

# Factors That Facilitate or Hinder the Performance of Distributed Virtual Teams

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## FACTORS THAT FACILITATE OR HINDER THE PERFORMANCE OF DISTRIBUTED VIRTUAL TEAMS

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Abstract. In the year 2020, a series of restrictive measures and social distancing were implemented worldwide due to the global outbreak of COVID-19. These measures had a significant impact on work models, leading to the need to find alternative solutions for teams. One of the solutions found was the formation of distributed virtual teams, which experienced a significant increase during this period and are now considered the answer to many organizational issues in the pandemic scenario. Studies on the performance of these teams have provided different perspectives to understand how to assess and measure their performance. The objective of this study was to identify factors that hinder or facilitate the performance of distributed virtual teams. Through a systematic literature review, 48 articles addressing "factors that hinder or facilitate the performance of distributed virtual teams" were identified. Factors such as leadership, effective communication, cohesion, trust, technology, emotions, geographic dispersion, spoken language, culture, and training were found. These factors were identified and grouped. This research represented a contribution to the literature by providing a comprehensive list of factors that affect or contribute to better performance, which can be used by distributed teams as an evaluation tool.

**Keywords:** distributed teams; performance evaluation; organizations; factors; systematic literature.

## 1 Introduction

In 1965, virtual teams were first used in developed countries such as the USA and the UK (Kirkman et al., 2002), due to their pioneering access to computers and other technologies. However, it was during the 1980s, especially during the total quality management movement, that they became more prominent (Gupta; Pathak, 2017). Virtual teams have become increasingly prevalent in organizations due to a more com-

petitive global market. They integrate specialized and geographically dispersed employees who work on highly interdependent tasks.

With the COVID-19 pandemic, employees in organizations had to adapt and work remotely. This transition happened almost instantly, with no preparation time for its members. The literature suggests several ways to monitor performance, such as leaders carrying out routine checks on team members, monitoring electronic discussions and emails, among others.

Many studies address effective ways of managing virtual teams or factors that can improve their performance, but no research has been found that summarizes all of these factors. This research aims to fill this gap by synthesizing the factors that can affect or contribute to the performance of virtual teams. These factors can provide guidance to leaders and organizations on how to measure, monitor, and/or improve the performance of their teams.

## 2 Methodology

This article conducted a systematic literature review focused on studies published between 2015 and 2024.

The search terms used were "performance indicators" OR "performance measurement system" OR "performance" OR "indicators" OR "measurement system" AND TITLE-ABS-KEY "Distributed Processing" OR "Distributed Teams" OR "Team work" OR "Assignment of tasks" OR "Teams distributed" OR ("Remote teams" OR "Geographically dispersed teams" OR "virtual teams").

The search was limited to articles in English published in journals indexed in Scopus or Web of Science. A total of 48 articles that met the inclusion criteria were identified.

## 3 Analysis and development

The results of the systematic review revealed several factors that are shown to be crucial for team performance. Appendix I presents a table with the factors and the authors who mention them, and each of them is discussed below.

### 3.1 Factor I: Leadership

The performance of virtual teams is influenced by various factors, and one of them is leadership. Studies show the importance of leadership styles used in virtual teams for their effectiveness and innovation (Gross, 2018). Styles such as transformational, transactional, and laissez-faire have been identified, each with their own characteristics and specific impacts (Davidaviciene, V. and Al Majzoub, K., 2022).

To ensure high performance in virtual teams, leaders need to understand the differences in this environment compared to traditional teamwork (Maduka et al., 2018). It is necessary to provide clear guidance and establish individual goals for team members, taking into account the lack of face-to-face interactions.

Geographical dispersion can also influence the effectiveness of empowered leadership (Hill and Bartol, 2016). As dispersion increases, it is essential to share power and responsibilities with team members to keep the team cohesive. This form of leadership is positively associated with virtual collaboration and performance. To establish empowered leadership and effective virtual collaboration, it is crucial to have clear communication, avoid misunderstandings, and be open to different ideas and approaches (Hill and Bartol, 2016).

Coordination in geographically dispersed teams, especially regarding temporal separation, also affects team performance, as mentioned by Mell, J.N., Jang, S., and Chai, S. Bridging (2021). Additionally, the ability for leaders to naturally stand out within a virtual context plays a significant role in the success of virtual teams (Mell, J.N. et al., 2021).

Several researchers emphasize the importance of leadership behaviors, effective management, and coordination for the performance of virtual teams. Furthermore, the satisfaction of virtual teams is directly related to their performance (Robert Jr., 2020; Gilli, K. et al., 2022).

Shared leadership, taking into account the trust and autonomy of members, contributes to greater individual satisfaction, and increased team satisfaction is associated with overall team performance (Liao, C., 2017; Ruiller, C. et al., 2019; Lauring and Jonasson, 2018; Paul, R. et al., 2016).

Trust in the leader is a relevant factor that influences team performance, especially in virtual contexts (Flavian, C. et al., 2019). Trust is also highlighted by Connelly, C.E. and Turel, O. (2016) as important at the team-level. Trust in virtual teams is also emphasized as a required competency for an effective leader (Maduka et al., 2018).

Other studies explore the importance of leaders' multicultural experiences and diverse experiences that facilitate communication competence and team performance, such as Hahm (2017); Lu, Swaab, and Galinsky (2021). Additionally, Kilcullen, Feitosa, and Salas (2021) assert that leadership is a factor that affects employee performance in virtual environments, and Lauring et al., (2021) highlight the crucial role of leadership in compensating for deficiencies in virtual teams, especially in terms of inclusion and linguistic diversity.

#### 3.2 Factor II: Emotions

Recent research has highlighted the importance of emotional management in virtual teams. Gamero et al. (2021) emphasize that emotional intelligence plays a crucial role in the well-being of virtual teams. Additionally, the emotional composition of a team, referring to the collective emotional states of team members, plays a fundamental role in team integration and performance.

This suggests that implementing interventions for emotional management is essential to mitigate the impact of emotions in virtual team settings. In addition to emotional intelligence, motivation is also a vital component. Haines (2021) emphasizes the importance of motivation in virtual teams as it can influence trust and performance. Lack of motivation can have a negative impact on social presence within the team.

The study by Sangwan, Jablokow, and De Franco (2020) highlights another critical factor - cognitive distance. Cognitive distance is a concept that refers to differences in how people solve problems. In virtual teams, this can translate into different problem-solving styles, which can affect the team's ability to collaborate effectively.

A shared understanding of the problem to be solved is essential for virtual teamwork, especially in sectors such as software. If team members do not have a common understanding of the problem, communication becomes more difficult, and team emotions can be negatively affected, harming overall performance. Additionally, cognitive diversity in tasks can have a significant impact on team emotions (Sangwan, et al., 2020).

In this context, Paul, R. et al., (2016) identify motivation and management as factors that play a crucial role in facilitating team performance.

An additional factor to consider is the issue of anxiety in computer-mediated communication in virtual teams. Fuller et al. (2016) suggest that individuals with communication anxiety tend to avoid participation, leading to a decrease in communication frequency. It is still not fully understood whether anxiety is more related to the quantity or quality of messages exchanged or if it is driven by the perception of anxiety itself. However, these individuals tend to send relatively more socially oriented messages (Fuller et al., 2016).

In summary, emotional intelligence and motivation of team members, as studied by Liao, C. (2017) and Connelly, C.E. et al., (2016), are essential aspects for the cohesion and success of virtual teams. Other research that is also relevant to the topic includes team motivation and dynamics, as demonstrated by Tavoletti, E. et al., (2019), as well as perceptions of psychosocial control at work and boundary management, according to Pianese, T. et al., (2022).

Additionally, studies on the ability of affective assessment of trustworthiness even at a distance, conducted by Calefato, F. and Lanubile, F. (2018), are also relevant when it comes to emotional management, motivation, and performance in virtual teams.

#### 3.3 Factor III: Effective Communication

The research conducted by Tan, C.K., et al., (2018) presented studies that emphasize the importance of communication as a key to the effective performance of virtual teams. Effective communication is a crucial factor for the success of virtual teams. Virtual teams face unique challenges when it comes to communication.

When there are different perspectives and approaches to solving a problem, conflicts and misunderstandings can arise. Therefore, it is essential for virtual teams to have open channels of communication to promote mutual understanding and avoid unnecessary conflicts (Sangwan, et al., 2020).

Centrality is an important measure of communication in networks. A survey conducted by Flavian, C. et al., (2019) found that individuals who had high centrality (direct contact) with colleagues who provided social support were less likely to leave organizations in the long term.

Communication and flexibility are considered important factors for the effective implementation of virtual teams, according to Kilcullen, Feitosa, and Salas (2021). Communication ability is also crucial, as cited by Lu, S., and Galinsky (2021).

Furthermore, Zakaria and Yusof (2020) and Gallego, J.S., et al., (2021) also highlight the importance of communication and provide guidelines for virtual meetings. Pianese, T. et al., (2022) emphasize the use of telecommunications. Ambos, T.C. et al., (2016) discuss the importance of effective communication. Marlow, S.L. et al., (2017) emphasize the ability to overcome communication limitations and timeliness of communication. Finally, according to the article by Tan, C.K. et al., (2019), factors affecting the performance of virtual teams include communication and how it is managed, as well as the sense of psychological safety within the team.

#### 3.4 Factor IV: Confidence and Technology

Trust and the use of communication technologies are factors intrinsically linked to the performance of virtual teams, according to Owens, D. and Khazanchi (2018). The research by Klostermann, M. et al., (2021) demonstrated a significant connection between trust and the success of virtual teams. Zakaria and Yusof (2020) also address the importance of trust in virtual environments and work teams.

Furthermore, trust in virtual teams has a significant positive impact on project success (Flavian, C., et al., 2019; Wei, L.H. et al., 2018). Trust among team members is crucial for the effective performance of virtual teams (Zaharie, 2021).

The effectiveness of electronic communication is crucial for team performance. When a team is working on a complex task, it is more effective to adapt the type of technology used, such as video calls, instead of increasing the amount of communication via email (Klostermann, M. et al., 2021). Additionally, Garro-Abarca, et al., (2021) highlight that a virtual environment can significantly impact team effectiveness due to the way tasks are interconnected.

The size and experience of the team may require different technologies (Lin, C.N. and Roan, J. 2021). Electronic dependence is also a relevant aspect in the context of virtual teams (Jaakson, K., et al., 2020).

Trust is fundamental for the smooth functioning of virtual teams (Han, S.J. et al., 2020). Factors affecting the performance of virtual teams include trust among team members (Calefato, F. and Lanubile, F. 2018).

The variety of communication tools available and the challenges related to communication are factors that affect the performance of virtual teams (Marlow, S.L. et al., 2017). Trust among team members and a clear and efficient information exchange structure are crucial for the performance of virtual teams (Iorio, J. et al., 2015).

Information and Communication Technologies (ICT) and the perception of proximity are highlighted as influencers of virtual team performance (Ruiller, C. et al., 2019). Trust in a virtual environment has a significant impact on team performance (Tan, C.K. et al., 2019), and the quality of the network is emphasized by Gupta, S. and Pathak, G.S. (2018).

Trust and the use of communication technologies are factors intrinsically linked to the performance of virtual teams, according to Owens, D. and Khazanchi (2018).

The fit of technology has a moderate to high correlation with team performance (Klostermann, M. et al., 2021). Trust in virtual teams has a positive impact on project success (Zakaria and Yusof, 2020).

In summary, trust and technology play a crucial role in the performance of virtual teams, as evidenced by studies by Chong Rei Tan et al., (2018), Flavian, C. et al., (2019), Connelly, C.E. and Turel, O. (2016), Maduka et al. (2018), Klostermann, M. et al., (2021), Zakaria and Yusof (2020), Zaharie (2021).

#### 3.5 Factor V: Geographical Dispersion / Culture / Spoken Language

The ability to effectively relate in culturally diverse situations is considered crucial in globally distributed virtual teams (Presbitero, A., 2020). Cultural diversity and geographic dispersion are factors that influence the performance of virtual teams (Jaakson, K., et al., 2020). Linguistic diversity also plays an important role in managing challenges and driving the productivity of these teams (Presbitero, A., 2020; Lauring and Jonasson, 2018).

Furthermore, M. et al., (2021) point out that the ability to mediate and integrate different cultures within a virtual team can lead to greater creativity and, consequently, better team performance. Intercultural understanding and competence are also identified as relevant aspects for the success of virtual teams by Zakaria and Yusof (2020).

Both T.C., et al., (2016) affirm that managing cultural diversity and leadership across different time zones is a challenge that can affect team efficiency and productivity. Jang, S. (2017) highlights those aspects such as the cultural composition of the team and the ability to integrate and elicit behaviors from multicultural members influence the performance of virtual teams.

Additionally, Lauring, J. et al., (2021) emphasize the importance of linguistic diversity and how it is managed within the team, affecting team performance. In summary, cultural diversity, geographic dispersion, and linguistic diversity are factors that impact the performance of virtual teams (Presbitero and Toledano, (2020); Jaakson, K., et al., 2020); Presbitero, A., (2020); Lauring and Jonasson, (2018); Messner, W., (2015); Richter, (2021); Zakaria and Yusof, (2020); Mell, J.N.; Jang, S. et al., (2021); Ambos, T.C. et al., (2016); Han, K. et al., (2020); Jang S., (2021); Lauring, J. et al., (2021); Kilcullen, Feitosa and Salas, (2021).

#### 3.6 Factor VI: Training

The Tan, C.K. et al., (2019) research addresses the performance factor of cohesion and conflict in virtual teams. According to Susskind A. M., Odom-Reed (2019), team cohesion can vary depending on the size and stage of team development, and Lin, C.N. and Roan, J. (2021) suggest that the cohesion of global virtual teams is positively related to task performance (Paul, R., Drake, J.R., and Liang, H. (2016); Ambos, T.C. et al., (2016). According to the article by Tan, C.K. et al., (2019).

Cohesion brings a sense of belonging to the group and is linked to other factors such as emotions, leadership, trust in the team and technologies, effective communication (Ruiller, C. et al., 2019). Training is a factor that contributes to team cohesion (Connelly, C.E., and Turel, O., 2016).

The training of virtual teams is a determining factor for their performance. According to Ruiller, C. et al., (2019), the team needs to have access to resources, information and training to achieve success. Furthermore, Z. and Yusof, (2020) highlight the importance of specific training for virtual project teams. In addition, Gallego, J.S. et al., (2021) emphasize the relevance of language training as a way to empower the team.

The effectiveness of knowledge transfer is another important factor, as pointed out by Ambos, T.C., et al., (2016). Task complexity, promotion of collaboration, and

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mutual understanding are highlighted by Marlow, S.L. et al., (2017) and Edsall and Conrad, N. (2021).

Furthermore, training programs offer spatial proximity between team members, which can facilitate learning and innovation, positively impacting team performance, as pointed out by Mell, J.N. et al., (2021). The effectiveness of virtual teams is also influenced by familiarity and proficiency with the technological tools used (Aritz, J. et al., 2018).

According to Gilli, K. et al., (2022), managers can provide training on effective communication and team building to increase trust among virtual teams. Furthermore, Gonzalez-Anta, B. et al., (2021) suggest that organizations seek to offer training for managing emotions and pay attention to the composition of the team's personality when implementing such training programs.

Finally, skills and knowledge of the virtual team are mentioned by Markovic, R., and Minovic (2015) as factors that affect the performance of virtual teams, with training being an important factor, as it can solve conflicts and consequently have a more cohesive team.

## 4 Discussions and conclusions

This article addresses a series of critical factors that influence the performance and satisfaction of globally distributed virtual teams. These factors include leadership, emotions, effective communication, trust, use of technology, geographic dispersion, cultural and linguistic diversity, cohesion, and training. Upon analyzing these elements, it becomes clear that the success of virtual teams depends on a comprehensive approach that takes into account both the human and technological dimensions of remote collaboration.

Although conflict is often mentioned in various articles as a complicating factor for the performance of distributed teams, it has not been addressed as an isolated factor. In fact, we consider conflict to be a consequence of the lack of other essential elements, such as team cohesion, communication problems, cultural differences, among others.

Even though a team without cohesion or with communication difficulties and diverse cultural differences may face significant conflicts, we believe that it is important to identify the root cause of these conflicts.

Cohesion is also widely discussed and explored in various studies. However, it is the result of various interconnected factors, and for this reason, it was not treated as an isolated factor. We consider cohesion to be a consequence of a team's good performance.

Trust is inherently linked to various factors, and they are mediated by technology, which is why they were described together.

Geographic dispersion, culture, and spoken language are interconnected and directly influence the trust between team members. It is important to highlight that Time Zone was not considered as an isolated factor, as distributed teams or teams with cultural differences will inevitably have different time zones due to distance or cultural issues. This study contributes to the existing literature by providing a comprehensive insight into the factors that affect virtual teams and serving as a guide for organizations looking to optimize virtual collaboration and performance of their distributed teams.

Future studies aim to identify strategies to enhance the performance of each of the aforementioned factors and to monitor them. In this way, a greater understanding is expected to be obtained regarding how to maximize the performance of virtual teams.

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