The roles of conflict management and psychological empowerment in virtual teams

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Abstract

Purpose – This paper aims to determine the impact of perceived virtuality on team dynamics and outcomes by adopting the Input-Mediators-Outcome (IMO) framework. Further, it also investigates the mediating role of team processes and emergent states.

Design/methodology/approach – The authors collected survey data from 315 individuals working in virtual teams (VTs) in the information technology sector in India using both offline and online questionnaires. They performed the analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM).

Findings – The authors investigated two sets of hypotheses – both direct and indirect (or mediation interactions). Results show that psychological empowerment and conflict management are significant in managing VTs. Also, perceived virtuality impacts team outcomes, i.e. perceived team performance, team satisfaction and subjective well-being.

Research limitations/implications – The interplay between the behavioural team process (conflict management) and the emergent state (psychological empowerment) was examined. The study also helps broaden our understanding of the various psychological variables associated with teamwork in the context of VTs.

Practical implications – Findings from this study will aid in assessing the consequences of virtual teamwork at both individual and organisational levels, such as guiding the design and sustainability of VT arrangements, achieving higher productivity in VTs, and designing effective and interactive solutions in the virtual space.

Social implications – The study examined the interplay between behavioural team processes (such as conflict management) and emergent states (such as psychological empowerment). The study also theorises and empirically tests the relationships between perceived virtuality and team outcomes (i.e. both affective and effectiveness). It may serve as a guide to understanding team dynamics in VTs better.

Originality/value – This exploratory study attempts to enhance the current understanding of the research and practice of VTs within a developing economy.

Keywords Virtual teams, Input-mediator-outcome (IMO) framework, Perceived virtuality,
Psychological empowerment, Conflict management, Subjective well-being, PLS-SEM

Paper type Research paper

The idea of commuting for hours to work 9–5 in a dreary office is fast becoming as about as relevant as a fax machine in the working day.

– Mark Dixon, IWG founder and CEO.

1. Introduction
In 2013, Richard Branson said, "one day, offices will be a thing of the past" [1]. Also, the COVID-19 pandemic has redefined the existing paradigm of organisational business processes. Consequently, many organisations now face work-related challenges (Chamakiotis *et al.*, 2021), such as difficulty in adopting hybrid work arrangements leading to less-connected employees who might be happy and less committed (Haas, 2022). To overcome these challenges, organisations are also shifting their existing work patterns. Some of them are embracing "remote work" policies to allow a minimal negative impact on the health of employees while also ensuring that they survive the pandemic shock (in press; Raghuram *et al.*, 2019). Therefore, virtual workplaces and VTs have emerged as key survival strategies among many organisations (Chamakiotis, 2020; Doyle and Conboy, 2020). Recently, the remote-work policies for 80% of organisations shifted to virtual and mixed modes of team collaboration during the early phase of the COVID-19 pandemic (Meluso *et al.*, 2020). This change is also a fitting response to the commentary by social scientists who envisaged a dramatic shift in doing business across organisations (LaFasto *et al.*, 2001).

However, remote working patterns and virtual teams are not entirely new. With the increase in the outsourcing of tasks, distribution of workload among offshore and onsite teams, and the emergence of computer-mediated communication (CMC) tools, workers have been collaborating electronically with co-workers or employees of other organisations. Often, these individuals have worked with multiple teams distributed over different geographical locations, major time zones, multiple business units, and even across diverse cultures and ethnicities. Therefore, it is evident that "conflicts" may arise within these virtual teams, and they need to be resolved amicably (Paul *et al.*, 2004a, b; Nesterkin *et al.*, 2016). Further, the employees working within virtual teams must be in an "empowered state" of mind to continue delivering their tasks and lead to outstanding team performance (Malik *et al.*, 2021).

Recently, the emergence of "virtual world" platforms such as Metaverse and AR/VR (Cheng *et al.*, 2022; Dwivedi *et al.*, 2022; Shiau and Huang, 2023) has also created a new dimension of virtual teamwork. Many organisations such as *Meta*, *Vastly* and *Party Space* have built 3-D video games, immersive interaction tools and simulations to enable team-building exercises across VT employees. HR managers and staff at several technology firms such as Google, Amazon, Facebook, Apple and Adobe use these simulation games to conduct team-building exercises to improve team performance outcomes among remotely working employees.

However, many challenges remain with the current design of virtual teams. First, many remote workers are challenged by burnout and remain disconnected from work (28% of employees) (GitLab, 2020). A survey conducted on the *State of Remote Work* reports that 20% of employees working in VTs find it difficult to collaborate with their colleagues [2]. Second, 12% of remote workers face distractions while working in their homes, while 10% struggle to collaborate with remote teams in different time zones. Therefore, across VTs, employees may suffer from a lack of empowerment due to incorrect task design, low job significance and the lack of importance of their roles during remote work. These challenges have made many employees feel *unempowered* at their VT workplaces, leading to lower performance outcomes. In this regard, *psychological empowerment* represents the perception of individuals concerning their capabilities, sovereignty within their work environments and the meaningfulness of their tasks. A few scholars have also suggested the mediating role of *psychological empowerment* between inputs and outcomes (Lee and Wei, 2011; Li *et al.*, 2017;

Malik *et al.*, 2021). Further, some scholars have also identified the role of *psychological empowerment* towards the final team outcomes (Lin *et al.*, 2017; Mills *et al.*, 2020; Seibert *et al.*, 2011), leading us to conclusively think of a new form of analysis of virtual teams using *psychological empowerment* as a mediator between virtuality and team outcomes, as well as examining its direct and indirect effects on those outcomes.

Second, a more recent study on the well-being of virtual employees found that more than 45% of remote employees say they have worked from their beds for 11 h per week [3]. The same study reports that 26% of remote workers feel socially isolated working in VTs. Hence, we note that VTs are not always successful, and many employees working in VTs remain dissatisfied and unhappy. Additionally, scholars have raised questions about employee well-being (Doyle and Conboy, 2020) and the satisfaction of team members within VTs [4]. Many VTs are also rife with distrust, interpersonal conflict, stress, high workload and lack of familiarity. Most of these challenges need to be addressed through adequate *conflict management* techniques within those virtual teams. According to scholars, *conflict* is an emergent state that enables better decision-making across teams through the promises of unconventional conclusions (Marks *et al.*, 2001).

Third, VTs typically have "remote" working structures and workers in VTs employ ICT tools to communicate among themselves and execute their tasks (Kankanhalli *et al.*, 2006; Paul *et al.*, 2004a, b). Therefore, VTs are more susceptible towards interpersonal conflicts, and herein lies the importance of *conflict management* within VTs (Kankanhalli *et al.*, 2006; Montoya-Weiss *et al.*, 2001; Van de Vliert and De Dreu, 1994). In this regard, only a few scholars have reported that *conflict management* mediates the antecedents and outcomes in a VT (Caputo *et al.*, 2023; Gilson *et al.*, 2015). Therefore, we were encouraged to examine the effects of *conflict management* as a mediator between *virtuality* and *team outcomes* in addition to studying its direct effect on those outcomes.

Fourth, in the context of those employees working within VTs, the effect of individual *team satisfaction* on the remaining team outcomes, i.e. *perceived team performance* and *subjective well-being,* needs re-examination. Employees' satisfaction while working within VTs may reflect upon the ensuing team performance, especially *affective outcomes* such as *team satisfaction* and *subjective well-being*. While *team satisfaction* remains an important metric for virtual teams (Gilson *et al.*, 2015; Handke *et al.*, 2021), it also requires to be measured by performance indicators (i.e. *team performance*) as well as by *subjective well-being* (Gilli *et al.*, 2022). We intend to examine these relationships in this study because, apart from a few scholars, past literature has not been vocal about these relationships (Cavazotte *et al.*, 2020; Jeanquart Miles and Mangold, 2002; Stark and Bierly, 2009).

Fifth, the traditional IPO model for team effectiveness examined the teamwork process as a "black box" (McGrath, 1964). Many research articles investigating virtual teams are typically based on the IPO framework (Dulebohn and Hoch, 2017; Shoaib *et al.*, 2022). Further, much extant research on VTs has focused solely on factors affecting VTs without drawing support from a robust theoretical framework. Also, contradictions have emerged regarding the theories and frameworks applicable to the study of VTs (Schiller and Mandviwalla, 2007). A review of recent research on virtual teams (Table 1 and Table 2) also reveals that few studies have addressed the abovementioned gaps using the IMO framework. Further, most studies have been satisfied with examining (team or individual) *performance* as the final outcome, while *team satisfaction* and *subjective well-being* are left unexplored. In this aspect, a holistic and theoretically-grounded framework is necessary to examine the different constructs of virtual teams, their mutual relationships, and finally, what drives their performance. Therefore, we present the following research questions through which we aim to address these gaps:

RQ1. What is the impact of *perceived virtuality* on the outcomes of a VT (i.e. *perceived team performance*, *team satisfaction* and *subjective well-being*)?

Study	Theory	Method/Sample	Input	Process/Emergent state (mediator)	Outcome			Findings
					Performance	Satisfaction	Well-being	
This study	*IMO*	*Survey of 315 IT professionals from India*	*Perceived virtuality*	*Conflict management and Psychological Empowerment*	✓	✓	✓	Perceived virtuality impacts team outcomes, i.e. perceived team performance, team satisfaction and subjective well-being. Perceived team satisfaction has a high positive impact on the other two team outcomes
Algesheimer *et al.* (2011)	IMO	606 professional online gaming teams	Team demography, past team performance	Shared decision to perform, shared goals to perform	✓	–	–	Team processes have a strong effect on both rational and emotional dimensions of strategic team consensus
Andressen *et al.* (2012)	IMO	681 employees and 116 team leaders in 129 teams	Transformational leadership, self-leadership	Motivation, self-leadership	✓	–	–	Influence of self-leadership on motivation in virtual work structures versus collocated work structures
Fuller *et al.* (2016)	IMO and MST	Quasi-experimental study/22 virtual project teams	Individual Characteristics — CMC Anxiety	Virtual Team Participation — Quantity and Quality	✓	–	–	Individuals with higher levels of CMC anxiety participated less and were rated more poorly by team members on their performance compared to those with lower levels of CMC anxiety
Hsu *et al.* (2017)	IMO and Control theory	Survey/220 IS practitioners	Control mechanisms (Formal control and Clan control)	Team-member behaviours (In-role behaviour and Extra-role behaviour)	✓	–	–	Formal control and clan control affect project performance by enhancing behaviours

(*continued*)

Table 1.
Summary of *Type I*
literature on VTs
employing the IMO
theoretical framework
(Empirical Studies)

Table 1.

Study	Theory	Method/Sample	Input	Process/Emergent state (mediator)	Outcome			Findings
					Performance	Satisfaction	Well-being	
Wei et al. (2018)	IMO, AST	Survey of 263 participants from Malaysian Global Business Services	Team cohesion, confidence, knowledge, skills, and abilities	Trust, creativity	✓	–	–	Impact of team climates on human dimensions (mediators) which affect team performance. Virtuality did not have a significant moderating effect on these relationships
Han et al. (2018)	IMO	Survey of 158 students	shared leadership	coordination, goal commitment and knowledge sharing	✓	–	–	Shared leadership positively affected coordination activities, goal commitment and knowledge sharing, which in turn positively affect team performance
Zhang and Guo (2019)	IMO and MIP-G theory	Survey of 96 Cross-functional project teams	Knowledge diversity	Knowledge leadership, transactive memory system	✓	–	–	Knowledge leadership is a crucial factor that can explain the inconsistency between knowledge diversity and CFPT performance
Holtz et al. (2020)	IMO and SIP theory	Experiments with 41 virtual teams of 164 students	Team Emotional Management	Team synergy and Motivation	✓	–	–	Training enhances the ability to identify and use resources, thus enabling the virtual team to increase performance
Malik et al. (2021)	IMO and JCM	Agile project managers and team members in Australia	Team autonomy, diversity, agile communication	Psychological empowerment	✓	–	–	Relationship between agile practices and the work-related psychological states experienced by agile teams
Rogers et al. (2021)	IMO	997 students nested across 242 project teams in the US university	Peer Skills, Peer Interactions	Team processes	–	✓	–	Teams overcome virtuality to perform effectively. Team-embedded members react differently across virtual teams and face-to-face contexts

Note(s): IMO = Input–mediator–output; AST = Adaptive Structuration Theory; MST = Media Synchronicity Theory; MIP-G = Motivational information processing in groups theory; SIP= Social information processing theory; CMC = computer-mediated communication; CFPT = cross-functional project teams; JCM = job characteristic model
Source(s): Author's own creation

Study	Theory	Method/Sample	Input	Process/Emergent state (mediator)	Outcome	Important findings
Klotz et al. (2014)	IMO	LR of new venture teams (42 empirical articles)	–	–	–	Role of affect in NVTs; how team climates emerge and how these climates affect team performance
Yang (2014)	IMO	LR	Membership-based swift trust	Team member exchange – (dis)confirmation, emotions, process-based trust	Team outcomes	A framework for understanding the role of (dis)confirmation and subsequent emotions during the process of trust update and of team development
Coultas et al. (2014)	IMO	LR of 259 articles	–	–	–	Better measurement of emergent states using an evolved construct or relevant item wordings
Rosen et al. (2015)	IMO	LR of teamwork literature within healthcare	Team composition, characteristics, context	Action, transition, interpersonal processes	Effectiveness, learning outcomes	Contribution of sensor-based measurement for improving organizational learning in healthcare
Maynard et al. (2015)	IMO	LR of team adaptation literature	Team adaptability	Team adaptation	Adaptive performance	A team's adaptation process is impacted by the type and severity of the disruption or trigger that gives rise to the need for adaptation
Courtright et al. (2015)	IMO	Meta-analysis on task and outcome interdependence with 262 articles	Structural task and outcome interdependence	Team functioning	Team performance	Task and outcome inter dependence are conceptually distinct and have differential effects on team performance
Maloney et al. (2016)	IMO	LR of field research on teams (published 2004–2013) 271 articles	Team external context as "input"	Team external context as "mediator"	Team external context as "output"	Guidelines to improve contextualization and avenues to explore context theorising in work teams

(*continued*)

Table 2.
Summary of *Type II* literature on VTs employing the IMO theoretical framework (Reviews and Meta-analyses)

Study	Theory	Method/Sample	Input	Process/Emergent state (mediator)	Outcome	Important findings
Dulebohn and Hoch (2017)	IMO	LR	–	–	–	Two levels of outcomes – first, team level (such as team performance); second, individual outcomes (such as satisfaction, commitment)
Schulze and Krumm (2017)	IMO	LR	Team member KSAOs; personality traits	Team mediators such as trust	–	Derive an integrative framework of virtual teamwork to address virtuality-related challenges
Rosen et al. (2018)	IMO	LR of empirical and narrative reviews in health care (published 2000 and 2017)	Team member attributes, team structure, organisational context	Interpersonal processes; affective and cognitive emergent states	Team member wellbeing; staff retention; financial outcomes	Improve teamwork among health care workers to manage workforce challenges
Takács and Juhász (2018)	IMO and theory of human performance	Conceptual integrative model	Team adaptation (Trigger)	Adaptation (Task execution and team mental models)	Standard performance and group efficacy	Adaptation (performance and collective efficacy)
Shuffler et al. (2018)	IMO	LR of articles on TDI (514 articles)	Team inputs (such as task analysis, work designs, and team charters)	Performance monitoring and assessment	Team debriefs	Distinguishing features that make for an effective TDI
Handke et al. (2021)	IMOI	Conceptual integrative model	Team virtuality, familiarity, design	Team Process, perceived virtuality	Task performance, satisfaction	Individual characteristics converge into a team-level property
Handke et al. (2022)	IMO	LR of 59 studies published between 1991 and 2020	Team input feedback	Team mediator feedback	Team output feedback	Virtual teams benefit from performance-related feedback that targets the entire team

Note(s): IMO = Input–mediator–output; IMOI = Input–mediator–output–input; AST = Adaptive Structuration Theory; MST = Media Synchronicity Theory; MIP-G = Motivational information processing in groups theory; SIP= Social information processing theory; LR= Literature Review; NVT = new venture teams; KSAO = appropriate knowledge, skills, abilities, and other characteristics; TDI = team development intervention
Source(s): Author's own creation

Table 2.

RQ2. How do *psychological empowerment* and *conflict management* mediate these relationships?

RQ3. Among those VT outcomes, how does *team satisfaction* affect *perceived team performance* and *subjective well-being*?

The remainder of the paper is as follows. Section 2 presents the literature on virtuality, mediators and team outcomes, while Section 3 builds the hypotheses. Section 4 presents the research methodology and data collection, followed by analysis in Section 5. Further, key findings are discussed in Section 6. Section 7 presents the implications of this study, followed by the limitations and future scopes in Section 8.

2. Theoretical foundation and literature review
2.1 The input–mediator–output (IMO) theoretical framework
In this study, we adopted the IMO theoretical framework proposed by Mathieu *et al.* (2008) to emphasise the importance of emergent states and processes in VTs. When taken together, the results offer a clearer picture of how the team perform and affect an individual's satisfaction and well-being. The IMO model extends the classical input–process–output (IPO) model (Hackman, 1987; McGrath, 1984; McGrath *et al.*, 2000), which is extensively used in behavioural studies. Within IMO, *inputs* represent the list of resources available to a VT, which can range between *external* (such as organisational rewards or workplace mobility) and *internal* (e.g. team distribution or task design) or exist at the *organisational*, *team*, or *individual* levels (Fuller *et al.*, 2016). The next stage of the IMO framework consists of the *mediators* representing different psychological mechanisms (such as team processes and emergent states) that signify critical phenomena within the VTs (Marlow *et al.*, 2017; Mathieu *et al.*, 2008, 2019). As the IMO framework extends the IPO framework by suggesting that most constructs in the IPO framework are not process(es) at all but *emergent states* (cognitive or affective) and *mediators* (Ilgen *et al.*, 2005; Mathieu *et al.*, 2008). Thus, the *inputs* impact the *mediators*, allowing team members to work on available resources and perform the assigned work within the VTs. Finally, the *outputs* (or *outcomes*) consider measures for both affective outcomes and team effectiveness (Mathieu and Gilson, 2012; Hertel *et al.*, 2005; Maynard *et al.*, 2015) (such as *team performance* or *team satisfaction*). Therefore, we examine the extant literature on VTs based on the IMO theoretical framework and categorise the salient research articles into two sets – ***Type I*** (empirical studies) and ***Type II*** (reviews and meta-analyses). We structure our literature based on the three dimensions of the IMO theoretical framework, i.e. *inputs, mediators* and *outcomes* within each research article, and summarise their key research findings (presented in Table 1 and Table 2).

Inputs: Within the extant literature on VTs examined by the IMO theoretical framework, the most widely used input variables are *virtuality* (Handke *et al.*, 2020, 2021; Purvanova and Kenda, 2022); *knowledge* and *skills* of team members (e.g. Schulze and Krumm, 2017; Wei *et al.*, 2018; Zhang and Guo, 2019); *team dimension and context* (Schulze and Krumm, 2017; Wei *et al.*, 2018) and *different forms of leadership* (Andressen *et al.*, 2012; Han *et al.*, 2018).

Mediators: Based on the VTs literature, the following are some of the mediators: *virtual team participation* (Fuller *et al.*, 2016); *team-member behaviours* (Hsu *et al.*, 2017); *goal commitment* and *knowledge sharing* (Han *et al.*, 2018); *knowledge leadership* (Zhang and Guo, 2019) and *team synergy and motivation* (Holtz *et al.*, 2020); *psychological empowerment* (Malik *et al.*, 2021) and *team processes* (Rogers *et al.*, 2021).

Outputs: Based on the extant VT literature, scholars have examined both affective (such as team satisfaction, individual member satisfaction, and subjective well-being) and effectiveness outcomes (such as team performance, individual member performance and financial outcomes). Although Mathieu and Gilson (2012) and Hertel *et al.* (2005) recommend that scholars need to study affective outcomes (such as satisfaction) of team

members, in addition to the overall performance-related outcomes, such studies are few (see the column "outcome" in Table 1 and Table 2). Wei *et al.* (2018) studied the impact of *team climates* (team cohesion, confidence, knowledge and skills) on the perceived *team performance* (*performance* outcome) using the IMO framework. Han *et al.* (2018) studied the effect of shared leadership on team performance (measured by content, efficiency, excellence and originality) (*performance* outcome). Zhang and Guo (2019) examined the effect of knowledge diversity on the performance of cross-functional teams measured by *effectiveness and efficiency* (*performance* outcome) and *team satisfaction* (*affect* outcome). Rogers *et al.* (2021) examined the effects of peer skills and interactions on satisfaction (*affect* outcome) by comparing face-to-face and virtual teams.

2.2 Perceived virtuality

Kirkman and Mathieu (2005) define *virtuality* as (1) the extent to which VT members used virtual tools to coordinate and execute team processes, (2) the amount of informational value provided by such tools and (3) the synchronicity of the virtual interaction among VT members. Handke *et al.* (2021) define *perceived virtuality* "as a shared affective-cognitive emergent state that is characterised by team members' co-constructed and collectively-experienced (1) distance and (2) information deficits, thereby capturing the unrealised nature of the team as a collective system . . . ." They adopt the IMO theoretical framework and propose that perceived virtuality is a collective team attribute. Over the years, scholars from the VT literature have proposed different dimensions to measure virtuality – *two* (i.e. electronic dependence and geographic dispersion) (Cohen and Gibson, 2003), *three* (i.e. technology support, time apart while working on a task and physical distance) (Griffith *et al.*, 2003), *three* (i.e. use of VT tools, informational value and synchronicity of communication) (Kirkman and Mathieu, 2005) and *four* (i.e. geographic dispersion, use of CMC, temporality and diversity) (Martins *et al.*, 2004) to examine the influence of virtuality on team outcomes. Schweitzer and Duxbury (2010) studied thirty VTs to create the construct *degree of virtuality*. Johnson *et al.* (2009) examined 150 members using CMC across VTs and found that individuals who used CMC experienced low positive affect while working with their VTs. Schulze and Krumm (2017) reviewed the VT literature and identified six *knowledge, skills, abilities and other characteristics* (KSAO) clusters deemed vital for virtual teams. Within the VT literature, many studies have also identified *virtuality* as an essential input in virtual teams that can affect their subsequent processes, emergent states and outcomes (Brown *et al.*, 2020; Foster *et al.*, 2015; Gibson and Gibbs, 2006; Handke *et al.*, 2020, 2021; Henderson, 2008; Hinds and Bailey, 2000; Purvanova and Kenda, 2022).

2.3 Psychological empowerment

Psychological empowerment can be related to self-efficacy (Bandura, 1977, 1982), which further stems from the views of team members regarding their beliefs of being empowered in their roles and responsibilities (Lee and Koh, 2001; Spreitzer, 1995) and their subsequent motivational outcomes within a team (Conger and Kanungo, 1988; Mathieu *et al.*, 2008). Scholars have adapted the definition of *psychological empowerment* to the IPO framework and positioned it as an emergent state, "a cognitive, motivational, and affective state of teams . . . that are typically dynamic in nature and vary as a function of team context, inputs, processes and outcomes" (Kirkman and Rosen, 1999; Kirkman *et al.*, 2004; Marks *et al.*, 2001). Maynard *et al.* (2012) and Amor *et al.* (2021) identified *structural empowerment*, *organisational support*, *external managerial support* and *team competencies* as antecedents of *psychological empowerment*. Extant literature on virtual teams has also established the role of *psychological empowerment* as a mediator between inputs and outcomes such as *participative goal setting* and *team outcomes* (Lee and Wei, 2011); *agile antecedents* (i.e. team autonomy, diversity, agile communications) and *innovative behaviour* of employees (Malik

et al., 2021); *team-directed empowering leadership* and *organisational citizenship behaviour* (Li *et al.*, 2017); prior performance and post-performance (D'Innocenzo *et al.*, 2021). Further, VT literature has also demonstrated evidence of the significant effects of *psychological empowerment* towards the final team outcome, such as building a *sense of task motivation* to increase *team performance* (Seibert *et al.*, 2011; Amor *et al.*, 2021), *increased team engagement* to influence the *project outcomes* (Mills *et al.*, 2020); *organisational empowerment climate* and *employee service quality* (Lin *et al.*, 2017).

2.4 Conflict management
Scholars have found that *conflict* is a significant interpersonal process that enables better decision-making across teams through possibilities of alternative outcomes (Jehn and Mannix, 2001; Marks *et al.*, 2001; Nesterkin *et al.*, 2016). Therefore, *conflict management* within a team is an important determinant of its outcomes, such as team performance and team satisfaction (Baron, 1989; Kankanhalli *et al.*, 2006; Montoya-Weiss *et al.*, 2001; Paul *et al.*, 2004a, b; Putnam, 1986; Van de Vliert and De Dreu, 1994). Team members in VTs typically employ ICT tools to communicate among themselves to execute their tasks (Kankanhalli *et al.*, 2006; Paul *et al.*, 2004a, b) and, therefore, are more susceptible towards conflicts (Wakefield *et al.*, 2008). Extant literature on virtual teams has also established the role of *conflict management* as a mediator between team inputs and team outcomes such as *commitments to team goals* and *perceived performance satisfaction* (Pazos, 2012); *e-profile use of employees* and *shared understanding* mediated by *conflict* (i.e. *relational conflict* and *task conflict*) (Windeler *et al.*, 2015; Nesterkin *et al.*, 2016). In their seminal review of VT literature, Gilson *et al.* (2015) found that conflict management was often studied as a mediator that adversely affected team processes and outcomes. A recent bibliometric and literature review by Caputo *et al.* (2023) also suggests that *conflict management* mediates the antecedents and outcomes in a VT. Further, extant literature has identified the direct effects of *conflict management* towards the outcome measure (in a team or group), such as *collaborative conflict management style* to increase *decision-related outcomes* (i.e. *satisfaction, perceived quality, perceived participation* and *agreement*) (Paul *et al.*, 2004a, b).

3. Hypothesis development and proposed research model
We propose the hypotheses in this section from the extant literature on VTs and the IMO framework.

3.1 Impact of virtuality on team outcomes
Virtuality is a contextual variable that affects various aspects of VTs, including team processes, performance and outcomes (Brown *et al.*, 2020; Foster *et al.*, 2015; Gibson and Gibbs, 2006; Handke *et al.*, 2020, 2021; Henderson, 2008; Hinds and Bailey, 2000; Purvanova and Kenda, 2022). Handke *et al.* (2021) define *perceived virtuality* "as a shared affective-cognitive emergent state that is characterised by team members' co-constructed and collectively experienced (1) distance and (2) information deficits, thereby capturing the unrealised nature of the team as a collective system . . .." They adopt the IMOI theoretical framework and propose that *perceived virtuality* is a collective team attribute. However, the definition of *virtuality* has often varied with the understanding of the scholars (Chudoba *et al.*, 2005; De Guinea *et al.*, 2012; Hosseini and Chileshe, 2013; Lu *et al.*, 2006; Panteli and Chiasson, 2008).

3.1.1 Virtuality and perceived team performance. Several studies have investigated the positive impact of *virtuality* on perceived team performance (Brown *et al.*, 2020; Foster *et al.*, 2015; Handke *et al.*, 2020, 2021; Lu *et al.*, 2006). Lu *et al.* (2006) found that the dimensions of virtuality significantly influenced performance, communication, trust among team members and the ability to meet commitments on time. Chudoba *et al.* (2005) proposed a virtuality index

to measure the aspects of virtuality using team distribution, workplace mobility and various work practices on the final team performance of the virtual team. Further, according to the IMO framework, virtuality is a multidimensional construct that can serve as a team "input" and directly affect the team "outcome". So, the degree of virtuality across VTs will positively affect the perceived team performance. Therefore, we hypothesise:

H1a. Virtuality will positively influence the perceived team performance of individuals working in VTs.

3.1.2 Virtuality and team satisfaction. According to Keyton (1991), *satisfaction* is a situational variable and an affective component of team performance. Therefore, it reflects the happiness of team members while they perform their tasks. *Team satisfaction* measures a team member's fulfilment, aggregated to the team level (De Dreu and Weingart, 2003; LePine *et al.*, 2008). Among recent studies, Rogers *et al.* (2021) found a positive effect of team processes towards *team satisfaction* within VTs by applying the IMO framework. Handke *et al.* (2021) adopted the IMOI framework. They found that *perceived virtuality* is a collective team property as team members interact with each other and will have a distinct impact on team satisfaction. Dulebohn and Hoch (2017) also reported the effect of perceived virtuality on *individual-level outcomes* such as team-member satisfaction. Virtuality affects team satisfaction (Thompson and Coovert, 2003), with evidence of stronger interpersonal relationships and team ties linked to stronger motivation and lower process loss, thereby improving team satisfaction (Fock *et al.*, 2011). Therefore, we hypothesise that:

H1b. Virtuality will positively influence the perceived team satisfaction of individuals working in virtual teams.

3.1.3 Virtuality and subjective well-being. *Virtuality* significantly influences interpersonal processes within teams (Hinds and Bailey, 2000), such as *communication* (Leenders *et al.*, 2003), *trust and cohesiveness* (Crisp and Jarvenpaa, 2013), and outcomes such as *member satisfaction* and *productivity* (Caballer *et al.*, 2005). Technological changes often affect an individual's work-related well-being (Cañibano *et al.*, 2021; Chamakiotis, 2020; Doyle and Conboy, 2020). While some changes may lead to the automation of routine activities, such as *work-from-home decisions* and greater access to information, others may present challenges to the individual's well-being, such as *work-life*, or *home-life interference* (Derks *et al.*, 2015), *quality of recovery time* (Sonnentag, 2003), *loss of control* and *increased stress* (Chamakiotis, 2020; Deery *et al.*, 2002; Doyle and Conboy, 2020). Further, according to the IMO theoretical framework, a team's virtuality can directly affect its employees' well-being. Subjective well-being, therefore, represents the individual opinion regarding the quality of life of an employee (Krueger and Stone, 2014; Michalke *et al.*, 2022). It can be promoted by permitting the employees to be independent and proficient and improving their subjective understanding of the tasks (Peters *et al.*, 2018), according to the self-determination theory (Ryan and Deci, 2000). Thus, we hypothesise:

H1c. Virtuality will positively influence the subjective well-being of individuals working in virtual teams.

3.2 Impact of virtuality on psychological empowerment and conflict management
Scholars have adopted the definition of *psychological empowerment* to the IMO framework and positioned it as an emergent state, "a cognitive, motivational, and affective state of teams . . . that are typically dynamic in nature and vary as a function of team context, inputs, processes and outcomes" (Kirkman and Rosen, 1999; Kirkman *et al.*, 2004; Marks *et al.*, 2001; Schaubroeck and Yu, 2017). Maynard *et al.* (2012) also suggested that team virtuality is an antecedent of *psychological empowerment*. Further, *psychological empowerment* positively impacts team performance in both face-to-face and virtual contexts (Amor *et al.*, 2021;

Kirkman and Rosen, 1999; Kirkman *et al.*, 2004). For instance, as noted by Kirkman and associates (Kirkman and Rosen, 1999; Kirkman and Mathieu, 2005), VT members enjoy an empowered collaboration due to relatively higher control in their proximal work environment. Hill *et al.* (2014) also found that the degree of virtuality affected the leader-member exchange in virtual teams and psychological empowerment. Thus, we hypothesise:

H2. Virtuality will positively influence the psychological empowerment of employees working in virtual teams.

Next, virtual teams typically operate across multiple geographical locations, dissimilar time zones, different business units and even across numerous cultures (Mortensen and Hinds, 2001). A meta-analysis by De Dreu and Weingart (2003) concluded that conflicts existed in all types of teams and negatively affected team performance and team members' satisfaction. Conflicts within virtual teams often emerge due to a lack of face-to-face communication, trust and differences in value systems (De Jong *et al.*, 2008; Pazos, 2012). Further, VTs employed ICT tools to communicate among themselves to execute their tasks and, therefore, are more susceptible towards conflicts (Jimenez *et al.*, 2017; Nesterkin *et al.*, 2016; Kankanhalli *et al.*, 2006; Paul *et al.*, 2004a, b). In a recent literature review, Caputo *et al.* (2023) applied the IPO framework. They found that virtual teams require more *conflict management* techniques, not to eradicate it completely but to find means to manage it properly. It is, therefore, expected that the role of *conflict management* will be more important to virtual teams than face-to-face teams. Thus, we hypothesise:

H3. Virtuality will positively influence the conflict management process within virtual teams.

3.3 Impact of psychological empowerment and conflict management on team outcomes
Next, we discuss the proposed relationships of the mediators in two ways; first, by considering *conflict management* and *psychological empowerment* as independent variables and their direct impact on the team outcomes. Second, we examine the mediating roles of *psychological empowerment* and *conflict management* within the relationships of virtuality towards team outcomes.

3.3.1 Direct impact of psychological empowerment on team outcomes. Previous literature has examined *psychological empowerment* at various levels of analysis as an isomorphic construct (Chen *et al.*, 2007). Kirkman *et al.* (2004) also argued that team empowerment might be more critical to the performance of virtual teams than co-located teams. Often, in the case of virtual teams, empowerment builds a sense of task motivation that may increase the performance of team members (Seibert *et al.* (2011), revealing a positive association with managerial and employee effectiveness. Previous studies have also identified a strong relationship between satisfaction with empowerment (Carless, 2004; Harris *et al.*, 2009). Maynard *et al.* (2012) noted the influence of empowerment on effective rather than performance outcomes. Seibert *et al.* (2011) found that psychological empowerment is positively associated with employee outcomes, including team satisfaction, commitment, task and contextual performance.

Next, according to Diener (1984), well-being is "a person's subjective positive experience of life and is closely related to happiness, satisfaction, morale, and positive effect". Creating a positive work environment for employees can positively impact their work performance and well-being. Van Mierlo *et al.* (2001) stated that autonomy (or empowerment) is positively related to subjective well-being. Russell (2008) opined that researchers and practitioners must continue exploring how different work practices can help to create more positive workplaces and lead to healthy employee outcomes. Thus, we hypothesise:

H4a. Psychological empowerment will positively influence the perceived team performance of individuals working in virtual teams.

H4b. Psychological empowerment will positively influence team satisfaction of individuals working in virtual teams.

H4c. Psychological empowerment will positively influence the subjective well-being of individuals working in virtual teams.

3.3.2 Direct impact of conflict management on team outcomes. Previous literature has examined *conflict management* and identified its key roles in facilitating team outcomes (Killumets *et al.*, 2015; Marks *et al.*, 2001). Marks *et al.* (2001) also contended that conflict management worked to be more critical to the performance of virtual teams. When team members belong to a team that engages in positive interpersonal processes, such as managing conflict, it often enables them to believe that their voices have been heard through productive discussions regarding goal accomplishment. Therefore, a positive relationship exists between interpersonal processes (such as conflict management) and performance across teams (such as team satisfaction, team performance and satisfaction) (Lin *et al.*, 2008; Mathieu *et al.*, 2008, 2019; Martins *et al.*, 2004).

Among extant studies, Pazos (2012) used the IMO theoretical framework and found that effective *conflict management* techniques could affect team outcomes in VTs – *team performance* and *satisfaction*. Langfred (2007) found that conflict in self-managing teams could jeopardise team members' trust and affect their overall team performance. Martínez-Moreno *et al.* (2015) examined the effects of self-guided training on conflict management in VTs. They found that synchronous teams used more functional strategies to improve their team performance outcomes. Tekleab *et al.* (2009) found that *conflict management* directly and positively affected team cohesion, while Yang *et al.* (2015) found that team cohesion directly affected team performance in fast-response virtual teams. Thus, we hypothesise:

H5a. Conflict management will positively influence the perceived performance of individuals working in virtual teams.

H5b. Conflict management will positively influence team satisfaction of individuals working in virtual teams.

H5c. Conflict management will positively influence the subjective well-being of individuals working in virtual teams.

3.3.3 Mediating effects of psychological empowerment and conflict management. Scholars have reported that the "virtual" design of the work environment can influence *psychological empowerment* (Kraimer *et al.*, 1999; Thomas and Velthouse, 1990), thereby leading to a more favourable performance outcome. Laschinger *et al.* (2001) conducted a cross-sectional study and found that *psychological empowerment* mediates the relationship between *empowerment* and *individual satisfaction*. Further, scholars observed that when employees gained a sense of higher empowerment, they became self-motivated and reported better performances (Thomas and Velthouse, 1990). Similarly, when employees perceive their (virtual) work environment as *empowered*, their sense of team satisfaction might also increase. In this manner, *psychological empowerment* builds a sense of belonging that typically leads to employees being more engaged in their workplace (Fock *et al.*, 2011, 2013). Liden *et al.* (2000) and Sparks *et al.* (2001) pointed out that the employees who perceived themselves as performing an activity of their choice compared to those directed to have higher intrinsic motivation. Such employees accepted more personal responsibility for their work outcomes and reported high *psychological empowerment* (Hackman and Oldham, 1976). Extant literature has also identified *psychological empowerment* as a mediator between inputs and outcomes such as *participative goal setting* and *team outcomes* (Lee and Wei, 2011); *agile antecedents* (i.e. team autonomy, diversity, agile communications) and *innovative behaviour* of employees (Malik *et al.*, 2021); *team-directed empowering leadership* and *organisational*

citizenship behaviour (Li *et al.*, 2017); prior performance and post-performance (D'Innocenzo *et al.*, 2021). Thus, we hypothesise:

H6a. Psychological empowerment will mediate the relationship between virtuality and perceived team performance.

H6b. Psychological empowerment will mediate the relationship between virtuality and team satisfaction.

H6c. Psychological empowerment will mediate the relationship between virtuality and subjective well-being.

Next, the extant literature on VTs has also established the role of *conflict management* as a mediator between team inputs and team outcomes, such as *commitments to team goals* and *perceived performance satisfaction* (Pazos, 2012); *e-profile use of employees* and *shared understanding* mediated by *conflict* (i.e. *relational conflict* and *task conflict*) (Windeler *et al.*, 2015. In their seminal review of VT literature, Gilson *et al.* (2015) found that conflict management was often studied as a mediator that adversely affected team processes and outcomes. A recent bibliometric and literature review by Caputo *et al.* (2023) also suggests that *conflict management* best mediates between the antecedents and outcomes in a VT. Thus, we hypothesise:

H7a. Conflict management will mediate the relationship between virtuality and perceived team performance.

H7b. Conflict management will mediate the relationship between virtuality and team satisfaction.

H7c. Conflict management will mediate the relationship between virtuality and subjective well-being.

3.4 Relationships between various team outcomes
Scholars define *perceived team performance* as the perceptions of team members of their team's productivity and performance (Jehn *et al.*, 1997). Extant research has highlighted that individual team satisfaction contributes to performance and well-being (Chamakiotis, 2020; Cañibano *et al.*, 2021). Van Mierlo *et al.* (2005) reported that teamwork and team performance was primarily linked to job satisfaction. They also concluded that teamwork was associated with positive psychological outcomes. Cavazotte *et al.* (2020) examined the effects of *team satisfaction* on *team performance*, leading to positive customer satisfaction. Gilli *et al.* (2022) found that average satisfaction within the team is related to higher team performance.

Next, team satisfaction may impact subjective well-being because work is vital in the lives of individuals. Therefore, team satisfaction may influence subjective well-being. In the work domain, occupational satisfaction is a predictor of life satisfaction. Various studies have reported higher satisfaction levels among employed versus unemployed people (Patterson *et al.*, 2004; Warr, 1990). Further, George and Brief (1992) have pointed out that people who experience high subjective well-being tend to become more engaged and involved in their work. Thus, we hypothesise:

H8. Team satisfaction will positively influence the perceived team performance of individuals working in virtual teams.

H9. Team satisfaction will positively influence the subjective well-being of individuals working in virtual teams.

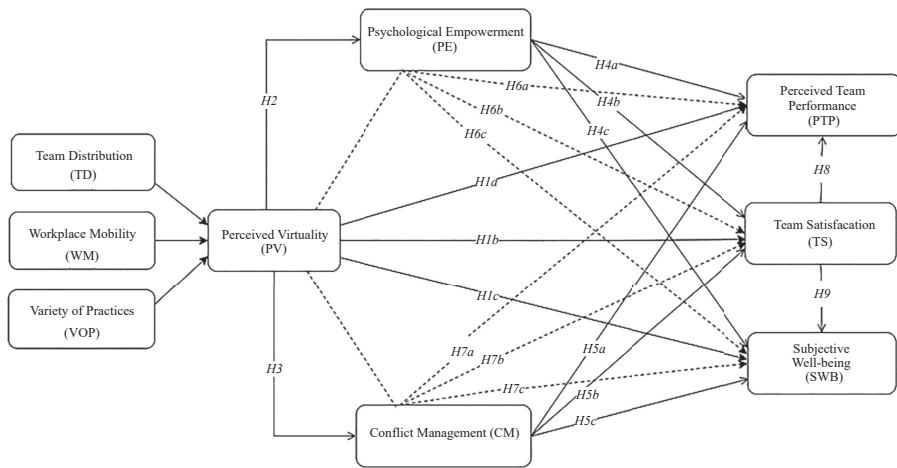We present the conceptual framework in Figure 1.

Figure 1.
Proposed
hypothesised model

Source(s): Author's own creation

4. Research methodology and data collection
4.1 Instrument and constructs
We collected data from employees working in Information Technology (IT) firms using structured items from a questionnaire (Table A1). The responses were measured on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree).

(1) *Virtuality:* We measured the three dimensions of virtuality with twelve items adapted from Chudoba *et al.* (2005). The respondents replied to reflect on how often they experienced the aspect of discontinuity, such as working with people from different business groups, time zones or cultural backgrounds, whether they had used a variety of technologies, worked at various locations and collaborated with people outside their organisations.

(2) *Conflict Management:* We measured conflict management using a four-item scale adapted from Pazos (2012) and also used by Tekleab *et al.* (2009). We operationalised conflict management as to *how the team could prevent negative conflicts and solve emerging conflicts* (Pazos, 2012).

(3) *Psychological Empowerment:* We measured psychological empowerment with a twelve-item scale adapted from Spreitzer (1995). A sample item is "*The work I do is very important to me*".

(4) *Perceived Team Performance:* We used a five-item scale adapted from Mortensen and Hinds (2001) to measure perceived team performance. De Jong *et al.* (2008) adopted a similar scale for virtual teams; hence, adaptation for the current study is justified.

(5) *Satisfaction:* We used a five-item scale adapted from Tekleab *et al.* (2009) to assess individual-level satisfaction within a team.

(6) *Subjective Well-being:* The widely used "life satisfaction" scale was adapted from Pavot and Diener (1993) to measure the construct of well-being for this research work. This scale consists of five items. A sample item is "*In most ways; my life is close to my ideal*".

The proposed model in this study consists of both formative and reflective indicators, which makes the model more robust (Gefen *et al.*, 2011; Henseler *et al.*, 2014). We operationalised

virtuality as a Reflective-Formative (R-F) type of hierarchical component construct because virtuality consists of the reflectively measured first-order constructs — team distribution, workplace mobility and variety of practices and the lower-order constructs do not share a common cause but rather form a general concept that fully mediates the influence on subsequent endogenous variables. For a more detailed description of Hierarchal Component Models (HCM) types, the reader may refer to the study of Becker *et al.* (2012).

4.2 Initial screening and pilot study

We employed the "decentering" method (Brislin, 1980) to adopt the instrument scales. As a rule, the goal of this adaptation process is a functional equivalence (Elder, 1976; Osgood, 1967). Further, we conducted a pilot study to test the scale properties. The sample for the pilot study consisted of 20 employees working in the IT industry and possessing experience working in virtual teams. Scholars have suggested testing the pilot questionnaire to improve the face and content validity. Cooper and Schindler (2007) have also suggested that researchers should do pilot testing of the questionnaire before the final version and mail-out. Based on the pilot, we tested the scales for face and content validity and did not drop any items.

Also, before conducting the primary empirical analysis, experts were asked to pre-test the questionnaire and pay specific attention to the content, wording, sequence, format, layout, difficulty and clarity of instructions. We observed that the respondents monitored their reactions and attitudes towards the questionnaire during this pre-test. Based on the problems identified and the inputs received from the respondents, we made minor adjustments to the questionnaire. Finally, we chose Times New Roman 12-point fonts while finalising the instrument for offline and online modes.

4.3 Sampling and data collection

This research aims to study a model of VT effectiveness in the context of the IT industry of India. Therefore, the population in our study can be summarised as the organisations within India's IT industry and, specifically, multinational organisations that employ VTs within the technology consulting and software development domains. Therefore, employees working in four major sub-sectors of the IT industry, such as *IT services*, *Business Processes Outsourcing* (BPO) or *Business Process Management*, *Engineering design* and *product development and Hardware,* were considered the target population of this study. Firms of all sizes: small, medium and large, were considered for the data collection process, but large multinational organisations were preferred.

Due to the various difficulties associated with access to data collection in organisations, researchers often adopt an "*opportunist approach*" (Buchanan *et al.*, 1988) to gain access and choose respondents for research (Saunders, 2013). Therefore, Buchanan and colleagues believe it is better to compromise to a limited extent and be able to collect data that will address the major aim of the research (Saunders, 2013). Similarly, Fricker (2014) opines that conducting surveys requires making compromises, as in all modes of data collection. In the quest for knowledge in science, researchers adopt various data collection methods: "survey method is one of them because surveys can provide us accurate, reliable, and valid data, but to do this they require serious effort and thought" (Shah *et al.*, 2015). Hence, for the current research, we adopted a combination of different sampling methods due to the specific nature of the research problem.

We conducted both offline and online surveys for this study. For the offline survey, we selected specific IT firms in select geographical locations based on the prior communication with the HR departments in those organisations in Bengaluru, Hyderabad, Kolkata and Delhi NCR in India. After receiving permission, we distributed the offline questionnaires to organisations that permitted access to respondents. Out of 450 questionnaires, only 80 filled and useable questionnaires were collected using an offline survey, leading to a response rate

of 17.78% (80 out of 450). We collected the duly completed questionnaires and thanked the respondents for participating.

Due to the need for formal engagements with the HR departments, we found a very low response rate in the offline data collection mode; therefore, we planned for online data collection. For the online surveys, we contacted respondents using an invitation letter via email, where we outlined the purpose of our research and explained why we value the respondents' involvement. We sent emails inviting potential participants who fit specific inclusion criteria (working in the IT sector and having worked in virtual teams) and wished to volunteer for the study. The respondents were also requested to forward the email to ten colleagues/team members working in the IT sector. By following this process, we collected 235 successful responses through online surveys. Therefore, $80 + 235 = 315$ completed responses were ready for empirical analysis.

Finally, according to Gefen *et al.* (2011) and Chin and Newsted (1999), the minimum requirement of the sample size for a Partial Least Square Structural Equation Modelling (PLS-SEM) based study should not be less than ten times the number of items within the most complex and formative construct of the model. Based on this rule of thumb, the minimum sample size requirement for this research is 120 responses (10×12) as the number of items in the most complex formative construct: *psychological empowerment,* is twelve. The total usable responses were 315, more than the minimum sample size requirement of 120, aligned with the rule of thumb (Chin, 1998; Hair *et al.*, 2013; Gefen *et al.*, 2011).

We applied PLS-SEM to test our conceptual model with SmartPLS Version 3.2.7. PLS-SEM is a suitable statistical technique for testing exploratory models or theory-building in emerging areas (Chen *et al.*, 2022; Huang *et al.*, 2017; Hair *et al.*, 2014; Khan *et al.*, 2019; Shiau *et al.*, 2019, 2020). Further, our proposed model consists of formative and reflective indicators, making PLS-SEM an appropriate choice (Chen *et al.*, 2022; Henseler *et al.*, 2014; Huang *et al.*, 2017; Khan *et al.*, 2019; Shiau *et al.*, 2019, 2020). Additionally, PLS-SEM can handle mediation effects easily. PLS-SEM has been widely used to examine team effectiveness for virtual teams (Crisp and Jarvenpaa, 2013; Staples and Webster, 2008). Figure 2 shows the different stages of data collection and analysis.

4.4 Data preparation and examination
While examining the raw data, we did not find any missing values. Before conducting the main empirical analysis, we examined the response patterns from raw data. Based on the straight-lining technique (Hair *et al.*, 2014), we did not find any suspicious response patterns, indicating a high engagement and involvement of the respondents. Further, we found no
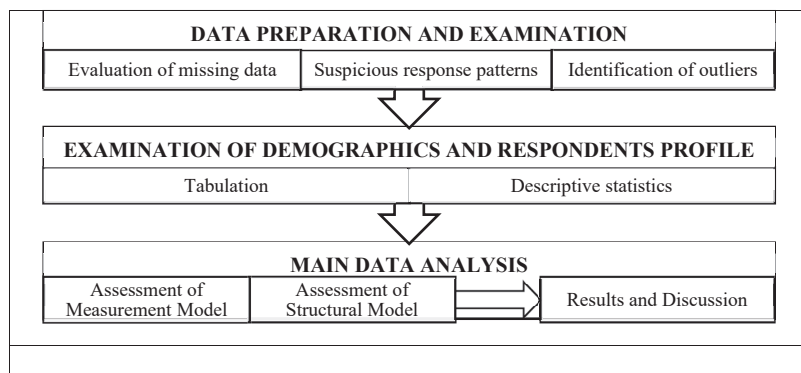
Source(s): Author's own creation

exceptional cases, possibly due to our control towards common method bias by applying both the procedural and statistical approaches (Podsakoff *et al.*, 2003).

4.5 Demographics and profile of respondents
The study involved IT professionals belonging to multinational organisations in India. Since most software professionals from large organisations work in teams, the possibility of receiving relevant results was high. The questionnaire started with a cover letter that provided an overview of the study. It also included a screening question that helped to identify the most appropriate and representative respondents. Further, the respondents were requested to provide personal information – such as gender, age, education, work experience, designation/role in the virtual team, etc. During the demographic analysis, we found that out of 315 respondents, 177 were males (56.19%), and 138 were females (43.80%), so the sample size was an almost homogeneous mix of both genders. In terms of age, 42 respondents (13.33%) were found in their early ages, i.e. below 25 years, whereas 130 (41.27%) were in the middle-age category (between 26 and 35 years). Notably, approximately 55% of the respondents were under 35. Additionally, we asked the respondents to mention their experience working within virtual teams, which is relevant to this study. Of the 315 respondents, 42 (13.33%) and 54 (17.14%) reported having more than 10 years and 6–10 years of experience in virtual teams, respectively. Whereas 136 (43.17%) respondents reported having 3–6 years of work experience in virtual teams. Therefore, the respondents had adequate exposure to the functioning of virtual teams. As the study focused on multinational organisations for data collection, the organisation's size also reflects this trend. Approximately 238 (75%) respondents reported that their organisations had more than ten thousand employees, indicating they were stationed in multinational corporations and familiar with global work practices. Conversely, only 62 employees (19.68%) reported that their organisation had 5000 to 10,000 employees. None of the respondents reported their strength as less than five hundred employees (refer to Table 3 for details). The subsequent sections will provide details of the main data analysis.

5. Results
5.1 Evaluation of the measurement (outer) model
Based on past literature (Becker *et al.*, 2012; Chen *et al.*, 2022; Shiau *et al.*, 2019, 2020). We assessed the measurement model in two stages: the adequacy of the reflective measurement model and the validation of the formative hierarchical component model.

5.1.1 Adequacy of the reflective measurement model. We validated the reliability of the reflective constructs by measuring their convergent validity and discriminant validity. First, we checked the outer loadings of the items. Typically, outer loadings should be 0.708 or higher (Chin, 1998; Fornell and Larcker, 1981). All the first-order constructs in our model displayed composite reliability between 0.855 and 0.958 (see Table 4), and the Cronbach alpha (α) between 0.772 and 0.945 is well above the threshold values of 0.7. These results indicated good construct reliability of the reflective constructs.

Next, we assessed the discriminant validity to ensure that a reflective construct has the strongest relationships with its own indicators compared to any other construct in the PLS path model (Hair *et al.*, 2014; Hulland, 1999). As Chin (1998) suggested, we have checked the discriminant validity with two measures, Fornell–Larcker criteria based on the analysis of average variance extracted (AVE) and cross-loadings examination. We found that all the diagonal elements (AVE values) are larger than the off-diagonal correlations in the rows and columns, thus meeting the criteria (Fornell–Larcker Criterion) of the test (Fornell and Larcker, 1981). We found that the AVE values of all constructs were above the threshold of 0.5, and

Characteristic	Category	Frequency	Percentage
Gender	*Male*	177	56.19
	Female	138	43.80
Age group (in Years)	Less than 25	42	13.33
	26–35	130	41.27
	36–45	96	30.48
	46–55	38	12.06
	>55	09	02.86
Educational level (Highest)	Bachelors	184	58.41
	Masters	92	29.21
	Doctorate	06	01.90
	Others	33	10.48
Work experience (in Years)	Less than 3	46	14.60
	3–6 Years	152	48.25
	6–10 Years	62	19.68
	10–15 Years	34	10.79
	>15 Years	21	06.67
Virtual teamwork experience (in Years)	Less than 3	83	26.35
	3–6 Years	136	43.17
	6–10 Years	54	17.14
	>10 Years	42	13.33
Company size (No of employees)	Less than 500	0	0
	501–1000	07	02.22
	1001–5000	11	03.49
	5001–10000	62	19.68
	>10,000	238	75.56

Table 3.
Demographic
characteristics of the
respondents ($n = 315$)
Source(s): Author's own work

values were between 0.542 and 0.884. Similarly, the results of the cross-loading examination indicate that all 41 indicators loaded distinctly on the specified construct they measured. Hence, the collective results of cross-loadings and the Fornell–Larcker demonstrate good discriminant validity at the construct level (see Table 5 and Table 6).

5.1.2 Validation of the formative hierarchical component model. Next, we examined the multicollinearity and internal validity of the formative items used in the hierarchical component model. The existence of high correlations between formative items indicates the presence of collinearity which could be a problem (Hair *et al.*, 2014). Our results showed that the variance inflation factor (VIF) values for the formative construct (i.e. virtuality) ranged between 4.213 and 2.344, which was below the threshold value of 5, while the tolerance values were above the 0.20 threshold (Hair *et al.*, 2013), exhibiting no collinearity among the items of the second-order construct (see Table 7).

Across PLS-SEM-based studies, scholars adhere to different standards of acceptable VIF values, such as 10.00 (Sarstedt and Mooi, 2014, Chapter 7). However, according to Ringle *et al.* (2020), due to the lack of a suitable VIF threshold, researchers may adhere to the more conservative rules of thumb, such as 3.33 (Diamantopoulos and Siguaw, 2006) or 5 (Hair *et al.*, 2011). In our study, the VIF value for one formative construct was higher than 3.33, so we carefully re-checked the diagnostics to dismiss any chances of multicollinearity. A similar approach has been adopted in literature (Ranjan and Read, 2016; Ringle *et al.*, 2020).

Further, we evaluated the path coefficients of the relationships (β) between the first-order and the second-order construct to determine their internal validities. We observed that all the first-order constructs had a critical *t*-value well above the threshold value of 2.57 ($p < 0.01$) (see Table 8). Therefore, the first-order constructs (TD, WM and VOP) form a second-order construct (PV), and the proposed measurement model is valid (Table 4). Based on these

Constructs	Source	Indicators	Mean	SD	Loadings	Cronbach alpha	C.R.	AVE
Team Distribution (TD)	Chudoba *et al.* (2005)	TD_1	4.70	2.218	0.902	0.898	0.930	0.770
		TD_2	4.85	2.226	0.925			
		TD_3	4.80	2.138	0.934			
		TD_4	4.21	2.333	0.736			
Workplace Mobility (WM)	Chudoba *et al.* (2005)	WM _1	3.57	2.332	0.672	0.788	0.855	0.542
		WM_2	4.39	2.168	0.796			
		WM_3	5.20	1.836	0.758			
		WM _4	3.92	2.065	0.681			
		WM _5	5.18	1.949	0.764			
Variety of Practices (VOP)	Chudoba *et al.* (2005)	VOP _1	3.75	1.980	0.878	0.911	0.944	0.850
		VOP _2	4.02	2.138	0.953			
		VOP _3	4.19	2.105	0.934			
Conflict Management (CM)	Tekleab *et al.* (2009), Pazos (2012)	CM_1	5.67	1.157	0.605	0.772	0.855	0.600
		CM_2	5.41	1.139	0.826			
		CM_3	5.21	1.205	0.827			
		CM_4	5.17	1.226	0.818			
Perceived Team Performance (PTP)	Cohen and Bailey (1997), Cox (2003), Song *et al.* (2006), Mortensen and Hinds (2001), De Jong *et al.* (2008)	PTP_1	5.71	1.443	0.879	0.945	0.958	0.819
		PTP_2	5.75	1.393	0.904			
		PTP_3	5.55	1.472	0.922			
		PTP_4	5.62	1.474	0.907			
		PTP_5	5.78	1.345	0.913			
Psychological Empowerment (PE)	Spreitzer (1995)	PE_1	5.81	1.132	0.672	0.934	0.944	0.586
		PE_2	5.97	1.026	0.706			
		PE_3	5.93	1.068	0.739			
		PE_4	5.83	1.346	0.898			
		PE_5	5.86	1.249	0.955			
		PE_6	5.41	1.367	0.754			
		PE_7	5.44	1.279	0.792			
		PE_8	5.35	1.425	0.700			
		PE_9	5.98	1.025	0.811			
		PE_10	5.89	1.078	0.680			
		PE_11	5.86	1.136	0.775			
		PE_12	5.96	1.097	0.641			
Team Satisfaction (TS)	Tekleab *et al.* (2009)	TS_1	5.21	1.389	0.947	0.934	0.958	0.884
		TS_2	5.18	1.327	0.954			
		TS_3	5.15	1.553	0.919			
Subjective Well-being (SWB)	Pavot and Diener (1993)	SWB_1	4.55	1.722	0.810	0.945	0.957	0.817
		SWB_2	4.70	1.491	0.940			
		SWB_3	4.81	1.494	0.939			
		SWB_4	4.65	1.571	0.927			
		SWB_5	4.31	1.742	0.897			

Note(s): C.R.-Composite Reliability, AVE-Average Variance Extracted
Source(s): Author's own work

Table 4.
Measurement model

results, it also presents acceptable levels of indicator reliability, convergent validity and discriminant validity. The results also show that the constructs are within acceptable error levels. Thus, the measurement model demonstrates sufficient robustness to test the relationships between the constructs (assessment of the structural model).

5.1.3 Assessment of common method bias. Due to the self-reported nature of the collected data, there was a possibility that the relationships could be potentially affected by common method bias (CMB) (Podsakoff *et al.*, 2003). First, to minimise the effects of consistency

	CM	PE	PTP	TS	SWB	TD	WM	VOP
CM_1	*0.605*	0.259	0.272	0.336	0.268	0.127	0.218	0.221
CM_2	*0.826*	0.210	0.282	0.313	0.324	0.192	0.220	0.292
CM_3	*0.827*	0.276	0.334	0.383	0.343	0.179	0.225	0.266
CM_4	*0.818*	0.316	0.455	0.448	0.372	0.194	0.276	0.328
PE_1	0.150	*0.672*	0.269	0.308	0.144	0.204	0.251	0.241
PE_2	0.230	*0.706*	0.315	0.337	0.178	0.249	0.264	0.248
PE_3	0.239	*0.739*	0.286	0.300	0.128	0.215	0.205	0.223
PE_4	0.347	*0.898*	0.489	0.525	0.283	0.308	0.356	0.344
PE_5	0.332	*0.955*	0.521	0.543	0.322	0.296	0.349	0.304
PE_6	0.389	*0.754*	0.466	0.486	0.341	0.357	0.389	0.333
PE_7	0.291	*0.792*	0.487	0.461	0.325	0.256	0.322	0.245
PE_8	0.286	*0.700*	0.447	0.400	0.398	0.138	0.203	0.176
PE_9	0.222	*0.811*	0.336	0.386	0.186	0.280	0.288	0.266
PE_10	0.162	*0.680*	0.259	0.344	0.171	0.242	0.213	0.219
PE_11	0.196	*0.775*	0.324	0.343	0.147	0.250	0.292	0.283
PE_12	0.208	*0.641*	0.275	0.292	0.224	0.214	0.253	0.252
PTP_1	0.389	0.447	*0.879*	0.669	0.439	0.254	0.256	0.221
PTP_2	0.433	0.467	*0.904*	0.650	0.466	0.238	0.265	0.213
PTP_3	0.411	0.431	*0.922*	0.647	0.524	0.156	0.151	0.198
PTP_4	0.377	0.460	*0.907*	0.666	0.554	0.115	0.143	0.112
PTP_5	0.404	0.493	*0.913*	0.683	0.521	0.260	0.269	0.232
TS_1	0.453	0.518	0.706	*0.947*	0.523	0.338	0.299	0.318
TS_2	0.433	0.506	0.708	*0.954*	0.558	0.330	0.299	0.271
TS_3	0.483	0.476	0.652	*0.919*	0.498	0.349	0.364	0.384
SWB_1	0.230	0.158	0.362	0.352	*0.810*	−0.065	0.006	0.027
SWB_2	0.411	0.355	0.572	0.570	*0.940*	0.017	0.125	0.067
SWB_3	0.465	0.376	0.559	0.575	*0.939*	0.058	0.143	0.157
SWB_4	0.448	0.279	0.486	0.526	*0.927*	−0.010	0.102	0.083
SWB_5	0.300	0.246	0.468	0.442	*0.897*	−0.019	0.071	0.064
TD_1	0.185	0.269	0.201	0.336	0.037	*0.902*	0.500	0.628
TD_2	0.220	0.363	0.227	0.371	0.058	*0.925*	0.517	0.624
TD_3	0.266	0.355	0.240	0.343	0.022	*0.934*	0.535	0.701
TD_4	0.099	0.147	0.115	0.191	−0.134	*0.736*	0.579	0.454
WM_1	0.180	0.158	0.111	0.211	0.118	0.466	*0.672*	0.533
WM_2	0.294	0.342	0.223	0.271	0.118	0.587	*0.796*	0.598
WM_3	0.245	0.263	0.192	0.278	0.025	0.662	*0.758*	0.568
WM_4	0.235	0.280	0.208	0.229	0.133	0.452	*0.681*	0.560
WM_5	0.174	0.330	0.152	0.258	0.028	0.681	*0.764*	0.505
VP_1	0.326	0.214	0.167	0.266	0.139	0.620	0.512	*0.878*
VP_2	0.343	0.374	0.238	0.341	0.074	0.640	0.475	*0.953*
VP_3	0.332	0.363	0.193	0.344	0.051	0.656	0.583	*0.934*

Source(s): Author's own work

Table 5.
Cross-loading
examination of the
constructs

	AVE	CM	PE	PTP	SWB	TD	TS	VOP	WM
CM	0.600	*0.775*							
PE	0.586	0.347	*0.765*						
PTP	0.819	0.446	0.508	*0.905*					
SWB	0.817	0.427	0.327	0.553	*0.904*				
TD	0.770	0.226	0.332	0.228	0.005	*0.878*			
TS	0.884	0.485	0.532	0.733	0.560	0.360	*0.940*		
VOP	0.850	0.362	0.345	0.217	0.095	0.693	0.344	*0.922*	
WM	0.542	0.306	0.378	0.242	0.109	0.643	0.341	0.648	*0.736*

Source(s): Author's own work

Table 6.
Fornell–Larcker
matrix for discriminant
validity

artefacts, we measured the questionnaire items related to the independent variable, followed by the mediating and dependent variables. Second, we tested the presence of CMB by using Harman's one-factor test (Podsakoff *et al.*, 2003). The results demonstrated that the first factor explains 33.830% of the overall variance of the forty-one factors. The fact that the first factor did not account for most of the variance (>50%) indicates that the data is not affected by CMB (Harman, 1967).

As recommended by past literature, we also conducted a marker variable test (Chin *et al.*, 2012; Liang *et al.*, 2021; Podsakoff and Organ, 1986; Rönkkö and Ylitalo, 2011; Shiau *et al.*, 2020). In particular, we followed the procedure adopted by Liang *et al.* (2021). First, we identified the marker variables from our survey responses such that they were not included in our theoretically-based conceptual model and did not have any explicit theoretical influence(s) on the items of the constructs. Additionally, we checked that these marker items presented low correlations to the chosen items for our original theoretical model. We then included the marker items as additional latent variables in our model and analysed their impact on all endogenous variables (Liang *et al.*, 2021; Rönkkö and Ylitalo, 2011). The results of the marker variable test are presented in Table 9. The path coefficients for direct effects and indirect paths suggest that there are no major differences in estimations with and without marker variables. Thus, common method bias can be ruled out in our study.

5.2 Evaluation of structural (inner) model

We employed a bootstrapping technique with resampling (5,000 subsamples) (Hair *et al.*, 2018) to estimate the statistical significance of the hypothesised model. Next, we used a systematic approach to assess the results of the structural model and examine its predictive capabilities and the relationships between the constructs (Hair *et al.*, 2014).

5.2.1 Path coefficients for the structural model. In the present study, the values of path coefficient (β) exist in the range of 0.620 to −0.090 ($p < 0.10$). The result found all proposed hypotheses significant except H4c (β = 0.064, t = 1.204, $p < 0.10$); this hypothesis proposed the relationship between *psychological empowerment* and *subjective well-being*, which is found insignificant. In comparison, two hypotheses (H1b and H5a) are found to be significant ($p < 0.05$). Other hypotheses (H1c, H2, H3, H4a, H4b, H5b, H5c, H8 and H9) are found to be highly significant ($p < 0.001$). The results for all hypotheses with the path coefficients are given in Table 10.

5.2.2 Analysis of the mediating effect. We performed the mediation analysis for the proposed six hypotheses, H6a – H6c and H7a – H7c, based on guidelines provided by

Second-order construct	First-order construct	Tolerance value	VIF
Perceived virtuality	TD	0.280	3.565
	WM	0.237	4.213
	VOP	0.427	2.344
Source(s): Author's own work			

Table 7.
Results of multicollinearity for the first-order construct

Second-order construct	Path	Path coefficient (β)	*t*-stat	*p*-value	Significant
Perceived Virtuality (PV)	TD→ PV	0.391	30.234	0.000***	Yes
	WM→ PV	0.368	33.290	0.000***	Yes
	VOP→ PV	0.330	25.565	0.000***	Yes
Note(s): *Levels of significance are as follows *p < 0.10; **p < 0.05; ***p < 0.01*					
Source(s): Author's own work					

Table 8.
Results of the second-order formative constructs

ITP
37,8

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		Survey		Survey + marker	
		Path Coeff	*p*-value	Path Coeff	*p*-value
Direct Paths					
H1a	PV→PTP	−0.090	0.091*	−0.095	0.086*
H1b	PV→TS	0.138	0.014**	0.115	0.018**
H1c	PV→SWB	−0.215	0.000***	−0.2224	0.009***
H2	PV→PE	0.385	0.000***	0.380	0.000***
H3	PV→CM	0.321	0.000***	0.311	0.000***
H4a	PE→PTP	0.174	0.000***	0.180	0.0086***
H4b	PE→TS	0.371	0.000***	0.386	0.000***
H4c	PE→SWB	0.064	0.223	0.075	0.235
H5a	CM→PTP	0.113	0.023**	0.118	0.030**
H5b	CM→TS	0.312	0.000***	0.322	0.001***
H5c	CM→SWB	0.232	0.000***	0.221	0.000***
H8	TS→PTP	0.620	0.000***	0.655	0.000***
H9	TS→SWB	0.493	0.000***	0.467	0.0095***
	MV→PE	–	–	0.018	0.486
	MV→CM	–	–	0.025	0.485
	MV →PTP	–	–	−0.034	0.433
	MV →TS	–	–	0.004	0.890
	MV →SWB	–	–	0.001	0.669
Indirect Effects					
H6a	PV→PE→ PTP	0.154	–	0.166	–
H6b	PV→PE→ TS	0.281	–	0.264	–
H6c	PV→PE→ SWB	0.239	–	0.211	–
H7a	PV→CM→ PTP	0.124	–	0.110	–
H7b	PV→CM→ TS	0.238	–	0.246	–
H7c	PV→CM→ SWB	0.288	–	0.313	–
	PV→ MV → PTP	–	–	0.016	–
	PV→ MV → TS	–	–	0.004	–
	PV→ MV → SWB	–	–	0.011	–
	PV→ MV → PTP	–	–	0.012	–
	PV→ MV → TS	–	–	0.002	–
	PV→ MV → SWB	–	–	0.004	–

Note(s): *Levels of significance are as follows *p < 0.10; **p < 0.05; ***p < 0.01; MV = Marker Variable*
Source(s): Author's own work

Table 9.
Comparison of the results using Marker Variables

Zhao *et al.* (2010) and Nitzl *et al.* (2016) (see Table 11). The result shows that five (i.e. H6a, H6b, H7a, H7b and H7c) out of the six hypotheses were accepted. Next, we checked for both complementary and competitive mediation effects based on the signs of the direct and indirect paths. Hypotheses H6b and H7b reported a complementary mediation, whereas the rest (H6a, H7a and H7c) reported a competitive mediation (see Table 12).

5.2.3 Coefficient of determination (R^2 value). The coefficient of determination (R^2 value) measures the predictive accuracy of the structural model (Hair *et al.*, 2018; Henseler *et al.*, 2014). The coefficients of determination (R^2) values are 0.570 for PTP, 0.401 for TS and 0.378 for SWB, respectively, indicating high and moderate predictive accuracy. This result reflects that the structural model developed in the study has predictive relevance.

5.2.4 Effect size f^2. In addition to assessing the R^2 values of all endogenous constructs, we evaluated the change in R^2 when we eliminated a specified exogenous construct from the model. The predictive effect of *virtuality* on *performance*, *satisfaction* and *well-being* (0.015, 0.026 and 0.059) was found to be relatively low ($f^2 < 0.15$), indicating low implications on R^2. In contrast, the effects of virtuality on psychological empowerment and conflict management

Hypothesis	Path		Coefficient	t-stat	p-value	Significant
H1a	Relationship between virtuality and team performance	PV→PTP	−0.090	1.693	0.091*	Yes
H1b	Relationship between virtuality and team satisfaction	PV→TS	0.138	2.446	0.014**	Yes
H1c	Relationship between virtuality and subjective well-being	PV→SWB	−0.215	4.752	0.000***	Yes
H2	Relationship between virtuality and psychological empowerment	PV→PE	0.385	7.771	0.000***	Yes
H3	Relationship between virtuality and conflict management	PV→CM	0.321	6.306	0.000***	Yes
H4a	Relationship between psychological empowerment and team performance	PE→PTP	0.174	3.804	0.000***	Yes
H4b	Relationship between psychological empowerment and team satisfaction	PE→TS	0.371	6.062	0.000***	Yes
H4c	Relationship between psychological empowerment and subjective well-being	PE→SWB	0.064	1.204	0.223 (NS)	No
H5a	Relationship between conflict management and team performance	CM→PTP	0.113	2.266	0.023**	Yes
H5b	Relationship between conflict management and team satisfaction	CM→TS	0.312	5.993	0.000***	Yes
H5c	Relationship between conflict management and subjective well-being	CM→SWB	0.232	4.257	0.000***	Yes
H8	Relationship between Team satisfaction and Team Performance	TS→PTP	0.620	11.791	0.000***	Yes
H9	Relationship between Team satisfaction and subjective well-being	TS→SWB	0.493	8.140	0.000***	Yes

Note(s): *Levels of significance are as follows *p < 0.10; **p < 0.05; ***p < 0.01*
Source(s): Author's own work

(0.174 and 0.155) were moderate ($0.15 < f^2 < 0.35$). The impacts of both of these mediators, i.e. *psychological empowerment* on *satisfaction* (0.183 and psychological empowerment on *conflict management* (0.136), showed moderate effects. In addition, the effect of *satisfaction* on *performance* ($f^2 = 0.535$) was high, while the considerably moderate impact on well-being ($f^2 = 0.234$) implies for R^2 value.

5.2.5 Blindfolding and predictive relevance Q^2. The predictive relevance Q^2 values (Stone–Geisser test) of endogenous variables PTP, TS and SWB were 0.440, 0.333 and 0.284, respectively. However, all these values were above zero, confirming that the structural model exhibited predictive relevance for all outcome variables, i.e. *team performance*, *satisfaction* and *subjective well-being*. Further, the root mean square residual (RMSR) value was 0.081, less than the criteria of 0.10; hence, the model showed a good fit.

Path		Direct path coefficient (β)			Indirect effect			Total effect	VAF	Mediation type
		a	b	c	a x b	SE	t-stat			
H6a	PV→PE→PTP	0.385	0.174	−0.090	0.067	0.019	3.509	0.154	0.435	Partial Mediation (Competitive Mediation)
H6b	PV→PE→TS	0.385	0.371	0.138	0.143	0.029	4.944	0.281	0.509	Partial Mediation (Complementary Mediation)
H6c	PV→PE→SWB	0.385	0.064	−0.215	0.025	0.022	1.162	0.239	0.105	No Mediation
H7a	PV→CM→PTP	0.321	0.113	−0.090	0.036	0.018	2.134	0.124	0.290	Partial Mediation (Competitive Mediation)
H7b	PV→CM→TS	0.321	0.312	0.138	0.100	0.021	4.870	0.238	0.420	Partial Mediation (Complementary Mediation)
H7c	PV→CM→SWB	0.321	0.232	−0.215	0.074	0.022	3.407	0.288	0.257	Partial Mediation (Competitive Mediation)

Source(s): Author's own work

Table 11.
Results for mediating effects

6. Discussion of the results

6.1 Effect of virtuality on team outcomes

This study finds that *virtuality* affects all three outcomes. It negatively affects *perceived team performance* ($\beta = -0.090$, $p < 0.10$). Hence, H1a is not supported because we have hypothesised the positive impact of virtuality on performance (Table 12). The negative influence could be a high dependency on technology such as video conferencing, instant messaging and email for communication, which can limit nonverbal cues and create communication barriers such as misunderstandings and misinterpretations. These barriers can negatively impact team members' ability to collaborate effectively and may decrease perceived team performance. This finding echoes De Guinea *et al.* (2012), who reported that the relationship between virtual teams and performance could be found in both directions, i.e. positive and negative. However, the relationship can also depend on the context and the "task" (i.e. *task complexity* and *interdependence*). Recent studies by Handke *et al.* (2021) and Costa *et al.* (2021) have identified that contrary to previous findings, interdependence can play an important role in virtual teams. While we measured *perceived virtuality* as a second-order construct with the help of *team distribution*, *workplace mobility* and *variety of practices*, Schaubroeck and Yu (2017) argue that a virtual team's core characteristics (such as *skill differentiation* and *temporal stability*) will differentially affect the opportunities presented by a virtual team. The growing popularity of the metaverse (Cheng *et al.*, 2022; Dwivedi *et al.*, 2022; Peukert *et al.*, 2022; Shiau and Huang, 2023) also supports the idea of this study in measuring the performance of virtual teams with the effect of virtuality measured by *team distribution*, *workplace mobility* and *variety of practices*.

Next, we found that *virtuality* positively influences individuals' *team satisfaction* ($\beta = 0.138$, $p < 0.05$); hence, H1b is supported by the results. It may be because virtual teams may allow individuals to work with diverse team members, regardless of geographical location, leading to opportunities for exposure to different perspectives, experiences and cultures, which can increase their team satisfaction. These findings align with previous studies (De Guinea *et al.*, 2012; Handke *et al.*, 2021; Rogers *et al.*, 2021), affirming that the virtual team environment positively affects an individual's satisfaction with the team.

Hypothesis		Status
H1a	Virtuality will positively influence perceived team performance of individuals' working in virtual teams	Not Supported
H1b	Virtuality will positively influence team satisfaction of individuals' working in virtual teams	Supported
H1c	Virtuality will positively influence the subjective well-being of individuals' working in virtual teams	Not Supported
H2	Virtuality will positively influence the psychological empowerment of employees working in virtual teams	Supported
H3	Virtuality will positively influence the conflict management process within virtual teams	Supported
H4a	Psychological empowerment will positively influence perceived team performance of individuals' working in virtual teams	Supported
H4b	Psychological empowerment will positively influence team satisfaction of individuals' working in virtual teams	Supported
H4c	Psychological empowerment will positively influence the subjective well-being of individuals' working in virtual teams	Not Supported
H5a	Conflict management will positively influence the perceived performance of individuals' working in virtual teams	Supported
H5b	Conflict management will positively influence team satisfaction of individuals' working in virtual teams	Supported
H5c	Conflict management will positively influence the subjective well-being of individuals' working in virtual teams	Supported
H6a	Psychological empowerment will mediate the relationship between virtuality and perceived team performance	Supported
H6b	Psychological empowerment will mediate the relationship between virtuality and team satisfaction	Supported
H6c	Psychological empowerment will mediate the relationship between virtuality and subjective well-being	Not Supported
H7a	Conflict management will mediate the relationship between virtuality and perceived team performance	Supported
H7b	Conflict management will mediate the relationship between virtuality and team satisfaction	Supported
H7c	Conflict management will mediate the relationship between virtuality and subjective well-being	Supported
H8	Team satisfaction will positively influence the perceived team performance of individuals' working in virtual teams	Supported
H9	Team satisfaction will positively influence the subjective well-being of individuals' working in virtual teams	Supported

Source(s): Author's own work

Table 12.
Summary of the results

In addition, the only empirical study that comes closest to ours by adopting *team satisfaction* as an outcome (see Table 1) is by Rogers *et al.* (2021). By applying the IMO framework, they also found the positive effect of team processes towards team satisfaction within VTs. Our finding is also congruent with Dulebohn and Hoch (2017). They identified two levels of outcome – first, *team level* (such as team performance) and second, *individual outcomes* (such as team-member satisfaction). In addition, if teams choose to work virtually, managers might encourage occasional face-to-face meetings to improve *team satisfaction* (Schweitzer and Duxbury, 2010). On the contrary, few scholars also find conflicting effects of virtuality on team satisfaction. Stark and Bierly (2009) find that relationship conflict has a more toxic effect on *team satisfaction* with increasing virtuality. Further, using "virtual world" tools such as metaverse (Cheng *et al.*, 2022; Dwivedi *et al.*, 2022; Peukert *et al.*, 2022; Shiau and Huang, 2023) also highlight the importance of *team satisfaction* in conducting tasks, such as training, performance evaluation and team-building exercises across virtual teams.

Next, we assessed the impact of virtuality on an individual's satisfaction towards life (subjective well-being) and found a negative relationship among them. However, we have proposed a positive effect of *virtuality* on the *individual's well-being* ($\beta = -0.215$, $p < 0.01$); therefore, H1c is not supported by the results. The reason could be a high dependency on ICT for communication and collaboration in virtual teams, creating a sense of social isolation. The lack of face-to-face interaction may result in disconnection and a reduced sense of belonging among team members. Furthermore, the absence of physical proximity may reduce emotional support and positive feedback, leading to decreased motivation and lower subjective well-being. In addition, virtual teamwork is not suitable for all; people working in virtual teams may respond differently at different team development phases. Few scholars have also identified similar unfavourable effects of virtual work on the well-being of employees. Villamor *et al.* (2023) found that increased virtuality in the workplace could jeopardise the subjective well-being of the women workforce. Palgi *et al.* (2020) found that loneliness has been a major health issue during the COVID-19 pandemic, making VT team members more susceptible to depression, anxiety and comorbidity. On the contrary, Doyle and Conboy (2020) proposed a selection of "liquid modernity" theoretical principles, which showed an implicit positive effect of remote work and telecommuting on workers' subjective well-being. Abelsen *et al.* (in press) examined the role of task and technology fit on work performance and the psychological well-being of workers. They noted that designing ICTs based on "task–technology fit" makes individuals less likely to experience feelings of loneliness and enjoy improved psychological well-being.

6.2 Effect of virtuality on psychological empowerment and conflict management

We also find that *virtuality* positively affects *psychological empowerment* ($\beta = 0.385$, $p < 0.01$); hence, H2 is supported. It may be because VTs are flexible work arrangements that provide individuals with more autonomy over their work, increasing their sense of control over their work environment and leading to higher psychological empowerment. These findings align with previous studies such as Kirkman and Rosen (1999) and Kirkman *et al.* (2004), who reported that virtual teams are empowered workplaces, and the employees possessed a high sense of *psychological empowerment*, leading to a positive impact on team performance. Further, Hill *et al.* (2014) found that the relationship between leader-member exchange in virtual teams and *psychological empowerment* is moderated by the degree of electronic communication (i.e. virtuality). Similarly, He *et al.* (2014) examined the negative effect of competition on *team empowerment* across hybrid-virtual teams of IT firms in Taipei, while *team empowerment* fostered knowledge-sharing and flexibility.

Next, we find that *virtuality* positively affects *conflict management* ($\beta = 0.321$, $p < 0.01$); thereby, H3 is supported. As we know, VTs are more task-oriented structures with greater anonymity for team members, which can help reduce tensions during conflicts and encourage formal communication, leading to more effective conflict resolution. Also, relationships within virtual teams are more professional as compared to collocated teams. These findings align with previous studies such as Paul *et al.* (2004a) and Paul *et al.* (2004b). They reported that group heterogeneity affects collaborative conflict management style, leading to team performance outcomes (such as *satisfaction with the decision-making process*, *perceived decision quality*, *perceived participation* and *group agreement*). Kankanhalli *et al.* (2006) found that the *volume of electronic communication*, *functional diversity* and *cultural diversity* affected *task* and *relationship conflicts*, affecting *team performance*. In contrast, Martínez-Moreno *et al.* (2015) used content analysis of chat messages and found that team feedback about processes improved *conflict management* in virtual teams. However, our findings contradict De Jong *et al.* (2008), who found that *conflict management* in virtual teams was less effective than in face-to-face groups.

6.3 Mediating roles of conflict management and psychological empowerment
The results from mediation analysis suggest that five were accepted among the six hypotheses we proposed (i.e. H6a, H6b, H7a, H7b and H7c). However, the indirect effect of PE →SWB was non-significant ($\beta = 0.064$, $p > 0.05$), so H6c was not supported. Hence, we can conclude that the proposed mediation does not exist. Based on the direct and indirect paths, we found both mediation effects (i.e. complementary and competitive mediation) in our study (see Table 11). Hypotheses H6b and H7b were found to have a complementary mediation, where the mediation of psychological empowerment and conflict management between virtuality and team satisfaction was proposed. These results support the proposed relationships and the theory that both mediators facilitate the team satisfaction of an individual working in virtual teams. The existence of complementary mediation demonstrated that feelings of a sense of empowerment and the existence of cordial interpersonal relationships have a positive impact on the virtual environment on an individual's team satisfaction. In their comprehensive literature review, Rapp *et al.* (2021) identified team psychological empowerment as a cognitive team emergent state. Extant literature on VTs has also identified *psychological empowerment* as a mediator between inputs and outcomes such as *participative goal setting* and *team outcomes* (Lee and Wei, 2011); *agile antecedents* and *innovative behaviour* of employees (Malik *et al.*, 2021); *team-directed leadership* and *organisational citizenship* (Li *et al.*, 2017). Further, VT literature has also presented the effects of *psychological empowerment* towards team outcomes, such as a *sense of task motivation* to increase *team performance* (Seibert *et al.*, 2011), *increased team engagement* to influence the *project outcomes* (Mills *et al.*, 2020); *organisational empowerment climate* and *employee service quality* (Lin *et al.*, 2017). Extant literature on VTs has shown that *conflict management* successfully mediates between team inputs and team outcomes, such as *commitments to team goals* and *perceived performance satisfaction* (Pazos, 2012). Gilson *et al.* (2015) found that *conflict management* has been used as a mediator that adversely affected team processes and outcomes.

The rest of the hypotheses (H6a, H7a and H7c) reported competitive mediation effects. From H6a, we found that an individual's high sense of psychological empowerment increases *team performance* by decreasing the negative impact of virtuality or mitigating the negative effects of virtuality by enhancing communication and collaboration among team members. While the results of H7a and H7c demonstrate that well-managed conflict within virtual teams facilitates better interpersonal processes that suppress the direct negative effects of virtuality on an individual's performance and the sense of well-being. By addressing conflicts constructively, VTs can facilitate better interpersonal processes, improving team performance and member satisfaction. Paul *et al.* (2004a) and Paul *et al.* (2004b) have reported similar effects while studying the effects of *conflict management* towards the outcome measure (in a team or group), such as *collaborative conflict management style* to increase *decision-related outcomes* (i.e. *satisfaction, perceived quality, perceived participation* and *agreement*).

6.4 Effect of team satisfaction on other team outcomes
In addition, our study also examined the effect of individual *team satisfaction* on the remaining team outcomes, i.e. *perceived team performance* and *subjective well-being*. The proposed relationship between *team satisfaction* and *perceived team performance* (H8: $\beta = 0.620$, $p < 0.01$) demonstrated a high impact within virtual teams. Thus, satisfied employees are more engaged and productive. Extant literature on VTs has reported similar findings. Stark and Bierly (2009) found that relationship conflict has a more toxic effect on *team satisfaction* with increasing virtuality among teams. Jeanquart Miles and Mangold (2002) found that the team leaders' performance influenced *team satisfaction*. Gilli *et al.* (2022)

found that average satisfaction within the team leads to higher performance across teams and individuals. Cavazotte *et al.* (2020) examined the effects of *team satisfaction* on *team performance*, leading to positive customer satisfaction.

Next, our study finds that *team satisfaction* catalyses an individual's affective reaction, i.e. an employee's well-being. This finding was supported by the results from the proposed relationship between *team satisfaction* and *subjective well-being* (H9: β = 0.493, p < 0.01). Therefore, individuals satisfied with the virtual team as their current work environment are happy in their everyday lives. While *team satisfaction* is an important metric for virtual teams (Gilson *et al.*, 2015; Handke *et al.*, 2021), team success needs to be measured by performance indicators (i.e. *team performance*) as well as by *subjective well-being* (Gilli *et al.*, 2022). On the contrary, conflict at work is detrimental to an individual's well-being (De Dreu *et al.*, 2004). Finally, the growing popularity of using "virtual world" platforms such as AR/VR and metaverse across virtual teams also highlight the importance of *team satisfaction* across the performance outcomes of VTs – i.e. *team performance* and *subjective well-being.* For instance, Shiau and Huang (2023) examine the fit and integration of a game's virtual world and reality from the perspective of information systems. While these novel tools can enhance performance evaluation across virtual teams, they also need real applicability and fitment.

7. Implications of this study
7.1 Theoretical implications
This study makes three major theoretical contributions. First, we theorised and tested the mediating roles of behavioural team processes (i.e. *conflict management*) and emergent states (i.e. *psychological empowerment*) on the combined effects of (1) *perceived virtuality* and *affective outcomes* (i.e. *team satisfaction* and *subjective well-being*); (2) *perceived virtuality* and *effectiveness outcomes* (i.e. *perceived team performance*). Existing research on the virtuality of teams focuses mainly on the following as inputs to the IMO framework: *leadership* (e.g. Andressen *et al.*, 2012; Han *et al.*, 2018); *team-related* characteristics (e.g. Algesheimer *et al.*, 2011; Holtz *et al.*, 2020; Malik *et al.*, 2021; Wei *et al.*, 2018) and *individual* characteristics and skills (e.g. Fuller *et al.*, 2016; Rosen *et al.*, 2015; Rogers *et al.*, 2021; Zhang and Guo, 2019). Therefore, our findings add to the existing body of literature on VTs (see Table 1 and Table 2), where a few studies have examined VTs with the IMO framework using virtuality as input (measured by *team distribution*, *workplace mobility* and *variety of practices*) and include the mediating effects of both behavioural team processes (i.e. *conflict management*) and emergent states (i.e. *psychological empowerment*) leading to *affective* and *effectiveness outcomes.*

Second, our paper theorises and empirically tests the relationships between *perceived virtuality* and *team outcomes* (i.e. both *affective* and *effectiveness*). It also examines the effect of *team satisfaction* on the other two forms of team outcomes (i.e. *perceived team performance* and *subjective well-being*). We add to the limited literature in this domain (Handke *et al.*, 2021; Purvanova and Kenda, 2022). Handke *et al.* (2021) studied *team virtuality* as input, perceived virtuality as a mediator, and *task performance* and *satisfaction* as outputs. In contrast, Purvanova and Kenda (2022) identified virtuality as a significant negative input to team effectiveness. Handke *et al.* (2021) also suggested that future scholars need to provide an empirical measure of how "virtual" a team perceives itself to be. Purvanova and Kenda (2022) also emphasise that results obtained from non-organisational studies could not be generalised or may have non-generalisability effects. However, these insights have not been formalised in theoretically-based research models or tested empirically. In this regard, we integrated the future research directions proposed by Handke *et al.* (2021) and Purvanova and Kenda (2022).

Third, while most scholars studied virtual teams in the context of developed economies (Baralou and Dionysiou, 2022; Lin and Roan, 2021), this study makes a humble attempt to

examine VTs in emerging economies. Hence, this study may be considered an early endeavour offering an exploratory lens to examine virtual teams in Indian IT organisations. Findings from this study add to the literature (Handke *et al.*, 2021; Purvanova and Kenda, 2022) about how individuals (working in virtual teams) perceive those *virtual teams* as workplaces (i.e. *empowered* or *powerless*) with the intervention of appropriate *conflict management* techniques to reach successful team performance outcomes across emerging economies such as India.

7.2 Managerial implications
The findings of this study also provide implications for managers in organisations who manage team members and task deliveries across virtual teams, especially in emerging market economies. First, *virtuality* (comprised of *workplace mobility*, *team distribution* and *variety of practices*) within a team can be characteristic of today's workplace, especially after the COVID-19 pandemic [5]. Therefore, managers overseeing team members in VTs are keen to observe their effectiveness outcomes (such as team and *individual member performance*). Thus, managers in VTs need to apprehend ways and mechanisms to champion the cause of employees and bring out their best performances. Our findings also suggest likewise: when *virtuality* alone cannot wield a strong and positive influence over the *perceived team performance* of individuals working in VTs, *psychological empowerment* will mediate their relationship and make it stronger and effective (see H1a versus H6a). Often, such techniques may include supporting the employees to understand their competencies, meaning, self-determination and impacts of their job roles (Spreitzer, 1995). In addition to *virtuality* in teams, empowerment may also involve *job enlargement* (increasing the horizontal scope of the employee's job role); *job enrichment* (increasing the vertical depth of the employee's job role); relevant training; access to decision-making information and display of confidence of the manager(s) towards the team member to undertake greater responsibilities [6].

Second, managers who engage with employees in virtual teams must also look at their *affective outcomes* (such as *team satisfaction* and *subjective well-being*). And, so, managers in VTs need to take care of the team satisfaction of individuals working in those VTs. Findings from our study also support their actions. Although *virtuality* and *team satisfaction* enjoy a positive and significant and positive relationship, *psychological empowerment* mediates their relationship and strengthens it (see H1b versus H6b). Often, organisational activities to improve *team satisfaction* in conjunction with *psychological empowerment* may involve the *satisfaction of an individual while working with team members*, the *satisfaction of an individual while working within a team*, or *how pleased was an individual in the way they worked together with the team members* (Tekleab *et al.*, 2009). Managers conduct virtual learning activities and training within the organisation and sometimes allow sick employees to attend office duties virtually online, if possible, when commuting is challenging [7]. In addition, if teams choose to work virtually, managers might encourage occasional face-to-face meetings to improve *team satisfaction* (Schweitzer and Duxbury, 2010). On the contrary, *virtuality* does not significantly influence the subjective well-being of individuals working in VTs. The mediation of *psychological empowerment* also does not improve this relationship (see H1c vs H6c).

Third, the findings from our study regarding the mediating effects of *conflict management* are also interesting. Although *virtuality* and *team satisfaction* enjoy a positive and significant and positive relationship, *conflict management* complementary mediates their relationship and makes it even stronger (see H1b vs H7b). Often, members in virtual teams employ different techniques to manage conflicts, such as *whether a conflict is dealt with openly within the virtual team*, or *if a conflict arises on the virtual team, the members involved in the conflict initiate steps to resolve the conflict immediately*, and finally, *whether the team can avoid the negative aspects of conflict before they occur* (Tekleab *et al.*, 2009). Similarly, *perceived virtuality*

significantly influences the *subjective well-being* of individuals working in VTs, and the partial mediation of *conflict management* also improves this relationship (see H1c vs H7c). This finding is important for managers in VTs because they must organise organisational activities to resolve the conflict in VTs. These activities may increase an individual's satisfaction *while working with VT members* or increase the *satisfaction of an individual while working within a team*, improving overall *subjective well-being* within a VT.

Fourth, the findings from our study may also help HR managers to design more effective solutions in the industry space of "virtual worlds" platforms such as metaverse and AR/VR (Cheng *et al.*, 2022; Dwivedi *et al.*, 2022; Peukert *et al.*, 2022; Shiau and Huang, 2023). After the COVID-19 pandemic, there has been a growing demand for hybrid work across corporates. Many startups, such as Vastly [8] and Party Space [9], are creating video games for team-building exercises for remote and virtual teams and fun events for large groups with a live host. The offerings have quickly become popular with international technology giants such as Google, Amazon, Facebook, Apple, Waymo and Adobe. While our study identifies a few important findings, they can be useful in designing effective and interactive solutions in the virtual space, keeping in mind the importance of *psychological empowerment* and *conflict management* as mediators while enumerating the final performance outcomes of a virtual team.

8. Conclusions and future research directions

Despite the recognised importance of virtual teams in the growth of contemporary business organisations, the present study aims to explore virtual teams in an emerging economy and adds to the literature in this domain (Handke *et al.*, 2021; Purvanova and Kenda, 2022). Virtuality is a multidimensional construct that can be understood through discontinuities arising from virtual teams (Watson-Manheim *et al.*, 2002, 2012). The findings of this study suggest that to reap the advantages of virtual teams (i.e. *performance*, *team satisfaction* and *well-being*), managers and organisations ought to develop good team behaviours (i.e. processes) and encourage positive empowerment instead of merely focusing on outcomes. One way to accomplish this objective is by actively engaging in interventions that empower teams. The study's findings have general implications for virtual teams and human-technology interfaces (Vidolov, 2022). The study also helps widen our understanding of the various psychological variables associated with teamwork in virtual teams. The study will be valuable in implementing and developing well-functioning, sustainable virtual collaboration across organisations. These findings will greatly aid in assessing the consequences of virtual teamwork at both individual and organisational levels.

Despite these interesting findings, our study has a few limitations. First, the study was conducted by collecting data only once. Hence, future research can adopt a longitudinal design that may help explore any temporal effects in virtual teams. Second, the current research engaged with respondents who represented the work culture of a single country (i.e. India). Therefore, future studies may examine onsite and offshore knowledge workers as members of global virtual teams and then examine cross-cultural effects within them. Third, the study primarily concerned an individual as the "unit of analysis" in a virtual team. Future studies may consider a virtual team as the "unit of analysis" and examine its interplays.

Notes

1. Twitter feed from Richard Branson: https://twitter.com/richardbranson/status/435376261603393537

2. State Of Remote Work 2020: https://buffer.com/state-of-remote-work/2020

3. Remote Workers and Rest: https://amerisleep.com/blog/remote-workers-and-rest/

4. SHRM Research Reveals Negative Perceptions of Remote Work: https://www.shrm.org/about-shrm/press-room/press-releases/pages/-shrm-research-reveals-negative-perceptions-of-remote-work.aspx

5. Work From Home Is The New Normal For Workers Around The World: https://www.forbes.com/sites/timbajarin/2021/04/29/work-from-home-is-the-new-normal-for-workers-around-the-world/

6. What is employee empowerment? https://asq.org/quality-resources/employee-empowerment

7. My virtual agile team experience: https://www.mckinsey.com/careers/meet-our-people/mckinsey-women-blog/my-virtual-agile-team-experience

8. From the Home Office to the Metaverse: Vastly is Pioneering the Future of Remote Team Building and Beyond: https://www.remoteteambuilding.io/

9. https://www.party.space/virtual-team-building/

References

Abelsen, S.N., Vatne, S.H., Mikalef, P. and Choudrie, J. (In press), "Digital working during the COVID-19 pandemic: how task–technology fit improves work performance and lessens feelings of loneliness", *Information Technology and People*, doi: 10.1108/ITP-12-2020-0870.

Algesheimer, R., Dholakia, U.M. and Gurău, C. (2011), "Virtual team performance in a highly competitive environment", *Group and Organization Management*, Vol. 36 No. 2, pp. 161-190.

Amor, A.M., Xanthopoulou, D., Calvo, N. and Vázquez, J.P.A. (2021), "Structural empowerment, psychological empowerment, and work engagement: a cross-country study", *European Management Journal*, Vol. 39 No. 6, pp. 779-789.

Andressen, P., Konradt, U. and Neck, C.P. (2012), "The relation between self-leadership and transformational leadership: competing models and the moderating role of virtuality", *Journal of Leadership and Organizational Studies*, Vol. 19 No. 1, pp. 68-82.

Bandura, A. (1977), "Self-efficacy: toward a unifying theory of behavioral change", *Psychological Review*, Vol. 84 No. 2, pp. 191-215.

Bandura, A. (1982), "Self-efficacy mechanism in human agency", *American Psychologist*, Vol. 37 No. 2, pp. 122-147.

Baralou, E. and Dionysiou, D.D. (2022), "Routine dynamics in virtual teams: the role of technological artifacts", *Information Technology and People*, Vol. 35 No. 7, pp. 1980-2001, doi: 10.1108/ITP-03-2020-0109.

Baron, R.A. (1989), "Personality and organizational conflict: effects of the Type A behavior pattern and self-monitoring", *Organizational Behavior and Human Decision Processes*, Vol. 44 No. 2, pp. 281-296.

Becker, J.M., Klein, K. and Wetzels, M. (2012), "Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models", *Long Range Planning*, Vol. 45 Nos 5/6, pp. 359-394.

Brislin, R.W. (1980), "Translation and content analysis of oral and written materials", in Triandis, H.C. and Berry, J.W. (eds), *Handbook of Cross-Cultural Psychology*, pp. 389-444, Boston: Allyn & Bacon.

Brown, M.I., Prewett, M.S. and Grossenbacher, M.A. (2020), "Distancing ourselves from geographic dispersion: an examination of perceived virtuality in teams", *Group Dynamics: Theory, Research, and Practice*, Vol. 24 No. 3, pp. 168-185.

Buchanan, D., Boddy, D. and McCalman, J. (1988), "Getting in getting on getting out and getting back", in Bryman, A. (Ed.), *Doing Research in Organisations*, Routledge, London, pp. 53-67.

Caballer, A., Gracia, F. and Peiró, J.M. (2005), "Affective responses to work process and outcomes in virtual teams: effects of communication media and time pressure", *Journal of Managerial Psychology*, Vol. 20 Nos 3/4, pp. 245-260.

Cañibano, A., Chamakiotis, P., Rojahn, L. and Russell, E. (2021), "Understanding well-being in virtual teams: a comparative case study", *European, Mediterranean, and Middle Eastern Conference on Information Systems*, Springer, Cham, pp. 667-680.

Caputo, A., Kargina, M. and Pellegrini, M.M. (2023), "Conflict in virtual teams: a bibliometric analysis, systematic review, and research agenda", *International Journal of Conflict Management*, Vol. 34 No. 1, pp. 1-31.

Carless, S.A. (2004), "Does psychological empowerment mediate the relationship between psychological climate and job satisfaction?", *Journal of Business and Psychology*, Vol. 18 No. 4, pp. 405-425.

Cavazotte, F., Moreno, V. and Lasmar, L.C.C. (2020), "Enabling customer satisfaction in call center teams: the role of transformational leadership in the service-profit chain", *The Service Industries Journal*, Vol. 40 Nos 5-6, pp. 380-393.

Chamakiotis, P. (2020), "Virtual teams as creative and agile work environments", in Grant, C. and Russell, E. (Eds), *Agile Working and Well-Being in the Digital Age*, Palgrave Macmillan, Cham.

Chamakiotis, P., Panteli, N. and Davison, R.M. (2021), "Reimagining e-leadership for reconfigured virtual teams due to Covid-19", *International Journal of Information Management*, Vol. 60, 102381.

Chen, G., Kirkman, B.L., Kanfer, R., Allen, D. and Rosen, B. (2007), "A multilevel study of leadership, empowerment, and performance in teams", *Journal of Applied Psychology*, Vol. 92 No. 2, pp. 331-346.

Chen, J., Hsu, P.-Y., Chang, Y.-W., Shiau, W.-L. and Lan, Y.-C. (2022), "For free or paid? A comparison of doctors' intention to offer consulting services in eHealth", *Industrial Management and Data Systems*, Vol. 122 No. 8, pp. 1816-1852.

Cheng, X., Mou, J., Shen, X., de Vreede, T. and Raianer, A. (2022), "Call for paper: opportunities and challenges in the metaverse", *Internet Research*, available at: https://www.emeraldgrouppublishing.com/calls-for-papers/opportunities-and-challenges-metaverse

Chin, W.W. (1998), "Issues and opinion on structural equation modelling", *MIS Quarterly*, Vol. 22 No. 1, pp. vii-xvi.

Chin, W.W. and Newsted, P.R. (1999), "Structural equation modelling analysis with small samples using partial least squares", in Hoyle, R.H. (Ed.), *Statistical Strategies for Small Sample Research*, Sage, Thousand Oaks, CA, pp. 307-341.

Chin, W.W., Thatcher, J.B. and Wright, R.T. (2012), "Assessing common method bias: problems with the ULMC technique", *MIS Quarterly*, Vol. 36 No. 3, pp. 1003-1019.

Chudoba, K.M., Wynn, E., Lu, M. and Watson-Manheim, M.B. (2005), "How virtual are we? Measuring virtuality and understanding its impact in a global organisation", *Information Systems Journal*, Vol. 15 No. 4, pp. 279-306.

Cohen, S.G. and Bailey, D.E. (1997), "What makes teams work: group effectiveness research from the shop floor to the executive suite", *Journal of Management*, Vol. 23 No. 3, pp. 239-290.

Cohen, S.G. and Gibson, C.B. (2003), "In the beginning: introduction and framework", in Gibson, C.B. and Cohen, S.G. (Eds), *Virtual Teams that Work: Creating Conditions for Virtual Team Effectiveness*, Jossey-Bass, San Francisco, pp. 1-13.

Conger, J.A. and Kanungo, R.N. (1988), "The empowerment process: integrating theory and practice", *Academy of Management Review*, Vol. 13 No. 3, pp. 471-482.

Cooper, D.R. and Schindler, P.S. (2007), *Business Research Methods*, Tata McGraw-Hill Publishing Company, New Delhi.

Costa, P.L., Handke, L. and O'Neill, T.A. (2021), "Are all lockdown teams created equally? Work characteristics and team perceived virtuality", *Small Group Research*, Vol. 52 No. 5, pp. 600-628.

Coultas, C.W., Driskell, T., Burke, C.S. and Salas, E. (2014), "A conceptual review of emergent state measurement: current problems, solutions", *Small Group Research*, Vol. 45 No. 6, pp. 671-703.

Courtright, S.H., Thurgood, G.R., Stewart, G.L. and Pierotti, A.J. (2015), "Structural interdependence in teams: an integrative framework and meta-analysis", *Journal of Applied Psychology*, Vol. 100 No. 6, pp. 1825-1846.

Cox, K.B. (2003), "The effects of intrapersonal, intragroup, and intergroup conflict on team performance effectiveness and work satisfaction", *Nursing Administration Quarterly*, Vol. 27 No. 2, pp. 153-163.

Crisp, C.B. and Jarvenpaa, S.L. (2013), "Swift trust in global virtual teams: trusting beliefs and normative actions", *Journal of Personnel Psychology*, Vol. 12 No. 1, pp. 45-56.

De Dreu, C.K.W. and Weingart, L.R. (2003), "Task versus relationship conflict: team performance, and team member satisfaction: a meta-analysis", *Journal of Applied Psychology*, Vol. 88 No. 4, pp. 741-749.

De Dreu, C.K., Van Dierendonck, D. and Dijkstra, M.T. (2004), "Conflict at work and individual well-being", *International Journal of Conflict Management*, Vol. 15 No. 1, pp. 6-26.

De Guinea, A.O., Webster, J. and Staples, D.S. (2012), "A meta-analysis of the consequences of virtualness on team functioning", *Information and Management*, Vol. 49 No. 6, pp. 301-308.

De Jong, R., Schalk, R. and Curşeu, P.L. (2008), "Virtual communicating, conflicts and performance in teams", *Team Performance Management: An International Journal*, Vol. 14 Nos 7/8, pp. 364-380.

Deery, S., Iverson, R. and Walsh, J. (2002), "Work relationships in telephone call centres: understanding emotional exhaustion and employee withdrawal", *Journal of Management Studies*, Vol. 39 No. 4, pp. 471-496.

Derks, D., Duin, D., Tims, M. and Bakker, A.B. (2015), "Smartphone use and work–home interference: the moderating role of social norms and employee work engagement", *Journal of Occupational and Organizational Psychology*, Vol. 88 No. 1, pp. 155-177.

Diamantopoulos, A. and Siguaw, J.A. (2006), "Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration", *British Journal of Management*, Vol. 17 No. 4, pp. 263-282.

Diener, E. (1984), "Subjective well-being", *Psychological Bulletin*, Vol. 95 No. 3, pp. 542-575.

Doyle, R. and Conboy, K. (2020), "The role of I.S. in the covid-19 pandemic: a liquid-modern perspective", *International Journal of Information Management*, Vol. 55, 102184.

Dulebohn, J.H. and Hoch, J.E. (2017), "Virtual teams in organisations", *Human Resource Management Review*, Vol. 27 No. 4, pp. 569-574.

Dwivedi, Y.K., Hughes, L., Baabdullah, A.M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M.M., Dennehy, D., Metri, B., Buhalis, B., Cheung, C.M.K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D.P., Gustafsson, A., Hinsch, C., Jebabli, I., Janssen, M., Kim, Y-G., Kim, J., Koos, S., Kreps, D., Kshetri, N., Kumar, V., Ooi, K-B., Papagiannidis, S., Pappas, I.O., Polyviou, A., Park, S-M., Pandey, N., Queiroz, M.M., Raman, R., Rauschnabel, P.A., Shirish, A., Sigala, M., Spanaki, K., Tan, G.W-H., Tiwari, M.K., Viglia, G. and Wamba, S.F. (2022), "Metaverse beyond the hype: multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy", *International Journal of Information Management*, Vol. 66, p.102542.

D'Innocenzo, L., Kukenberger, M., Farro, A.C. and Griffith, J.A. (2021), "Shared leadership performance relationship trajectories as a function of team interventions and members' collective personalities", *The Leadership Quarterly*, Vol. 32 No. 5, 101499.

Elder, J.W. (1976), "Comparative cross-national methodology", *Annual Review of Sociology*, Vol. 2 No. 1, pp. 209-230.

Fock, H., Chiang, F., Au, K.Y. and Hui, M.K. (2011), "The moderating effect of collectivistic orientation in psychological empowerment and job satisfaction relationship", *International Journal of Hospitality Management*, Vol. 30 No. 2, pp. 319-328.

Fock, H., Hui, M.K., Au, K. and Bond, M.H. (2013), "Moderation effects of power distance on the relationship between types of empowerment and employee satisfaction", *Journal of Cross-Cultural Psychology*, Vol. 44 No. 2, pp. 281-298.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Foster, M.K., Abbey, A., Callow, M.A., Zu, X. and Wilbon, A.D. (2015), "Rethinking virtuality and its impact on teams", *Small Group Research*, Vol. 46 No. 3, pp. 267-299.

Fricker, R.D. (2014), "Sampling methods for web and E-mail surveys", in Fielding, N.G., Lee, R.M. and Blank, G. (Eds), *The SAGE Handbook of Online Research Methods*, Sage Publications, London, pp. 195-216, 2008.

Fuller, R.M., Vician, C.M. and Brown, S.A. (2016), "Longitudinal effects of computer-mediated communication anxiety on interaction in virtual teams", *IEEE Transactions on Professional Communication*, Vol. 59 No. 3, pp. 166-185.

Gefen, D., Rigdon, E.E. and Straub, D. (2011), "Editor's comments: an update and extension to SEM guidelines for administrative and social science research", *MIS Quarterly*, Vol. 35 No. 2, pp. iii-xiv, June 2011.

George, J.M. and Brief, A.P. (1992), "Feeling good-doing good: a conceptual analysis of the mood at work-organisational spontaneity relationship", *Psychological Bulletin*, Vol. 112 No. 2, pp. 310-329.

Gibson, C.B. and Gibbs, J.L. (2006), "Unpacking the concept of Virtuality: the effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation", *Administrative Science Quarterly*, Vol. 51 No. 3, pp. 451-495.

Gilli, K., Veglio, V., Gunkel, M. and Taras, V. (2022), "In search of the Holy Grail in global virtual teams: the mediating role of satisfaction on performance outcomes", *Journal of Business Research*, Vol. 146, pp. 325-337.

Gilson, L.L., Maynard, M.T., Jones Young, N.C., Vartiainen, M. and Hakonen, M. (2015), "Virtual teams research: 10 years, 10 themes, and 10 opportunities", *Journal of Management*, Vol. 41 No. 5, pp. 1313-1337.

GitLab (2020), "The remote work report by GitLab: the future of work is remote", available at: https://page.gitlab.com/rs/194-VVC-221/images/the-remote-work-report-by-gitlab.pdf (accessed 16 April 2021).

Griffith, T.L., Sawyer, J.E. and Neale, M.A. (2003), "Virtualness and knowledge in teams: managing the love triangle of organizations, individuals, and information technology", *MIS Quarterly*, Vol. 27 No. 2, pp. 265-287.

Haas, M. (2022), "5 Challenges of hybrid work–and how to overcome them", *Harvard Business Review*, available at: https://hbr.org/2022/02/5-challenges-of-hybrid-work-and-how-to-overcome-them (accessed 10 April 2022).

Hackman, J.R. (1987), "The design of work teams", in Lorsch, J.W. (Ed.), *Handbook of Organizational Behavior*, Prentice-Hall, Englewood Cliffs, NJ, pp. 315-342.

Hackman, J.R. and Oldham, G.R. (1976), "Motivation through the design of work: test of a theory", *Organisational Behavior and Human Performance*, Vol. 16 No. 2, pp. 250-279.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: indeed a silver bullet", *Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139-152.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Editorial- Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 Nos 1-2, pp. 1-12.

Hair, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, G.V. (2014), "Partial least squares structural equation modeling (PLS-SEM) an emerging tool in business research", *European Business Review*, Vol. 26 No. 2, pp. 106-121.

Hair, J.F., Sarstedt, M., Ringle, C.M. and Gudergan, S.P. (2018), *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage, Thousand Oaks.

Han, S.J., Lee, Y., Beyerlein, M. and Kolb, J. (2018), "Shared leadership in teams: the role of coordination, goal commitment, and knowledge sharing on perceived team performance", *Team Performance Management*, Vol. 24 Nos 3/4, pp. 150-168.

Handke, L., Klonek, F.E., Parker, S.K. and Kauffeld, S. (2020), "Interactive effects of team virtuality
and work design on team functioning", *Small Group Research*, Vol. 51 No. 1, pp. 3-47.

Handke, L., Costa, P.L., Klonek, F.E., O'Neill, T.A. and Parker, S.K. (2021), "Team perceived virtuality:
an emergent state perspective", *European Journal of Work and Organizational Psychology*,
Vol. 30 No. 5, pp. 624-638.

Handke, L., Klonek, F., O'Neill, T.A. and Kerschreiter, R. (2022), "Unpacking the role of feedback in
virtual team effectiveness", *Small Group Research*, Vol. 53 No. 1, pp. 41-87.

Harman, D. (1967), "A single factor test of common method variance", *Journal of Psychology*, Vol. 35,
pp. 359-378.

Harris, K.J., Wheeler, A.R. and Kacmar, K.M. (2009), "Leader–member exchange and empowerment:
direct and interactive effects on job satisfaction, turnover intentions, and performance", *The
Leadership Quarterly*, Vol. 20 No. 3, pp. 371-382.

He, H., Baruch, Y. and Lin, C.P. (2014), "Modeling team knowledge sharing and team flexibility: the
role of within-team competition", *Human Relations*, Vol. 67 No. 8, pp. 947-978.

Henderson, L.S. (2008), "The impact of project managers' communication competencies: validation and
extension of a research model for virtuality, satisfaction, and productivity on project teams",
Project Management Journal, Vol. 39 No. 2, pp. 48-59.

Henseler, J., Dijkstra, T.K., Sarstedt, M., Ringle, C.M., Diamantopoulos, A., Straub, D.W., Ketchen, D.J.,
Hair, J.F., Hult, G.T.M. and Calantone, R.J. (2014), "Common beliefs and reality about partial
least squares: comments on Rönkkö and Evermann", *Organisational Research Methods*, Vol. 17
No. 2, pp. 182-209.

Hertel, G., Geister, S. and Konradt, U. (2005), "Managing virtual teams: a review of current empirical
research", *Human Resource Management Review*, Vol. 15 No. 1, pp. 69-95.

Hill, N.S., Kang, J.H. and Seo, M.G. (2014), "The interactive effect of leader–member exchange and
electronic communication on employee psychological empowerment and work outcomes", *The
Leadership Quarterly*, Vol. 25 No. 4, pp. 772-783.

Hinds, P.J. and Bailey, D.E. (2000), "Virtual teams: anticipating the impact of virtuality on team
process and performance", *Academy of Management Proceedings, Briarcliff Manor, NY 10510*,
Vol. 2000 No. 1, pp. C1-C6, Academy of Management.

Holtz, K., Orengo Castella, V., Zornoza Abad, A. and González-Anta, B. (2020), "Virtual
team functioning: modeling the affective and cognitive effects of an emotional
management intervention", *Group Dynamics: Theory, Research, and Practice*, Vol. 24
No. 3, pp. 153-167.

Hosseini, M.R. and Chileshe, N. (2013), "Global virtual engineering teams (GVETs): a fertile ground for
research in Australian construction projects context", *International Journal of Project
Management*, Vol. 31 No. 8, pp. 1101-1117.

Hsu, J.S.C., Shih, S.P. and Li, Y. (2017), "The mediating effects of in-role and extra-role behaviors on the
relationship between control and software-project performance", *International Journal of Project
Management*, Vol. 35 No. 8, pp. 1524-1536.

Huang, L.C., Shiau, W.L. and Lin, Y.H. (2017), "What factors satisfy e-book store customers?
Development of a model to evaluate e-book user behavior and satisfaction", *Internet Research*,
Vol. 27 No. 3, pp. 563-585.

Hulland, J. (1999), "Use of partial least squares (PLS) in strategic management research: a review of
four recent studies", *Strategic Management Journal*, Vol. 20 No. 2, pp. 195-204.

Ilgen, D.R., Hollenbeck, J.R., Johnson, M. and Jundt, D. (2005), "Teams in organizations", *Annual
Review of Psychology*, Vol. 56, pp. 517-543.

Jeanquart Miles, S. and Mangold, G. (2002), "The impact of team leader performance on team member
satisfaction: the subordinate's perspective", *Team Performance Management*, Vol. 8 Nos 5/6,
pp. 113-121.

Jehn, K.A. and Mannix, E.A. (2001), "The dynamic nature of conflict: a longitudinal study of intragroup conflict and group performance", *Academy of Management Journal*, Vol. 44 No. 2, pp. 238-251.

Jehn, K.A., Chadwick, C. and Thatcher, S.M. (1997), "To agree or not to agree: the effects of value congruence, individual demographic dissimilarity, and conflict on workgroup outcomes", *International Journal of Conflict Management*, Vol. 8 No. 4, pp. 287-305.

Jimenez, A., Boehe, D.M., Taras, V. and Caprar, D.V. (2017), "Working across boundaries: current and future perspectives on global virtual teams", *Journal of International Management*, Vol. 23 No. 4, pp. 341-349.

Johnson, S.K., Bettenhausen, K. and Gibbons, E. (2009), "Realities of working in virtual teams: affective and attitudinal outcomes of using computer-mediated communication", *Small Group Research*, Vol. 40 No. 6, pp. 623-649.

Kankanhalli, A., Tan, B.C. and Wei, K.K. (2006), "Conflict and performance in global virtual teams", *Journal of Management Information Systems*, Vol. 23 No. 3, pp. 237-274.

Keyton, J. (1991), "Evaluating individual group satisfaction as a situational variable", *Small Group Research*, Vol. 22 No. 2, pp. 200-219.

Khan, G.F., Sarstedt, M., Shiau, W.L., Hair, J.F., Ringle, C.M. and Fritze, M.P. (2019), "Methodological research on partial least squares structural equation modeling (PLS-SEM): an analysis based on social network approaches", *Internet Research*, Vol. 29 No. 3, pp. 407-429.

Killumets, E., D'Innocenzo, L., Maynard, M.T. and Mathieu, J.E. (2015), "A multilevel examination of the impact of team interpersonal processes", *Small Group Research*, Vol. 46 No. 2, pp. 227-259.

Kirkman, B.L. and Mathieu, J.E. (2005), "The dimensions and antecedents of team virtuality", *Journal of Management*, Vol. 31 No. 5, pp. 700-718.

Kirkman, B.L. and Rosen, B. (1999), "Beyond self-management: antecedents and consequences of team empowerment", *Academy of Management Journal*, Vol. 42 No. 1, pp. 58-74.

Kirkman, B.L., Rosen, B., Tesluk, P.E. and Gibson, C.B. (2004), "The impact of team empowerment on virtual team performance: the moderating role of face-to-face interaction", *Academy of Management Journal*, Vol. 47 No. 2, pp. 175-192.

Klotz, A.C., Hmieleski, K.M., Bradley, B.H. and Busenitz, L.W. (2014), "New venture teams: a review of the literature and roadmap for future research", *Journal of Management*, Vol. 40 No. 1, pp. 226-255.

Kraimer, M.L., Seibert, S.E. and Liden, R.C. (1999), "Psychological empowerment as a multidimensional construct: a test of construct validity", *Educational and Psychological Measurement*, Vol. 59 No. 1, pp. 127-142.

Krueger, A.B. and Stone, A.A. (2014), "Progress in measuring subjective well-being", *Science*, Vol. 346 No. 6205, pp. 42-43.

LaFasto, F., LaFasto, F.M. and Larson, C. (2001), *When Teams Work Best: 6,000 Team Members and Leaders Tell what it Takes to Succeed*, Sage Publications, London.

Langfred, C.W. (2007), "The downside of self-management: a longitudinal study of the effects tf conflict on trust, autonomy, and task interdependence in self-managing teams", *Academy of Management Journal*, Vol. 50 No. 4, pp. 885-900.

Laschinger, H.K.S., Finegan, J., Shamian, J. and Wilk, P. (2001), "Impact of structural and psychological empowerment on job strain in nursing work settings: expanding Kanter's model", *Journal of Nursing Administration*, Vol. 31 No. 5, pp. 260-272.

Lee, M. and Koh, J. (2001), "Is empowerment really a new concept?", *International Journal of Human Resource Management*, Vol. 12 No. 4, pp. 684-695.

Lee, J. and Wei, F. (2011), "The mediating effect of psychological empowerment on the relationship between participative goal setting and team outcomes–a study in China", *The International Journal of Human Resource Management*, Vol. 22 No. 2, pp. 279-295.

Leenders, R.T.A., Van Engelen, J.M. and Kratzer, J. (2003), "Virtuality, communication, and new product team creativity: a social network perspective", *Journal of Engineering and Technology Management*, Vol. 20 Nos 1-2, pp. 69-92.

LePine, J.A., Piccolo, R.F., Jackson, C.L., Mathieu, J.E. and Saul, J.R. (2008), "A meta-analysis of teamwork processes: tests of a multidimensional model and relationships with team effectiveness criteria", *Personnel Psychology*, Vol. 61 No. 2, pp. 273-307.

Li, N., Chiaburu, D.S. and Kirkman, B.L. (2017), "Cross-level influences of empowering leadership on citizenship behavior: organizational support climate as a double-edged sword", *Journal of Management*, Vol. 43 No. 4, pp. 1076-1102.

Liang, T.P., Lin, Y.L., Shiau, W.L. and Chen, S.F. (2021), "Investigating common method bias via an EEG study of the flow experience in website design", *Journal of Electronic Commerce Research*, Vol. 22 No. 4, pp. 305-321.

Liden, R.C., Wayne, S.J. and Sparrowe, R.T. (2000), "An examination of the mediating role of psychological empowerment on the relations between the job, interpersonal relationships, and work outcomes", *Journal of Applied Psychology*, Vol. 85 No. 3, pp. 407-416.

Lin, C.N. and Roan, J. (2021), "Identifying the development stages of virtual teams–An application of social network analysis", *Information Technology and People*, Vol. 35 No. 7, pp. 2368-2392.

Lin, C., Standing, C. and Liu, Y.C. (2008), "A model to develop effective virtual teams", *Decision Support Systems*, Vol. 45 No. 4, pp. 1031-1045.

Lin, M., Wu, X. and Ling, Q. (2017), "Assessing the effectiveness of empowerment on service quality: a multi-level study of Chinese tourism firms", *Tourism Management*, Vol. 61, pp. 411-425.

Lu, M., Watson-Manheim, M.B., Chudoba, K.M. and Wynn, E. (2006), "Virtuality and team performance: understanding the impact of variety of practices", *Journal of Global Information Technology Management*, Vol. 9 No. 1, pp. 4-23.

Malik, M., Sarwar, S. and Orr, S. (2021), "Agile practices and performance: examining the role of psychological empowerment", *International Journal of Project Management*, Vol. 39 No. 1, pp. 10-20.

Maloney, M.M., Bresman, H., Zellmer-Bruhn, M.E. and Beaver, G.R. (2016), "Contextualization and context theorizing in teams research: a look back and a path forward", *Academy of Management Annals*, Vol. 10 No. 1, pp. 891-942.

Marks, M.A., Mathieu, J.E. and Zaccaro, S.J. (2001), "A temporally based framework and taxonomy of team processes", *Academy of Management Review*, Vol. 26 No. 3, pp. 356-376.

Marlow, S.L., Lacerenza, C.N. and Salas, E. (2017), "Communication in virtual teams: a conceptual framework and research agenda", *Human Resource Management Review*, Vol. 27 No. 4, pp. 575-589.

Martínez-Moreno, E., Zornoza, A., Orengo, V. and Thompson, L.F. (2015), "The effects of team self-guided training on conflict management in virtual teams", *Group Decision and Negotiation*, Vol. 24 No. 5, pp. 905-923.

Martins, L.L., Gilson, L.L. and Maynard, M.T. (2004), "Virtual teams: what do we know and where do we go from here?", *Journal of Management*, Vol. 30 No. 6, pp. 805-835.

Mathieu, J.E. and Gilson, L.L. (2012), "Critical issues and team effectiveness", in Kozlowski, S.J.W. (Ed.), *Oxford Handbook of Industrial and Organizational Psychology*, Oxford University Press, New York, NY, pp. 910-930.

Mathieu, J., Maynard, M.T., Rapp, T. and Gilson, L. (2008), "Team effectiveness 1997-2007: a review of recent advancements and a glimpse into the future", *Journal of Management*, Vol. 34 No. 3, pp. 410-476.

Mathieu, J.E., Gallagher, P.T., Domingo, M.A. and Klock, E.A. (2019), "Embracing complexity: reviewing the past decade of team effectiveness research", *Annual Review of Organizational Psychology and Organizational Behavior*, Vol. 6, pp. 17-46.

Maynard, M.T., Gilson, L.L. and Mathieu, J.E. (2012), "Empowerment—fad or fab? A multilevel review of the past two decades of research", *Journal of Management*, Vol. 38 No. 4, pp. 1231-1281.

Maynard, M.T., Kennedy, D.M. and Sommer, S.A. (2015), "Team adaptation: a fifteen-year synthesis (1998-2013) and framework for how this literature needs to 'adapt' going forward", *European Journal of Work and Organizational Psychology*, Vol. 24 No. 5, pp. 652-677.

McGrath, J.E. (1964), *Social Psychology: A Brief Introduction*, Holt Rinehart & Winston, New York.

McGrath, J.E. (1984), *Groups: Interaction and Performance*, Prentice-Hall, Englewood Cliffs, NJ.

McGrath, J.E., Arrow, H. and Berdahl, J.L. (2000), "The study of groups: past, present, and future", *Personality And Social Psychology Review*, Vol. 4 No. 1, pp. 95-105.

Meluso, J., Johnson, S. and Bagrow, J. (2020), "Making virtual teams work: redesigning virtual collaboration for the future", *SocArXiv*, September, pp. 1-14.

Michalke, S., Lohrenz, L., Lattemann, C. and Robra-Bissantz, S. (2022), "Exploring engagement, well-being, and welfare on engagement platforms: insight into the personal service sector from the DACH region", *Electronic Markets*, Vol. 32, pp. 2429-2444.

Mills, A.J., Berthon, P.R. and Pitt, C. (2020), "Agile authorship: evolving models of innovation for information-intensive offerings", *Journal of Business Research*, Vol. 110, pp. 577-583.

Montoya-Weiss, M.M., Massey, A.P. and Song, M. (2001), "Getting it together: temporal coordination and conflict management in global virtual teams", *Academy of Management Journal*, Vol. 44 No. 6, pp. 1251-1262.

Mortensen, M. and Hinds, P.J. (2001), "Conflict and shared identity in geographically distributed teams", *International Journal of Conflict Management*, Vol. 12 No. 3, pp. 212-238.

Nesterkin, D.A., Porterfield, T.E. and Li, X. (2016), "Relationship conflict, conflict management, and performance of information technology teams", *Journal of Computer Information Systems*, Vol. 56 No. 3, pp. 194-203.

Nitzl, C., Roldán, J.L. and Cepeda Carrión, G. (2016), "Mediation analysis in partial least squares path modeling: helping researchers discuss more sophisticated models", *Industrial Management and Data Systems*, Vol. 119 No. 9, pp. 1849-1864.

Osgood, C.E. (1967), "On the strategy of cross-national research into subjective culture", *Social Science Information*, Vol. 6 No. 1, pp. 5-37.

Palgi, Y., Shrira, A., Ring, L., Bodner, E., Avidor, S., Bergman, Y., Cohen-Fridel, S., Keisari, S. and Hoffman, Y. (2020), "The loneliness pandemic: loneliness and other concomitants of depression, anxiety and their comorbidity during the COVID-19 outbreak", *Journal of Affective Disorders*, Vol. 275 October, pp. 109-111.

Panteli, N. and Chiasson, M. (2008), "Rethinking virtuality", in *Exploring Virtuality within and beyond Organisations*, Palgrave Macmillan, London, pp. 1-17.

Patterson, M., Warr, P. and West, M. (2004), "Organisational climate and company productivity: the role of employee affect and employee level", *Journal of Occupational and Organisational Psychology*, Vol. 77 No. 2, pp. 193-216.

Paul, S., Samarah, I.M., Seetharaman, P. and Mykytyn, P.P., Jr (2004a), "An empirical investigation of collaborative conflict management style in group support system-based global virtual teams", *Journal of Management Information Systems*, Vol. 21 No. 3, pp. 185-222.

Paul, S., Seetharaman, P., Samarah, I. and Mykytyn, P.P. (2004b), "Impact of heterogeneity and collaborative conflict management style on the performance of synchronous global virtual teams", *Information and Management*, Vol. 41 No. 3, pp. 303-321.

Pavot, W. and Diener, E. (1993), "Review of the satisfaction with life scale", *Psychological Assessment*, Vol. 5 No. 2, pp. 164-172.

Pazos, P. (2012), "Conflict management and effectiveness in virtual teams", *Team Performance Management: An International Journal*, Vol. 18 Nos 7/8, pp. 401-417.

Peters, D., Calvo, R.A. and Ryan, R.M. (2018), "Designing for motivation, engagement and wellbeing in digital experience", *Frontiers in Psychology*, Vol. 9, p. 797, doi: 10.3389/fpsyg.2018.00797.

Peukert, C., Weinhardt, C., Hinz, O. and Van der Aalst, W.M. (2022), "Metaverse: how to approach its challenges from a BISE perspective", *Business and Information Systems Engineering*, Vol. 64 No. 4, pp. 401-406.

Podsakoff, P.M. and Organ, D.W. (1986), "Self-reports in organizational research: problems and prospects", *Journal of Management*, Vol. 12 No. 4, pp. 531-544.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903.

Purvanova, R.K. and Kenda, R. (2022), "The impact of virtuality on team effectiveness in organizational and non-organizational teams: a meta-analysis", *Applied Psychology*, Vol. 71 No. 3, pp. 1082-1131.

Putnam, L. (1986), "Contradictions and paradoxes in organizations", in Norwood, I.T. (Ed.), *Organization Communication: Emerging Perspectives*, Ablex, MA, Vol. 1, pp. 151-167.

Raghuram, S., Hill, N.S., Gibbs, J.L. and Maruping, L.M. (2019), "Virtual work: bridging research clusters", *The Academy of Management Annals*, Vol. 13 No. 1, pp. 308-341.

Ranjan, K.R. and Read, S. (2016), "Value co-creation: concept and measurement", *Journal of the Academy of Marketing Science*, Vol. 44, pp. 290-315.

Rapp, T., Maynard, T., Domingo, M. and Klock, E. (2021), "Team emergent states: what has emerged in the literature over 20 years", *Small Group Research*, Vol. 52 No. 1, pp. 68-102.

Ringle, C.M., Sarstedt, M., Mitchell, R. and Gudergan, S.P. (2020), "Partial least squares structural equation modeling in HRM research", *The International Journal of Human Resource Management*, Vol. 31 No. 12, pp. 1617-1643.

Rönkkö, M. and Ylitalo, J. (2011), "PLS marker variable approach to diagnosing and controlling for method variance", *ICIS 2011 Proceedings*, pp. 222-223.

Rogers, B.L., Madden, L.T., Grubb, L.K. and Karriker, J.H. (2021), "Shouting across the digital divide: the import of social interactions in virtual teams", *Team Performance Management: An International Journal*, Vol. 27 Nos 1/2, pp. 1-14.

Rosen, M.A., Dietz, A.S., Yang, T., Priebe, C.E. and Pronovost, P.J. (2015), "An integrative framework for sensor-based measurement of teamwork in healthcare", *Journal of the American Medical Informatics Association*, Vol. 22 No. 1, pp. 11-18.

Rosen, M.A., DiazGranados, D., Dietz, A.S., Benishek, L.E., Thompson, D., Pronovost, P.J. and Weaver, S.J. (2018), "Teamwork in healthcare: key discoveries enabling safer, high-quality care", *American Psychologist*, Vol. 73 No. 4, pp. 433-450.

Russell, J.E. (2008), "Promoting subjective well-being at work", *Journal of Career Assessment*, Vol. 16 No. 1, pp. 117-131.

Ryan, R.M. and Deci, E.L. (2000), "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American Psychologist*, Vol. 55 No. 1, pp. 68-78.

Sarstedt, M. and Mooi, E.A. (2014), *A Concise Guide to Market Research: The Process, Data, and Methods Using IBM SPSS Statistics*, Springer, Heidelberg.

Saunders, M.N. (2013), "Choosing research participants", in symon, G. and Casell, C. (Eds), *Qualitative Organizational Research: Core Methods and Current Challenges*, Sage, London, pp. 35-52.

Schaubroeck, J.M. and Yu, A. (2017), "When does virtuality help or hinder teams? Core team characteristics as contingency factors", *Human Resource Management Review*, Vol. 27 No. 4, pp. 635-647.

Schiller, S.Z. and Mandviwalla, M. (2007), "Virtual team research: an analysis of theory use and a framework for theory appropriation", *Small Group Research*, Vol. 38 No. 1, pp. 12-59.

Schulze, J. and Krumm, S. (2017), "The 'virtual team player' A review and initial model of knowledge, skills, abilities, and other characteristics for virtual collaboration", *Organizational Psychology Review*, Vol. 7 No. 1, pp. 66-95.

Schweitzer, L. and Duxbury, L. (2010), "Conceptualising and measuring the virtuality of teams", *Information Systems Journal*, Vol. 20 No. 3, pp. 267-295.

Seibert, S.E., Wang, G. and Courtright, S.H. (2011), "Antecedents and consequences of psychological and team empowerment in organisations: a meta-analytic review", *Journal of Applied Psychology*, Vol. 96 No. 5, pp. 981-1003.

Shah, D.V., Cappella, J.N. and Neuman, W.R. (2015), "Big data, digital media, and computational social science: possibilities and perils", *The ANNALS of the American Academy of Political and Social Science*, Vol. 659 No. 1, pp. 6-13.

Shiau, W.L. and Huang, L.C. (2023), "Scale development for analyzing the fit of real and virtual world integration: an example of Pokémon Go", *Information Technology and People*, Vol. 36 No. 2, pp. 500-531.

Shiau, W.L., Sarstedt, M. and Hair, J.F. (2019), "Internet research using partial least squares structural equation modeling (PLS-SEM)", *Internet Research*, Vol. 29 No. 3, pp. 398-406.

Shiau, W.L., Yuan, Y., Pu, X., Ray, S. and Chen, C.C. (2020), "Understanding fintech continuance: perspectives from self-efficacy and ECT-IS theories", *Industrial Management and Data Systems*, Vol. 120 No. 9, pp. 1659-1689.

Shoaib, M., Nawal, A., Korsakienė, R., Zámečník, R., Rehman, A.U. and Raišienė, A.G. (2022), "Performance of academic staff during COVID-19 pandemic-induced work transformations: an IPO model for stress management", *Economies*, Vol. 10 No. 2, p. 51.

Shuffler, M.L., Diazgranados, D., Maynard, M.T. and Salas, E. (2018), "Developing, sustaining, and maximizing team effectiveness: an integrative, dynamic perspective of team development interventions", *Academy of Management Annals*, Vol. 12 No. 2, pp. 688-724.

Song, M., Dyer, B. and Thieme, R.J. (2006), "Conflict management and innovation performance: an integrated contingency perspective", *Journal of the Academy of Marketing Science*, Vol. 34 No. 3, pp. 341-356.

Sonnentag, S. (2003), "Recovery, work engagement, and proactive behavior: a new look at the interface between nonwork and work", *Journal of Applied Psychology*, Vol. 88 No. 3, pp. 518-528.

Sparks, K., Faragher, B. and Cooper, C.L. (2001), "Well-being and occupational health in the 21st century workplace", *Journal of Occupational and Organizational Psychology*, Vol. 74 No. 4, pp. 489-509.

Spreitzer, G.M. (1995), "Psychological empowerment in the workplace: dimensions, measurement, and validation", *Academy of Management Journal*, Vol. 38 No. 5, pp. 1442-1465.

Staples, D.S. and Webster, J. (2008), "Exploring the effects of trust, task interdependence and virtualness on knowledge sharing in teams", *Information Systems Journal*, Vol. 18 No. 6, pp. 617-640.

Stark, E.M. and Bierly, P.E., III (2009), "An analysis of predictors of team satisfaction in product development teams with differing levels of virtualness", *R&D Management*, Vol. 39 No. 5, pp. 461-472.

Takács, V.K. and Juhász, M. (2018), "Adaptation and cognition of high-risk environment teams in an input-mediator-outcome framework", *Periodica Polytechnica Social and Management Sciences*, Vol. 26 No. 2, pp. 157-167.

Tekleab, A.G., Quigley, N.R. and Tesluk, P.E. (2009), "A longitudinal study of team conflict, conflict management, cohesion, and team effectiveness", *Group and Organization Management*, Vol. 34 No. 2, pp. 170-205.

Thomas, K.W. and Velthouse, B.A. (1990), "Cognitive elements of empowerment: an "interpretive" model of intrinsic task motivation", *Academy of Management Review*, Vol. 15 No. 4, pp. 666-681.

Thompson, L.F. and Coovert, M.D. (2003), "Teamwork online: the effects of computer conferencing on perceived confusion, satisfaction, and post discussion accuracy", *Group Dynamics: Theory, Research, and Practice*, Vol. 7 No. 2, pp. 135-151.

Van de Vliert, E. and De Dreu, C.K.W. (1994), "Optimizing performance by stimulating conflict", *The International Journal of Conflict Management*, Vol. 5 No. 3, pp. 211-222.

Van Mierlo, H., Rutte, C.G., Seinen, B. and Kompier, M. (2001), "Autonomous teamwork and psychological well-being", *European Journal of Work and Organizational Psychology*, Vol. 10 No. 3, pp. 291-301.

Van Mierlo, H., Rutte, C.G., Kompier, M.A. and Doorewaard, H.A. (2005), "Self-managing teamwork and psychological well-being: review of a multilevel research domain", *Group and Organization Management*, Vol. 30 No. 2, pp. 211-235.

Vidolov, S. (2022), "Uncovering the affective affordances of videoconference technologies", *Information Technology and People*, Vol. 35 No. 6, pp. 1782-1803.

Villamor, I., Hill, N.S., Ernst Kossek, E. and Foley, K. (2023), "Virtuality at work: a doubled-edged sword for women's career equality?", *Academy of Management Annals*, Vol. 17 No. 1, pp. 113-140.

Wakefield, R.L., Leidner, D.E. and Garrison, G. (2008), "Research note—a model of conflict, leadership, and performance in virtual teams", *Information Systems Research*, Vol. 19 No. 4, pp. 434-455.

Warr, P. (1990), "The measurement of well-being and other aspects of mental health", *Journal of Occupational and Organisational Psychology*, Vol. 63 No. 3, pp. 193-210.

Watson-Manheim, M.B., Chudoba, K.M. and Crowston, K. (2002), "Discontinuities and continuities: a new way to understand virtual work", *Information Technology and People*, Vol. 15 No. 3, pp. 191-209.

Watson-Manheim, M.B., Chudoba, K.M. and Crowston, K. (2012), "Perceived discontinuities and constructed continuities in virtual work", *Information Systems Journal*, Vol. 22 No. 1, pp. 29-52.

Wei, L.H., Thurasamy, R. and Popa, S. (2018), "Managing virtual teams for open innovation in Global Business Services industry", *Management Decision*, Vol. 56 No. 6, pp. 1285-1305.

Windeler, J., Maruping, L.M., Robert, L.P. and Riemenschneider, C.K. (2015), "E-profiles, conflict, and shared understanding in distributed teams", *Journal of the Association for Information Systems*, Vol. 16 No. 7, p. 1, doi: 10.17705/1jais.00401.

Yang, I. (2014), "What makes an effective team? The role of trust (dis) confirmation in team development", *European Management Journal*, Vol. 32 No. 6, pp. 858-869.

Yang, X., Tong, Y. and Teo, H.H. (2015), "Fostering fast-response spontaneous virtual team: effects of member skill awareness and shared governance on team cohesion and outcomes", *Journal of the Association for Information Systems*, Vol. 16 No. 11, p. 2, doi: 10.17705/1jais.00414.

Zhang, L. and Guo, H. (2019), "Enabling knowledge diversity to benefit cross-functional project teams: joint roles of knowledge leadership and transactive memory system", *Information and Management*, Vol. 56 No. 8, 103156.

Zhao, X., Lynch, J.G. and Chen, Q. (2010), "Reconsidering Baron and Kenny: myths and truths about mediation analysis", *Journal of Consumer Research*, Vol. 37 No. 2, pp. 197-206.

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Appendix

Constructs	Indicators	Items
Team Distribution (TD)		How frequently do you …
	TD_1	Collaborate with people across different time zones
	TD_2	Work with people via Internet-based conferencing applications
	TD_3	Collaborate with people you have never met face-to-face
	TD_4	Collaborate with people who speak different languages
Workplace Mobility (WM)		How frequently do you …
	WM_1	Work on the sites of different companies
	WM_2	Interact professionally with people outside your own Organisation
	WM_3	Work with mobile devices/technology-enabled devices
	WM_4	Work at home during normal business days
	WM_5	Work while travelling, for example, at airports, hotels, etc.
Variety of Practices (VOP)		How frequently do you …
	VOP_1	Work on projects on which the team members changed with the passage of time
	VOP_2	Work with teams that have different methods to track their work
	VOP_3	Work with people that use different collaboration methods
Conflict Management (CM)		I feel that in my team …
	CM_1	Conflict is dealt openly
	CM_2	If a conflict arises, the people involved in the conflict initiate steps to resolve it immediately
	CM_3	Team members know what to do when conflicts between team members arise
	CM_4	Team members are able to avoid the negative aspects of conflict before it may occur
Perceived Team Performance (PTP)		I feel that the team …
	PTP_1	Works efficiently
	PTP_2	Performs quality work
	PTP_3	Attains technical innovation
	PTP_4	Adheres to schedule/budge
	PTP_5	Attains work excellence
Psychological Empowerment (PE)		I feel that … … …
	PE_1	The work I do is very important to me
	PE_2	My work activities are personally meaningful to me
	PE_3	The work I do is meaningful to me
	PE_4	I am confident about my ability to do my jobs
	PE_5	I am self-assured about my capabilities to perform my work activities
	PE_6	I have mastered the skills necessary for my job
	PE_7	I have significant autonomy in determining how I do my job
	PE_8	I can decide on my own how to proceed with my work
	PE_9	I have considerable opportunity for independence and freedom in how I do my job
	PE_10	I have a large impact on what happens in my department
	PE_11	I have a great deal of control over what happens in my department
	PE_12	I have significant influence over what happens in my department
Team Satisfaction (TS)	TS_1	I am satisfied with the contributions made by the other members of my virtual team
	TS_2	I am satisfied with the climate within my virtual team(s)
	TS_3	I would be interested to work in the current virtual team(s) in the future
Subjective Well-being (SWB)		To what extent do you feel …
	SWB_1	In most ways, my life is close to my ideal
	SWB_2	The conditions of my life are excellent
	SWB_3	I am satisfied with my life
	SWB_4	So far, I have gained the important things I wanted in life
	SWB_5	If I could live my life, again, I would change almost nothing

Table A1.
Details of the item(s) for each construct in our study

Source(s): Questionnaire items adopted from various studies