Navigating the digital era: the role of virtual teams in organizational transformation

Augustine Abakpa and Ondřej Dvouletý
Department of Entrepreneurship, Prague University of Economics and Business, Prague, Czech Republic

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Abstract

Purpose – The purpose of this paper is to better understand the role of virtual teams in organizational transformation. This conceptual paper explores the significant influence of the digital era on organizational structures, specifically focusing on the transformative shift toward virtual teams (VTs) with a strong message for small and medium-sized enterprises (SMEs).

Design/methodology/approach – The article is based on the review of existing concepts identified in the previously published studies and their critical reflection. The literature search was conducted in the Web of Science database in May 2024 by using the keywords VTs, Digitalization and SMEs.

Findings – In the rapidly changing business environment, organizational transformation is no longer a choice but a prerequisite for the survival and growth of businesses. It is argued in the study that organizations, especially SMEs, need to embrace VT despite the challenge of a comprehensive theoretical framework for understanding VT and the need for the development of a novel theory, which has been a reoccurring phenomenon and subject of debate in the literature. Furthermore, the paper underlines the necessity of providing essential preparation and training for VTs, focusing on both technological skills and collaborative work methods. In the context of SMEs, the paper argues that collaboration with external partners and the adoption of virtuality can enhance competitiveness. In the end, the emergence of virtual learning communities is proposed as a solution, providing a platform for SME owners/managers to share experiences and acquire new skills.

Originality/value – Overall, this study provides several recommendations for future research on VTs.

Keywords Virtual teams, Technological changes, SMEs

Paper type Conceptual paper

1. Introduction

In the 21st century, no organization would pride itself on being consistent, unchanging or maintaining the same status as it did a decade ago. Rather than being seen as a sign of

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stability, remaining unchanged is often perceived as a lack of progress. Organizations that resist change and fail to adapt to the changing business environment are generally regarded as resistant to progress (Cameron and Quinn, 2006, p. 1; Nydegger and Nydegger, 2010; Morrison-Smith and Ruiz, 2020; Cowling and Dvouletý, 2023; Yadav and Banerji, 2023).

The world is becoming increasingly interconnected, transcending time zones, regions, geography and national boundaries (Abarca *et al.*, 2020; Caputo *et al.*, 2023; Pandey *et al.*, 2024). This is driven by technological progress and the influence of globalization. Thus, the use of virtual teams (VT) has become a major trend within organizations (Kimura, 2024). This connectivity extends to even the most remote areas, enabling the formation of relationships with individuals around the globe without the need for physical meetings. This capability embodies the strength of the digital era. However, despite its impact on organizations, it does not always guarantee optimal outcomes for every organization or individual (Thuong, 2019). Today, many businesses are gaining competitive edges by fostering global collaborations and reshaping their organizational activities through strength maximization, addressing threats and increasing speed as a result of digitalization (Duarte and Snyder, 2006; Horwitz *et al.*, 2006; Olson and Olson, 2012). Businesses also make a conscious effort to catch up with the changing times, and the adoption of VT remains an integral part of the process in this digital age as it brings diverse members from different locations and cultures, bringing varied work experiences and unique strategic perspectives (Thuong, 2019; Gliksona and Erezb, 2020). This changing business environment includes but not limited to the following: advancement in communication technology (Ebrahim *et al.*, 2009a; Houdek, 2023), the swift growth of the global economy and growing demands to attain and sustain a level of operational efficiency by businesses, aiming to enhance their competitiveness (Yesil and Kaya, 2013; Sahoo, 2022; Wang and Gao, 2022), and most recently, the advent of COVID-19 pandemic (Caputo *et al.*, 2023; Xu and Liu, 2023; Javalagi *et al.*, 2024; Deku *et al.*, 2024). For example, during the peak of the COVID-19 pandemic in the spring of 2020, more than 70% of Americans in the workforce worked from home either full-time or occasionally, and as of January 2021, 56% remained virtual workers. Prior to the epidemic, just about 2% of employees worked entirely from home (KPMG, 2021), while Afota *et al.* (2023) note that only about 3% of workers in America and Europe worked from home for more than half of the workweek prior to the pandemic. Thus, it makes sense to presume that almost all the information we know about workplace automation originated from work done in a conventional, face-to-face work context.

In line with the argument above, it is also interesting to note that the outbreak of the COVID-19 pandemic indeed had a profound impact on the adoption of VT. Organizations were compelled to rapidly restructure their operations to accommodate remote work setups, and this shift involved leveraging digital technologies such as video conferencing, project management software, cloud-based collaboration platforms and instant messaging applications, among others, to facilitate communications and collaboration among employees working within the same and outside locations (Firmansyah *et al.*, 2022; Prabhu *et al.*, 2022; Correia and Martens, 2023; Bagga *et al.*, 2023) and today, many organizations are either fully virtual or hybrid-based system (Swart *et al.*, 2022).

For organizations to thrive in this dynamic business environment, they need to think and act quickly to develop new products and services, often regarded as their "lifeblood" for survival. These radical technological changes have made many organizations redesign their operations, which would have been difficult to achieve through traditional face-to-face interactions only (Badrinarayanan and Arnett, 2008; Caputo *et al.*, 2023; Javalagi *et al.*, 2024). As a result, these challenges facing businesses necessitate the incorporation of VT as a solution to adapt to their dynamic business surroundings (Ebrahim *et al.*, 2009a; Nalweyiso *et al.*, 2022).

Organizations that fail to use VT effectively, may struggle to compete in today's highly competitive global environment (Duarte *et al.*, 2006; Marlow *et al.*, 2017). Companies that thrive in this environment have discovered innovative approaches to operate seamlessly across boundaries by integrating systems, processes, technology and human resources. Mastering the ability to work within or lead VTs is now an essential skill for individuals in many organizations.

In this digital age, VTs are essential because they let businesses take advantage of a wide range of talent, become more adaptable and react quickly to changes in the market and technology. To further buttress the points mentioned above, the following main ideas emphasize how important VTs are in the current digital environment: Access to and collaboration with global talent (Gliksona and Erezb, 2020; Natu and Aparicio, 2022), scalability and agility (Duarte *et al.*, 2006; Olson and Olson, 2012), cost-effectiveness (Thuong, 2019; Smith and Ruiz, 2020; Murphy, 2024), heightened employee satisfaction and retention, resilience and business continuity (Duarte *et al.*, 2006), digital transformation and innovation (Natu and Aparicio, 2022), enabling new business models (Vuchkovski *et al.*, 2023) and drawing on advanced technology (Daim *et al.*, 2012; Thuong, 2019). VTs are not only a practical choice in the digital age but also a tactical requirement for businesses that want to be inventive, competitive and flexible. Their capacity to overcome geographical obstacles, use various abilities and remain adaptable makes them invaluable in negotiating the challenges posed by the digital transition and the needs of an international economy.

Based on the foregoing, the popularity of VT is on the rise (Cascio, 2000; Fan *et al.*, 2014; Caputo *et al.*, 2023; Pandey *et al.*, 2024). Nevertheless, the formation and operation of VT are not without challenges, and overcoming several barriers is essential to fully realize the potential in the contemporary business environment (Kimble, 2011).

Another interesting point to note is that the adoption of VT has been widely acknowledged to be common among large firms. Conversely, virtuality has also been proposed as a viable remedy for small and medium-sized enterprises (SMEs) seeking to enhance their competitiveness because they also exist and are affected by the same business environment (Ebrahim *et al.*, 2009b; Zhan *et al.*, 2003). Today, companies are experiencing the need not only to modify their current business structures but also to manage a range of diverse business models to adapt to customers who are becoming more unpredictable and seek both flexibility and personalized offerings (Saarikko *et al.*, 2020; Vuchkovski *et al.*, 2023). This requires stepping beyond familiar practices and potentially discarding established practices that employees and customers may have grown accustomed to or consider standard (Saarikko *et al.*, 2020).

In this regard, this article will put forward the argument to trigger owners and managers of SMEs to see the need to incorporate VT in their business operations and increase their competitiveness. This can be achievable when managers are stimulated to engage in forward-thinking strategies that will make them foresee potential benefits and also challenges in the form of opportunities that could impede the effectiveness of VT in SMEs and deliberatively work toward achieving its implementation.

The rest of this conceptual article is structured as follows: Section 2 presents the theoretical foundations of VTs, highlighting key theories and models shaping this domain. Section 3 defines and categorizes the characteristics of VTs, drawing from the literature. Section 4 reviews key milestones in VT's evolution. Section 5 explores the prospects and challenges of VT adoption. Section 6 outlines strategies to improve VT efficiency. Section 7 focuses on the specific dynamics of VTs in SMEs, while Section 8 concludes by summarizing the findings and emphasizing implications for future research, theoretical contributions and managerial practice.

2. Theoretical foundations and methodological approach

2.1 Theoretical foundations

The concept of VT was largely driven by advancements in communication technology and the increasing internationalization of business. While no single individual is credited with the idea, some earlier foundations could be seen in the works of Bales and Strodtbeck (1951), where the researchers proposed the idea of group and development, and the number of categories was provided for the direct observation of group processes. A series of circumstances are outlined that are thought to be typical of many staff meetings, committees and also other issues in organizations that deal with planning and analysis of issues to reach a consensus. Furthermore, the concept of group dynamics and development has evolved significantly over time, as noted by Lauring *et al.* (2022). However, the notion of VTs gained widespread recognition through research and thought leadership in the fields of management and organizational studies. Key contributors to this advancement are Lipnack and Stamps (1997), who established a foundational understanding of VT by exploring how technology can facilitate collaboration across geographical and temporal boundaries.

VT is simply a handful of individuals that use teleconferencing, videoconferencing like zoom or skype, Microsoft teams or Slack, e-mail, FAX and other technological tools to collaborate, communicate and interact with one another to overcome time and distance barriers (McCool and Mitchell, 2024). The team is driven by the main objective of completing a project successfully (Lin and Roan, 2022). Team members scarcely interact with each other in person; instead, they work together using new technologies for communication and computing (Liao, 2017; Lauring *et al.*, 2022). Nevertheless, despite the possibility that dispersion will impair interpersonal cooperation, people can occasionally get past obstacles brought on by distance (Lauring *et al.*, 2022). Today, organizations use VT to quickly respond to volatile business environments and adjust to the worldwide marketplace (Dulebohn and Hoch, 2017; Lin and Roan, 2022). It is safe to say that this is one of the reasons why many firms integrate VT into their organizations. The discussion on VT continues to stimulate the interest of many scholars, as opined by Lin and Roan (2022).

Meanwhile, VT is constrained by the absence of cogent theory (Piccoli *et al.*, 2004; Ratcheva, 2008; Gilson *et al.*, 2015). Naik and Kim (2010) and Zheng *et al.* (2024) stressed more strongly the lack of theory in the context of VT, where the researchers put forward the absence of a comprehensive theory in research that can explain how teams can attain success by effectively addressing the challenges cropping up from VT research. In this study, a review of relevant literature can stand in the gap to advance the understanding of VT and why SMEs need to integrate it into business operations. This conceptual study also presents a comprehensive table of the literature reviewed to help readers have a clear snapshot of the gap, diverse theories, models, methods, context and findings of previous research. It also shows appreciation for the researchers who have joined the discussion about VT.

As we advance, we shall look at various related theories and frameworks that have tried to elucidate the concept of VT. The creation of adaptive structuration theory (AST) by DeSanctis and Poole (1994) was one of the major contributions to the growth of structuration theory. Two things make this development stand out: first, AST highlights that social structures are composed of both structural features and the parts that correspond to them, going beyond simply identifying the constructions. It also considers elements like internal group structures, organizational environment and work tasks. The second significant contribution represents the four dimensions of appropriation that AST introduces are: instrumental uses, appropriation moves, faithfulness of appropriations and attitudes toward appropriations. As a result, AST proposes that the process of adopting technology differs throughout people because it is the outcome of deliberate decisions regarding the use of

structures. Because traditional structuration theory tends to ignore the importance of information technology, this makes it possible for AST to overcome some of its shortcomings (Wei *et al.*, 2018).

Further, the systems theory-based input-process-output (IPO) model is another popular paradigm for analyzing VT performance. It implies that group processes are influenced by team inputs, which eventually result in team results. Team inputs are a team's compositional and structural characteristics, whereas team processes are how a team accomplishes its goals, as discussed by Dulebohn and Hoch (2017) and Wei *et al.* (2018). Notwithstanding its extensive application, this paradigm has a few known drawbacks. First, because it ignores a few mediational factors that influence the relationship between inputs and outcomes, it fails to take emergent or emotional states into consideration. Second, because it only considers a one-way linear path from inputs to outputs, it is devoid of a feedback mechanism. Third, because it presumes a strictly linear progression from inputs to processes to outputs, it is unable to capture the interconnections among inputs, processes and emergent states as put forward by (Naik and Kim, 2010; Wei *et al.*, 2018). To overcome these constraints, the term "process" has been substituted with the term "mediator," which includes behavioral, affective and cognitive factors. In addition, the hyphen between elements has been deleted to suggest that the relationships between the elements are not always linear, and an additional "I" has been inserted at the conclusion of the model to symbolize the concept of a cyclical feedback loop. The model is now known as the Input-Mediator-Outcome-Input model because of these changes as opined by Wei *et al.* (2018).

Going forward, the fundamental element crucial for success in conventional teams is "trust" as one of the most significant aspects of VT because when trust exists among team members, they build the confidence to share information and work to achieve common goal (Badrinarayanan, 2024; Muresan *et al.*, 2024; Gardner *et al.*, 2024), cohesion and satisfaction (McLaren and Spink, 2020; O'Bryan *et al.*, 2024), are reflected in VT. Nevertheless, a notable distinction in VTs lies in the influence of technology, which plays a mediating role in the development and efficacy of team communications (Walvoord *et al.*, 2008).

As Piccoli *et al.* (2004) mentioned, this absence of an established theory for VT introduced a model called "Team Control Structure to work process." This model aimed to explore the impact of technology on VT, emphasizing the importance of addressing contextual and environmental challenges arising from technology-dependent communication. DeSantis *et al.* (2004) submit that teams allowed to self-direct, rather than adhering to predetermined behavior, can adapt available technology to align with their unique skills, limitations and needs. This claim was validated by the findings from the work of Piccoli *et al.* (2004), where two groups were assessed to determine managerial control's influence on VT's effectiveness. The findings revealed that the self-directed VT group exhibited a higher level of effectiveness and satisfaction compared to the VT group subjected to enforced behavioral control.

Furthermore, Naik and Kim (2010) recognize the efforts of other researchers trying to apply certain models or adopt theories from other fields. The researcher advanced the argument that several investigations in team research have embraced the IPO model for both conceptual and empirical inquiries. However, DeSanctis and Poole (1994) applied the structuration theory to elucidate the role of advanced information technology (AIT) in organizational change, coining the term AST for this new framework. AST centers on the social structures facilitated by AITs, such as coordination and interpersonal exchange facilities (Chang *et al.*, 2020). Other authors (Koch *et al.*, 2013; Jones and Karsten, 2008) also advocate structuralism theory at the organizational level theories.

Although numerous researchers have converged on these theories and models to explain the trajectory of success for VTs, Naik and Kim (2010) posit that the aforementioned theories

have limitations that make them inadequate for comprehensively capturing the intricate dynamics of VTs. The IPO framework, for instance, depicts a linear causal effect from inputs to process to output, but VTs operate as complex adaptive systems, collaborating over time on interdependent tasks to achieve a final goal. The spatial, temporal and organizational dispersion of VT poses challenges that the AST cannot adequately explain or measure. Additionally, both the structuration theory and AST lack a goal-oriented focus, where VTs commence their work with a specific goal. AST does not offer insights into how the goal of VTs shapes the social interaction among team members. As a result, this research suggests a continuous search for a novel theory to comprehensively explain the trajectory of VTs.

Furthermore, Zheng *et al.* (2024), using a systematic review approach, have also made it clear that there is a lack of coherence in the definitions of team virtuality, insufficient theoretical integration and incomplete understanding of its consequences on individual and team performance. The researchers examined the traits of team virtue and its advantages and disadvantages from a variety of theoretical angles to close these gaps. From their review, they discovered that there is no universally accepted definition of team virtuality, and its specific dimensions remain unclear. Some of the theories used to discuss VT were identified but not limited to *social network theory, AST, transactive memory theory, swift trust theory, empowerment theory, person-environment fit theory, cognitive load theory, social identity theory and media richness theory.*

Table 1 provides an overview of numerous research papers reviewed in line with the theories and frameworks used by previous researchers, all of which offer relevant information about VT's operation, administration and effectiveness. The importance of communication, trust, leadership techniques and the modification of control mechanisms are just a few common constructs. Robust lenses for analyzing these processes in the context of VT can be found in the application of theoretical frameworks such as IPO model, Resource Conservation models, Social Cognitive Theory and AST, among others. The previously mentioned aspects are of significant importance for organizations seeking to maximize their utilization of VT, particularly in light of the growing popularity of remote work and digital collaboration platforms in all types of businesses, including SMEs. Again, due to the lack of a comprehensive theoretical framework, as earlier stated by (Piccoli *et al.*, 2004; Ratcheva, 2008; Gilson *et al.*, 2015; Zheng *et al.*, 2024), this could be attributed to the reason for the development and application of diverse theories and framework by the researchers trying to explain the relevance of VT in organizations. The framework shown in Figure 1 draws inspiration from the work of Powel *et al.* (2004).

2.2 Methodological approach

The research methodological approach (see Figure 2) used in this study is a conceptual and literature review approach. The study thoroughly reviews relevant literature, focusing on existing theories, models and frameworks related to VTs used by previous researchers like Turner *et al.* (2019) and Wei *et al.* (2018). The included studies were selected based on a systematic search conducted in Web of Science database in May 2024 by using the keywords VTs, *Digitalization* and *SMEs* and based on the prior publications identified by the author team. By synthesizing past research and identifying theoretical gaps, this study builds a conceptual understanding of VTs and their application to SMEs. The literature is categorized, analyzed and presented systematically through summary tables to highlight key findings, theoretical foundations and practical implications, thus contributing to the ongoing scholarly discourse on VT effectiveness and competitiveness in SMEs. Figure 2 shows the methodological step-by-step approach in this study.

Table 1. Summary table of literature review

Research focus	Authors	Theories/models/ framework	Role of VT in the organization	Results
The significance of intercultural communicative competence in VT and Face-to-Face Teamwork	Yousef (2024)	_	Enhance intercultural communicative competence (ICC)	ICC was found to be crucial in VT
The experiences of VT leaders during the COVID-19	Efimov *et al.* (2024)	*Health-Oriented leadership (HoL)*	Virtual leadership experience	Discussed several challenges leaders face in implementing HoL
Leadership strategy employed by project managers in building leadership trust	Badrinarayanan (2024)	*Leadership theory*	Project team to work under virtual conditions	Discussed the need for VT leaders to build a high-trust environment to enhance higher performance
The role VT plays in the current rate of software project success level in software project management in ICT companies in India	Pandey *et al.* (2024)	*Project management principles and frameworks*	How communication in VTs helps to achieve success	Discussed how VT characteristics such as team dynamics, diversity, and technical augmentation impact software project outcomes
To address deficiencies in the definition and theoretical integration of team virtuality	Zheng *et al.* (2024)	*Resources conservation-based model of the effects of team virtuality*	How it influences individual and team performance	Discussed the positive influence of team virtuality on individual and team performance through the mechanisms: resources and information and motivation and also the negative effect through cognition, emotion and relationship, media and technology
To investigate the possible impact of two suggested combinations of Hofstede's (1980) cultural variables on the formation of early trust in VT, including the effects of referral sources	Gardner, *et al.* (2024)	*Cognitive-based trust/ early trust models.*	To advance the early trust in VT among university students	The transference-based trust impacts positively on early trust development
Investigate the relationship between virtual team efficacy and VT effectiveness	Hardin *et al.* (2023)	*Social cognitive theory*	Enhances work efficiency through collective belief and ability to work together	Virtual team efficacy is significant to VT success

(*continued*)

Table 1. Continued

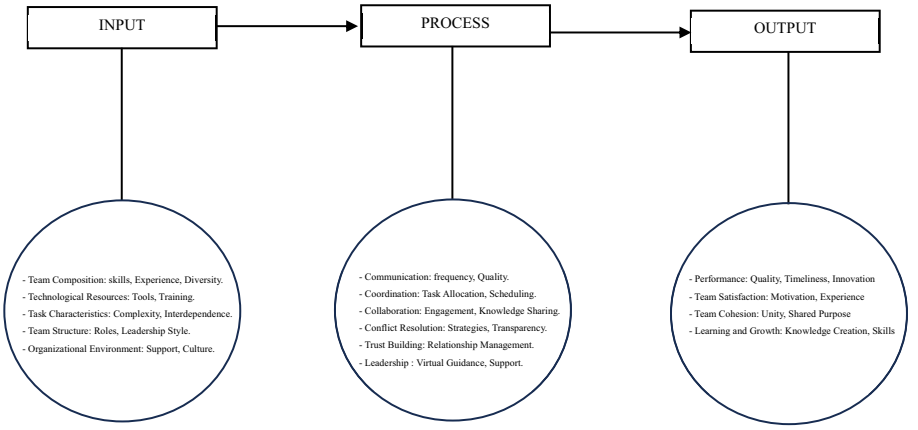
Research focus	Authors	Theories/models/ framework	Role of VT in the organization	Results
To examine how management control transitioned from face-to-face to VT meetings	Noto *et al.* (2023)	*Holistic perspective of control*	Enhances communication to achieve the goals of the organization	Managers must adapt to the diminished ability to utilize cultural controls effectively
How nascent technology initiatives affect both individuals and the organization as a whole	Turner *et al.* (2019)	*Adaptive structuration theory (AST)*	How new technology should help in increasing productivity	AST offers fresh perspectives on the interactions occurring during change initiatives
The extension of information sharing at both the individual and team levels (i.e. communication network structure) is linked to increased perceived task cohesion and improved team performance	McLaren and Spink (2020)	*Social network analysis (SNA)*	VT is used for information exchange at individual and team levels	The relationship between information exchange, task cohesion, and team performance aligns with previous theories
It examines how human factors, team environments, and technological characteristics influence the performance of global virtual teams (GVT) within the Malaysian global business services (GBS) sector	Wei *et al.* (2018)	*Adaptive structuration theory(AST)/ input-process-outputs (IPO) model*	VT is used for open innovation practice	Team dynamics such as cohesion, confidence, and the knowledge, skills, and abilities of team members had varying effects on human factors like trust and creativity
To address the gap in VT real-world experiences related to high-performance work processes	Bruyn (2017)	*The task-media-fit theory*	VT experiences are important within the organizational performance	Reveals a value-driven approach to addressing cybercrime, supported by a predefined architecture, significantly enhances the practice of VT expertise
How variations in individual characteristics impact how leaders are perceived in a virtual setting	Charlier *et al.* (2016)	*Adaptive structuration theory*	Essential for communication among leaders in an organization	The study reveals a significant association between communication apprehension and text-based communication ability
Advancing a theory that will identify determinants of VT success and connect them with their performances	Naik and Kim (2010)	*EAST model*	Work place flexibility and responsiveness	The study proposed a theory that aims to offer a comprehensive perspective on VT success

(*continued*)

Table 1. Continued

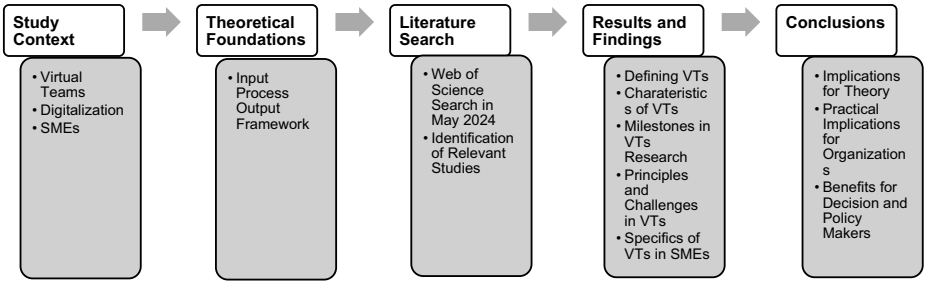
Research focus	Authors	Theories/models/ framework	Role of VT in the organization	Results
How team leaders in remote, computer-mediated ("virtual") teams perceive the necessity for technology adaption intervention	Thomas and Bostrom (2010)	*Adaptive structuration theory.*	VT is used for efficient and essential communication among team members	The study has highlighted the significance of having appropriate communication tools in place from the beginning
Assess how managerial controls influence the effectiveness of VT	Piccoli *et al.* (2004)	*Team control structure to work processes.*	Communication among team members	It reveals that members of self-managed VT experience greater personal satisfaction with the team and project
How a virtual inter-organizational team is assigned to develop a highly innovative product over a span of 10 months	Majchrzak, *et al.* (2000)	*Structuration Theory.*	VT essential inter-organizational connection	The study revealed that the team initially faced substantial discrepancies between the established organizational environment, group dynamics, and technological frameworks
Analyze the underlying frameworks present in both technological tools and the work settings	DeSanctis and Poole (1994)	*Adaptive structuration theory (AST).*	Digital tools used in multiparty participation	AST is suggested as an effective framework for analyzing the impact of advanced information technologies on organizational change

Sources: Authors' own work and elaboration based on the conducted literature search



Sources: Authors' own work and elaboration based on the conducted literature search

Figure 1. Theoretical framework



Sources: Authors' own work and elaboration based on the conducted literature search

Figure 2. Research method diagram

3. Results and findings

3.1 What is a virtual team

The literature on VTs also continues to highlight a deficiency in the comprehensive definition of the construct (Chudoba *et al.*, 2005; Ebrahim *et al.*, 2009a; Zheng *et al.*, 2024). As the literature concerning VTs has expanded, there has been a surge in the number of definitions. A scrutiny of these definitions reveals significant overlap in the fundamental definition, with minor variations in the specific details (Martins *et al.*, 2004). Cascio and Shurygailo (2003) consider the establishment of VT as imperative, driven by the challenges posed by geographical distance. In contrast, Hung *et al.* (2021) perceive the creation of VT as a way to address spatial and temporal dimensions, aiming to overcome communication barriers. This VT concept falls within the team member diversity, the structure of the team and process, team communication, trust and relationship building within the team, leadership in the team and collaboration technology (McCool and Mitchell, 2024).

Abarca *et al.* (2020) attempt to define VT as a group of individuals spread across different locations collaborating to accomplish shared objectives. Horwitz *et al.* (2006) see VT as

consisting of individuals collaborating on independent tasks, dispersed across different locations, primarily conducting their essential work through electronic mediums, and they collectively shoulder the responsibility for the outcome of the team. Piccoli *et al.* (2004) note that VT comprises knowledge workers who are geographically, temporally and/or organizationally separated but are united across distances and time through the use of digital tools for interaction. Dulebohn and Hoch (2017) refer to VT as work setups in which team members are spread across different geographical locations, experience minimal in-person interactions and collaborate interdependently by using communication tools to accomplish shared objectives. Meanwhile, Caputo *et al.* (2023), in their contribution, view VT as a group of co-workers spread across different locations collaborating interdependently. Numerous researchers have made careful efforts to define what VT stands for; it is essential to note that these definitions share similar characteristics in terms of pointing out various geographical disparities, common goals and the use of technology, among others.

To arrive at a more holistic view of VTs, this research further attempts to identify and categorize the characteristics of VT, which are drawn from the scholarly works of many researchers that have joined the VT discussion, as shown in Table 2 below.

3.2 Key milestones of the literature on virtual teams

While the utilization of work teams in the USA dates back to the 1960s, the widespread adoption of teams and quality circles gained momentum during the Total Quality Management movement in the 1980s. In the late 1980s and 1990s, many companies embraced the implementation of self-managing or empowered work teams as a means to streamline processes, reduce bureaucratic obstacles and enhance service quality. As time went on, in the 1990s, an increasing number of companies, including notable ones like

Table 2. Characteristics of virtual teams identified in the previous studies

Description of virtual teams characteristics	Reference to previous studies
Spread across various time zones	Naik and Kim (2010); Abarca *et al.* (2020); Piccoli *et al.* (2004); Snellman (2014); Malhotra *et al.* (2007); Duarte and Snyder (2006); Pandey *et al.* (2024)
Motivated by a shared goal (directed by shared purpose)	Kimble (2011); Horwitz *et al.* (2006); Dulebohn and Hoch (2017); Abarca *et al.* (2020)
Facilitated by communication technology	Bagga *et al.* (2023); Nydegger and Nydegger (2010); Cascio (2000); Fan *et al.* (2014); Walvoord *et al.* (2008); Maduka *et al.* (2018); Pandey *et al.* (2024); McCool and Mitchell (2024)
Engaged in collaboration across boundaries	Cascio and Shurygailo (2003); Abarca *et al.* (2020); Piccoli *et al.* (2004); Dulebohn and Hoch (2017); Caputo *et al.* (2023); Pandey *et al.* (2024)
It is temporary	Kimble (2011); Piccoli *et al.* (2004); Gilson *et al.* (2015); Chen (2008); Chen *et al.* (2008); Jarvenpaa and Leidner (1999)
The team member is a knowledgeable professional	Piccoli *et al.* (2004); Saarikko *et al.* (2020); Ebrahim *et al.* (2009b); Horwitz *et al.* (2006); Ratcheva (2008); Handke *et al.* (2024)
Team members could be affiliated with various organizations	Naik and Kim (2010); Fan *et al.* (2014); Duarte *et al.* (2006); McCool and Mitchell (2024)
Flexibility	DeSantis *et al.* (2004); Dulebohn and Hoch (2017); Caputo *et al.* (2023); Dixon and Panteli (2010); Ratcheva (2008); Chen (2008)

Sources: Authors' own work and elaboration based on the conducted literature search

Goodyear, Motorola, TX Instruments and General Electric, extended the team concepts beyond national borders. They began exporting this approach to their foreign affiliates in Asia, Europe and Latin America, aiming to integrate global human resource practices and foster a unified organizational culture (Kirkman *et al.*, 2001).

However, the team-oriented organizational framework can be traced back to the 1970s, when the dynamics of contemporary teamwork underwent substantial transformations. This has led to a greater geographic dispersion of organizations and a rising trend of firms engaging in collaborative partnerships that extend across diverse industries (Kimble, 2011). Concurrently, organizations have embraced team-based organizational structures more extensively, driven by a belief in the efficacy of teamwork to enhance productivity, flexibility and collaboration. The convergence of these two trends has led to the emergence of the concept of a "Virtual team" (Dixon and Panteli, 2010). However, Lee-Kelley and Sankey (2008) cautioned that the excessive dependence on technological infrastructure could hinder the expansion of global companies into regions lacking the required technology to adopt VT.

Today, VT are present in many organizations and are not only found in highly technologically driven business environments (Nydegger and Nydegger, 2010; Mayer *et al.*, 2023). Today, companies have implemented new setups enabling work to be conducted in cyberspace, embracing higher degrees of virtuality. The diffusion of information and knowledge through modernization from structures within the organization to expansive virtual knowledge has extended beyond temporal and spatial constraints, diminishing the significance of physical location (Snellman, 2014; Mayer *et al.*, 2023; Khalilzadeh *et al.*, 2023).

To fully realize the advantages of virtual organizations, there is a need to shift toward a management approach grounded more in trust than in control. The effectiveness of virtuality hinges on trust as a crucial factor, emphasizing that technology alone is insufficient for its success (Dani *et al.*, 2006; Purvanova and Kenda, 2022). Trust in VT is summarized by Abarca *et al.* (2021) as leadership, cohesion and team empowerment. Cascio and Shurygailo (2003) and Powel *et al.* (2004) opine that the prevalence of VT will always continue to be on the rise.

3.3 Prospects and challenges of virtual teams

As the business environment continues to change due to technology spreading throughout various sectors of the economy, there is a growing need to see the potential prospects and challenges arising from physical and VT interaction (Saarikko *et al.*, 2020). Observing both the potential advantages and obstacles in virtual work setups, scholars have investigated various technological, social and organizational elements to enhance the efficiency of virtual work (Wang and Haggerty, 2011; Davison and Ou, 2016).

Bergiel *et al.* (2008) made an interesting point that the VT, in reality, was not a meticulously planned initiative; instead, it evolved organically due to the availability of suitable supporting technology. The application of technology-enabled team collaboration extends beyond in-person interactions to teleconferences and, eventually, virtual conferences. Furthermore, exploring the advantages and challenges that arise from the formation of VTs is essential as this is drawn from previous researchers' work and should stimulate owners and managers of SMEs to yearn to adopt VT in their organization if they are yet to do so.

The adoption of VTs is advocated for its potential to save both time and costs (accommodation, transportation and other logistics are reduced and sometimes eliminated) as advocated by Bergiel *et al.* (2008), provide access to experts and diverse sources of information, offer convenience for individuals with disabilities and enable employees to more easily maintain a balance between work and home life, among other various other benefits (Horwitz *et al.*, 2006; Bergiel *et al.*, 2008). As every organization clamors to cut costs, to be

time efficient and to remain relevant in the market, the application of VT significantly contributes toward the actualization of these goals, the need to address geographical distances, as the use of VT also concurrently reduces expenses associated with office space and time wastage (Cascio and Shurygailo, 2003). This will go a long way to reducing the operation costs of SMEs and setting the ground for more profitability.

Assembling diverse teams and fostering collaboration has traditionally posed challenges to businesses. However, adopting needed change has been advocated as a strategy to leverage diversity and enhance creativity, as highlighted by Gilson *et al.* (2015). Moreover, establishing VTs can consolidate functions throughout an organization, expand employment opportunities in less favorable locations and aid in recruiting skilled employees who may be reluctant to relocate (Snellman, 2014). Ebrahim *et al.* (2009b) also put forward an argument in support of being capable of selectively accessing centers of excellence, achieving enhanced productivity and shorter development times and enabling prompt response to the dynamic business environment.

Moving further, working with VT contributes to capacity building. Team members can enhance their professional growth and broaden their viewpoints by collaborating with different organizations and cultures, engaging in diverse projects and undertaking various tasks (Duarte *et al.*, 2006). Members now have the flexibility to work in entirely different contextual environments, and an individual's workspace may be consistently changing. This mobility signifies that work can be accomplished at any time and from anywhere (Gilson *et al.*, 2015), and SMEs will benefit a lot if they can adopt this new normal.

Conversely, VT often encounters challenges related to misconceptions about the essence and effectiveness of virtual groups. Individuals may harbor beliefs and emotions regarding aspects they do not genuinely understand, and issues may arise, such as difficulties in supervision, the potential for people to evade or conceal their work and limitations for managers to exert a substantial impact on the performance of VTs (Nydegger and Nydegger, 2010; Purvanova and Kenda, 2022). The managerial challenges boil down to the query of how to effectively oversee individuals who are not physically present (Dennis *et al.*, 2022). The straightforward response is to trust them, yet this seemingly simple solution implies a fundamental shift in organizational mindset. The principles of trust are evident and firmly established, but they clash with a managerial tradition that associates efficacy and close control, suggesting that one cannot exist without a substantial amount of the other. Carmel (2002) posits that employees typically function in an environment characterized by limited communication richness. A significant portion of communication happens through methods such as emails, electronic conferencing or voicemail, which provide restricted information and lack interactivity. Many tasks are carried out without the benefit of immediate clarification or feedback and can bring about potential failure to achieve consensus within the designated time framework.

Many individuals still prioritize face-to-face interaction over VT collaboration. The preference stems from the belief that face-to-face interactions allow team members to discern and understand the personalities and non-apparent underlying traits of their colleagues through observations of non-verbal actions, which is lacking in VT settings, as investigated in the work of Batarseh *et al.* (2017). Contrary to this, Hoefling (2017, p. 15) puts forward that workspaces and team areas are considered resources rather than symbols of status. Individuals do not associate a particular physical work area with their tasks, and work is viewed as an ongoing activity based on responsibilities rather than being tied to a specific location aside from their computers and devices.

As highlighted by Bergiel *et al.* (2008) and Dennis *et al.* (2022) recently, not all employees may be psychologically inclined to thrive in a completely virtual work

environment, making VTs less than ideal for many individuals. Those who find stimulation through interactions with others or rely on external structure to stay focused might face challenges in a VT setting. Such employees may need comprehensive training and support to become even partially effective as members of a VT. From the global perspective of economic development, the task is to ensure that the advantages of virtuality extend to everyone and not just a privileged few (Handy, 1995), but at the same time, are also communicated with the dark sides and risks (Caputo *et al.*, 2023).

3.4 Ways to improve efficiency in virtual teams

Scholars (Duarte *et al.*, 2006; Davaei *et al.*, 2022; Mutha and Srivastava, 2023) frequently discuss ways how to enhance the efficiency of VTs. This is achievable by establishing career-development systems. Team leaders can support remote team members by offering career opportunities and assignments that mirror those in conventional team setups. Fairly applying promotion and career-development policies to individuals in virtual settings reinforces the acceptance of virtual work as a valid career option. Members often express concerns about being overlooked for promotions due to their lack of daily visibility. VT leaders must ensure that members receive equal career development opportunities compared to their counterparts in traditional teams.

Furthermore, one of the obstacles in the successful collaboration of VT revolves around the necessity for effective communication among all dispersed team members. Ensuring consistent and timely communication feedback is crucial for fostering trust and commitment within distributed teams. To promote open communication among VT members, it is advisable to equip each participant with their own communication tools, even if these tools are less technologically advanced than shared technology support (Anderson *et al.*, 2007; Bagga *et al.*, 2023).

Duarte *et al.* (2006) and Hertel *et al.* (2005) recognize that incentivizing work that spans boundaries and yields results is crucial. Many organizational reward systems tend to prioritize individual and functional contributions, but VT members often engage in cross-functional or cross-organizational collaboration. It is necessary to adjust the methods of recognition and reward to align with the unique nature of VT dynamics.

Researchers (Duarte *et al.*, 2006; Hertel *et al.*, 2005; Abi Saad and Agogué, 2023) also see the utilization of both formal and informal public acknowledgment for virtual teamwork, including immediate awards, bonuses and similar methods, can strengthen the appreciation for remote collaboration and enhance the performance of VT. Using organizational bulletin or web-based technology, such as creating a platform for the VTs' "best practices" and showcasing team achievements and performance, serves as a means to publicly commend individuals in a virtual environment. Additionally, highlighting instances of success within the VTs in speeches, presentations and discussions with other team leaders and managers contributes to the recognition of virtual teamwork.

Going further in this context, Anderson *et al.* (2007) advocated for crucial considerations involving providing explicit preparation and training for VTs, emphasizing not only technological skills that are insufficient for success but also collaborative work methods. An effective approach to promote communication excellence in VT meetings may involve using facilitators to foster open and inclusive communication patterns across dispersed locations. This emphasis on communication practices is vital, as highlighted by this study and numerous workplace studies on VT collaboration, which consistently report challenges in eliciting effective team behaviors and cultivating a sense of reciprocity among the geographically dispersed workforce. This point also aligns with the view of Gold *et al.* (2001) or recent observations of Hergueux *et al.* (2023).

Bergiel *et al.* (2008), Cascio and Shurygailo (2003) and Ebrahim *et al.* (2009a) share a similar idea on this point to enhance the effectiveness of VT members both within and outside an organization. Members need to have well-defined roles and responsibilities aligned with the team's objectives. The lack of physical visibility can result in members perceiving themselves as less accountable for outcomes. While goals are crucial for all teams, they become especially vital for teams where members have limited face-to-face interactions. In such situations, team goals serve as a cohesive force, integrating the organization's strategy, individual team members' objectives and the team's collective needs. VT members should actively participate in constructive dialogue to ensure clarity regarding performance metrics and the specific contributions needed from each member to achieve positive outcomes. This approach fosters active collaboration among team members with a shared positive mindset.

3.5 Specifics of virtual teams in small and medium-sized firms

To thrive in the global economy, specifically, Small and Medium-sized Firms (SMEs), often characterized by fewer resources, need to optimize their products and processes by taking advantage of intellectual capital within a dynamic network of knowledge-intensive relationships, both domestically and internationally (Corso *et al.*, 2003; Greimel *et al.*, 2023). Consequently, SMEs aspiring to bring about significant transformations in their technological and innovative foundations may need to reassess their collaboration strategies, as recommended by Hanna and Walsh (2002). Engaging in cooperation with external partners becomes crucial for SMEs to complement their competencies and resources. Two decades ago, Pihkala *et al.* (1999) proposed the concept of virtuality as a potential solution for SMEs seeking to enhance their competitiveness in today's dynamic business environment, and this is still a valid recommendation even in these turbulent times (Greimel *et al.*, 2023). Research indicates that successful businesses often attribute their achievements to e-leadership. Leaders who embrace teleworking see it as a valuable opportunity for enhancing efficiency, fostering growth and ensuring sustainability. One interesting finding is that prompt access to essential information, efficient communication and clearly defined tasks are pivotal in promoting collaboration among VT members, particularly in VT management (Ābeltiņa and Rizhamadze, 2021). It is well known that SMEs play a pivotal role in the economic development of any nation (Ebrahim *et al.*, 2009c; Birchall and Giambona, 2007). But they are faced with many challenges. Previous studies on crisis response strategies have concentrated on how crises drive companies of various sizes, SME inclusive and sectors to implement ICTs and modify their business models to navigate through the challenges (Gkeredakis *et al.*, 2021; Wenzel *et al.*, 2020). Due to their strong reliance on face-to-face interactions between business professionals (Seraphin, 2020), it is unsurprising that numerous SMEs in the business sector were and continue to be significantly impacted by the economic effects of the COVID-19 pandemic (Rogers and Moylan, 2022). Despite these difficulties, some SMEs have not only managed to endure but have emerged stronger by rapidly transitioning from hosting physical events to providing comprehensive support for virtual events, which has enabled them to expand their audience reach and diversity. Understanding the factors behind their success is crucial for other SMEs to develop effective strategies for responding to present and future crises (Wendt *et al.*, 2022).

However, from empirical investigations and due to issues attracting and maintaining the requisite knowledge and skills, as well as a lack of awareness of the technologies that are now available and their potential benefits, SMEs frequently encounter significant obstacles when attempting to embrace ICTs and in addition, due to their typically limited financial resources, they are often unable to invest in costly, tailored ICT solutions (Birchall and Giambona, 2007;

Chan *et al.*, 2020; Heidt *et al.*, 2019). Small businesses must effectively identify and assess opportunities. However, rapid and unpredictable environments marked by evolving customer demands, technological progress and strong competition make innovation especially risky for them. Furthermore, due to limited resources, small firms aiming to innovate often need to balance the pursuit and acquisition of new external knowledge while efficiently using their current internal expertise (Chan *et al.*, 2020; Breier *et al.*, 2021). However, with VT, it is said to be cost-effective (Thuong, 2019; Smith and Ruiz, 2020). It implies that the resources (time, money or effort) that will be used are justified by the benefits or value gained, making it an efficient way to achieve a result among SMEs.

Managers of SMEs often face limited training and development opportunities compared to their counterparts in larger organizations. As technology becomes increasingly integrated into business operations, there is an opportunity to establish virtual learning communities connecting SME managers who share similar challenges. This initiative aims to foster engagement and facilitate shared learning experiences among SME managers from diverse backgrounds (Ojha *et al.*, 2023). Consequently, this interaction can assist contemporary managers in acquiring and developing new skill sets, encompassing attributes such as adaptability, self-initiative and the ability to structure learning processes independently (Birchall and Giambona, 2007).

As SMEs expand, their leaders often seek assistance from similar-sized enterprises and those that have demonstrated success in areas like internship programs. The growing use of VT resources among SMEs has simplified their ability to compete even with larger counterparts by establishing an online footprint. This allows them to gain a better understanding of the distinctive learning opportunities they can provide to potential candidates. This increased confidence has facilitated the emergence of various innovations and advancements within SMEs (Jeske and Axtell, 2016). These points underscore the challenges faced by SMEs in technological advancement, adoption of VT and managerial learning and propose strategic solutions, such as virtual learning communities and enhanced collaboration, to address these challenges.

4. Conclusions

This conceptual study, methodologically relying on the survey of existing research and its synthesis (Jaakkola, 2020), explored the existing body of knowledge and draws strength from the comprehensive synthesis of existing literature to identify gaps in the current understanding of VTs and tried to address how VT reshapes organizational structures by considering the specifics of SMEs in this digital age. The article has articulated the increasing importance of VTs as a strategic solution for organizations navigating the complexities of the contemporary business environment. The fast-paced evolution of the business environment, driven by technological advancements and global dynamics, necessitates organizations, including SMEs, to embrace innovative approaches to remain competitive. The argument presented in this article emphasizes the need for SMEs to adapt swiftly, especially in the face of challenges such as the aftermath of the COVID-19 pandemic, and to prepare them for unforeseen and spontaneous challenges in the future. VTs emerged as a key response to these challenges, taking advantage of digital technologies to enable remote work setups, enhance collaboration and maintain productivity.

4.1 Implications for theory

Furthermore, this study joined in the theoretical discussions, where the authors underscored the absence of a comprehensive theory for VT organizational effectiveness. While the researchers acknowledged existing models, such as AST (Piccoli *et al.*, 2004) or Team Control Structure to

Work Process Concept (Koch *et al.*, 2013), this article emphasized the limitations of current theories in capturing the intricate dynamics of VTs and called for a novel theory to comprehensively explain the trajectory of VTs toward effectiveness, which was presented as a crucial avenue for future research. This research adds value to the theoretical debate by integrating specific components that clearly show what the IPO framework covers at each stage (Input stage, process stage and output stage). It also shows the need for the integration of these frameworks, considering variables such as resource limitations, trust-building and digital adaptability. This expanded model provides a closer understanding of VT operations, incorporating aspects such as leadership, technology alignment and intercultural competence. It enriches the academic discourse by highlighting the critical role of technology-mediated communication in sustaining virtual collaborations, which is vital for developing more robust theories on organizational adaptation in the digital era.

This research further juxtaposed the historical evolution of teamwork, leading to the emergence of VTs showcasing the transformative impact of technology fostered by the recent global pandemic and gig-economy boost (Mayer *et al.*, 2023). The article argued that VTs offer unparalleled adaptability and responsiveness, challenging traditional notions of workspace and organizational boundaries. Besides, the article continues to bring to light the concept of VT and some other vital components of the construct by exploring the prospects and challenges of VTs, recognizing their potential to save costs, enhance creativity and contribute to the capacity building of managers and VT members.

The article also recognize the lack of effective communication as a key obstacle in VT collaboration, emphasizing the need for consistent and timely feedback and recognition and reward systems tailored to the unique dynamics of VTs, which will play a pivotal role in acknowledging and motivating remote collaboration, these were points among others brought to light in the article (Bagga *et al.*, 2023).

4.2 Practical implications for organizations

This conceptual work offers practical guidance for organizations, particularly SMEs, in optimizing their adoption of VT to enhance competitiveness and sustainability in the dynamic business environment (Ojha *et al.*, 2023). The research outlines strategic areas for improvement needed by different organizations and SMEs, such as fostering a robust digital infrastructure, investing in trust-building among dispersed team members, taking advantage of virtuality to access global talent, efficient communication and clearly defined tasks. This understanding should enable SMEs and even larger organizations to use VT solutions to reduce overhead costs and maintain flexibility, allowing them to compete more effectively in rapidly changing markets, expand market reach, enhance employee satisfaction and retention and improve operational efficiency, among other benefits.

Virtuality offers a potential solution for SMEs seeking to enhance competitiveness (Ojha *et al.*, 2023). As SMEs face challenges in technological advancement and managerial learning, establishing virtual learning communities becomes crucial. Connecting SME managers facing similar challenges fosters shared learning experiences and skill development, contributing to adaptability and independent learning processes. Yet, the current research on specifics of the VT and virtuality in SMEs remains a challenge for future studies. According to the authors, these could capture organizational effectiveness and productivity by testing diverse sets of communication technologies and software solutions, aiming to understand cultural and sectoral specifics and providing the best possible outcomes through the longitudinal case studies research. Within the Asian context, experiencing a rapid digital transformation, we mention specifically the usage of platforms and solutions, such as WeChat Work and LINE services, that are affordable for SMEs. Other relevant tools

include packages of Zoom, Google Workspace, Microsoft Teams, Slack and Trello, used for collaboration and task management. From the development perspective, the crucial question is how to design training and development instruments into complex programs, helping SME managers and owners to successfully enhance their businesses' competitiveness while continuously promoting their team members' effectiveness and skills.

4.3 Benefits for decision and policymakers

This study offers a blueprint for decision-makers by providing evidence-informed recommendations on how VTs can serve as a catalyst for innovation and competitiveness in SMEs. The research encourages policymakers to: Develop policies that facilitate digital infrastructure development, making it easier for SMEs to adopt and take advantage of VTs, invest in training programs to help SMEs build managerial and technical competencies required for successful VT implementation, introduce incentives such as tax holidays or grants benefits for SMEs in VT technologies, enabling wider adoption and also promote cross border collaboration by flexible regulatory barriers for virtual and hybrid work arrangements, allowing SMEs to also engage in global markets more effectively. This is a crucial task in light of ongoing digital transformation and large-scale application of AI-based tools and advanced digital technologies enabling SMEs to operate in a virtual environment by having the potential to overcome language and culture barriers that are often present within the Asian business context, being very divers in terms of cultural habits and spoken languages.

References

Abarca, V.G., Palos-Sanchez, P. and Camacho, M.A. (2021), "Virtual teams in times of pandemic: factors that influence performance", *Front. Psychol*., Vol. 12, pp. 624-637, doi: 10.3389/fpsyg.2021.624637.

Abarca, V.M.G., Palos-Sanchez, P.R. and Rus-Arias, E. (2020), "Working in virtual teams: a systematic literature review and a bibliometric analysis", *IEEE Access*, Vol. 8, pp. 168923-168940, doi: 10.1109/ACCESS.2020.3023546.

Ābeltiņa, A. and Rizhamadze, K. (2021), "Challenges to managing virtual teams in Georgian SMEs", *SHS Web of Conferences*, Vol. 119 Nos 2/9, doi: 10.1051/shsconf/202111903003.

Afota, M., Savard, Y.P., Malaterre, A.O. and Léon, E. (2023), "Work-from-home adjustment in the US and Europe: the role of psychological climate for face time and perceived availability expectations", *The International Journal of Human Resource Management*, Vol. 34 No. 14, pp. 2765-2796, doi: 10.1080/09585192.2022.2090269.

Anderson, A.H., McEwan, R., Bal, J. and Carletta, J. (2007), "Virtual team meetings: an analysis of communication and context", *Computers in Human Behavior*, Vol. 23 No. 5, pp. 2558-2580, doi: 10.1016/j.chb.2007.01.001.

Badrinarayanan, V. (2024), "Trust building strategies for virtual leaders in the post pandemic era", *Project Leadership and Society*, Vol. 5 No. 4, pp. 2-13, doi: 10.1016/j.plas.2024.100126.

Badrinarayanan, V. and Arnett, D.B. (2008), "Effective virtual new product development teams: an integrated framework", *Journal of Business and Industrial Marketing*, Vol. 23 No. 4, pp. 242-248, doi: 10.1108/08858620810865816.

Bagga, S.K., Gera, S. and Haque, S.N. (2023), "The mediating role of organizational culture: transformational leadership and change management in virtual teams", *Asia Pacific Management Review*, Vol. 28 No. 2, pp. 120-131, doi: 10.1016/j.apmrv.2022.07.003.

Bales, R.F. and Strodtbeck, F.L. (1951), "Phases in group problem-solving", *Journal of Abnormal and Social Psychology*, Vol. 46 No. 4, pp. 485-495, doi: 10.1037/h0059886.

Batarseh, F., Usher, J.M. and Daspit, J.J. (2017), "Collaboration capability in virtual teams: examining the influence on diversity and innovation", *International Journal of Innovation Management*, Vol. 21 No. 4, pp. 1-29, doi: 10.1142/S1363919617500347.

Bergiel, B.J., Bergiel, E.B. and Balsmeier, P.W. (2008), "Nature of virtual teams: a summary of their advantages and disadvantages", *Management Research News*, Vol. 31 No. 2, pp. 99-110, doi: 10.1108/01409170810846821.

Birchall, D. and Giambona, G. (. (2007), "SME manager development in virtual learning communities and the role of trust: a conceptual study", *Human Resource Development International*, Vol. 10 No. 2, pp. 187-202, doi: 10.1080/13678860701347164.

Breier, M., Kallmuenzer, A., Clauss, T., Gast, J., Kraus, S. and Tiberius, V. (2021), "The role of business model innovation in the hospitality industry during the COVID-19 crisis", *International Journal of Hospitality Management*, Vol. 92, p. 102723.

Bruyn, A.J.D. (2017), "Exploring high-performance work processes in effective virtual teams", *African Journal of Economic and Management Studies*, Vol. 8 No. 4, pp. 398-409, doi: 10.1108/AJEMS-06-2016-0070.

Cameron, K.S. and Quinn, R.E. (2006), "Diagnosing and changing organizational culture based on the competing values framework", *The Jossey-Bass Business and Management Series*, Revised Edition, pp. 1-242.

Caputo, A., Kargina, M. and Pellegrini, M. (2023), "Conflict in virtual teams: a bibliometric analysis, systematic review, and research agenda", *International Journal of Conflict Management*, Vol. 34 No. 1, pp. 1044-4068, doi: 10.1108/IJCMA-07-2021-0117.

Carmel, E. (2002), "Global software teams: opportunities and challenges of technology-enabled work", *Perspectives on Work*, Vol. 6 No. 2, pp. 6-8.

Cascio, W. (2000), "Managing a virtual workplace", *Academy of Management Perspectives*, Vol. 14 No. 3, pp. 81-90.

Cascio, W.F. and Shurygailo, S. (2003), "E-leadership and virtual teams", *Organizational Dynamics*, Vol. 31 No. 4, pp. 362-376, doi: 10.1016/S0090-2616(02)00130-4.

Chan, Y.E., Krishnamurthy, R. and Desjardins, C. (2020), "Technology-Driven innovation in small firms", *MIS Quarterly Executive*, Vol. 19 No. 1, pp. 39-55, doi: 10.17705/2msqe.00024.

Chang, X., Fong, P.S., Chen, Q. and Liu, Y. (2020), "Coordination contracts in the university technology transfer chain", *Knowledge Management Research and Practice*, Vol. 18 No. 2, pp. 234-247, doi: 10.1080/14778238.2019.1596198.

Charlier, D.S., Stewart, G.L., Greco, L.M. and Reeves, C.Z. (2016), "Emergent leadership in virtual teams: a multilevel investigation of individual communication and team dispersion antecedents", *The Leadership Quarterly*, Vol. 27 No. 5, pp. 745-764, doi: 10.1016/j.leaqua.2016.05.002.

Chen, T.Y. (2008), "Knowledge sharing in virtual enterprises via an ontology-based access control approach", *Computers in Industry*, Vol. 59 No. 5, pp. 502-519, doi: 10.1016/j.compind.2007.12.004.

Chen, T.Y., Chen, Y.M. and Chu, H.C. (2008), "Developing a trust evaluation method between co-workers in virtual project team for enabling resource sharing and collaboration", *Computers in Industry*, Vol. 59 No. 6, pp. 565-579, doi: 10.1016/j.compind.2008.01.001.

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 organization", *Information Systems Journal*, Vol. 15 No. 4, pp. 279-306, doi: 10.1111/j.1365-2575.2005.00200.x.

Correia, S.R.V. and Martens, C.D.P. (2023), "Cloud computing projects: critical success factors", *RAUSP Management Journal*, Vol. 58 No. 1, pp. 5-21, doi: 10.1108/RAUSP-06-2021-0107.

Corso, M., Martini, A., Paolucci, E. and Pellegrini, L. (2003), "Knowledge management configuration in Italian small-to-medium enterprises", *Integrated Manufacturing Systems*, Vol. 14 No. 1, pp. 46-56.

Cowling, M. and Dvouletý, O. (2023), "Who is brave enough to start a new business during the COVID-19 pandemic?", *Baltic Journal of Management*, Vol. 18 No. 3, pp. 402-419, doi: 10.1108/BJM-11-2022-0414.

Daim, T.U., Ha, A., Reutiman, S., Hughes, B., Pathak, U., Bynum, W. and Bhatla, A. (2012), "Exploring the communication breakdown in global virtual teams", *International Journal of Project Management*, Vol. 30 No. 2, pp. 199-212, doi: 10.1016/j.ijproman.2011.06.004.

Dani, S.S., Burns, N.D., Backhouse, C.J. and Kochhar, A.K. (2006), "The implications of organizational culture and trust in the working of virtual teams", *Proc. IMechE Part B*, Vol. 220 No. 6, pp. 951-960, doi: 10.1243/09544054JEM415.

Davaei, M., Gunkel, M., Veglio, V. and Taras, V. (2022), "The influence of cultural intelligence and emotional intelligence on conflict occurrence and performance in global virtual teams", *Journal of International Management*, Vol. 28 No. 4, pp. 1-20, doi: 10.1016/j.intman.2022.100969.

Davison, R.M. and Ou, C.J. (2016), "Digital work in a digitally challenged organization", *Information and Management*, Vol. 54 No. 1, pp. 1-9, doi: 10.1016/j.im.2016.05.005.

Deku, W.A., Wang, J. and Preko, A.K. (2024), "Digital marketing and small and medium-sized enterprises' business performance in emerging markets", *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 18 No. 3, pp. 251-269.

Dennis, A.S., Barlow, J.B. and Dennis, A.R. (2022), "The power of introverts: personality and intelligence in virtual teams", *Journal of Management Information Systems*, Vol. 39 No. 1, pp. 102-129, doi: 10.1080/07421222.2021.2023408.

DeSanctis, G. and Poole, M.S. (1994), "Capturing the complexity in advanced technology use: adaptive structuration theory", *Organization Science*, Vol. 5 No. 2, pp. 121-147, available at: www.jstor.org/stable/2635011.

DeSantis, A., Coster, W., Bigsby, R. and Lester, B. (2004), "Colic and fussing in infancy and sensory processing at 3 to 8 years of age", *Infant Mental Health Journal*, Vol. 25 No. 6, pp. 522-539.

Dixon, K.R. and Panteli, N. (2010), "From virtual teams to virtuality in teams", *Human Relations*, Vol. 63 No. 8, pp. 1177-1197, doi: 10.1177/0018726709354784.

Duarte, D.L. and Snyder, N.T. (2006), *Mastering Virtual Teams: strategies, Tools, and Techniques That Succeed*, Wiley, Berlin.

Duarte, A., Ranganath, C., Trujillo, C. and Knight, R.T. (2006), "Intact recollection memory in high-performing older adults: ERP and behavioral evidence", *Journal of Cognitive Neuroscience*, Vol. 18 No. 1, pp. 33-47.

Dulebohn, J.H. and Hoch, J.E. (2017), "Virtual teams in organizations", *Human Resource Management Review*, Vol. 27 No. 4, pp. 569-574, doi: 10.1016/j.hrmr.2016.12.004.

Ebrahim, N.A., Ahmed, S. and Taha, Z. (2009a), "Virtual R and D teams in small and medium enterprises: a literature review", *Scientific Research and Essay*, Vol. 4 No. 13, pp. 1575-1590.

Ebrahim, N.A., Ahmed, S. and Taha, Z. (2009b), "Innovation and R&D activities in virtual team", *European Journal of Scientific Research*, Vol. 34 No. 3, pp. 297-307, available at: https://nbn-resolving.org/urn:nbn:de:0168-ssoar-233040

Ebrahim, N., Ahmed, S. and Taha, Z. (2009c), "SMEs: ERP or virtual collaboration teams", First Enterprise Resource Planning conference, January 27-28, 2009, *Tehran, Iran*.

Efimov, I., Harth, V. and Mache, S. (2024), "That was one of my most difficult and biggest challenges: experiences, preconditions and preventive measures of health-oriented leadership in virtual teams – A qualitative study with virtual leaders", *BMC Public Health*, Vol. 24 No. 1, pp. 2-28, doi: 10.1186/s12889-024-18800-7.

Fan, K., Chen, Y., Wang, C. and Chen, M. (2014), "E-leadership effectiveness in virtual teams: motivating language perspective", *Industrial Management and Data Systems*, Vol. 114 No. 3, pp. 421-437, doi: 10.1108/IMDS-07-2013-0294.

Firmansyah, J., Suhandi, A., Setiawan, A. and Permanasari, A. (2022), "Evaluation of virtual workspace laboratory: cloud communication and collaborative work on Project-Based laboratory", *Journal on Efficiency and Responsibility in Education and Science*, Vol. 15 No. 3, pp. 131-141.

Gardner, R., Blomme, R.J., Kil, A. and Dam, N.V. (2024), "Cultural influences on early trust development in virtual teams", *Management Research Review*, Vol. 47 No. 6, pp. 861-882, doi: 10.1108/MRR-09-2022-0615.

Gilson, L.L., Maynard, M.T., Young, N.C.J., 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, doi: 10.1177/0149206314559946.

Gkeredakis, M., Lifshitz-Assaf, H. and Barrett, M. (2021), "Crisis as opportunity, disruption and exposure: exploring emergent responses to crisis through digital technology", *Information and Organization*, Vol. 31 No. 1, p. 100344, doi: 10.1016/j.infoandorg.2021.100344.

Gliksona, E. and Erezb, M. (2020), "The emergence of a communication climate in global virtual teams", *Journal of World Business*, Vol. 55 No. 6, pp. 2-10, doi: doi.org/10.1016/j.jwb.2019.101001.

Gold, A.H., Malhotra, A. and Segars, A.H. (2001), "Knowledge management: an organizational capabilities perspective", *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 185-214, available at: www.jstor.org/stable/40398521

Greimel, N.S., Kanbach, D.K. and Chelaru, M. (2023), "Virtual teams and transformational leadership: an integrative literature review and avenues for further research", *Journal of Innovation and Knowledge*, Vol. 8 No. 2, p. 100351.

Handke, L., Costa, P. and Feitosa, J. (2024), "How virtual are we? Introducing the team perceived virtuality scale", *Journal of Business and Psychology*, doi: 10.1007/s10869-024-09966-3.

Handy, C. (1995), "Trust and the virtual organization: how do you manage people whom you do not see?", *Harvard Business Rev*, Vol. 73, pp. 40-48.

Hanna, V. and Walsh, K. (2002), "Small firm networks: a successful approach to innovation?", *R&D Management*, Vol. 32 No. 3, pp. 201-207.

Hardin, A., Davison, R.M., Schneider, C., Looney, C.A. and Sarker, S. (2023), "Contextualising collective efficacy in virtual team research: the essential role of collaborative technologies in the virtual team efficacy conceptual framework", *Information Systems Journal*, Vol. 34 No. 2, pp. 469-498, doi: 10.1111/isj.12484.

Heidt, M., Gerlach, J. and Buxmann, P. (2019), "Investigating the security divide between SME and large companies: how SME characteristics influence organizational IT security investments", *Information Systems Frontiers*, Vol. 21 No. 6, pp. 1285-1305, doi: 10.1007/s10796-019-09959-1.

Hergueux, J., Henry, E., Benkler, Y. and Algan, Y. (2023), "Social exchange and the reciprocity roller coaster: evidence from the life and death of virtual teams", *Organization Science*, Vol. 34 No. 6, pp. 2296-2314, doi: 10.3929/ethz-b-000533399.

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, doi: 10.1016/j.hrmr.2005.01.002.

Hoefling, T. (2017), "Working virtually, transforming the mobile workspace", *Stylus Publishing*, Vols 13/23, doi: 10.4324/9781003448815.

Horwitz, F.M., Bravington, D. and Silvis, U. (2006), "The promise of virtual teams: identifying key factors in effectiveness and failure", *Journal of European Industrial Training*, Vol. 30 No. 6, pp. 472-494, doi: 10.1108/03090590610688843.

Houdek, P. (2023), "The deep roots of cross-cultural differences in organizational behavior: do human resource management education has to respect them?", *The International Journal of Management Education*, Vol. 21 No. 3, pp. 1-14, doi: 10.1016/j.ijme.2023.100876.

Hung, S., Cheng, M., Hou, C. and Chen, N. (2021), "Inclusion in global virtual teams: exploring non-spatial proximity and knowledge sharing on innovation", *Journal of Business Research*, Vol. 128, pp. 599-610, doi: 10.1016/j.jbusres.2020.11.022.

Jaakkola, E. (2020), "Designing conceptual articles: four approaches", *AMS Review*, Vol. 10 Nos 1/2, pp. 18-26.

Jarvenpaa, S.L. and Leidner, D.E. (1999), "Communication and trust in global virtual teams", *Organization Science*, Vol. 10 No. 6, pp. 791-815, available at: www.jstor.org/stable/2640242

Javalagi, A.A., Watson, A.M.H. and DeChurch, L.A. (2024), "Zooming in and zoning out: remote deliberation impairs team decision quality", *Group and Organization Management*, Vol. 49 No. 5, pp. 1071-1085, doi: 10.1177/10596011231169590.

Jeske, D. and Axtell, C.M. (2016), "Going global in small steps: E-internships in SMEs", *Organizational Dynamics*, Vol. 45 No. 1, pp. 55-63, doi: 10.1016/j.orgdyn.2015.12.007.

Jones, M. and Karsten, H. (2008), "Giddens's structuration theory and information systems research", *MIS Quarterly*, Vol. 32 No. 1, pp. 127-158, available at: www.jstor.org/stable/25148831

Khalilzadeh, M., Banihashemi, S.A. and Bahari, A. (2023), "Investigation of the effects of knowledge management on organizational performance through human resource management as mediator", *Business Perspectives and Research*, Vol. 12 No. 4, pp. 579-598, doi: 10.1177/22785337221148567.

Kimble, C. (2011), "Building effective virtual teams: how to overcome the problems of trust and identity in virtual teams", *Global Business and Organizational Excellence*, Vol. 30 No. 2, pp. 6-15, doi: 10.1002/joe.20364.

Kimura, T. (2024), "Virtual teams: a smart literature review of four decades of research", *Human Behavior and Emerging Technologies*, Vol. 2024, p. 8373370, doi: 10.1155/2024/8373370.

Kirkman, B.L., Gibson, C.B. and Shapiro, D.L. (2001), "Exporting" teams enhancing the implementation and effectiveness of work teams in global affiliates", *Organizational Dynamics*, Vol. 30 No. 1, pp. 12-29, doi: 10.1016/S0090-2616(01)00038-9.

Koch, H., Gonzalez, E. and Leidner, D.E. (2013), "Digitally enabling social networks: resolving IT-culture conflict", *Information Systems Journal*, Vol. 23 No. 6, pp. 501-523, doi: 10.1111/isj.12020.

KPMG (2021), "From remote to hybrid work", KPMG Insights, pp. 1-12, available at: https://advisory.kpmg.us/articles/2021/from-remote-to-hybrid-work.html

Lauring, J., Drogendijk, R. and Kubovcikova, A. (2022), "The role of context in overcoming distance-related problems in global virtual teams: an organizational discontinuity theory perspective", *The International Journal of Human Resource Management*, Vol. 33 No. 21, pp. 4251-4283, doi: 10.1080/09585192.2021.1960584.

Lee-Kelley, L. and Sankey, T. (2008), "Global virtual teams for value creation and project success: a case study", *International Journal of Project Management*, Vol. 26 No. 1, pp. 51-62.

Liao, C. (2017), "Leadership in virtual teams: a multilevel perspective", *Human Resource Management Review*, Vol. 27 No. 4, pp. 648-659, doi: 10.1016/j.hrmr.2016.12.010.

Lin, C.N. and Roan, J. (2022), "Identifying the development stages of virtual teams – an application of social network analysis", *Information Technology and People*, Vol. 35 No. 7, pp. 2368-2392, doi: 10.1108/ITP-04-2020-0251.

Lipnack, J. and Stamps, J. (1997), *The TeamNet Factor. Bringing the Power of Boundary Crossing into the Heart of Your Business*, Wiley and Sons, Hoboken, NJ.

McCool, L.B. and Mitchell, A. (2024), "Teaching for a digital world: foundations, practices and possibilities", *Business and Professional Communication Quarterly*, Vol. 87 No. 2, pp. 272-299, doi: 10.1177/23294906231157084.

McLaren, C.D. and Spink, K.S. (2020), "Examining the prospective relationship between communication network structure and task cohesion and team performance", *Group Dynamics: Theory, Research, and Practice*, Vol. 24 No. 2, pp. 74-87, doi: 10.1037/gdn0000110.

Maduka, N.S., Edwards, H., Greenwood, D., Osborne, A. and Babatunde, S.O. (2018), "Analysis of competencies for effective virtual team leadership in building successful organisations", *Benchmarking: An International Journal*, Vol. 25 No. 2, pp. 696-712, doi: 10.1108/BIJ-08-2016-0124.

Majchrzak, A., Rice, R.E., Malhotra, A., King, N. and Ba, S. (2000), "Technology adaptation: the case of a computer-supported inter-organizational virtual team", *MIS Quarterly*, Vol. 24 No. 4, pp. 569-600, available at: www.jstor.org/stable/3250948

Malhotra, A., Majchrzak, A. and Rosen, B. (2007), "Leading virtual teams", *Academy of Management Perspectives*, Vol. 21 No. 1, pp. 60-70, available at: www.jstor.org/stable/4166287

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, doi: doi.org/10.1016/j.hrmr.2016.12.005.

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.doi, doi: 10.1016/j.jm.2004.05.002.

Mayer, C., Sivatheerthan, T., Mütze-Niewöhner, S. and Nitsch, V. (2023), "Sharing leadership behaviors in virtual teams: effects of shared leadership behaviors on team member satisfaction and productivity", *Team Performance Management: An International Journal*, Vol. 29 Nos 1/2, pp. 90-112, doi: 10.1108/TPM-07-2022-0054.

Morrison-Smith, S. and Ruiz, J. (2020), "Challenges and barriers in virtual teams: a literature review", *SN Applied Sciences*, Vol. 2 No. 6, pp. 1-33, doi: 10.1007/s42452-020-2801-5.

Muresan, G.C., Mititelu, S., Andres, J. and Schraefel, M.C. (2024), "Should I introduce myself? Asynchronous semi-guided professional introductions for enhanced perceived team effectiveness in new virtual dyadic teams. Int", *International Journal of Human-Computer Studies*, Vol. 188, pp. 2-21, doi: 10.1016/j.ijhcs.2024.103279.

Murphy, L. (2024), "Work automation and the rise of virtual teams: how to lead employees in the post-pandemic world", *Development and Learning in Organizations: An International Journal*, Vol. 38 No. 4, pp. 19-21, doi: 10.1108/DLO-04-2023-0092.

Mutha, P. and Srivastava, M. (2023), "Decoding leadership to leverage employee engagement in virtual teams", *International Journal of Organizational Analysis*, Vol. 31 No. 3, pp. 737-758, doi: 10.1108/IJOA-07-2021-2856.

Naik, N. and Kim, D.J. (2010), "Virtual team success: towards a theory of performance in virtual teams", *AMCIS, Proceedings*, Vol. 429, pp. 1-8, available at: http://aisel.aisnet.org/amcis2010/429

Nalweyiso, G., Mafabi, S., Kagaari, J., Munene, J., Ntayi, J. and Abaho, E. (2022), "Relational agency and relational people management: evidence from Uganda's micro and small enterprises", *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 16 No. 1, pp. 51-68, doi: 10.1108/APJIE-01-2022-0004.

Natu, S. and Aparicio, M. (2022), "Analyzing knowledge sharing behaviors in virtual teams: practical evidence from digitalized workplaces", *Journal of Innovation and Knowledge*, Vol. 7 No. 4, pp. 1-10, doi: 10.1016/j.jik.2022.100248.

Noto, G., Marisca, C. and Barresi, G. (2023), "Adapting management control to virtual teams: evidence from a natural experiment", *Qualitative Research in Accounting and Management*, Vol. 20 No. 5, pp. 621-646, doi: 10.1108/QRAM-04-2022-0066.

Nydegger, R. and Nydegger, L. (2010), "Challenges in managing virtual teams", *Journal of Business and Economics Research*, Vol. 8 No. 3, pp. 69-82.

O'Bryan, L., Oxendahl, T., Chen, X., McDuff, D., Segarra, S., Wettergreen, M., Beier, M.E. and Sabharwal, A. (2024), "Objective communication patterns associated with team member effectiveness in real-world virtual teams", *Human Factors: The Journal of the Human Factors and Ergonomics Society*, Vol. 66 No. 5, pp. 1414-1430, doi: 10.1177/00187208221147341.

Ojha, D., Patel, P.C. and Parida, V. (2023), "Virtual integration in SMEs: the digitalization circuitry of dynamic strategic planning for SMEs", *International Journal of Information Management*, Vol. 73, pp. 1-12, doi: 10.1016/j.ijinfomgt.2023.102657.

Olson, J. and Olson, L. (2012), "Virtual team trust: task, communication and sequence", *Team Performance Management: An International Journal*, Vol. 18 Nos 5/6, pp. 256-276, doi: 10.1108/13527591211251131.

Pandey, R.A., Natrajan, N.S. and Chitra,R. (2024), "Virtual teams and software project management success in a developing country: an empirical study", *International Journal of System Assurance Engineering and Management*, Vol. 15 No. 6, pp. 2689-2703, doi: 10.1007/s13198-024-02290-2.

Piccoli, G., Powell, A. and Ives, B. (2004), "Virtual teams: team control structure, work processes and team effectiveness", *Information Technology and People*, Vol. 17 No. 4, pp. 359-379, doi: 10.1108/09593840410570258.

Pihkala, T., Varamaki, E. and Vesalainen, J. (1999), "Virtual organization and the SMEs: a review and model development", *Entrepreneurship and Regional Development*, Vol. 11 No. 4, pp. 335-349, doi: 10.1080/089856299283146.

Powel, A., Piccoli, G. and Ives, B. (2004), "Virtual teams: a review of current literature and directions for future research", *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, Vol. 35 No. 1, pp. 6-36.

Prabhu, N., Ramaprasad, B.S., Prasad, K. and Modem, R. (2022), "Does workplace spirituality influence reflexivity in ongoing teams? Examining the impact of shared transformational leadership on team performance", *South Asian Journal of Business Studies*, Vol. 11 No. 3, pp. 341-369, doi: 10.1108/SAJBS-07-2020-0246.

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, doi: 10.1111/apps.12348.

Ratcheva, V. (2008), "The knowledge advantage of virtual teams-process supporting knowledge synergy", *Journal of General Management*, Vol. 33 No. 3, pp. 53-67.

Rogers, T. and Moylan, P.W. (2022), *Conferences and Conventions, 4th Edition A Global Industry*, Routledge, London, doi: 10.4324/9781003298953.

Saad, A.E. and Agogué, M. (2023), "Creativity in virtual teams: systematic review, synthesis and research agenda", *Creativity and Innovation Management*, Vol. 32 No. 1, pp. 117-140, doi: 10.1111/caim.12540.

Saarikko, T., Westergren, U.H. and Blomquist, T. (2020), "Digital transformation: five recommendations for the digitally conscious firm", *Business Horizons*, Vol. 63 No. 6, pp. 825-839, doi: 10.1016/j.bushor.2020.07.005.

Sahoo, S. (2022), "Big data analytics in manufacturing: a bibliometric analysis of research in the field of business management", *International Journal of Production Research*, Vol. 60 No. 22, pp. 6793-6821.

Seraphin, H. (2020), "COVID-19: an opportunity to review existing rounded theories in event studies", *Journal of Convention and Event Tourism*, Vol. 22 No. 1, pp. 3-35, doi: 10.1080/15470148.2020.1776657.

Smith, S.M. and Ruiz, J. (2020), "Challenges and barriers in virtual teams: a literature review", *SN Applied Sciences*, Vol. 2 No. 6, doi: 10.1007/s42452-020-2801-5.

Snellman, C.L. (2014), "Virtual teams: opportunities and challenges for e-leaders", *Procedia – Social and Behavioral Sciences*, Vol. 110, pp. 1251-1261, doi: 10.1016/j.sbspro.2013.12.972.

Swart, K., Barnard, T.B. and Chugh, R. (2022), "Challenges and critical success factors of digital communication, collaboration and knowledge sharing in project management virtual teams: a review", *International Journal of Information Systems and Project Management*, Vol. 10 No. 4, pp. 59-75, doi: 10.12821/ijispm100404.

Thomas, D.M. and Bostrom, R.P. (2010), "Vital signs for virtual teams: an empirically developed trigger model for technology adaptation interventions", *MIS Quarterly*, Vol. 34 No. 1, pp. 115-142, available at: www.jstor.org/stable/20721417

Thuong, N.U. (2019), "Virtual teams in the digital age", *Hue University Journal of Science: Economics and Development*, Vol. 128 No. 5C, pp. 67-80, doi: 10.26459/hueuni-jed.v128i5C.5121.

Turner, J.R., Morris, M. and Atamenwan, I. (2019), "A theoretical literature review on adaptive structuration theory as its relevance to human resource development", *Advances in Developing Human Resources*, Vol. 21 No. 3, pp. 289-302, doi: 10.1177/1523422319851275.

Vuchkovski, D., Zalaznik, M., Mitręga, M. and Pfajfar, G. (2023), "A look at the future of work: the digital transformation of teams from conventional to virtual", *Journal of Business Research*, Vol. 163, pp. 2-17, doi: 10.1016/j.jbusres.2023.113912.

Walvoord, A.A., Redden, E.R., Elliott, L.R. and Coovert, M.D. (2008), "Empowering followers in virtual teams: guiding principles from theory and practice", *Computers in Human Behavior*, Vol. 24 No. 5, pp. 1884-1906.

Wang, J. and Gao, J. (2022), "The exploration and practices of TusPark in promoting business incubation and industrial development", *Journal of Evolutionary Studies in Business*, Vol. 7 No. 2, pp. 298-320, doi: 10.1344/jesb2022.2.j114.

Wang, Y. and Haggerty, N. (2011), "Individual virtual competence and its influence on work outcomes", *Journal of Management Information Systems*, Vol. 27 No. 4, pp. 299-333, available at: www.jstor.org/stable/4130460

Wei, L.H., Thurasamy, R. and Popas, S. (2018), "Managing virtual teams for open innovation in global business services industry", *Management Decision*, Vol. 56 No. 6, pp. 1285-1305, doi: 10.1108/MD-08-2017-0766.

Wendt, C., Adam, M., Benlian, A. and Kraus, S. (2022), "Let's connect to keep the distance: how SMEs leverage information and communication technologies to address the COVID-19 crisis", *Information Systems Frontiers*, Vol. 24 No. 4, pp. 1061-1079, doi: 10.1007/s10796-021-10210-z.

Wenzel, M., Stanske, S. and Lieberman, M.B. (2020), "Strategic responses to crisis", *Strategic Management Journal*, Vol. 41, pp. 7-18, doi: 10.1002/smj.3161.

Xu, X. and Liu, Y. (2023), "The association between managerial short-termism and green innovation: the moderating role of firms' digital transformation", *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 17 Nos 3/4, pp. 195-214.

Yadav, M. and Banerji, P. (2023), "A bibliometric analysis of digital financial literacy", *American Journal of Business*, Vol. 38 No. 3, pp. 91-111, doi: 10.1108/AJB-11-2022-0186.

Yesil, S. and Kaya, A. (2013), "The effect of organizational culture on firm financial performance: evidence from a developing country", *Procedia – Social and Behavioral Sciences*, Vol. 81, pp. 428-437.

Yousef, K. (2024), "Intercultural communicative competence in virtual and face-to-face teamwork: a quantitative analysis of culturally diverse teams", *Organizacija*, Vol. 57 No. 2, pp. 139-150, doi: 10.2478/orga-2024-0010.

Zhan, H.F., Lee, W.B., Cheung, C.F., Kwok, S.K. and Gu, X.J. (2003), "A web-based collaborative product design platform for dispersed network manufacturing", *J. Mat. Processing Technol*, Vol. 138 Nos 1/3, pp. 600-604, doi: 10.1016/S0924-0136(03)00156-0.

Zheng, S., Yan, M., Liang, Y., Chen, Y., Wei, Q. and Li, S. (2024), "Understanding the positive and negative effects of team virtuality: a theoretical review and research agenda", *Human Resource Management Review*, Vol. 34 No. 2, pp. 2-18, doi: 10.1016/j.hrmr.2024.101013.

Further reading

Foss, N.J. and Saebi, T. (2017), "Fifteen years of research on business model innovation", *Journal of Management*, Vol. 43 No. 1, pp. 200-227, doi: 10.1177/0149206316675927.

About the authors

Augustine Abakpa is a PhD candidate at the Prague University of Economics and Business. His research focuses on the entrepreneurship development, and competitiveness of SMEs, emphasizing the role of digitalisation and attitudes towards sustainability.

Ondřej Dvouletý is an Associate Professor at the Department of Entrepreneurship, Prague University of Economics and Business. His research focuses on the heterogeneity of self-employment and the typology of entrepreneurs, entrepreneurship and SMEs supporting policies evaluation and entrepreneurial economics. He is Associate Editor of the *Journal of Small Business Management*, *Journal of Entrepreneurship in Emerging Economies and Central European Business Review*. Ondřej Dvouletý is the corresponding author and can be contacted at: ondrej.dvoulety@vse.cz