	.000
3	(Constant)	-1.114	.448		-2.487	.016
	Knowledge. Sharing	.388	.055	.491	7.025	.000
	Team. Trust	.470	.136	.249	3.455	.001
	Team.CQ	.366	.082	.326	4.469	.000
4	(Constant)	-1.044	.469		-2.225	.030
	Knowledge. Sharing	.385	.056	.487	6.902	.000
	Team. Trust	.442	.146	.234	3.022	.004
	Team.CQ	.384	.089	.342	4.301	.000
	Intereffect KS*CQ	-.033	.063	-.033	-.532	.597

a. Dependent Variable: Virtual.team.performance

- Model 2b

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.900[c]	.810	.801	.36850
4	.900[d]	.811	.798	.37064
5	.907[e]	.822	.801	.36864

a. Predictors: (Constant), Knowledge. Sharing

b. Predictors: (Constant), Knowledge. Sharing, Team. Trust

c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ

d. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ, Intereffect KS*CQ

e. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ, Intereffect KS*CQ, Cultural. Diversity, Gender. Diversity, Team. Members

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.578	1	28.578	116.246	.000[b]
	Residual	15.734	64	.246		
	Total	44.312	65			
2	Regression	33.181	2	16.591	93.906	.000[c]
	Residual	11.130	63	.177		
	Total	44.312	65			
3	Regression	35.893	3	11.964	88.109	.000[d]
	Residual	8.419	62	.136		
	Total	44.312	65			
4	Regression	35.932	4	8.983	65.388	.000[e]
	Residual	8.380	61	.137		
	Total	44.312	65			
5	Regression	36.430	7	5.204	38.295	.000[f]
	Residual	7.882	58	.136		
	Total	44.312	65			

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.164	.296		3.931	.000
	Knowledge. Sharing	.635	.059	.803	10.782	.000
2	(Constant)	-1.107	.511		-2.168	.034
	Knowledge. Sharing	.474	.059	.599	8.014	.000
	Team. Trust	.721	.141	.382	5.105	.000
3	(Constant)	-1.114	.448		-2.487	.016
	Knowledge. Sharing	.388	.055	.491	7.025	.000
	Team. Trust	.470	.136	.249	3.455	.001
	Team.CQ	.366	.082	.326	4.469	.000
4	(Constant)	-1.044	.469		-2.225	.030
	Knowledge. Sharing	.385	.056	.487	6.902	.000
	Team. Trust	.442	.146	.234	3.022	.004
	Team.CQ	.384	.089	.342	4.301	.000
	DeviationinterKSCQ	-.033	.063	-.033	-.532	.597
5	(Constant)	-1.131	.519		-2.180	.033
	Knowledge. Sharing	.359	.058	.454	6.205	.000
	Team. Trust	.476	.150	.252	3.165	.002
	Team.CQ	.386	.095	.343	4.074	.000
	Intereffect KS*CQ	-.031	.067	-.030	-.456	.650
	Cultural. Diversity	-.035	.046	-.043	-.760	.450
	Gender. Diversity	.085	.049	.102	1.743	.087
	Team. Members	-.014	.073	-.013	-.197	.845

a. Dependent Variable: Virtual.team.performance

- Model 3a & 3b, Testing H4B
- Model 3a

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.900[c]	.810	.801	.36850
4	.901[d]	.812	.800	.36931

a. Predictors: (Constant), Knowledge. Sharing

b. Predictors: (Constant), Knowledge. Sharing, Team. Trust

c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ

d. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ, Intereffect CQ*TT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.578	1	28.578	116.246	.000[b]
	Residual	15.734	64	.246		
	Total	44.312	65			
2	Regression	33.181	2	16.591	93.906	.000[c]
	Residual	11.130	63	.177		
	Total	44.312	65			
3	Regression	35.893	3	11.964	88.109	.000[d]
	Residual	8.419	62	.136		
	Total	44.312	65			
4	Regression	35.992	4	8.998	65.974	.000[e]
	Residual	8.320	61	.136		
	Total	44.312	65			

coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.164	.296		3.931	.000
	Knowledge. Sharing	.635	.059	.803	10.782	.000
2	(Constant)	-1.107	.511		-2.168	.034
	Knowledge. Sharing	.474	.059	.599	8.014	.000
	Team. Trust	.721	.141	.382	5.105	.000
3	(Constant)	-1.114	.448		-2.487	.016
	Knowledge. Sharing	.388	.055	.491	7.025	.000
	Team. Trust	.470	.136	.249	3.455	.001
	Team.CQ	.366	.082	.326	4.469	.000
4	(Constant)	-1.021	.462		-2.212	.031
	Knowledge. Sharing	.383	.056	.484	6.876	.000
	Team. Trust	.462	.137	.245	3.385	.001
	Team.CQ	.363	.082	.323	4.414	.000
	Intereffect CQ*TT	-.118	.138	-.049	-.853	.397

a. Dependent Variable: Virtual.team.performance

- Model 3b

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.639	.49582
2	.865[b]	.749	.741	.42032
3	.900[c]	.810	.801	.36850
4	.907[d]	.823	.802	.36757

a. Predictors: (Constant), Knowledge. Sharing

b. Predictors: (Constant), Knowledge. Sharing, Team. Trust

c. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ

d. Predictors: (Constant), Knowledge. Sharing, Team. Trust, Team.CQ, Intereffect CQ*TT , Cultural. Diversity, Gender. Diversity, Team. Members

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.578	1	28.578	116.246	.000[b]
	Residual	15.734	64	.246		
	Total	44.312	65			
2	Regression	33.181	2	16.591	93.906	.000[c]
	Residual	11.130	63	.177		
	Total	44.312	65			
3	Regression	35.893	3	11.964	88.109	.000[d]
	Residual	8.419	62	.136		
	Total	44.312	65			
4	Regression	36.475	7	5.211	38.568	.000[e]
	Residual	7.836	58	.135		
	Total	44.312	65			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.164	.296		3.931	.000
	Knowledge. Sharing	.635	.059	.803	10.782	.000
2	(Constant)	-1.107	.511		-2.168	.034
	Knowledge. Sharing	.474	.059	.599	8.014	.000

	Team. Trust	.721	.141	.382	5.105	.000
3	(Constant)	-1.114	.448		-2.487	.016
	Knowledge. Sharing	.388	.055	.491	7.025	.000
	Team. Trust	.470	.136	.249	3.455	.001
	Team.CQ	.366	.082	.326	4.469	.000
4	(Constant)	-1.116	.517		-2.158	.035
	Knowledge. Sharing	.358	.058	.452	6.217	.000
	Team. Trust	.499	.146	.264	3.418	.001
	Team.CQ	.360	.095	.321	3.794	.000
	Intereffect CQ*TT	-.112	.151	-.046	-.741	.462
	Team. Members	-.004	.074	-.004	-.056	.956
	Cultural. Diversity	-.037	.045	-.046	-.826	.412
	Gender. Diversity	.083	.049	.099	1.693	.096

a. Dependent Variable: Virtual.team.performance

- **Appendix I: Exploring Data based on team characteristics**

Dependent Variable: Knowledge. Sharing

Tukey HSD

(I) Gender. Diversity	(J) Gender. Diversity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Medium	-.91356*	.28202	.005	-1.5905	-.2366
	High	-.57165	.37787	.292	-1.4787	.3354
Medium	Low	.91356*	.28202	.005	.2366	1.5905
	High	.34191	.41917	.695	-.6642	1.3480
High	Low	.57165	.37787	.292	-.3354	1.4787
	Medium	-.34191	.41917	.695	-1.3480	.6642

- **One-Way-ANOVA and Post Hoc team size**

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge.sharing	Between Groups	.498	2	.249	.223	.801
	Within Groups	70.397	63	1.117		
	Total	70.895	65			
Team.trust	Between Groups	.143	2	.071	.366	.695
	Within Groups	12.267	63	.195		
	Total	12.410	65			
Team CQ	Between Groups	3.881	2	1.940	3.922	.025
	Within Groups	31.168	63	.495		
	Total	35.049	65			
Virtual or real relationship	Between Groups	.613	2	.307	3.009	.056
	Within Groups	6.417	63	.102		
	Total	7.030	65			

- **Multiple Comparisons**

Dependent Variable: Team's

Tukey HSD

(I) Team. Members	(J) Team. Members	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1&2	3&4	-.40353	.19410	.102	-.8694	.0624
	>4	-.59126*	.23477	.038	-1.1548	-.0277
3&4	1&2	.40353	.19410	.102	-.0624	.8694
	>4	-.18773	.24222	.720	-.7691	.3937
>4	1&2	.59126*	.23477	.038	.0277	1.1548
	3&4	.18773	.24222	.720	-.3937	.7691

*. The mean difference is significant at the 0.05 level.

- **One-Way-ANOVA and Post Hoc Gender diversity**

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge sharing	Between Groups	10.679	2	5.339	5.586	.006
	Within Groups	60.216	63	.956		
	Total	70.895	65			
Team trust	Between Groups	.318	2	.159	.828	.442
	Within Groups	12.092	63	.192		
	Total	12.410	65			
Team CQ	Between Groups	1.245	2	.622	1.160	.320
	Within Groups	33.804	63	.537		
	Total	35.049	65			
Virtual team performance	Between Groups	3.674	2	1.837	2.847	.065
	Within Groups	40.638	63	.645		
	Total	44.312	65			

- **One-Way-ANOVA and Post Hoc cultural diversity**

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge.sharing	Between Groups	.431	2	.215	.192	.825

	Within Groups	70.464	63	1.118		
	Total	70.895	65			
Team.trust	Between Groups	.003	2	.002	.008	.992
	Within Groups	12.407	63	.197		
	Total	12.410	65			
Team CQ	Between Groups	.467	2	.234	.426	.655
	Within Groups	34.581	63	.549		
	Total	35.049	65			
Virtual.team.performance	Between Groups	.089	2	.045	.063	.939
	Within Groups	44.222	63	.702		
	Total	44.312	65			

- **One-Way-ANOVA and Post Hoc Satisfaction with team work**

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge.sharing	Between Groups	11.344	2	5.672	6.000	.004
	Within Groups	59.551	63	.945		
	Total	70.895	65			
Team.trust	Between Groups	1.500	2	.750	4.331	.017
	Within Groups	10.910	63	.173		
	Total	12.410	65			
Team.CQ	Between Groups	5.392	2	2.696	5.728	.005
	Within Groups	29.656	63	.471		
	Total	35.049	65			
Virtual.team.performance	Between Groups	7.081	2	3.540	5.991	.004

	Within Groups	37.231	563	.591			
	Total	44.312	65				

Dependent Variable	(I) Satisfaction.with.teamwork	(J) Satisfaction.with.teamwork	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Knowledge.sharing	Low	moderate	-1.06250	.59537	.183	-2.4916	.3666
		High	-1.27546*	.36832	.003	-2.1596	-.3914
	moderate	Low	1.06250	.59537	.183	-.3666	2.4916
		High	-.21296	.50380	.906	-1.4223	.9963
	High	Low	1.27546*	.36832	.003	.3914	2.1596
		moderate	.21296	.50380	.906	-.9963	1.4223
Team.trust	Low	moderate	-.61364*	.25483	.049	-1.2253	-.0020
		High	-.42929*	.15765	.022	-.8077	-.0509

	moderate	Low	.61364*	.25483	.049	.0020	1.2253
		High	.18434	.21564	.670	-.3333	.7019
	High	Low	.42929*	.15765	.022	.0509	.8077
		moderate	-.18434	.21564	.670	-.7019	.3333
Team.CQ	Low	moderate	-1.00000	.42015	.052	-2.0085	.0085
		High	-.86023*	.25992	.004	-1.4841	-.2363
	moderate	Low	1.00000	.42015	.052	-.0085	2.0085
		High	.13977	.35553	.918	-.7136	.9932
	High	Low	.86023*	.25992	.004	.2363	1.4841
		moderate	-.13977	.35553	.918	-.9932	.7136
Virtual.team.performance	Low	moderate	-.96875	.47076	.107	-2.0987	.1612
		High	-1.00579*	.29123	.003	-1.7048	-.3067
	moderate	Low	.96875	.47076	.107	-.1612	2.0987

		High	-.03704	.39835	.995	-.9932	.9191
	High	Low	1.00579*	.29123	.003	.3067	1.7048
		moderate	.03704	.39835	.995	-.9191	.9932

*. The mean difference is significant at the 0.05 level.

- **One-Way-ANOVA and Post Hoc acquaintance with team members**

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge.sharing	Between Groups	9.215	2	4.608	4.706	.012
	Within Groups	61.680	63	.979		
	Total	70.895	65			
Team.trust	Between Groups	.162	2	.081	.416	.661
	Within Groups	12.248	63	.194		
	Total	12.410	65			
Team.CQ	Between Groups	2.037	2	1.018	1.943	.152
	Within Groups	33.012	63	.524		
	Total	35.049	65			
Virtual.team.performance	Between Groups	3.166	2	1.583	2.424	.097
	Within Groups	41.145	63	.653		
	Total	44.312	65			

- **Sample T -test virtual or real team work**

independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Knowledge.sharing	Equal variances assumed	.646	.424	-1.414	64	.162	-.55280	.39088	-1.33368	.22808
	Equal variances not assumed			-1.208	8.331	.260	-.55280	.45757	-1.60072	.49511
Team. Trust	Equal variances assumed	.640	.427	-.532	64	.597	-.08817	.16571	-.41921	.24288
	Equal variances not assumed			-.494	8.668	.634	-.08817	.17851	-.49434	.31801
Team.CQ	Equal variances assumed	2.646	.109	-.427	64	.671	-.11905	.27870	-.67582	.43772
	Equal variances not assumed			-.298	7.758	.773	-.11905	.39911	-1.04441	.80632

Virtual.team.performance	Equal variances assumed	.426	.516	-1.653	64	.103	-.50808	.30733	-1.12204	.10587
	Equal variances not assumed			-1.301	8.063	.229	-.50808	.39043	-1.40719	.39103

- **Appendix H: Residual Statistics**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.4939	5.6892	4.2879	.74310	66
Residual	-.87296	.83045	.00000	.35989	66
Std. Predicted Value	-2.414	1.886	.000	1.000	66
Std. Residual	-2.369	2.254	.000	.977	66

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.900[a]	.810	.801	.36850	1.930

- **Regression coefficient Control variables**

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.625	.938		.666	.508	-1.252	2.503		

	Knowledge Sharing	.182	.102	.230	1.776	.081	-.023	.386	.204	4.902
	Team Trust	.381	.197	.202	1.935	.058	-.013	.775	.314	3.182
	Inter.effect K T CQ	.012	.004	.513	2.897	.005	.004	.020	.109	9.190
	Cultural.diversity.2	-.022	.061	-.022	-.366	.716	-.145	.100	.931	1.074
	Gender.diversity.2	.111	.077	.092	1.439	.155	-.043	.265	.839	1.191
	Team members	-.016	.076	-.015	-.217	.829	-.168	.135	.691	1.448

Dependent Variable: Virtual.team.performance

Appendix G: SPSS OUTPUT Descriptive Statistics

Team Members

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Between 2 and 4 members	29	43.9	43.9	43.9
	Between 4 and 6 members	24	36.4	36.4	80.3
	Between 6 and 8 members	12	18.2	18.2	98.5
	More than 8 members	1	1.5	1.5	100.0
	Total	66	100.0	100.0	

- Cultural Diversity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	19	28.8	28.8	28.8

	moderate	22	33.3	33.3	62.1
	High	25	37.9	37.9	100.0
	Total	66	100.0	100.0	

- Gender Diversity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	41	62.1	62.1	62.1
	moderate	17	25.8	25.8	87.9
	High	8	12.1	12.1	100.0
	Total	66	100.0	100.0	

- Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Latino or Spanish origin (Eg: Mexican or Mexican American, Puerto Rican, Colombian, etc.)	7	10.6	10.6	10.6
	Asian (Eg: Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)	7	10.6	10.6	21.2
	Middle Eastern or North African (Eg: Lebanese, Iranian, Egyptian, etc.)	5	7.6	7.6	28.8
	I prefer not to say	3	4.5	4.5	33.3

	Other	44	66.7	66.7	100.0
	Total	66	100.0	100.0	

- Satisfaction with teamwork

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	8	12.1	12.1	12.1
	moderate	4	6.1	6.1	18.2
	High	54	81.8	81.8	100.0
	Total	66	100.0	100.0	

- Virtual or real relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, only virtually	58	87.9	87.9	87.9
	No, we also met in real	8	12.1	12.1	100.0
	Total	66	100.0	100.0	

- Previous Acquaintance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	We did not know each other at all	29	43.9	43.9	43.9
	Some of us knew each other a little bit	27	40.9	40.9	84.8
	Some of us knew each other quite good	10	15.2	15.2	100.0
	Total	66	100.0	100.0	