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# A Comprehensive Review of Enhancing Collaboration and Performance in Virtual Teams

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## ABSTRACT

**This review aims** to analyze and assess the main factors that influence the effectiveness of Virtual Teams (VT) in diverse applications. The study used two complementary **methods**: systematic literature review and bibliometric analysis. The paper showcases the critical drivers of virtual team performance, including leadership, communication, trust, and digital collaboration tools, while also considering challenges such as cultural diversity and technological limitations. In addition, the paper outlines specific virtual team implementation approaches adopted within different industries while assessing collaborative technology performance and management strategies that impact team productivity and efficiency. **The results** indicate that while virtual teams offer significant advantages in global business environments, their success is highly dependent on effective leadership, structured communication, and the appropriate use of digital tools and technology. Finally, **the conclusion emphasizes** the need for organizations to adopt a strategic approach to managing virtual teams, ensuring optimal engagement, performance, and long-term sustainability.

**Keywords:** virtual team; collaboration tools; performance management; remote team building; work strategies; communication; technology collaboration platforms; innovation project; systematic literature review

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## ОРИГИНАЛЬНАЯ СТАТЬЯ

# Комплексный обзор проблем улучшения сотрудничества и производительности в виртуальных командах

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## АННОТАЦИЯ

**Целью** данного обзора является анализ и оценка основных факторов, влияющих на эффективность виртуальных команд (ВК) в различных ситуациях. В исследовании использовались два взаимодополняющих **метода**: систематический обзор литературы и библиометрический анализ. В статье представлены важнейшие факторы эффективности виртуальной команды, включая лидерство, коммуникацию, доверие и инструменты цифровой совместной работы, а также рассматриваются такие проблемы, как культурное разнообразие и технологические ограничения. Кроме того, в статье излагаются конкретные подходы к внедрению виртуальной команды, принятые в различных отраслях, а также оценивается эффективность технологий совместной работы и стратегий управления, которые влияют на производительность и результативность команды.

**Результаты** показывают, что виртуальные команды обладают значительными преимуществами в глобальной бизнес-среде, однако их успех в значительной степени зависит от эффективного руководства, структурированной коммуникации и надлежащего использования цифровых инструментов и технологий. **В заключении** подчеркивается необходимость принятия организациями стратегического подхода к управлению виртуальными командами, обеспечивающего оптимальную вовлеченность, производительность и долгосрочную устойчивость.

**Ключевые слова:** виртуальная команда; инструменты совместной работы; управление производительностью; удаленное построение команды; стратегии работы; коммуникация; платформы технологического сотрудничества; инновационный проект; систематический обзор литературы

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## 1. Introduction

The 21st century's interconnected global economy and the tremendous acceleration of modern technologies have led to the development of virtual teams that solve a wide range of issues in the corporate and educational sectors, including leadership, intra-team relationships, cultural diversity, time zone differences, and many more [1]. Numerous businesses and academic institutions have adopted the virtual team approach and continue to implement it [2]. The escalation of working remotely and using digital communication technology has redefined how organizations operate, leading to the increased importance of understanding how virtual teams perform efficient operations. Virtual teams have been a significant method of conducting business within organizations to gain a competitive edge since the early 1990s. The concept of working remotely was introduced in the late 20<sup>th</sup> century due to advancements in communication technologies. At the same time, the advent of Internet communication enabled real-time interactions through email and instant messaging, making remote work more feasible and lucrative for the corporate world. The development of project management tools and video conferencing platforms such as Skype at the beginning of the 21<sup>st</sup> century facilitated remote teamwork, reduced resource requirements, leveraged global talent, and adopted more flexible policies. Several prominent companies have adopted a fully remote work model in recent years [3].

The massive adoption of the virtual team has introduced a new area of research, with several scholars already establishing various aspects, variables, and factors and solving many challenges; however, considerable progress has to be made. Nearly 85% of businesses responded that virtual teamwork was

essential in a survey of over 1300 businesses in 2016 [4]. Flexibility is one of the most significant advantages to those businesses due to the better utilization capability of the time zone and geographic location differences through electronic communication, resulting in a possible productivity time 24/7. Even half of those businesses reported that over 50% of their virtual team workers are from non-native cultures and geographical locations, leading to another significant advantage of "Access to Global Talent." [5]. Managing and leading diverse teams effectively increases creativity and enhances teams problem-solving capabilities by gathering diverse perspectives and resources brought by the team members. Convening diverse talents also brings the advantage of cost-effectiveness by eliminating the need to travel to meet in person or relocate colleagues from different countries, exploiting information and communication technologies. By leveraging virtual team capabilities and possibilities, organizations can reduce operational rental and overhead costs and save money and time on travel-related expenses.

Virtual teams use related technologies, such as the cloud, artificial intelligence, and virtual reality, to support their communications. Such technologies assist in filling the gap where real-time communication and coordination are lacking and enhance team efficiency and the quality of end output [6]. Recent studies have demonstrated that virtual teams are more effective at decision-making and creativity than co-located face-to-face teams because communication is less stressful and gives more time for reflection. In addition, the structured parts of virtual teams lead to higher overall effectiveness because of organized processes, formalities, and better digital communication tools. Drawing on current literature and empirical evidence [7], this paper outlines practices and novel ideas that enhance virtual collaboration

through structured communication protocols, clear objectives, and feedback recognition mechanisms.

This review is not only a summary of current knowledge but also a reference for further studies and practical applications, outlining the directions that are worth future exploration to the scholars and stating the suggestions that might be useful for practitioners who deal with virtual teams. The first section of this paper focuses on the evolution of virtual teams and a comparison between virtual and traditional teams. The second section presents a literature review and highlights previous research in this field. Section 3 discusses the methodological approach, followed by Section 4, which examines virtual teamwork across the phases of the project life cycle. This section highlights how virtual teams collaborate and perform during the various stages of a project's development, providing insights into the specific challenges and opportunities that arise in each phase. It also addresses key aspects of managing virtual teams, focusing on strategies to optimize team performance, enhance communication, and ensure project success in a virtual environment. In addition, it analyzes virtual teams in specific contexts and explores how team dynamics are affected by different organizational, cultural, and technological factors. Section 5 presents the findings and discussion. Finally, the research concludes with a summary in the concluding remarks.

## 2. Literature review

Virtual teams (VTs) are increasingly important in modern organizations, especially with the rise of remote work during the COVID-19 pandemic [8]. Communication and trust are critical factors for the success of virtual work teams. Due to the COVID-19 pandemic, remote work and virtual team (VT) integration have become part of the modern organizational structure. Communication tools like email and video calls often cause delays and misunderstandings while adopting new technologies [9]. These examples shed light on the need for companies to prioritize leadership and develop effective communication strategies to address the challenges associated with transitioning to a virtual workspace. As we have seen, the capacity to communicate with and within virtual teams is a critical success factor. The level of virtual project teams' understanding of the specific information and communication technologies (ICTs) required to support their particular coordination needs de-

termines their effectiveness, optimistically or pessimistically [10]. According to [11], collaboration technologies proved helpful during the COVID-19 pandemic, and virtual teams intending to manage their operations require consistent and situation-appropriate communication tools. Practical virtual work requires leadership and trust within a team to produce outstanding results. Leadership in the literature also informed task complexity and trust building in virtual environments [12].

Their systematic review of a decade of virtual team research identified manager support as a critical variable; leaders who empower and breed trust within virtual teams serve them best. *Table 1*, focused on organizational behavior, synthesizes findings from hundreds of virtual team studies to provide insights into team dynamics and performance. This section highlights different methods for analyzing virtual team interactions, explores common challenges across various industries, and offers solutions to improve team cohesion and efficiency in remote work environments.

*Table 2* provides another critical finding highlighted by [16]: team members must develop good communication channels and use good leadership practices when engaging virtual teams. Finally, both ICT tools and knowledge sharing are mandatory in virtual teams. Davidavičienė et al. [17], asserts that motivation, trust, and leadership foster effective knowledge-sharing in virtual teams and that interruptions in knowledge-sharing processes enhance productivity in remote work environments. Malhotra and Majchrzak [18], state that ICT can be used selectively in a more strategic manner when a virtual team requires particular forms of coordination or information to occur in its environment, and the strategic use of ICTs was found to improve their performance. Kilcullen et al. [19], confirmed that virtual teams could preserve high-performance levels during the COVID-19 pandemic by enhancing communication approaches. These studies show that ICT and knowledge-sharing-facilitating devices are crucial in effectively running virtual teams. Last, it is vital to facilitate knowledge transfer and incorporate ICT facilitators in virtual teams. A more recent study established a positive correlation between motivation, trust, and leadership and the willingness of virtual team members to share knowledge, pointing to the need to enhance protocol-based KS in the virtual working environment. It is noted that selectively using ICTs to address coordination and

Table 1  
Recent VT research findings in different organizational sectors

Authors	Field	Topic and Objectives	Method of Research	Contribution
[8]	Organizational Psychology	Communication and trust in leadership, empowerment, and cohesion influence virtual team performance during pandemics.	This methodology provided robust insights into the relationships. The partial least squares (PLS) method is based on variance and was derived from a quantitative approach using structural equation modeling (SEM).	Studied the determinants of performance in virtual teams during the pandemic, focusing on communication, leadership, and trust.
[13]	Organizational Behavior	This study explores the micro-dynamics of intercultural communication within global virtual teams, focusing on how relational-oriented content in initial messages during team formation creates a psychologically safe communication climate, enhancing team performance.	The research analyzed early asynchronous communication in 60 global virtual teams composed of MBA students. The study assessed team communication climate and performance to test the hypotheses.	Investigate the role of media and language diversity in global teams.
[14]	Organizational Behavior	The study aims to examine the transition of work teams to remote work during COVID-19, assess factors that helped or hindered virtual team performance, and explore the challenges these teams face.	Based on actual data from an electronic questionnaire conducted in June 2020, the research analyzes the experiences of Human Resources and Financial Department teams as they adapted to remote work. Relevant literature on virtual teams and leadership supports this analysis.	Analyzed how HR and Finance teams adapted to remote work during the pandemic, highlighting challenges and strategies for virtual team success.
[15]	Organizational Management	The study explores the experiences of IT professionals working in virtual teams in India, focusing on motivators, skills, and challenges to enhance understanding of virtual work environments	A qualitative approach, using semi-structured interviews with 52 IT professionals, was used, and the data were analyzed through thematic and content analysis methods	Studied the challenges and motivators for virtual team members in the IT sector in India, highlighting the required skills and challenges of virtual work

Source: Compiled by the authors.

Table 2  
Recent literature on virtual teams across management sectors

Authors	Field	Topic and Objectives	Method of Research	Contribution
[20]	Management and Organizational Studies	The study aims to review the virtual team (VT) literature over the past decade, organizing key themes from research and identifying 10 opportunities for future study in VT dynamics, mainly influenced by technological advancements.	An inductive review of empirical studies from the past 10 years was conducted.	Provided a thematic review of virtual team research, identifying trends and future research opportunities in technology, leadership, and trust.
[11]	Information Systems and Management	It aims to improve comprehension of effective virtual collaboration in both pandemic and post-pandemic scenarios.	Based on participant feedback, the study analyzed qualitative data from 55 graduate students transitioning to remote work and identified critical technology affordances.	Explored key collaboration technology affordances and their role in improving virtual collaboration during and after the COVID-19 pandemic.
[18]	Management and Information Systems	Geographically distributed teams can enhance performance by utilizing ICTs to explicitly address situational awareness requirements rather than exclusively relying on technology.	The research gathered data from 54 geographically diverse teams that utilized ICT solely, incorporating questionnaires from team leaders, sponsors, and members.	Studied how geographically distributed teams use ICT to enhance performance, focusing on task awareness and collaboration.
[16]	Project Management	This study emphasizes the crucial role that improved trust and collaboration play in boosting the likelihood of success in project management.	Using structural equation modeling (SEM) and data from an international survey of 151 project practitioners	Demonstrated how trust and collaboration influence project management success using structural equation modeling (SEM).
[21]	Project Management	The research analyzes the impact of motivational climates on collaboration in project teams and the function of prosocial motivation in this dynamic transition	Surveyed 173 senior project members to evaluate the influence of the alignment between performance and mastery climates on team cooperation	Studied how motivational climates (mastery and performance) affect collaboration in project teams

Source: Developed by the authors.



situational awareness levels significantly boosts the productivity of virtual teams. Various studies confirm this, showing that virtual teams performed exceptionally well through effective communication even after the coronavirus attack. Ybañez et al., also extended support for these findings by revealing that VPM requires ICT integration for performance assessment and leadership [14].

### 3. Methodological approach

Our research began with a comprehensive examination of the current trends in VT literature. To enhance the relevance of our work and establish stronger connections between theories and practices. In addition, we conducted research on virtual teams by utilizing keywords such as “virtual team,” “remote team,” “geographically distributed team,” and team performance in ‘Google Scholar’ and ‘ResearchGate,’ along with other business, communication, and management research databases. This was done to facilitate a more accurate comparison with the data shown in [22, 23]. We emphasized the literature review research to effectively determine the key difficulties and solutions and discern the trends and subjects in the literature. Initially, our study focused on the most recent patterns highlighted in the literature, and subsequently, we evaluated the qualitative feedback. All qualitative responses regarding cooperation and collaboration, whether direct or indirect, were considered. In addition, we adopted a dual-methodological approach by combining systematic literature review (SLR) with bibliometric analysis. The studies utilizing the CIMO model (Context, Intervention, Mechanism, and Outcome) have highlighted the utility of integrating bibliometric analysis with SLR. Bibliometric analysis allows for an extensive, automated overview of the research landscape, while a systematic literature review enables a more profound, systematic selection of the most relevant studies. This combination ensures a comprehensive analysis, as bibliometric analysis provides a broad perspective, and SLR refines it by focusing on critical studies. Thus, this methodology proved appropriate for finding the elements influencing virtual team effectiveness by searching a vast body of literature and selecting the most relevant articles for systematic review. Together, these methodologies allowed us to present a comprehensive and in-depth examination of virtual teams’ critical difficulties, trends, and solutions in the context of projects.

### 4. Virtual teamwork across the phases of the project life cycle

The phases of the project life cycle examine virtual teamwork from different angles. This cycle explores the vital role that communication tools like Slack and Zoom, project management software like Asana and Trello, and information-sharing platforms like Google Drive and Dropbox play. These systems have high adoption rates and deal with issues such as cybersecurity and the potential of new technologies such as artificial intelligence (AI) and virtual reality (VR). Employees have different experience levels, and these organizational norms and structures help them perform their jobs better [24]. They also help build trusting relationships, deal with cultural differences, keep employees motivated, settle disagreements, and improve work. Managing the different stages of the life cycle, using Agile methods, setting up good communication channels, keeping an eye on performance, and making practices that are all about improving all the time are all parts of the process. The features, difficulties, and growth of virtual teams in project management are rooted in technological changes, subtleties of human interaction, and simplified processes, providing a global view [10].

*Fig. 1* illustrates that the blue ring around the outside shows factors that depend on technology and are essential for virtual teamwork. “Social Presence” refers to how technology can create a psychological presence for team members through media. “Reliability of Project Information” shows how technology could provide correct and up-to-date information. These points to the role of technology in making virtual teamwork work effective. The human-centered factors that affect how the team works together and how well they do their job are in the middle yellow ring. In a virtual setting, “communication” is just as important as in a real one, but it is doubled because there are no actual cues. “Trust” is still the most important thing when working together and getting things done in a virtual setting. It takes a certain level of leadership to get a group to work together on a problematic virtual job. Motivation is the drive and desire of a person to help the project reach its goals. All these factors help define how people connect in virtual teams. The second “inner” green ring shows processes that significantly affect how well a virtual project team completes the project as a whole, whether they are

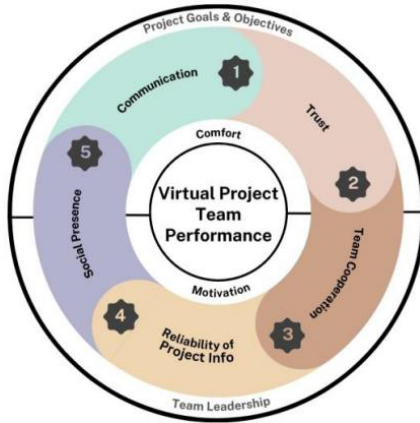


Fig. 1. Virtual teams throughout the project life cycle

Source: Developed by the authors.

present or not. It supports “Comfort” as an essential part of the virtual space. This could mean something physical, like how the remote work setting supports people’s comfort, or psychological, like how people feel comfortable in the virtual space. “Team Cooperation” shows that virtual teamwork includes tasks that require your team to work together. This part discusses the process approach, which stresses that group standards and methods are essential for reaching project goals and targets when working as a virtual team.

#### 4.1. Enhancing collaboration among virtual teams

In order to enhance collaboration between teammates in virtual teams (VT), it is essential to use a combination of communication and project management tools that are customized to meet the team’s requirements. Communication tools such as Slack and Microsoft Teams provide instant connections, creating an atmosphere of prompt response and lively conversation [25]. Project management software such as Asana and Trello visually depicts work advancement, improving transparency and fostering responsibility among team members [26]. Utilizing collaborative tools such as Miro for brainstorming and Figma for design facilitates a smooth transition from ideation to implementation [27]. Protecting communication and group activities with cybersecurity is important, primarily through VPNs and good antivirus software [28]. Cloud storage services such as Google Drive and OneDrive are also helpful for centrally handling papers and controlling who can see them. This lets team members work from home with the most up-to-date information [29].

##### 4.1.1. Selection criteria

The selection of appropriate technology for virtual teams requires a comprehensive evaluation of key criteria to ensure effective collaboration and productivity. These tools should feature user-friendly interfaces and be able to integrate with other systems. In addition, evaluating the potential for future expansion and the associated costs is essential. The effectiveness of these technologies depends on improving team communication, managing tasks more efficiently, and integrating with other systems smoothly. Selecting appropriate technology ensures that the chosen technology meets the team’s real needs and helps them reach their project goals [21]. On the other hand, servant leaders prioritize the needs of the team, encourage initiative, and empower members to take ownership of their work by trusting their expertise, providing access to the necessary tools and information, promoting work-life balance, offering opportunities for training and career development, and encouraging open communication. It is not about delegating tasks and setting expectations; leaders should also provide the support and resources for achieving those goals. Leaders should offer feedback while being open to receiving it well. This two-way communication builds team cohesion and trust.

In [30], some factors that influence the team’s efficiency are highlighted, which can be seen in Fig. 2 from [16]. The ratio of remote teams with communication barriers gradually decreases yearly, including in industries like IT and finance.

##### 4.1.2. Geographical considerations

Geographical variables significantly impact the selection of technology for virtual teams. Because these teams usually work in different locations and time zones, it is essential to select appropriate technology tools to handle these differences. This means giving more weight to technologies that support asynchronous contact and teamwork, which allows team members work well even in different time zones [31]. In addition, these options need to be available to everyone, considering the different infrastructures in different areas. This ensures that everyone has the same opportunity to participate, no matter where they live. Virtual teams are helpful for businesses because they allow them to use many talented people worldwide. This method gives companies access to a broader range of skills and gives people who work from



Fig. 2. Factor influencing team efficiency

Source: Developed by the authors.

home or travel much more freedom. Examples of how location, time, and distance work together in virtual teams are shown in Fig. 3 [32]. This shows how they join to make virtual teamwork easier. Fig. 3 also shows how to understand the different levels of complexity of Virtual Teams (VTs) regarding geographical factors. The axes on this three-dimensional graph show location, time, and distance. Location tells the difference between home-based team members and expatriate team members, who work from home and abroad.

On the timeline, asynchronous work (where tasks do not happen simultaneously) is shown next to synchronous work (where team tasks are organized in real-time). Lastly, the distance line goes from the single distance dimension, which shows a simple way to measure the distance between two points, to multiple distance dimensions, which shows how complicated it is to measure the distance between many points. These picture dimensions show how difficult it is for teams that work in different time zones and parts of the world compared to the primary company's operations.

#### 4.1.3. Structuring virtual meetings

Virtual meetings begin with "Preparation," a vital phase due to the reduced likelihood of casual interactions in virtual environments. This highlights the necessity of prior preparation, as illustrated by [33] in Fig. 4. Before the meeting, it is essential to establish the purpose, themes, objectives, and intended outcomes. The "Agenda and Invitations"

stage involves implementing formal procedures that, according to [34], improve output quality in virtual teams. The agenda provides a comprehensive overview of the subjects that will be discussed, the sequence in which they will be presented, and the designated time for each item.

During the "Conduct Meeting" phase, the formal framework serves as a substitute for the absence of external incentives as [35] discussed, as having a leader physically present is impossible. The use of "Action Items and Summary" aids in preserving clarity and ensuring responsibility, which effectively tackles the communication obstacles emphasized by [36]. A synopsis of the meeting's content, including the tasks to be completed, is compiled after the meeting. The last phase, "Follow-up and Review," guarantees continuous involvement and tackles the decline in team unity caused by the lack of informal connections, as posited by [33]. This encompasses the determinations, allocations, time limits, and obligations allocated to various persons or teams.

#### 4.1.4. Communication tools used by project team members

International organizations utilize these communication solutions to enhance virtual collaboration among project members. Each sector collaborates uniquely, as shown in Table 3, with specific project management and file-sharing tools tailored to its functions. In the tech field, Slack and Trello are essential for effective project management [37]. At the same time, healthcare utilizes compliance and



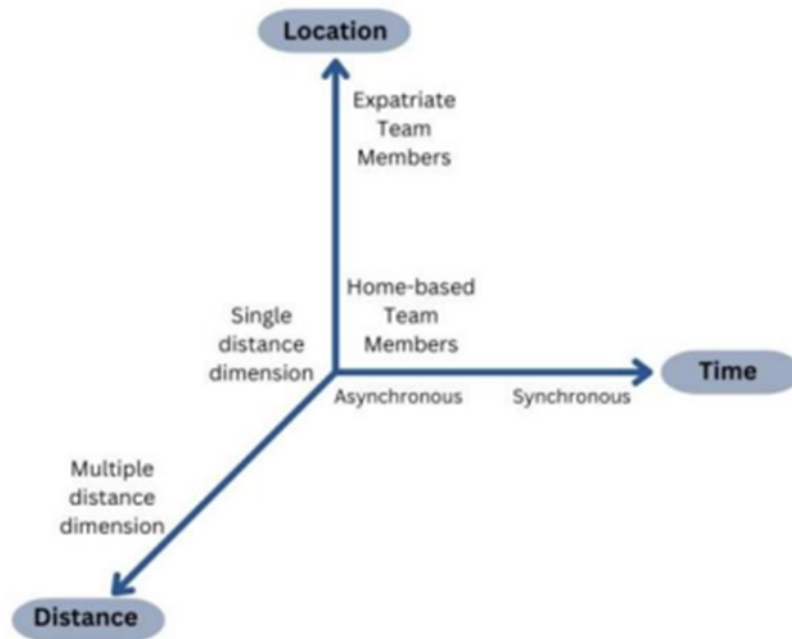


Fig. 3. Complexity dimensions of VTs

Source: Developed by the authors.

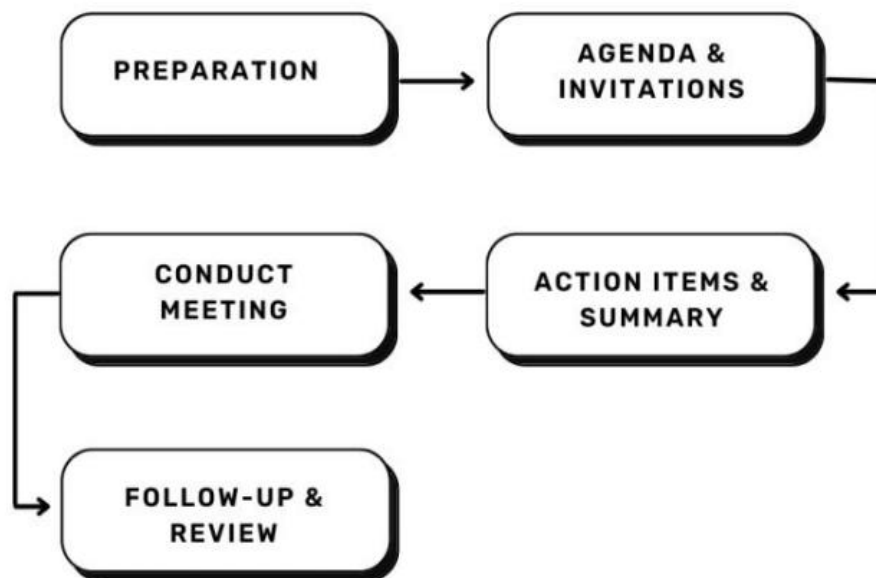


Fig. 4. Virtual meeting structure

Source: Developed by the authors.

security paired with HIPAA-compliant cloud storage and Wrike to manage sensitive projects. The energy sector is keen on applying tools such as ArcGIS to handle geographic information. In contrast, the retail sector has focused on Figma as a platform for the collective design of applications to enhance interaction with the end consumer. Video and audio conferencing has remained a key area of necessity worldwide, with applications like Zoom, Cisco WebEx, and Microsoft Teams instrumental in the ongoing virtual teams. The importance of tech-

nology in team management is highly significant. It connects remote team members for communication, collaboration, and project management. Proper selection and application of technological tools contribute to the effective operation of virtual teams. These resources support team members' unity and encourage creativity, in addition to helping with daily tasks. Video conferencing platforms (Zoom, Tencent, Skype, Microsoft Teams, and so on) have become crucial in today's work environment. These platforms offer features that replicate

Table 3  
Communication tools for virtual teams

Category	Collaboration Tools	Project Management Tools	File Sharing and Document Storage	Meeting Tools	Video and Audio Conferencing
Tech Industry	Slack, Red booth	Jira, Trello	Google Drive, SharePoint	Zoom, WebEx	Microsoft Teams
Financial Services	Miro, Notion, Huddle	Asana, Monday.com	Dropbox Business, Box	Adobe Connect, iMeet	Skype, Cisco WebEx
Healthcare and Pharma	Go plan, Lucid chart	Wrike, Proof Hub	HIPAA-compliant Cloud Storage	Google Meet	Viber
Manufacturing	Autodesk BIM 360, Blackboard	SAP Project Management, Apollo	IBM Cloud, Amazon S 3, Zoho Docs	GoToMeeting	Polycom Telepresence
Retail	Figma, Collaborate	Basecamp, Smartsheet	iCloud, Microsoft OneDrive	Cisco Jabber	Join Me
Energy Sector	ArcGIS, Chanty	Zoho Projects, Clarizen	AWS, Azure Files	GoToMeeting	Cisco WebEx
Tech Industry	Slack, Red booth	Jira, Trello	Google Drive, SharePoint	Zoom, WebEx	Microsoft Teams

Source: Developed by the authors.

face-to-face interactions, such as screen sharing, virtual backgrounds, and breakout rooms for group discussions. By incorporating these tools into meetings, the personal touch of in-person communication is preserved, resulting in engaging and productive interactions.

Project management software such as Trello, Jira, and Asana provide teams with platforms to seamlessly organize tasks, deadlines, and workflows. These tools utilize elements like Kanban boards and Gantt charts to track project phases and individual contributions, enhancing accountability and efficiency within the team. Cloud storage and collaboration platforms like Google Drive, Dropbox, and OneDrive enable real-time document sharing and editing. They make collaborative work effortless by eliminating file size or format compatibility barriers. The students from two different schools use daily tools to work together on their daily tasks. According to [38], messaging tools (Facebook, Messenger, WhatsApp, Telegram) are vastly used, and some collaboration tools (Yammer, Jive) are less used.

#### 4.1.5. Virtual teams in business and economic applications

Virtual teams are pivotal in modern business and economic contexts, driving productivity, reducing

costs, and enabling global collaboration. Across industries, VT leverages digital tools to optimize remote operations. Slack and Trello support agile technological development, while financial institutions utilize Asana and Monday.com for secure collaboration and investment management. Healthcare providers employ VT for telemedicine and research, ensuring data security with HIPAA-compliant tools like Wrike. Autodesk BIM 360 and SAP Project Management in manufacturing enable remote quality control and supply chain management. Retail sectors adopt Figma and Smartsheet to streamline e-commerce operations, and the energy industry uses ArcGIS and Zoho Projects for remote data analysis and compliance tracking.

VT drives significant business outcomes, including cost efficiency through reduced overhead, enhanced productivity via streamlined workflows, and expanded access to global talent, fostering innovation and competitiveness. Additionally, remote collaboration promotes work-life balance, boosting employee retention and organizational resilience. According to [26], effective VT implementation requires a strong IT infrastructure with secure cloud services, standardized communication protocols, and skilled remote leadership to ensure accountability and engagement. By supporting operational agility and global market

reach, VT contributes directly to economic growth and competitive advantage on industry-specific tools to enhance productivity, streamline communication, and optimize project execution within virtual teams, reinforcing their growing role in modern business and economic environments.

#### **4.2. Performance management in virtual teams**

Assessing team performance in virtual teams (VT) is essential for ensuring productive online collaborations. Instruments such as Asana are crucial in overseeing work quality and progress relative to deadlines, which are fundamental performance indicators [39]. There is a growing trend among virtual team leaders to utilize video conferencing platforms such as Zoom, Google Meet, and Skype to receive real-time feedback. This practice enables prompt discussions and fosters team cohesion. Tools such as Microsoft Teams, Slack, and Discord provide valuable insights into levels of engagement and communication patterns, which serve as indicators of team participation [40]. Additionally, surveys and self-evaluation instruments offer instrumental insights into individual contentment and team morale for a project's long-term viability [41]. When used together, these methods give a complete picture of how well a virtual team is doing, ensuring that online workers work toward the same goals as the organization.

##### **4.2.1. Training for effective conferencing**

Virtual teams need “effective conferencing” because it is the primary way people can talk to each other and work together. Proper training in this area can make meetings run much more smoothly, help people make better decisions, and boost team happiness [42]. It is also essential to avoid misunderstandings and problems when people communicate poorly. According to [43], teams that get full training on virtual communication tools and methods are more productive and successfully complete their projects. One exciting aspect of this study was comparing how well teams with different levels of training performed when they started using a new method [44]. At first, both teams' abilities decreased, but the team with more training improved faster and more significantly than the team with less training. Training is an integral part of team growth, especially for virtual teams that need specific types of training in areas like self-manage-

ment, communication and meeting facilitation, project management, and technology [45].

##### **4.2.2. Defining goals**

Numerous theories aim to explain how people collaborate effectively in virtual teams. These theories emphasize the importance of visibility and measurement of actions. Essential tasks for successful virtual teamwork include setting goals, creating plans, communicating, collaborating, and reflecting on performance [46]. In contrast to the direct leadership styles common in traditional teams, virtual team members may benefit more from a leadership style that gives team members the power to make decisions and share management duties among the team members [47]. This strategy changes the traditional job of a team manager as a controller into more like coaching and moderation for their goals [48]. Leaders of virtual teams should prioritize finding things that everyone can agree on right from the start. At the same time, they should focus the team on meeting key performance goals and setting up a clear way for the team to recognize and celebrate its successes.

##### **4.2.3. Process-oriented approaches in virtual teamwork**

Process-oriented approaches in virtual teamwork have become more critical as the world of online work changes. These methods involve making different parts of virtual teams work better to be more efficient, work better together, and do better overall. The key to effective virtual teamwork is getting team goals and tactics to work together well. Also, virtual talks are essential to working as a team from afar, but they must be set up correctly to be helpful.

*Fig. 5* shows process-oriented approaches in virtual teamwork by ensuring everyone on the team is on the same page through effective communication. The team can build strong relationships and a feeling of unity, which is strategic alignment. Virtual meetings can be more productive and improve performance if the plan considers the team's social and emotional aspects, such as building relationships and cohesion. Also, the tools we use for communication should make it easier to do more than share information. They should also help build relationships and create a “cohesive” team. When judging a team's work in a virtual setting, we should look at how well they interact, build relationships, and remain together [21].

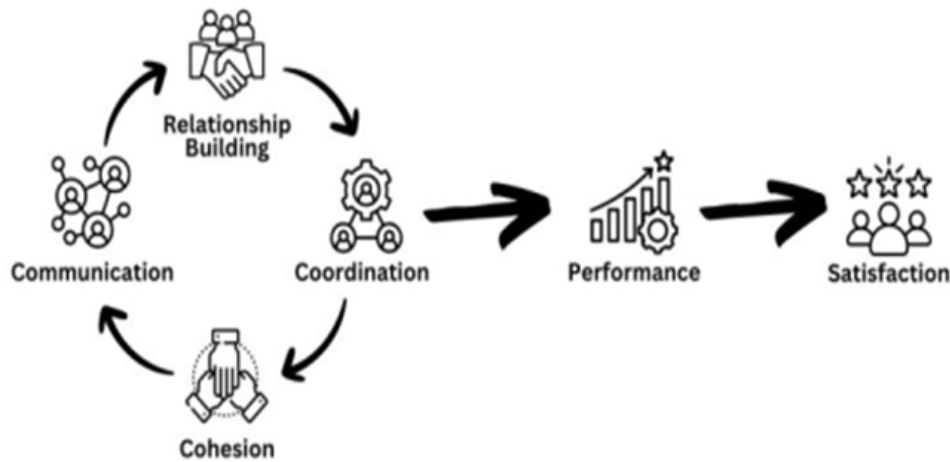


Fig. 5. Process-oriented approaches in VT

Source: Developed by the authors.

## 5. Findings and discussion

This paper thoroughly reviewed literature and related resources on virtual teams and identified 44 relevant studies. Virtual teams provide advantages to firms that are adapting to a more challenging work environment but have many difficulties and drawbacks. Key failure factors include geographic and temporal dispersion, cultural variety, and unfavorable leadership traits. The study discovered that while virtual work allowed for focused individual activities, it impeded spontaneous collaboration and relationship development. This necessitated careful planning and the adjustment of digital tools to enhance team engagement. In virtual team settings, challenges in obtaining information were more prominent than difficulties in sharing knowledge. Additionally, new technology has increasingly become essential for facilitating cooperation across distances. The study emphasizes six essential leadership practices for successful virtual team management: building trust through communication technology, valuing and utilizing diversity, overseeing the virtual work process, tracking team progress with technology, increasing team and member visibility, and guaranteeing individual benefits from involvement in virtual teams.

This research offers a crucial advancement in understanding the development of virtual team efficacy and its implications within virtual team environments. The results highlight the critical role of technology selection in improving virtual teamwork. However, we must address location-specific challenges like technology access and literacy disparities through standardized platforms and comprehensive training programs. Additionally, the research em-

phasizes the importance of people-oriented strategies — particularly reward structures and clear communication protocols — which significantly influence team morale and engagement. These approaches are crucial for maintaining focus and cohesion, especially in diverse, globally distributed teams. Effective process management, including aligning team goals, structured meetings, and continuous performance measurement, emerged as vital for ensuring operational efficiency in virtual teams.

Moreover, we dealt with the issue of closing the virtual gap by discussing the practical communication tools and strategies involved in bridging the social gap and creating a sense of community among the virtual team. We identified leadership development, trust building, and team cohesion building as critical strategies to maintain performance and team cohesion. Therefore, the findings underscore the need for industry-specific strategies in virtual team management. While asynchronous communication and performance tracking tools help IT and software development teams become flexible and productive, they also help customers write async code through the same process.

## 6. Concluding remarks

In summary, this review paper highlighted the unique dynamics of virtual teams, focusing on improving collaboration and performance. The worldwide acceptance of remote work, especially during the COVID-19 pandemic, has demonstrated the importance of companies and businesses in adapting to remote work sufficiently. The paper also highlights the fundamental role that technology, trust, and communication play in the



ultimate success of virtual teams. Though tools like video conferencing or Microsoft Project are crucial factors, the effectiveness of virtual teams depends equally on individualistic factors, such as team cohesion, clear communication protocols, and the strategic alignment of goals. Thus, leadership comes out as a key component, and effective virtual teams are defined by leaders who enhance trust, set clear expectations, and promote team cooperation. Geographical distance, time zone differences, and cultural differences make it necessary to address these issues effectively through successful virtual meetings, a cross-cultural reward systems, and continued training in virtual technologies.

Moreover, this paper points out the importance of managing virtual teams with flexibility and adaptability, ensuring communication remains

open and that team members are supported in their professional tasks and personal well-being. The study also suggests that industry-specific approaches are vital to addressing virtual teams' main dilemmas in different sectors, such as construction and IT. Subsequently, in future studies, questions related to the analysis of virtual team dynamics, such as flexible working and team dynamics, will be even more influenced by modern trends like AI, VR, and so on. More organizations are adopting virtual teams as part of their business models, hence the need for further conceptual and pragmatic support to enhance the existing virtual team performance. This review serves as a decent resource for scholars and practitioners, providing valuable information regarding the factors contributing to effective virtual teamwork and establishing the basis for further developments of virtual collaboration practices.

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**M.M.U. Hoque** — Led the preparation of the Introduction, Literature Review, Methodological Approach, and Findings and Discussions sections. He organized the structure of the review, created tables and charts for data visualization, compiled the reference list, and completed the final manuscript edits.

**X. Zhang** — Focused on the Literature Review and Methodological Approach, synthesizing relevant studies and thoroughly comparing existing research.

**M.F.F. Rahman** — Contributed extensively to the Virtual Teams in Business and Economic Applications and Geographic Considerations sections. He also contributed to the Findings and Discussions, Concluding Remarks, and ensuring clarity and coherence throughout the manuscript.

**B. Zahra** — Developed the sections on Training for Effective Conferencing, Defining Goals, and Process-Oriented Approaches in Virtual Teams. She provided analytical insights into performance management and shaped the Findings and Discussions.

**M.S. Hasnat** — Assisted in drafting the Findings and contributed to the Concluding Remarks.

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