



In search of the Holy Grail in global virtual teams: The mediating role of satisfaction on performance outcomes

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ARTICLE INFO

Keywords:

Multicultural teams
Team performance
Trust
Motivation
Technical expertise
Cultural intelligence

ABSTRACT

Although the satisfaction–performance relationship has been well-established in the context of traditional face-to-face teams, prior research has largely overlooked the context of global virtual teams (GVTs). As the COVID-19 pandemic has given virtual teams a further boost and increased their relevance, it is unclear whether findings based on traditional teams are generalizable to GVTs. Our multilevel analysis, based on a sample of 2,756 participants working in 689 teams, examines the relationship between satisfaction and both individual and team performance in GVTs. Our results show that increased individual satisfaction with the team's effort and performance is negatively associated with individual performance in GVTs. In contrast, average satisfaction within the team leads to higher team and individual performance. The results show that satisfaction positively mediates the effects of team motivation and technical expertise, and negatively mediates the effect of conflict and individual and team performance. Our study contributes to the “Holy Grail”-literature by extending the satisfaction–performance relationship to the contemporary setting of GVTs and enriches the current literature by examining the mechanisms contributing to high individual performance in GVTs.

1. Introduction

Global virtual teams (GVTs), regardless of their size and purpose, have become a preferred form of collaboration for successful organizations in today's global economy (Neeley, 2015). According to a recent study, collaboration in GVTs grew from 64% in 2010 to 89% in 2018 (RW3 Culture Wizard, 2018). Thus, 89% of corporate employees are involved in at least one GVT. Owing to the COVID-19 pandemic, the importance of virtual teams has increased even further. As international travel came to a halt and organizations across sectors sent millions of employees to connect virtually from their home offices with their local and international colleagues (Clark, 2020), GVTs made it possible to maintain international business activities.

In addition to being a necessity in times of restricted travel and congregation in large numbers in workspaces, GVTs provided numerous advantages to organizations prior to the pandemic. These include the availability of the most skilled individuals regardless of geographic boundaries (Piccoli, Powell, & Ives, 2004), the possibility of a 24-hour workday, and the maximization of the quality of decisions (Martins,

Gilson, & Maynard, 2004), all without travel expenses (Geister, Konradt, & Hertel, 2006). Nevertheless, due to their specific nature, GVT members face additional challenges not seen in co-located teams (Davis & Bryant, 2003; Hoch & Kozlowski, 2014; Ortiz de Guinea, Webster, & Staples, 2012; Reinares-Lara, Martín-Santana, & Muela-Molina, 2016). One source of difficulty in GVTs lies in the spatial and temporal dispersion of team members. To ensure successful collaboration, GVTs must rely on technology rather than personal communication to pool their resources and coordinate their activities. Although previous research has examined some of the hurdles that virtual teams face, recent research reveals that despite technological improvements, the same challenges still exist in practice (RW3 Culture Wizard, 2018).

The increasing relevance of virtual teams has aroused interest in understanding their dynamics (Bell & Kozlowski, 2002; Ebrahim, Ahmed, & Taha, 2009; Martins et al., 2004). Virtual teams differ in several ways from traditional collocated work teams, mostly because of the distance between GVT members and their reliance on digital communication technology (Bell & Kozlowski, 2002). While virtual teams are defined as “distributed work teams whose members are

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<https://doi.org/10.1016/j.jbusres.2022.03.056>

Received 9 June 2021; Received in revised form 16 March 2022; Accepted 19 March 2022

Available online 2 April 2022

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geographically dispersed and coordinate their work predominantly with electronic information and communication technologies” (Hertel, Geister, and Konrad, 2005: 71), in GVTs, increased spatial and temporal distance, and the cultural component, come into play. As an extension of the concept of virtual teams, GVTs refer to “temporary, culturally diverse, geographically dispersed, and electronically communicating work group(s)” (Jarvenpaa & Leidner, 1999: 793).

Since the effective operation of GVTs is critical to organizational success and corporate effectiveness is directly tied to how well these teams collaborate and operate, team member satisfaction is crucial for performance outcomes. While performance is the most important variable in management research, satisfaction has been shown to be associated with performance. Thereby, satisfaction can appear both at the individual level, as the individual satisfaction with the team, as well as at the team level, as team satisfaction that reflects the team members’ attitudes toward their work unit and their willingness to continue working together over time (Hackman & Morris, 1978). Consequently, the more satisfied team members are, the more likely they are to show higher performance and team commitment (de la Torre-Ruiz, Ferrón-Vílchez, & Ortiz-de-Mandojana, 2014; Reinig, 2003).

The satisfaction–performance relationship is of great interest to both scholars and practitioners and has thus been well-established in the literature in the context of traditional teams. Landy (1989) described the relationship as the “Holy Grail” of organizational behavior, reflecting the importance of the linkage. But the relationship has not been examined in the context of GVTs. As satisfied employees (happy employees) perform better, making sure that the employees working in GVTs are satisfied becomes a crucial task for company management. While satisfaction cannot be commanded or trained, it is important to understand which team processes and team member characteristics are associated with satisfaction (or dissatisfaction).

Hence, the goal of this study is to expand the focus from merely retesting whether satisfaction and performance are positively associated to finding out which factors predict satisfaction in GVTs. Given the importance of GVTs for corporate effectiveness, especially in the case of possible future pandemics, organizations cannot rely on studies on traditional teams, assuming that the results can be applied to the context of GVTs as well. In order to understand how to tackle the challenges arising with GVTs, the examination of factors influencing the performance of GVTs has become ever more important. Moreover, when it comes to teams, performance is a multi-level construct: individual and team performance are distinct dimensions of performance in teams. Likewise, satisfaction at the individual level and at the team level are two distinct phenomena. Thus, it is possible that a particular team member is satisfied with the team while the rest of the team is not. Would that team member’s individual performance be higher despite the team’s average satisfaction level being low? Without understanding these nuances, managers and team members are not able to intervene to improve individual performance, and ultimately, team performance.

The present study is set off to provide a big-picture view of this crucial phenomenon. Based on the social exchange theory, the study is, to the best of our knowledge, the first to examine the antecedents of satisfaction and their effects on performance in the context of GVTs. To ensure the generalizability of our results, we utilize an international GVT dataset with participants from over 80 countries. As suggested by Chen, Kirkman, Kanfer, Allen, and Rosen (2007), we conduct our analysis in several steps. First, we examine the relationship between a team member’s satisfaction with their GVT and their individual performance, as well as the relationship between the overall team satisfaction and the GVT’s performance. We then extend the analysis, using a multilevel lens, and examine whether team satisfaction influences individual performance in GVTs.

This study contributes to existing research in several ways. First, we refined the examination of the effects of satisfaction on performance in GVTs. Particularly useful in this context is our differentiation of individual and team performance, which has not been directly addressed by

prior research. Second, in addition to testing the direct effects, the study also explored the role and mechanisms by which satisfaction affects performance in more depth. Particular attention was paid to satisfaction’s mediating role in the relationships between technical expertise, motivation, conflict, and communication, as well as individual and team performance in GVTs. There is a sizable body of research on the satisfaction–performance link (for an overview, see Judge et al., 2001), and many studies have examined the antecedents of satisfaction in virtual or multicultural teams (e.g., Earley, 2002; Javanpaa & Leidner, 1999; Kayworth & Leidner, 2000). Our study extends this literature by combining these two streams of literature and testing the relationship in the GVT context. We discuss the implications of our results for research and practice.

2. Theoretical background

According to Russell (1930), the pursuit of well-being is one of the most persistent topics of widespread interest. It stems from social psychology research on attitudes and is based on the common assumption that attitudes result in behavioral implications (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975). Following this logic, attitudes toward the job are related to behaviors on the job, the most central of which is job performance.

Viswesvaran and Ones (2017) suggest that job performance comprises all the measurable actions, behaviors, and outcomes that employees engage in, contributing to organizational goals. Hence, an organization’s performance depends on individual performance (Shin & Konrad, 2017), which in turn is influenced by employees’ feelings toward their job. Accordingly, workplaces are more productive, and outcomes are more efficient when people are happy with their work. The “a happy worker is a productive worker” is the leitmotif of this literature (Saari & Judge, 2004). This implies that performance and efficiency are higher in organizations where employees have higher job satisfaction (Van der Zee, 2009).

The link between job satisfaction and performance is one of the most venerable research traditions in organizational psychology and is described as the “Holy Grail” of industrial psychology and organizational behavior (Landy, 1989). Originally, the Holy Grail was the cup used by Christ at the Last Supper, in which St Joseph of Arimathea received Christ’s blood. As such, it is a metaphor for anything that is eagerly sought after, a type of recipe for success in a particular setting. The assumption that satisfaction aids performance goes back to the Hawthorne studies in the 1930s (Roethlisberger & Dickson, 1939), which demonstrated that social factors affect performance (Judge et al., 2001). Thereupon, the human relations movement stimulated interest in that link, until Brayfield and Crockett (1955) concluded their review of the job satisfaction–job performance relationship with a negation, suggesting that the relationship does not hold. However, several other important reviews have followed (Herzberg, Mausner, Peterson, & Capwell, 1957; Locke, 1970; Vroom, 1964). These studies examined the nature of the satisfaction–performance relationship more closely, paying attention to factors that might moderate or mediate the relationship. More recently, Judge et al. (2001) described several ways in which satisfaction could interact with performance, from unidirectionally and reciprocally related to spuriously correlated. However, there are many inconsistencies in the results of testing these models and a lack of consensus regarding their validity. Considering the estimated satisfaction–performance correlation, Judge et al. (2001) suggest that it seems premature to dismiss this relationship.

The satisfaction–performance relationship can be grounded on and explained with the social exchange theory, which is a conceptual paradigm for understanding workplace behavior (Cropanzano & Mitchell, 2005). Job satisfaction is defined as a person’s “positive emotional state resulting from the appraisal of [her/his] job or job experiences” (Locke, 1976: 1300). Hence, job satisfaction can be considered an essential facet of effectiveness (Cohen & Bailey, 1997; Kozlowski & Ilgen, 2006),

resulting from successful social exchange relationships. According to the social exchange theory, social exchange is a series of repetitive interactions that create obligations between two parties, where one party's actions provide rewards and incentives for the actions of another party (Blau, 1964; Emerson, 1976). In other words, employees who enjoy the goodwill and care of an organization are — as a result of that social exchange — committed to returning the favor with behaviors that benefit the company (Blau, 1964) and ultimately lead to higher performance. Other examples of social exchange results are communication, motivation, or conflict. While effective, frequent communication and motivation lead to job satisfaction (Galeger & Kraut, 1994; Wolf, 1970), conflict within the team can lead to dissatisfaction and ineffective teamwork (McGrath, 1991). Hence, job satisfaction is a pleasurable, positive state resulting from an employee's job experience, and thus a predictor of organizational performance (Yang & Kassekert, 2010).

2.1. Satisfaction and performance in GVTs

Several studies have shown that individual and team satisfaction are directly related. Increases in individual job satisfaction directly correspond to increases in overall team satisfaction (Barrick, Mount & Li, 2013; Robert, 2013). Thus, overall team satisfaction, which reflects the team members' attitudes toward their work unit and their willingness to continue working together over time (Hackman & Morris, 1978), is directly related to the satisfaction of its members (Robert & You, 2018). Team members who are satisfied with their team tend to be more committed to the team's goals (Judge et al., 2001). Therefore, they are more motivated to contribute to the team's success (Geister et al., 2006) and ultimately increase team performance. Owing to this relationship and the broad concept of job satisfaction, satisfaction with the team is a natural part of job satisfaction.

The positive linkage between satisfaction and performance — both at the individual and team levels — can also be transferred to a virtual team setting. Even if the team members' spatial and temporal dispersion and reliance on digital communication technology may challenge effective collaboration, these factors do not prevent the social exchange from taking place or contradict the findings that attitudes toward the job are related to behaviors on the job. Prior research has shown that more commitment and motivation derived from satisfaction lead to better performance, and thus satisfaction ultimately improves performance in GVTs (Hertel et al., 2005).

2.2. Antecedents of satisfaction in GVTs

Earlier studies have examined the factors that influence satisfaction in multicultural teams, as well as in virtual teams. Nevertheless, very few, if any, have examined the case of GVTs in connection with both satisfaction and performance, in a single study.

Our systematic literature review revealed that nine factors affect satisfaction in multicultural and/or virtual teams (a detailed literature review is available from the authors). Some of these are similar to those affecting satisfaction in traditional teams (De Dreu & Weingart, 2003; Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015), while others are specific to multicultural or virtual teams due to particular challenges of each type of team. Our literature research identified factors contributing to satisfaction such as leadership, trust, communication, conflict, cultural intelligence, motivation, technical expertise, task, and shared purpose/goal. Some of these antecedents are individual-level factors, such as the cultural intelligence of the team member in question or the trust an individual has toward the other team members. Others are at the team level, such as the communication within the team, the technical expertise of the team, the team's motivation to complete the project, the existence of a team leader, or the number of conflicts the team experiences. Fig. 1 presents the conceptual model of the multilevel antecedents of satisfaction in GVTs. We refrained from examining the effects of the task and shared purpose/goal, given the specific characteristics of our study sample, in which all individuals are working toward the same goal and are performing the same task. In addition, our model treats leadership as a control variable, given that it is a binary variable of having a leader or not having a leader in a team. In the following, we discuss the individual-level factors influencing each team member's satisfaction in a GVT separately.

2.3. Individual-Level factors

2.3.1. Cultural intelligence

The significance of cultural intelligence for traditional teamwork settings (Earley, 2002) demonstrates that cultural differences affect the attitudes of team members, which in turn affect team dynamics and performance (Hofstede, 1984, 1991; So, West, & Dawson, 2011; Szymanski, Fitzsimmons, & Danis, 2019). Cultural differences are common in international projects and play a critical role in GVTs (Maznevski & Chudoba, 2000). While cultural diversity has been shown to aid

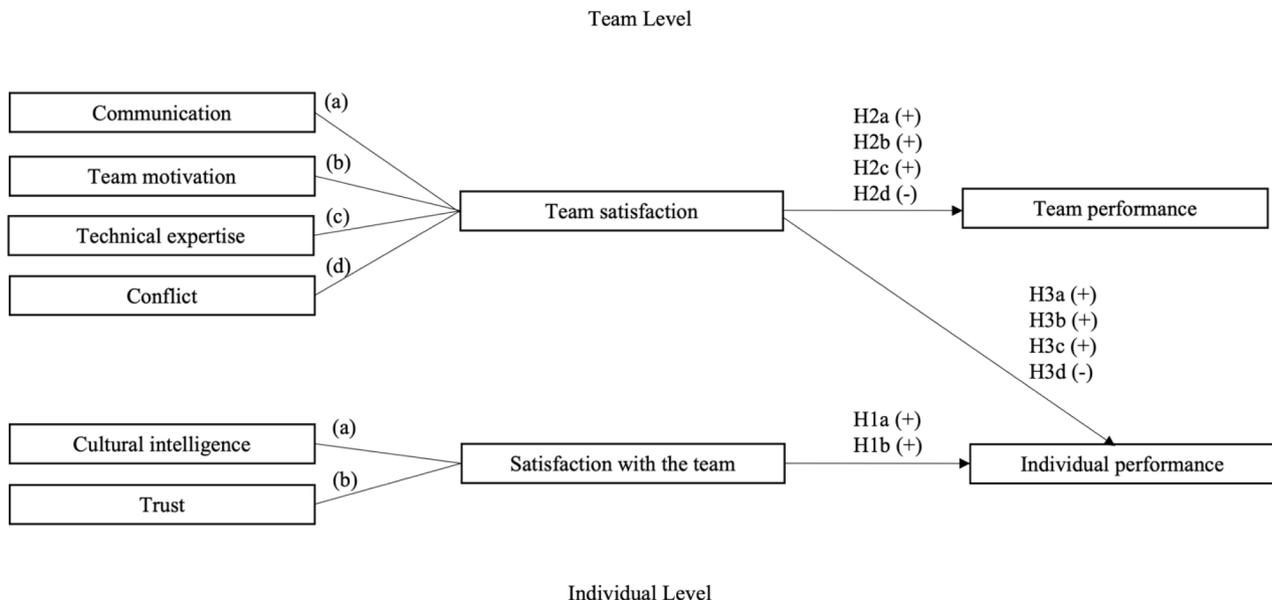


Fig. 1. Conceptual Model.

innovation, creativity, and problem-solving, it can also hinder social integration among team members (Stahl, Maznevski, Voigt, & Jonsen, 2010; Taras et al., 2019). In contrast, cultural differences can also impede collaboration (Johansson, Ditttrich, & Juustila, 1999; Kayworth & Leidner, 2000; Maznevski & Chudoba, 2000) and create obstacles to effective communication (Kayworth & Leidner, 2000; Van Ryssen & Godar, 2000). However, these adverse effects may be mitigated by understanding and accepting the differences (Robey, Khoo, & Powers, 2000). In other words, with behaviors and attitudes characterizing cultural intelligence, which refers to “a person’s capability to adapt effectively to new cultural contexts” (Earley & Ang, 2003: 59), the challenges and problems resulting from cultural differences can be overcome and solved. The relevance of cultural intelligence for traditional teamwork settings (Earley, 2002) has provoked further studies, resulting in the finding that cultural intelligence of virtual team members affects team interactions (Collins, Choua, Warner, & Rowley, 2017) and is, thus, an important antecedent of satisfaction in GVTs.

2.3.2. Trust

Besides cultural intelligence, trust is another crucial factor that contributes to the success of GVT-based projects (Javanpaa & Leidner, 1999; Kasper-Fuehrer & Ashkanasy, 2001; Sarker Lau & Sahay, 2001). As trust lowers transaction costs (Watson-Manheim & Belanger, 2002), team members, who do not trust each other, are more likely to double-check each other’s work to ensure the output, which increases the time and resources required to complete a project. Furthermore, trust reduces psychological distance (Snow, Snell, & Davison, 1996). Accordingly, research has shown that it is challenging to examine trustworthiness among team members without ever meeting in person (McDonough, Kahn, & Barczak, 2001). As the duration of organizational projects is relatively short, trust must be developed quickly (Jarvenpaa & Leidner, 1999). Trust enhances relationships within the team by fostering open information exchanges (Javanpaa, Knoll, & Leidner, 1998). Many virtual teams operate in knowledge-intensive settings (Kirkman & Mathieu, 2005), in which trust plays an important role in the exchange of information and ideas (Malhotra & Majchrzak, 2014). Consequently, trust can be seen as the glue holding virtual teams together. Team members with higher levels of trust in their teammates are expected to have higher satisfaction levels than those with low levels of trust (Piccoli et al., 2004).

Given the satisfaction–performance relationship discussed above and existing research on antecedents of satisfaction, we focus on the mediating role of satisfaction in the relationship between individual-level antecedents of satisfaction and individual performance in GVTs. Thus, we propose the following hypotheses:

Hypothesis 1: Satisfaction with the team mediates the positive relationship between a) cultural intelligence and b) trust and individual performance in GVTs.

2.4. Team-Level factors

Next, we discuss the team-level factors that influence satisfaction in GVTs. Research has explored the conditions that enable GVTs to perform at the highest efficiency levels, showing that flexibility and adaptability of its members and virtual configuration play a significant role (Gross, 2018). High-level performance in virtual teams requires two conditions: communication and coordination. Both have been linked to the subjective meaning of performance and effectiveness (Piccoli & Ives, 2000), which in turn are directly linked to satisfaction. As noted by Hulnick, “if technology is the foundation of the virtual business, communication is the cement” (2000: 33). We now discuss how satisfaction mediates the relationship between each of these factors and team performance.

2.4.1. Communication

Communication is at the core of GVT dynamics and has thus been the focus of a substantial body of research (Piccoli et al., 2004). Earlier studies have shown that effective communication is easier to achieve in traditional collocated teams than in virtual teams (Javanpaa et al., 1998; Javanpaa & Leidner, 1999). The latter faces greater obstacles for efficient information exchange, especially when the virtual team is global (McDonough et al., 2001). As the GVT members typically never meet face-to-face, the only mode of interaction and keeping members interconnected is via technology-enabled communication channels (Cordery & Soo, 2008). Time delays, differences in the interpretation of written texts, and missing nonverbal communication present considerable challenges to effective communication (Sproull & Kiesler, 1991). Consequently, teams that do not clearly communicate their goals may disagree on priorities and processes for accomplishing objectives (Yukl, 1994). To overcome these difficulties, successful virtual teams have been shown to communicate more frequently than traditional teams (Galeger & Kraut, 1994). However, as in any team, communication plays a central role, and thus, the frequency of communication among team members is an important predictor of team satisfaction in GVTs.

2.4.2. Motivation

According to Gilmeanu (2015), motivation is one of the most complex processes that build the base for almost all individual activities. It has direct implications for work performance and, thus, organizational success. Expressing the willingness of individuals to engage in their work and achieve professional goals (Gilmeanu, 2015), motivation leads to satisfaction with a positive job outcome and links the organization’s interest and the individual. Thus, the effects of motivation and satisfaction on individual performance can be positive or negative. The fact that motivation and satisfaction are closely related (Wolf, 1970) can also be observed in the context of virtual teams. Virtual collaboration leads to challenges in team members’ motivation (Geister et al., 2006). As the team members rarely or never meet personally, they face difficulties engaging in regular exchanges, possibly because they simply lack the motivation to do so. Team motivation is an important element in GVTs (Hertel, 2002). Given that earlier studies have shown that team success is not only measured by performance indicators but also by subjective well-being (Hackman & Oldham, 1974; McGrath, 1991), motivation is a crucial variable with a positive impact on team satisfaction.

2.4.3. Technical expertise

Regarding composition, earlier research recommends selecting team members who are qualified to do the work. Considering the high reliance on information and communication technology, one of these qualifications is technical expertise. Not surprisingly, studies have shown that virtual team members’ technical expertise matters both for performance and satisfaction (Piccoli et al., 2004). Accordingly, a lack of technical understanding, such as the inability to solve technical problems, influences the virtual team dynamics and, thus, negatively affects individual satisfaction and performance (Kayworth & Leidner, 2000; Van Ryssen & Godar, 2000). Technologically skilled team members, who can cope with technological uncertainty and technology-related challenges, develop higher levels of trust in each other than unskilled virtual team members (Jarvenpaa & Leidner, 1999). Technical expertise within a team is the foundation for positive virtual team outcomes since the entire operation cannot occur without proper technical skills. Therefore, one can conclude that technical expertise within a team positively influences team satisfaction.

2.4.4. Conflict

Conflict, which is the process resulting from the tension between team members because of real or perceived differences (De Dreu, Harinck, & Van Vianen, 1999), hinders teamwork both at the group level (De Dreu, 2008; Evan, 1965) and the interpersonal level (Vahtera, Buckley, & Aliyev, 2017). Although conflict can have constructive

effects on teams, such as creating creativity or supporting team development (Hofielen & Broome, 2000; Thomas, 1976), conflicts, if poorly managed, can lead to dissatisfaction and ineffective teamwork (McGrath, 1991). Studies have highlighted the importance of proactive conflict management in minimizing the adverse effects of conflict (Saunders, 2000).

Conflicts can be categorized into three main types: the relationship, process, and task conflict (De Dreu & Weingart, 2003; Jehn, 1997; Jehn & Mannix, 2001). A relationship conflict stems from personal issues such as dislike and personality clashes and affective components such as tension and friction among team members (Jehn & Mannix, 2001). In contrast, task conflict results from different opinions regarding task allocation and delegation. Process conflict is related to differences among team members in understanding how the team should proceed to accomplish the task (Jehn & Mannix, 2001). Regardless of the type, conflicts tend to diminish team satisfaction by decreasing goodwill and creating discomfort in teams (Ross, 1989), adversely affecting both satisfaction and performance (Stark & Bierly, 2009). Other studies indicate that in some cases, different types of conflict can lead to contrary results. While process conflict has been consistently found to hinder team performance (Jehn, 1995; Shah & Jehn, 1993), moderate levels of task conflict can be beneficial for high team performance (Jehn, 1995; Jehn & Shah, 1997; Shah & Jehn, 1993), as complex tasks can cause different opinions, which in turn could improve decision quality (Mason & Mitroff, 1981; Schweiger & Sandberg, 1989).

Given our previous discussion on the satisfaction–performance relationship, we examine whether team-level satisfaction mediates the positive relationship between the antecedents of team-level satisfaction and team performance, as presented in Hypothesis 2.

Hypothesis 2: Team satisfaction mediates the positive relationship between a) communication, b) motivation, c) technical expertise, and team performance in GVTs, as well as the negative relationship between d) conflict and team performance.

2.5. Multilevel factors

As mentioned before, earlier studies have demonstrated the relationship between individual and team-level satisfaction (Barrick et al., 2013; Robert, 2013). More satisfied team members are more committed to the goals of the team (Judge et al., 2001) and are thereby more motivated to contribute to the team's success (Geister et al., 2006) and ultimately increase team performance. That is, their individual performance is higher.

As satisfaction can appear at both the individual and team levels, the factors leading to satisfaction are at both levels. Ultimately, what is important to a team is that each team member contributes to the team project with their individual performance. If all individuals perform at high levels, the outcome will be at a high level. Hence, not only does individual satisfaction influence the performance as discussed with respect to Hypotheses 1 and 1b, the team-level satisfaction may also influence the performance of individuals. If the satisfaction within a team is high, according to the satisfaction–performance linkage as well as the arguments of the social exchange theory, team members would be more committed to the team, and thus, exert higher levels of individual effort. Thus, a multilevel relationship between individual satisfaction with the team and satisfaction within the team influences team members' performance. Therefore, we propose the following hypothesis:

Hypothesis 3: Team satisfaction mediates the positive effect of a) communication, b) team motivation, c) technical expertise of team members, and d) the negative effect of conflict on individual performance.

3. Method

3.1. Sample and data collection

To test our hypotheses, we utilized multi-source data collected at various time points over a period of approximately nine weeks in connection with an international virtual collaboration project conducted at over 140 universities worldwide. The project was conducted in the fall of 2018. The data were obtained from multiple sources (including different evaluators for the product of the project), including online surveys in the English language, peer evaluations of the team members, and expert evaluations of the final project outcome. The project participants worked in multicultural teams of four to seven members to solve real-life business challenges for organizations in various locations worldwide. Although the project was a student project, it should be noted that the participants, both undergraduate and graduate, possessed a considerable amount of work experience and worked on a real-life consulting project under conditions similar to a work-life project. The project allowed the possibility of examining the unique situation of having participants from 82¹ different countries.

Even though student samples have been criticized in the literature (Bello, Leung, Radebaugh, Tung, & Van Witteloostuijn, 2009), the threats to validity of findings obtained based on student samples do not necessarily apply here. Unlike in previous studies on teams that used student samples and relied on simulations, the teams in the present study were truly international and virtual. The team members were dispersed across countries and relied exclusively on online communication. The project involved real clients with real-life business challenges. The project was not a quick in-class activity but lasted over two months. The project accounted for a substantial portion of the course grade, and failing the project meant failing the course. The variables we examined were not related to the individuals' work experience, but rather to the individuals' or the team's characteristics, and they were not related to work-life positions. The team members worked with each other in a virtual context, solving a real-life business challenge without seeing each other or being physically present. Their individual performance was evaluated by their peers within the team, while external experts assessed the team performance. To reduce possible culture bias in the ratings, both in peer evaluations as well as the expert ratings, both the team members and the raters were selected randomly; however, ensuring that each team member and each rater originated from a different country. While the generalizability of the findings should still be interpreted with caution, the project's design and duration were quite closely reminiscent of the design and duration of projects in the corporate world.

The sample utilized for our analysis consisted of 2,756 undergraduate and graduate students grouped into teams of four (larger teams were omitted from the analysis, as in those cases, not all team members had completed all surveys). The sample consisted of 689 teams. Over

¹ The variable was determined by the home country of the participants. The home countries were: Algeria, Argentina, Armenia, Australia, Austria, Bahamas, Bahrain, Belarus, Belgium, Bolivia, Botswana, Brazil, Canada, China, Colombia, Congo, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Germany, Ghana, Greece, Grenada, Guatemala, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Italy, Jamaica, Japan, Kenya, Latvia, Lebanon, Lesotho, Lithuania, Macau, Madagascar, Malaysia, Martinique (French), Mexico, Moldova, Mongolia, Montenegro, Myanmar, Netherlands, Nigeria, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Puerto Rico, Russia, Saudi Arabia, Singapore, Somalia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Trinidad and Tobago, Turkey, Uganda, UK, Ukraine, United Kingdom, United States, USA, Uzbekistan, Vietnam, and Zambia. However, the individuals were born in 121 different countries. We considered the country, which they consider to be their home country, the most accurate variable as some participants grew up in multiple countries and had multiple nationalities and multiple cultural identities.

half (56%) of the participants were between 20 and 23 years old, 33% were older than 23 years, and 12% were younger than 20 years. About half (51%) of the sample was female, 23% were MBA students, and 70% were undergraduate students (the remaining participants did not provide the information). The final sample included participants from 80 nationalities.

3.2. Measures

The following variables — many of which were based on the adaptation of existing measures from the literature — were built to test the research hypotheses. New scales were developed in the absence of existing measures (Dasi, Pedersen, Gooderham, Elter, & Hildrum, 2017). Cronbach's alpha coefficients were estimated for each variable based on a multi-item construct, reflecting a high internal consistency ($\alpha > 0.80$). We checked for the Cronbach's alpha test for cultural intelligence ($\alpha = 0.908$) and trust ($\alpha = 0.898$). In addition, when the number of constructs is more than three, exploratory factor analysis needs to be performed to ensure over-identification of the construct (Hair et al., 2010).

Our first dependent variable refers to the *individual performance* of each team member. The team members evaluated each other's performance nine times along six performance categories (including communication, effort, intellectual contribution, and collegiality.) during the entire project on a 5-point scale that ranged from "poor" to "excellent." Individual performance was calculated as an average across all dimensions and all evaluations received during the entire project.

The second dependent variable was *team performance*. The quality of the team reports that detailed the team proposed solutions to the business challenges was used as a proxy for team performance. Each report was independently evaluated by four to seven experts, typically business professors and client company representatives. The evaluations were conducted in nine dimensions, including the feasibility and creativity of the proposed solution, quality of the supporting arguments, and quality of presentation. The final score was the average rating across all evaluation dimensions, and experts evaluated the report.

The independent variables can be grouped into two macro-categories at both the individual and team levels. The first group of variables was grand mean-centered, while the second group was mean-centered (Zhang, Zyphur, & Preacher, 2009). We will discuss the individual and team-level independent variables.

3.2.1. Cultural intelligence

Cultural intelligence was measured using a 20-item measure proposed by Ang, Van Dyne, & Koh (2006) on a scale from 1 (strongly disagree) to 7 (strongly agree). Sample items are: "I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds" and "I know the rules for expressing nonverbal behaviors in other cultures." Similar to numerous previous studies (Chen & Lin, 2011; Rockstuhl et al., 2011), we measured confidence interval (CI) as a single variable. Given the 20-item measure, we ran an exploratory factorial analysis (EFA) to minimize the risk of biased estimations (KMO and Bartlett's test: 0.924 – Sig. 0.000). The factors were extracted based on the principal component method using Varimax rotation. The EFA identified four factors that explained 63.483% of the total variance. The cultural intelligence of each team member was calculated as the average of the four factors identified by the EFA.

3.2.2. Trust

Four items adapted from Jarvenpaa and Leidner (1999) were used to measure the level of trust within the team. Based on a 5-point scale ranging from "strongly disagree" to "strongly agree," respondents indicated their agreement of the following statements: "I trust my team members," "I believe that my team members will follow through on their commitment," "My team members always do what they say they will do," and "I trust my team members to contribute worthwhile ideas." Each team member's level of trust was calculated as the average of the four

previously cited items.

3.2.3. Communication

Communication was measured as the total time the team spent communicating live via text alone (e.g., WhatsApp, chat function in Slack), or via audio and/or video communication tools (e.g., Zoom, Skype, phone) during the entire project period, measured in minutes. In this way, the variable represents the total time spent communicating live via text, audio, and video.

3.2.4. Conflict

The level of conflict within the teams was assessed weekly. The measure was a direct count of instances when team members experienced "conflict, misunderstanding, or tension when interacting with their team members." Since this is not an attitude scale, but rather a counting scale, the respondents were asked to provide a direct count, not an opinion, on a Likert-type scale. Likert-type scales with answer options such as from "strongly agree" to "strongly disagree," or from "never" to "sometimes" to "always" are open to the subjective interpretation of scale anchors (e.g., different people may differently interpret "sometimes" vs. "often") so a direct count (i.e., in our case 0 conflicts, 1, 2, 3, 4, 5, 6 or more) is a more direct and valid measure of conflict frequency. Furthermore, the question asked to provide a count of interpersonal, task-related, and process-related conflicts and misunderstandings, and the total conflict was measured as the sum of the three counts².

3.2.5. Motivation

Motivation refers to the level of motivation of each team member to work on the project. Each participant was asked to rate their motivation level to work on the project on a scale from 0 to 100 weekly (seven times during the project). The team motivation level was calculated as the average of all seven motivation levels for all team members.

3.2.6. Technical expertise

Technical expertise indicated the ability of each team to use various communication and information-processing tools. The respondents evaluated each other's technical expertise on a scale ranging from "poor" to "excellent." The pool of technical expertise within a team was calculated as the average of all evaluations of all members within a team (Taras et al., 2019).

3.2.7. Satisfaction with the team

Individual satisfaction was measured with two items: a participant's satisfaction with team performance and satisfaction with the team effort during the entire project. The average of the two items was then calculated.

3.2.8. Team satisfaction

This variable was measured as the aggregate of the individual satisfaction scores at the team level. Each team member's satisfaction with the team (the average across the two variables and weekly measured) was averaged for each team.

3.2.9. Control variables

Finally, we added several control variables to test for confounding explanations for the variations in an individual's performance in GVTs. We controlled for the type of leadership structure in the team, gender, number of nationalities, and the team member's English proficiency.

² Even though literature suggests that different types of conflict can lead to contrary results (e.g., Jehn, 1995; Shah & Jehn, 1993), our final model includes an aggregated conflict variable given the high correlation between the three conflict variables. The analysis was also conducted using the individual conflict variables – task, process, and interpersonal conflict. The results can be made available upon request.

Leadership was measured as a dichotomous measure assuming a value of 1 when the team has a team leader; if otherwise, it was 0. The participants were asked to report whether their team held a formal leader election or if an informal team leader emerged naturally. If so, the value 1 was assigned to the team in cases where the team members reported that their team did not have a leader, and if otherwise, 0 was assigned. Gender was a dichotomous measure that assumed a value of 1 when the team member was male and 2 when the team member was female. The number of nationalities indicates the number of different nationalities within a team, as per the self-reported place of birth of the team members. English proficiency refers to the level of knowledge of English in terms of listening, reading, speaking, and writing of each team member. It was measured as an average of the self-assessment of each dimension on a scale ranging from “very poor” to “excellent.”.

3.3. Method

Owing to the nature and structure of the data, a hierarchical linear model (HLM) was used to test our multilevel mediation. Mplus (Version 8) was used to conduct the analyses. This research approach is recommended for the analyses of nested data (Klein & Kozlowski, 2000; MacKinnon, 2008; Mathieu, DeShon, & Bergh, 2008; Mathieu & Taylor, 2007), such as when individuals are nested within teams, as is the case in our database. In addition, the intraclass correlation (ICC) value (25,7%) confirmed the appropriateness of the multilevel approach for data analysis (Sommet & Morselli, 2017). We have developed a 2–2–1 hierarchical regression mediation model, which means that the independent variables and the mediator are at the team level, while the dependent variable is at the individual level (Zhang et al., 2009).

Though common method bias could present a threat to the validity of the findings of studies that relied on survey-based measures (Chidlow, Plakoyiannaki & Welch, 2014; Podsakoff, MacKenzie, Podsakoff, 2012), it is highly unlikely that the results of our models are subject to this threat. First, our data came from different sources: some via self-report surveys, others via expert evaluations, and others via peer evaluations. Second, for variables measured via self-report surveys, the measures were typically taken at different times (Siemsen, Roth, & Oliveira, 2010). Third, the hypotheses were formulated with a focus on comparing the perceptual values of the same individuals. However, to address this issue further, the following actions were taken: First, we guaranteed the anonymity of the respondents (Podsakoff et al., 2012). Second, we separated the independent and dependent variables into different sections of the surveys and included measures at different time points in our models (Dasí et al., 2017). Fourth, Harman’s one-factor test indicated that common method bias was not a major issue because multiple factors were identified, and the variance did not merely stem from the first factors (Podsakoff et al., 2012). In fact, the test identified 24 factors, and the first explained 29.141% of the total variance. Finally,

the results are based on comparative values and complex estimations that involve multiple independent variables (Siemens et al., 2010).

4. Results

Tables 1–3 present the individual level, team level, and multilevel correlations and standard deviations. Table 1 shows correlations at the individual level. Individual performance is positively correlated with gender and English proficiency ($p < 0.001$) and with trust and leadership ($p < 0.05$), while it is negatively correlated with satisfaction with the team and number of nationalities ($p < 0.001$) but not with cultural intelligence.

Table 2 highlights the correlations at the team level. Team performance is positively correlated with technical expertise, motivation, communication, team satisfaction, English proficiency, leadership, gender, and the number of nationalities ($p < 0.001$), but not correlated with conflict.

Table 3 provides the correlations at both the individual and team levels. Individual performance is positively correlated with communication, gender, English proficiency, technical expertise, motivation, and team satisfaction ($p < 0.001$) and leadership ($p < 0.05$). Instead, the correlation between individual performance conflict and the number of nationalities is negative ($p < 0.01$).

Table 4 presents the results of hierarchical linear modeling. Three multivariate regression models were developed to test the hypotheses.

Model 1 shows the effects of both control and individual-level factors, highlighting that satisfaction mediates the relationship between cultural intelligence, trust, and individual performance in GVTs. Hypotheses 1a and 1b are not supported, showing that the relationship between cultural intelligence and individual performance in GVTs is not mediated by satisfaction with the team. In addition, satisfaction with the team negatively mediated the relationship between trust and individual performance. Model 2 examines both control and team-level factors, showing the mediation effect of team satisfaction on the effects of technical expertise, motivation, conflict, and communication on team performance. Specifically, satisfaction within a team positively mediates the relationship between technical expertise, motivation, communication, and team performance in GVTs, while the relationship with conflict is negative. Hypotheses 2a, 2b, 2c, and 2d are supported.

Table 5 presents the results of the multilevel hierarchical linear models. Two multivariate regression models were developed to test the hypotheses.

Model 1 includes both independent and control variables. The results underline a positive relationship between technical expertise, motivation, team satisfaction, and individual performance in GVTs, while the relationship between trust and individual performance is statistically significant with a negative coefficient. In contrast, the negative relationship between cultural intelligence and individual performance, as

Table 1
Individual-Level: Means, Standard Deviations, and Pearson’s Correlations.

	Mean	SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Individual Performance	3.877	0.775	1							
(2) Cultural Intelligence	3.934	0.554	0.032	1						
(3) Trust	4.087	0.636	0.038*	0.207**	1					
(4) Satisfaction with the Team	3.887	1.071	−0.067**	0.123**	0.284**	1				
(5) Leadership*	0.279	0.449	0.040*	0.050**	0.029	0.046*	1			
(6) Gender*	1.515	0.500	0.134**	0.043*	−0.011	−0.052**	0.017	1		
(7) Number of Nationalities	3.290	0.568	−0.066**	0.049*	−0.026	−0.011	0.048*	0.019	1	
(8) English Proficiency	4.555	0.637	0.120**	0.128**	−0.018	−0.052**	0.030	0.013	−0.027	1

* SD = standard deviation.

* Leadership is a binary variable; thus, Spearman’s rho coefficient has been calculated.

* Gender is a binary variable; thus, Spearman’s rho coefficient has been calculated.

* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (two-tailed test).

N = 2,756.

Table 2
Team-Level: Means, Standard Deviations, and Pearson's Correlations.

Mean	SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(1) Team Performance	5.153	0.924	1									
(2) Technical Expertise	4.006	0.411	0.127**	1								
(3) Motivation	76.568	14.324	0.291**	0.313**	1							
(4) Conflict	1.333	0.337	0.009	-0.132**	-0.103**	1						
(5) Communication	137.625	45.132	0.170**	0.151**	0.237**	0.051**	1					
(6) Team Satisfaction	3.887	0.617	0.226**	0.462**	0.443**	-0.212**	0.206**	1				
(7) English Proficiency	4.556	0.637	0.067**	0.024	0.061**	-0.017	0.029	0.010	1			
(8) Leadership*	0.279	0.449	0.093**	-0.040*	0.047*	-0.013	0.054**	0.043**	0.023	1		
(9) Gender*	1.515	0.500	0.057**	0.017	0.081**	0.054*	0.033	0.066**	0.018	0.017	1	
(10) Number of Nationalities	3.290	0.568	0.056**	-0.127**	0.080**	-0.024	0.099**	-0.020	-0.027	0.048*	0.019	1

* SD = standard deviation.
 * Leadership is a binary variable; thus, Spearman's rho coefficient has been calculated.
 * Gender is a binary variable; thus, Spearman's rho coefficient has been calculated.
 * Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (two-tailed test).
 N = 2,756.

Table 3
Multilevel: Means, Standard Deviations, and Pearson's Correlations.

Mean	SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(1) Individual Performance	3.877	0.775	1									
(2) Leadership*	0.279	0.449	0.040*	1								
(3) Communication	137.623	45.132	0.116**	0.045*	1							
(4) Gender*	1.515	0.499	0.134**	0.017	0.033	1						
(5) Conflict	1.334	0.336	-0.107**	0.002	0.051**	0.044*	1					
(6) Number of Nationalities	3.290	0.568	-0.066**	0.048*	0.099**	0.019	-0.024	1				
(7) English Proficiency	4.556	0.637	0.120**	0.030	0.029	0.013	-0.017	-0.027	1			
(8) Technical Expertise	4.006	0.410	0.426**	-0.037	0.151**	0.015	-0.132**	-0.127**	0.024	1		
(9) Motivation	76.568	14.324	0.265**	0.044*	0.237**	0.092**	-0.103**	0.080**	0.061**	0.313**	1	
(10) Team Satisfaction	3.887	0.617	0.429**	0.046*	0.206**	0.069**	-0.212**	-0.020	0.010	0.462**	0.443**	1

* SD = standard deviation.
 * Leadership is a binary variable; thus, Spearman's rho coefficient has been calculated.
 * Gender is a binary variable; thus, Spearman's rho coefficient has been calculated.
 * Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (two-tailed test).
 N = 2,756.

well as the positive relationship with communication, is not significant; neither is the negative effect of conflict on individual performance in GVTs.

Model 2 shows that team satisfaction mediates the positive relationships between technical expertise, motivation, conflict, communication, and individual performance in GVTs. Hypotheses 3a, 3b, 3c, and 3d are supported. Team satisfaction positively mediates the relationship between motivation, technical expertise, communication, and individual performance in GVTs. However, the relationship between conflict and individual performance in GVTs is negatively mediated by team satisfaction. Conflict does not have a direct effect on individual performance in GVTs, even though the total indirect effect is negative and significant.

Table 6 summarizes the results of the indirect effects and presents the model's goodness of fit. The 99% CI confirms the negative effect of satisfaction with the team in the relationship between trust and individual performance, as well as the negative influence of team satisfaction in the relationship with conflict. In addition, it confirms the positive effect of team satisfaction on the relationship between motivation, technical expertise, and communication on individual and team performance.

The robustness check of the model was tested through several statistical analyses, such as the comparative fit index (CFI), the Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA). Statistical analyses confirmed an acceptable goodness of fit for the models. Both CFI and TLI are close to 1, and the RMSEA ranges from 0.032 to 0.037. In addition, the variance inflation factor (VIF) index confirms the absence of common method bias; in fact, all VIF values are less than the 2.5 threshold, refuting the concerns for

multicollinearity distorting the results (Allison, 1999).

5. Discussion

The objective of our analysis was to examine whether individual satisfaction and team satisfaction influence the performance of individual team members and the entire team. We extended our analysis to a multilevel model to investigate whether team satisfaction in a GVT influences individual performance. In the exploratory part of our study, we aimed to examine the antecedents of satisfaction based on a systematic literature review of factors influencing satisfaction in either multicultural or virtual teams. We found a positive relationship between satisfaction and both individual and team performance in GVTs. However, the effect of individual satisfaction with the team on individual performance was negative. That is, an individual who is satisfied with his/her team may perform at lower levels than an individual whose satisfaction with his/her team is lower. On the contrary, a higher team satisfaction is associated with higher team performance. Finally, a higher team satisfaction was found to be associated with higher individual performance of the team members.

Team satisfaction mediates the positive relationship between team motivation, technical expertise, communication, and individual performance in GVTs. The mediation effect of team satisfaction in the negative relationship between conflict and individual and team performance is no less important. Thus, if a team experiences conflicts, it will most likely reduce satisfaction within the team, reducing the performance of the team as a whole and everyone in the team. Contrary to the literature suggesting that conflict can have both negative (e.g., Jehn, 1995; Shah & Jehn, 1993) and positive effects (e.g., Hoflielen & Broome, 2000; Jehn,

Table 4
Hierarchical Regression Models.

	Model 1	Model 2
Intercept	4.954 (p = 0.000)	2.864 (p = 0.000)
Cultural Intelligence	0.010 (p = 0.604)	
Trust	0.058 (p = 0.003)	
Gender	0.277 (p = 0.000)	0.061 (p = 0.091)
Technical Expertise		0.005 (p = 0.810)
Motivation		0.211 (p = 0.000)
Conflict		0.053 (p = 0.004)
Communication		0.084 (p = 0.000)
English Proficiency	0.111 (p = 0.000)	0.049 (p = 0.006)
Leadership	0.081 (p = 0.051)	0.141 (p = 0.000)
Satisfaction	-0.074 (p = 0.000)	0.120 (p = 0.000)
Number of Nationalities	-0.067 (p = 0.000)	0.032 (p = 0.077)
Indirect effects		
Cultural Intelligence	-0.005 (p = 0.009)	
Trust	-0.020 (p = 0.000)	
Technical Expertise		0.040 (p = 0.000)
Motivation		0.036 (p = 0.000)
Conflict		-0.017 (p = 0.000)
Communication		0.011 (p = 0.000)
Model fit		
CFI	0.970	0.991
TLI	0.902	0.963
RMSEA	0.032	0.034

The dependent variable is Individual Performance within GVTs (Model 1).
The dependent variable is Team Performance (Model 2).
Standardized coefficient and p-values in parentheses.
p < 0.000.
(***); p < 0.01 (**); p <= 0.05 (*).
N = 2,756.

1995; Jehn & Shah, 1997; Thomas, 1976) on satisfaction and performance, our analysis showed that the three types of conflict (interpersonal, process, and task) are highly correlated. While conceptually these are different kinds of conflict, in our study, they represent the same underlying process, which is tension and misunderstanding among team members. Consequently, given our measure and the resulting high correlation between the three different types of conflict, we utilized an overall measure of conflict. Furthermore, we also found that the relationship between communication and both team and individual performance is not mediated by team satisfaction, as we expected.

To conclude, the results are in line with previous research on traditional teams (Judge et al., 2001; Van der Zee, 2009), providing new insights regarding the strategic role of team member satisfaction on the overall performance of GVTs. Next, we discuss the implications of our findings for both researchers and practitioners.

5.1. Implications for researchers

Our study contributes to the “Holy Grail” literature by extending the satisfaction–performance relationship to the contemporary setting of GVTs. However, we can only confirm the satisfaction–performance

Table 5
Multilevel Hierarchical Regression Models.

	Model 1	Model 2
Intercept	0.387 (p = 0.308)	0.387 (p = 0.308)
Within variables		
Cultural Intelligence	-0.001 (p = 0.976)	-0.001 (p = 0.976)
Trust	-0.080 (p = 0.000)	-0.080 (p = 0.000)
Gender	0.189 (p = 0.000)	0.189 (p = 0.000)
English Proficiency	0.119 (p = 0.000)	0.119 (p = 0.000)
Leadership	0.072 (p = 0.139)	0.072 (p = 0.139)
Between variables		
Technical Expertise	0.553 (p = 0.000)	0.553 (p = 0.000)
Motivation	0.114 (p = 0.001)	0.114 (p = 0.001)
Conflict	-0.032 (p = 0.212)	-0.032 (p = 0.212)
Communication	0.017 (p = 0.489)	0.017 (p = 0.488)
Satisfaction	0.531 (p = 0.000)	0.531 (p = 0.000)
Number of Nationalities	-0.063 (p = 0.029)	-0.063 (p = 0.029)
Indirect effects		
Motivation		0.161 (p = 0.000)
Technical Expertise		0.178 (p = 0.000)
Conflict		-0.075 (p = 0.000)
Communication		0.048 (p = 0.004)
Model fit		
ICC	0.257	0.257
CFI	0.996	0.997
TLI	1.000	0.954
RMSEA	0.000	0.037

The dependent variable is Individual Performance within GVTs.
Standardized coefficient and p-values in parentheses.
p < 0.000.
(***); p < 0.01 (**); p <= 0.05 (*).
Number of teams: 689.
N = 2,756.

relationship between team satisfaction and team performance, as well as in the multilevel context between team satisfaction and individual performance. We extend the analysis by Zeitun et al. (2013) and Robert and You (2018), who show that the relationship also exists in multicultural and virtual teams, respectively. Our findings partly support the results of Judge et al. (2001) and Van der Zee (2009), suggesting that the satisfaction–performance relation, which has been shown to exist for traditional teams, also applies to GVTs. Existing literature on traditional team research indicates that the relationship between satisfaction and performance can be positive, unidirectional, or reciprocally related. Some findings even state that there is no relationship between satisfaction and performance (for a detailed examination of the different relationships, see Judge et al., 2001). However, we show that this argument holds only for team-level satisfaction, as our study does not support the hypothesis that individual satisfaction with the team would lead to higher individual performance. This relation is negative in our study and may be explained by free-riding, which is commonly discussed in the teamwork literature (e.g., Furst, Reeves, Rosen, & Blackburn, 2004; Holmstrom, 1982; Olson, 1965). If one is very satisfied with the team’s effort and performance, one may decide to put less effort as one believes that others in the team are doing a good job. In previous literature, trust has been shown to have a positive influence on both team

Table 6
Summary of Indirect Effects and Model Fit.

	Indirect Effect*	95% CI
Individual-Level Factors		
Cultural Intelligence → Satisfaction with the Team → Individual Performance	–0.005	(–0.010;0.000)
Trust → Satisfaction with the Team → Individual Performance	–0.020	(–0.034;–0.006)
	0.036	
Team-Level Factors		
Motivation → Team Satisfaction → Team Performance	0.040	(0.018;0.054)
Technical Expertise → Team Satisfaction → Team Performance	–0.017	(0.020;0.060)
Conflict → Team Satisfaction → Team Performance	0.011	(–0.026;–0.008)
Communication → Team Satisfaction → Team Performance	0.161	(0.004;0.018)
		(0.093;0.288)
Multilevel Factors		
Motivation → Team Satisfaction → Individual Performance		
Technical Expertise → Team Satisfaction → Individual Performance	0.178	(0.107;0.249)
Conflict → Team Satisfaction → Individual Performance	–0.075	(–0.129;–0.020)
Communication → Team Satisfaction → Individual Performance	0.048	(0.005;0.092)

* Standardized coefficient of indirect effect.

N = 2,756.

satisfaction (McNall & Roch, 2009; Piccoli et al., 2004; Robert & You, 2018) and individual performance (Sarker, Ahuja, Sarker, & Kirkeby, 2011). Interestingly, our results show that although trust is positively related to individual performance, the indirect effect on performance moderated by satisfaction is negative. This finding highlights the significance of the free-riding problem in this context – though trust is positively correlated with satisfaction, the positive effect is overrun by free-riding. We also found direct effects of technological expertise, motivation, and communication on individual performance in GVTs. However, satisfaction within the team positively mediates the relationship between technological expertise and motivation and individual and team performance. This supports the findings of Geister et al., 2006 and Piccoli et al. (2004), showing that motivation and technical expertise influence team satisfaction. Accordingly, virtual teamwork leads to challenges regarding team members' motivation, as members rarely meet personally. Thus, it is difficult for them to engage in regular exchanges of feedback and information. Consequently, feedback could lead to positive effects on motivation, which in turn affects team satisfaction (Geister et al., 2006). Moreover, the technical expertise of team members influences team satisfaction, as highlighted by Piccoli et al. (2004). Consequently, the inability to cope with technical issues negatively affects team satisfaction.

As suggested in the literature, team conflict has a negative effect on satisfaction (Stark & Bierly, 2009), thus decreasing the outcomes of teams (De Dreu & Weingart, 2003). In line with this, our results show that satisfaction within the team negatively mediates the relationship between conflict and individual and team performance in GVTs. In doing so, conflict takes attention from the tasks and inhibits the ability of team members to process new information. As a result, goodwill decreases, and threats and uneasiness in a group will increase (Stark & Bierly, 2009), which will negatively affect team performance (De Dreu & Weingart, 2003).

5.2. Implications for managers

Our results will be of importance to the international human

resource management practice, as they enable human resource managers to select and train members of GVTs in a manner that may enhance their satisfaction in teams, leading to improved individual and team performance. We found that communication, technical expertise, conflict, and motivation of the team members are associated with team satisfaction, and the team members' CQ and trust are associated with individual performance. As these factors can be influenced by selection, training, and counseling, they are important aspects when selecting members for a GVT. HR managers may want to think about offering training on effective communication and seminars on team-building, which may increase the trust between the team members. Also, conflict management training may help to increase satisfaction within teams. Moreover, the management of organizations should pay attention to allowing sufficient time and possibilities for communicating among team members, as our results show that communication time has a positive impact on performance. Project timeframes that are too short may negatively influence performance. Naturally, members' motivation is essential for their performance. For this, the management has various possibilities ranging from team-building seminars to specific incentive systems rewarding teamwork. Nevertheless, most importantly, our results demonstrate that the team itself, resulting in its members' satisfaction, is a crucial factor in individual and team performance. Therefore, attention should be paid to team composition and the overall satisfaction of team members. Regular discussions with team members on their satisfaction are necessary; however, helping GVTs to establish norms and values for the team to support their well-being may also be necessary. As our results highlight the significance of free-riding in GVTs and its negative effects on individual performance, it is necessary to ensure that the incentives for the teams are set in a way that individual performance also matters (Holmstrom, 1982). A careful design of performance measures for GVTs is essential to avoid the free-riding problem, which is amplified in the virtual context (Furst et al., 2004). In summary, the present study not only reiterates that satisfaction is associated with performance but also provides a clear roadmap for what could be done to improve satisfaction, as well as provides a more nuanced, multi-level view on the mechanisms that link team member characteristics and team dynamics to satisfaction and to individual and team performance.

5.3. Limitations and implications for future research

Despite providing interesting results, our study is not free of limitations. First, as discussed in the Method section, we utilized a student sample. While we believe that the design of our study omits the common criticism of student samples (Bello et al., 2009), future studies should test our conceptual model in real-life organizations. Second, although we tried to randomly select the team members as well as the experts rating the teams and still make sure that team members, as well as the evaluators, come from different countries, the evaluations might still have a certain culture bias. We believe, however, that having a great mix of nationalities in the sample will reduce the effects of culture in the evaluations and thus, do not influence our results to a great degree. Third, even though we explored a very diverse sample of individuals from 80 countries, the specific combinations of nationalities in the four-person teams examined may have influenced the results. In addition, the teams worked on consulting projects related to the internationalization of organizations; however, the projects were different. Thus, the content-related differences between the teams may have influenced the work in teams, especially when it comes to conflict and motivation within the team or even satisfaction within the team. Therefore, future studies should examine different combinations of nationalities within teams to examine the possible influences of culture combinations. In addition, examining the influence of specific tasks, such as, the type and content of the consulting project, may be useful to examine the project's specific influence on the motivation, conflict, and satisfaction level of the teams. Fourth, given the exploratory nature of our study, we

collected the examined antecedents of team satisfaction from existing studies. Future studies may concentrate on proposing theoretical reasoning behind the antecedents of team satisfaction in GVTs. Fifth, the multilevel design of our study can also be considered a limitation. Although it allows us to examine both individual- and team-level variables in a single model, it also poses limitations to the study design. The level of the analysis can only change once within a model (Zhang, Zyphur, & Preacher, 2009), which limits the possibility of examining various combinations of variables at different levels of analysis. Sixth, in our analysis, we aggregated the three different types of conflict to a single variable due to their high correlation and assumed that they represent the same underlying process, which is tension and misunderstanding among the team members. Future research may use different measures of conflict, which may allow the separation of the different types of conflict.

Seventh, other relevant factors, such as team member role (e.g., member/leader), remuneration, and tenure, seem relevant in the context of our theoretical model. Unfortunately, the available data did not allow us to test these effects. We urge future researchers to further explore the effects of these relevant factors. Finally, as our results show, satisfaction and performance are multi-level constructs, we recommend future researchers to differentiate between the levels of analysis when examining teams. Regardless of the limitations, we believe that our study not only contributes to the current state of the literature on GVTs but also opens avenues for future research.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRedit authorship contribution statement

Katharina Gilli: Investigation, Writing – original draft, Writing – review & editing. **Valerio Veglio:** Writing – original draft, Methodology, Formal analysis. **Marjaana Gunkel:** Conceptualization, Writing – original draft, Writing – review & editing. **Vas Taras:** Writing – review & editing, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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