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LEADERSHIP IN FACE-TO-FACE AND VIRTUAL TEAMS: A SYSTEMATIC LITERATURE REVIEW ON HYBRID TEAMS MANAGEMENT

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ABSTRACT

Aim/Purpose	The rise of virtual communication technologies and hybrid work contexts has brought significant changes to leadership dynamics, highlighting the need for effective management of teams operating in both face-to-face and virtual settings, known as hybrid teams.
Background	This systematic review examines leadership models utilized in face-to-face and virtual teams, factors contributing to leadership emergence in these contexts, and effective strategies for leading hybrid teams.
Methodology	In this study, three scientific databases were searched, resulting in the retrieval of 1,707 studies. These studies were then subjected to a review process following the PRISMA guidelines, ultimately leading to the inclusion of 15 research contributions in the final review.
Findings	The findings emphasize three prominent leadership models – transformational leadership, leader-member exchange (LMX), and shared leadership – all of

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	which play crucial roles in hybrid team settings. Personality factors drive leadership emergence in face-to-face settings, while virtual settings benefit more from task-related behaviors.
Recommendations for Practitioners	Given the results, key strategies for practitioners include the development of strong communication skills, providing constructive feedback, and implementing efficient remote management techniques.
Recommendations for Researchers	This review informs researchers seeking to enhance leadership efficacy in modern group settings, aiding leaders in navigating the complexities of hybrid team environments.
Keywords	leadership, face-to-face teams, virtual teams, hybrid teams, systematic review

INTRODUCTION

The COVID-19 pandemic triggered a significant surge in remote working due to the lockdown measures compelling companies worldwide to adapt to the work-from-home setup (Newman et al., 2022; Wang et al., 2021). This emergency-driven shift resulted in employees expressing their desire to work, even in a post-pandemic setting, combining office-based and remote work arrangements (Hopkins & Bardoel, 2023). According to the Gallup survey (Gallup, 2023), six out of ten U.S. employees with remote-capable jobs desire to work in a combined work setup, blending the benefits of both in-office and remote work. One-third of respondents prefer full remote work, while less than 10% indicated a preference for exclusively on-site work. This flexible work arrangement is now known as hybrid work and consists in dividing work time between office and other locations, such as home, coworking spaces, libraries, or other places (Ekelman & Kantor, 2023).

This great surge of preference towards hybrid work is changing the composition and the way of working of entire work teams. Hybrid work creates opportunities for collaboration across multiple locations (Halford, 2005). In such settings, work teams frequently consist of colleagues who are simultaneously working either at the office or from any other location. This particular and currently spread work arrangement is generating alleged "hybrid teams," whose members may "rely upon both face-to-face and electronic communication on a daily basis" (Cousins et al., 2007).

The defining feature of hybrid teams lies in their members' ability to operate from diverse locations with varying degrees of virtuality (Foster et al., 2015). Virtuality encompasses the extent of technology dependence and geographic dispersion within a work team (Dulebohn & Hoch, 2017; Gibbs et al., 2017). This means that hybrid teams can range from having some members physically co-located in a central office while others work remotely to entirely distributed teams where all members operate from different locations using virtual communication technologies. High virtuality contexts involve more technology-mediated interactions and spatial dispersion, while low virtuality contexts have fewer such demands (Purvanova et al., 2021). Eisenberg and colleagues (2019) refer to this as "team geographical dispersion," which depends on factors like organizational size and the distribution of production sites. The distribution of remote and on-site work can be influenced by organizational culture (Schein, 2016), organizational policies, and employee preferences (Ekelman & Kantor, 2023). Despite its causes, the level of virtuality within these teams plays a crucial role in shaping members' communication, collaboration, and overall dynamics.

Effective management of hybrid teams, comprising both face-to-face (FtF) and virtual members, places a critical emphasis on leadership. As the prevalence of virtual teams continues to grow due to the widespread adoption of hybrid work models, the role of leadership becomes indispensable in addressing the challenges that arise.

In work contexts involving virtuality, leaders bear the responsibility of ensuring that this arrangement aligns with the expectations and capabilities of all team members. They should take measures to ensure that job responsibilities are effectively fulfilled, employees receive adequate supervision, and communication is efficient. Additionally, leaders must prioritize creating distraction-free, safe, and secure off-site workspaces for their team members (Cortellazzo et al., 2019; Mello, 2007). By addressing these aspects, leaders can foster productive and positive work environments that benefit both the team as a whole and individual employees.

However, this responsibility is not only complex but also represents a new challenge for today's leaders, considering the recent increase in hybrid teams. Therefore, it is imperative to delve deeper into this vital subject to understand how leadership can positively impact the success and productivity of hybrid teams.

For this reason, by exclusively focusing on research papers that investigate both FtF and virtual groups in the same studies, this review aims to examine leadership in the contexts in which supervisors are tasked with managing hybrid teams.

This paper seeks to provide insights into leadership model studies in hybrid teams and the antecedents of the emergence of leadership in hybrid teams and to offer practical recommendations for leading hybrid teams; for example, by identifying leadership strategies that can differ according to the degree of team dispersion. In the context of teams comprising individuals working both in physical proximity and at a distance, this paper provides a first review of empirical research, offering significant contributions to theory and practice.

On the theoretical side, this paper aims to shed light on the most commonly used leadership models for groups operating in FtF and virtual (or hybrid) teams, as well as the antecedents of leadership emergence. On the practical side, the paper outlines recommendations for leading hybrid teams and suggests essential skills that leaders should cultivate for the future. Additionally, this review identifies current gaps that warrant further theoretical and practical exploration.

Leadership in Hybrid Teams and the Need for this Review

Since the beginning of the last century, many studies have been conducted to list the characteristics of effective leadership, identifying the best practices and the appropriate behaviors to support employees both in routine working arrangements and during crises or organizational changes (Grabo et al., 2017). Most of these studies were carried out in face-to-face working context (Ernst et al., 2022). In recent years, rapid technological innovation and globalization have transformed spaces. New technologies have introduced new forms of interaction and communication and have contributed to the blurring of boundaries between time and space (Halford, 2005). Thus, the virtual environment and its implications for management quickly became one of the most important issues (e.g., Cortellazzo et al., 2019; Kiljunen et al., 2022).

As the relevance of managing virtual spaces has surged, numerous studies have focused on this urgent topic, each employing its own terms and labels, making the body of research more complex and often confused. The variety of terms used to describe related concepts, such as "e-leadership" (Avolio et al., 2014; Van Wart et al., 2019), "remote leadership," and "virtual leadership" (Kiljunen et al., 2022; Mehtab et al., 2017; Terkamo-Moisio et al., 2022) contributes to an overwhelming number of definitions that are difficult to consolidate and distinguish clearly.

Recent studies on leadership show a lack of complete understanding of leadership dynamics in different contexts (Wilson et al., 2021), as they focus on either FtF or virtual teams and rarely consider hybrid teams. Leading a hybrid team may, however, be completely different from leading FtF or virtual teams. Leaders of hybrid teams are called to satisfy employees' flexibility needs, improve inclusivity when employees are not able to physically join the team (Torres & Orhan, 2023), and avoid the social isolation typical of a fully remote team (Toscano & Zappalà, 2020). Furthermore, they also must en-

sure clear and consistent communication channels, encourage team bonding activities, create a culture of trust, and ensure that each team member feels responsible for their tasks and contributions in ways that require different approaches than those typically used to manage a fully FtF or fully remote team (Stratone et al., 2022; Torres & Orhan, 2023).

At the moment, to the best of our knowledge, no previous review has been carried out on leadership in teams composed of members working in both presence and virtually. Although, in fact, review contributions to e-leadership already exist, they aimed to focus scholars' attention on the importance of studying leadership in the digital era (Banks et al., 2022), have focused only on health care settings (Cleary et al., 2020; Terkamo-Moisio et al., 2022), or on only distributed teams (Nayani et al., 2018).

Currently, however, at least three main issues on leadership in hybrid work are still open.

First, there is no evidence on whether the leadership models commonly used for traditional FtF or virtual teams are adopted and still effective in the context of hybrid teams since features of virtual teams make leadership demands about leading these teams different from traditional FtF teams (Huang et al., 2010). Research on remote work, for instance, underlines how exerting traditional leadership practices (i.e., inspiring or influencing followers towards common goals) and adapting them in leading technology-mediated teams is more complicated than performing more "managerial" functions, i.e., more pragmatic actions such as planning, control and establishing administrative procedures (Contreras et al., 2020). Furthermore, as Cousins and colleagues (2007) stated, hybrid teams are characterized by four paradoxes: those of remoteness–closeness (i.e., distance and detachment in asynchronous interactions versus co-location and involvement in synchronous interactions), cultural uniformity–cultural diversity (i.e., homogeneity versus heterogeneity), rationality–emotionality (i.e., predictability, rules, and procedures versus unpredictability, sentiment, and subjective approach), and control–empowerment (i.e., monitoring and formal contracts versus freedom, trust, and social contracts), which require managers to deal with them in ways that are far from obvious.

Second, given the recent spread of hybrid teams, it is not clear what are the specific factors that contribute to the informal emergence of leadership processes in these teams. In many virtual teams, leaders are not appointed or elected but emerge (Alon et al., 2023). Previous works (e.g., Balthazard et al., 2009) suggested that different features and actions may facilitate the emergence of a leader according to the setting and the interaction mode. The literature's support for psychological characteristics (e.g., emotional and cultural intelligence) as conditions for the emergence of leadership underscores the importance of assessing through a psychological perspective this process, in a context where diversity and technology-supported environments make it more complex (Alon et al., 2023).

Third, and finally, it is urgent to identify the best tailored strategies able to improve the management of such complex teams. Focusing on the points of strength of each environment (face-to-face vs. remote) may help in finding the best strategies to manage hybrid teams, having the opportunity to reinvent the workplace to fully take advantage of technology, time, and places in order to meet the workforce needs (Mitchell & Brewer, 2022). By looking at the differences in strategies that seem effective in a face-to-face and a virtual context, an attempt is made to shed light on what might work for the management of hybrid teams.

This systematic review starts from the three identified gaps and, taking into account studies that simultaneously consider work teams involving members working both in presence and virtually, aims to address the following research questions (RQ):

RQ1: Which leadership models are most commonly used in studies on FtF and virtual teams?

RQ2: What are the factors that facilitate the informal emergence of leadership in these contexts?

RQ3: What strategies have been reported to effectively manage FtF and virtual teams?

In the following sections, we present the methodology followed to conduct this review. Then, the results of the review will be shown in response to the three research questions. A discussion will comment on the main results. Then, the study limitations and its theoretical and practical implications will be traced. Finally, the conclusion will close this study.

METHODS

To address the three research questions, we conducted a systematic review of the empirical literature in the first six months of 2023. Following the recommended PRISMA criteria (Page et al., 2021), we adhered to a structured and well-accredited systematic literature review method, encompassing five key steps: (1) scoping and planning the research strategy for literature source collection; (2) conducting data collection with a structured approach; (3) evaluating search results against eligibility criteria; (4) performing data abstraction; and (5) assessing the methodological quality of the collected data.

In the following paragraph, we outline the specific search criteria and describe our comprehensive literature search process, which involves using targeted keywords and searching through electronic databases. Subsequently, we detail the quality assessment of the included studies, as well as the process of data extraction and synthesis.

KEYWORDS AND SEARCH QUERY

Based on our research questions, we identified four thematic areas (leadership, face-to-face teams, virtual teams, and work) and conducted a pilot search of databases using specific key terms. After refining the search through the pilot phase, the final search string, incorporating Boolean operators, was as follows: ("leader*" OR "e-leader*" OR "manager") AND ("face to face" OR "in presence") AND ("virtual" OR "digital" OR "remote" OR "telework*" OR "agile work" OR "distance" OR "online") AND ("work*" OR "employee*" OR "team"). This comprehensive search string aimed to capture relevant studies pertaining to leadership in the context of face-to-face and virtual teams and their work-related aspects.

We conducted our search using the following databases: Scopus, Web of Science, and PsychINFO. The search was not limited by time and covered articles up until February 2023. We set restrictions for language, study type, and publication type, specified in the next sub-paragraph, to ensure that we captured all relevant contributions without any omissions. This rigorous approach aimed to gather a comprehensive and diverse range of studies related to our research questions on leadership in face-to-face and virtual teams and their work-related aspects.

INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria consisted of: (a) papers published in English in scientific journals; (b) papers studying leadership taking into account, contemporarily, face-to-face groups and virtual groups, or different levels of geographical distribution or degrees of virtuality; and (c) studies with empirical data, with a quantitative, qualitative, experimental or mixed-method research design.

Consequently, we defined the following conditions for exclusion: (a) studies not in English and not published as journal articles (i.e., book chapters, conference proceedings); (b) studies not focusing on leadership, or focusing only on face-to-face or virtual groups, alternatively; and (c) studies with no empirical data (e.g., theoretical studies, reviews, letters, etc.).

The authors worked together to curate the papers for the review. Initially, duplicate articles, which were found across multiple bibliographic databases, were removed. Next, studies were screened based on their titles and abstracts, and those that did not meet the inclusion and exclusion criteria were excluded. Finally, the remaining papers were thoroughly evaluated by reading the full-text to provide a comprehensive analysis of the results. Table 1 provides an overview of the criteria.

Table 1. Inclusion and exclusion criteria

	Criteria and description
Inclusion	*Papers published in English in scientific journals*
	Papers studying leadership taking into account contemporarily, face-to-face groups and virtual groups, teams with different levels of spatial, temporal, or configural distribution of members, or different degrees of virtuality
	Studies with empirical data: quantitative, qualitative, experimental, or mixed-method research design
Exclusion	*Publication type*: the study is not published as an article in indexed journals
	Lack of one face-to-face or virtual group: the study involves only one of the groups of interest, alternatively
	Lack of abstract or data: the paper does not show an abstract to read in the first round, or it does not present research data (it is, for example, an editorial paper)
	Paper not published in English
	Wrong population: the target sample works in contexts that do not involve virtuality or the possibility of geographic dispersion or is not implied in studies about leaders managing groups with different levels of virtuality in the context setting
	Lack of leadership: the study does not investigate leadership dynamics
	Wrong study design: the study adopts study design not of interest for this research (e.g., interventions)

Methodological Quality Assessment

According to the PRISMA, it is necessary to evaluate the methodological quality of each study included in the review. The methodological quality of the articles included in the study was assessed using the Mixed Methods Appraisal Tool (MMAT) developed by Hong et al. (2018). The MMAT is specifically designed for the quality assessment of systematic reviews that include qualitative, quantitative, and mixed methods studies. The tool evaluates methodological quality across five categories, namely qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies. The appropriate category of studies is chosen based on the study design type. The MMAT includes two screening questions to identify whether a study is empirical and eligible for assessment. For each typology, five indicators are then used to evaluate the quality of the assessed studies. Each study is rated as "Yes," "No," or "Can't tell" to each indicator. In this study, papers that did not provide adequate information to answer "Yes" and "Can't tell" responses were converted to "No" since it meant the studies lacked sufficient information.

Since an overall score may not provide a comprehensive understanding of the study's strengths and weaknesses, stars (*) and percentages (%) were used to inform readers of the quality of the included studies. This means that a study that receives five stars on each criterion is interpreted as 100%, while a rating of four stars is equal to 80%, three stars are equal to 60%, two stars are equal to 40%, and one star is equal to 20%.

Ethical Considerations

This study combines the results from previous research. Since it did not directly involve participants, no approval was required. The systematic review was performed in compliance with PRISMA guidelines and the Declaration of Helsinki (World Medical Association, 2013) and its updates.

Identification and Selection of the Studies

The research query conducted in the consulted databases yielded 1,707 results, 540 of which consist of studies previously identified by searches in other databases. The exclusion of these contributions made a total of 1,167 research contributions eligible for the title and abstract reading. Among these, 1,107 contributions were excluded based on one or more of the four exclusion criteria. After a thorough full-text screening of the remaining 60 contributions, 45 were further excluded due to the exclusion criteria. Ultimately, 15 studies were deemed eligible and included in the review. For a detailed summary of the process followed in the described inclusion and exclusion stages, refer to Figure 1.

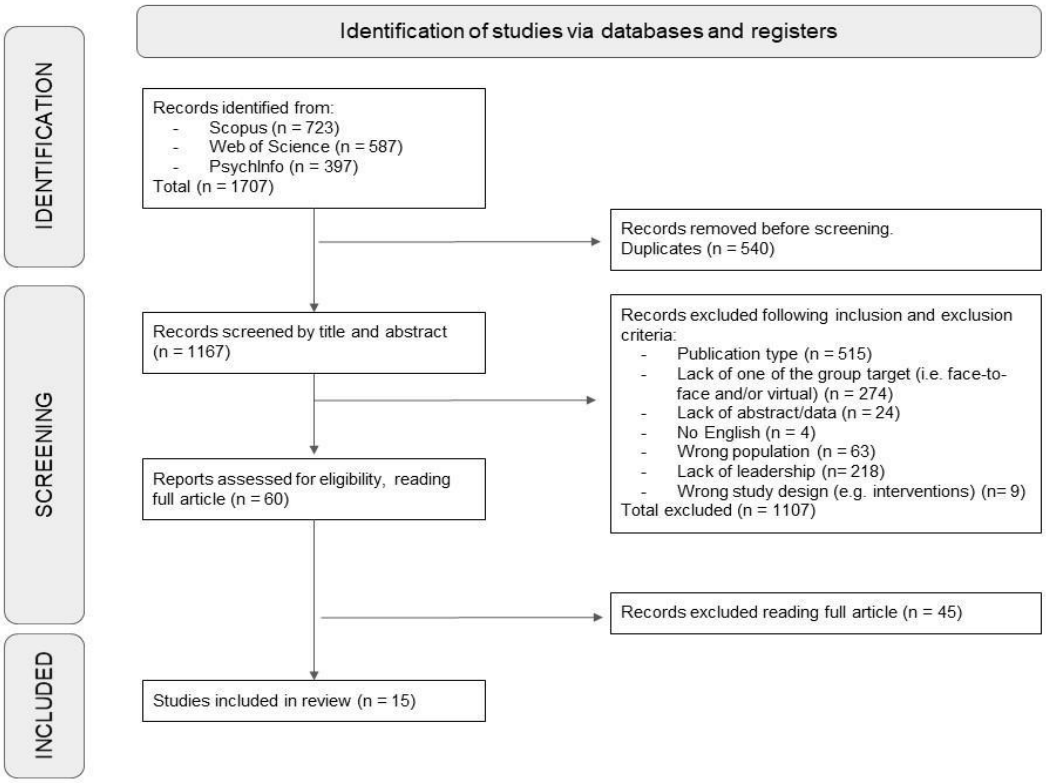

Figure 1. Number of articles in each stage after applying the inclusion and exclusion criteria

Overview and Quality Assessment of the Studies

The 15 studies selected through the developed search strategy encompassed various research designs: seven were solely quantitative and utilized surveys; six were experimental studies; one employed a qualitative approach; and finally, one adopted a mixed-method design. The samples used in these studies were diverse, with about half of them involving student participants and the other half involving employees and managers.

Each of the 15 studies possesses specific characteristics that allow for a differentiated evaluation of their methodological quality. As reported above, each study was assigned stars (*) and percentages (%) based on the MMAT (Hong et al., 2018) indicators, providing a clear assessment of their quality. A comprehensive summary of the reviewed studies along with their respective quality scores, is presented in Table 2.

Table 2. Summary and quality assessment of the reviewed studies

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
Balthazard et al. (2009)	USA	1) To examine the degree to which the five-factor model of personality is predictive of perceived transformational leadership behaviors in both virtual and face-to-face settings; (2) to examine predictors specific to virtual teams.	262 undergraduate business students (127 members of virtual teams and 135 in face-to-face teams)	Virtual members were dispersed throughout a large computer facility and randomly assigned to a computer-mediated team FTF team participants received paper-based task materials and huddled around a table with their respective team members, away from other teams	Experimental	Emerging Transformational Leadership	MLQ (Bass & Avolio, 1990)	In virtual settings, personality is not an effective antecedent of emerging transformational leadership; in FTF contexts, instead, a high level of extraversion or emotional stability correspond to a high level of emerging transformational leadership.	**** (80%)
Braun et al. (2019)	Germany	To assess employees' job satisfaction, leader's effectiveness, and perceived leader's team identification by evaluating quality and quantity of leader-follower communication channels.	261 employees	FTF communication: personal execution of leadership with leaders and employees physically present and conveying information in a verbal manner. High synchronicity. Email or telephone communication: technology-mediated communication. Respectively low and medium synchronicity.	Quantitative (online survey)	Leader Effectiveness (LE) and Perceived Leader's Team Identification (PLTI)	LE: *ad hoc* items PLTI (Mael & Ashforth, 1992; Van Dick et al., 2004)	Face-to-face communications with leaders are preferred by employees and also the most positively related dimensions to the dependent variables.	*** (60%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
Busse and Weidner (2020)	Germany	To suggest a framework of what they call "augmented leadership," which goes beyond the classical (i.e., face-to-face) management towards a more distant leadership approach.	10 leading executives from various Germany-based organizations	Leadership richness continuum. >50% remote leadership: contacts mostly through virtual and remote conferences, rare physical presence. <50% remote leadership: leading via personal physical contact.	Qualitative	Distant or Augmented Leadership	/	The increasing level of leadership richness continuum (i.e., from a FtF to a virtual level of interaction with the leader) is associated with employee engagement (EE) with a U-shaped relation. This association is stronger in agile organizations applying tools for remote working. To improve EE, a balance between FtF leadership in presence and distant leadership is needed.	***** (100%)
Charlier et al. (2016)	USA	To assess how emergent leadership is affected by team dispersion (i.e., overall team configuration and dyadic team member co-location).	344 undergraduate business majors randomly assigned to teams of 4 (a total of 86 teams)	Four different team configurations according to different levels of members' co-location. From all 4 members co-located (i.e., same room) to 2-1-1 (two members co-located and two isolated).	Experimental	Emergent Leadership	Generalized Leadership Impression scale (Lord & Alliger, 1985)	1) Co-located teams have a higher rating of emergent leadership than non-co-located teams. 2) Surprisingly, as the amount of dispersion among virtual teams grows, so does emergent leadership.	**** (80%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
Drescher and Garbers (2016)	USA Germany	To explore causal relationship of shared leadership on intended work performance and predicted satisfaction, also considering team commonality and communication mode.	262 students +99 employees	Virtual: Team members work at different locations and most of your conversations are held via communication technology (e.g., e-mail, chat). Face-to-face: team members work at the same location, and for conversations, members meet somewhere in the building.	Experimental	Shared Leadership	Instruction to be a group with shared or hierarchical leadership	Performance and predicted satisfaction were higher in FtF teams with high commonality. All kinds of groups (virtual and FtF, with high or low commonality) benefit from a shared leadership rather than a hierarchical one.	*** (60%)
Eisenberg et al. (2019)	USA	To explore the moderating role of transformational leadership on the relationship between team dispersion, team communication, and team performance.	53 innovation teams, comprising 543 individual team members	Geographic dispersion: Calculate the Blau Index using team member addresses, from 0 = "completely collocated team" to 1 = "complete geographic dispersion."	Quantitative (online survey)	Transformational Leadership	Four dimensions associated with transformational leadership (Bass & Avolio, 1994; Pearce & Sims, 2002)	The influence of transformational leadership on communication and team performance decreases when team dispersion increases.	***** (100%)
Gajendran and Joshi (2012)	USA	To explore, in distributed teams, the effects of LMX and communication frequency in shaping member influence on team decisions.	167 individuals from 40 teams of an IT multinational	Team dispersion refers to the extent to which members are distributed across different locations and time zones.	Quantitative	LMX	Six items from Kacmar et al.'s (2003) measure of dyadic leader–member communication frequency	When leader-member communication is frequent in highly dispersed settings, high-quality LMX relationships are effective in creating member inclusion and involvement in team decisions. In these highly dispersed	**** (80%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
								groups, leader-member frequency of communication, when low, dampens LMX benefits.	
George et al. (2022)	USA UK Netherlands China	To examine traditionalism and the extent of virtuality as features changing the relationship between shared leadership and team effectiveness.	211 employees working in 56 engineering project teams	Virtuality: the extent to which electronic mediums are used to achieve collective goals.	Quantitative	Shared leadership	Team Multifactor Leadership Questionnaire by Avolio et al. (2003)	Shared leadership is positively related to team effectiveness. When virtuality is low, shared leadership is not significantly associated with team effectiveness; when virtuality is high, shared leadership has a significant positive effect on team effectiveness. When traditionalism is high, shared leadership results in team effectiveness if teams are also highly virtual.	**** (80%)
Joshi et al. (2009)	USA	To explore the effects of inspirational leadership in dispersed groups on commitment and trust to the team, and then on team performance.	247 out of 700 employees of the customer services division organized into 91 teams	Team dispersion: company records indicating the country and city location for employees and managers.	Quantitative	Inspirational Leadership (subfactor of Transformational Leadership)	Six-item version of Bass's (1985) inspirational leadership questionnaire adapted by Spreitzer et al. (1999)	The positive relationship between inspirational leadership and individuals' commitment to the team and trust in team members was strengthened in more dispersed teams.	**** (80%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
Kelley and Kelloway (2012)	Canada	To explore the effects of transformational leadership as mediator between some antecedents (regularly scheduled communication, unplanned communication, prior knowledge) and organizational outcomes (job satisfaction, organizational commitment, manager trust) both in a remote and proximal sample.	402 individuals in either professional or management positions	Remote environment: characterized by physical distance and reduced face-to-face interaction; the individuals and their leaders work in different locations.	Quantitative	Transformational Leadership	The seven-item Global Transformational Leadership scale (Carless & De Paola, 2000)	In the remote environment, perceptions of transformational leadership mediate the relationship between these elements and individual outcomes, while the same model does not fit the proximal environment. Thus, it seems that being managed proximally differs significantly from being managed remotely, with differences residing in the context.	*** (60%)
Purvanova and Bono (2009)	USA	1) To examine the consistency of leaders' transformational leadership behaviors in face-to-face and virtual teams, and 2) To determine whether the effects of transformational leadership behavior differ by team type on team performance and project satisfaction.	301 psychology students	Face-to-face team condition: leader and members seated at the same table. Virtual team condition: leader and team members in different rooms, equipped with a computer.	Experimental	Transformational Leadership	Multifactor Leadership Questionnaire (MLQ; Bono & Judge, 2003)	Transformational leadership had a stronger effect on team performance in virtual teams than in FtF. Leaders who increased their transformational leadership behaviors in their virtual teams, relative to their FtF teams, led them to be the most successful teams. On the contrary, no significant interactions between team type and leadership were	***** (100%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
								found for project satisfaction.	
Purvanova et al. (2021)	USA	To explore the importance of achievement and ascription antecedents to leadership emergence in contexts of low, medium, and high virtuality.	344 undergraduate business 526 undergraduate psychology students	Collocated teams: low degree of spatial separation from their teammates; interaction is mostly in-person. Virtual teams: high virtuality contexts experience a high degree of spatial separation from teammates who occupy multiple sites and/or a high degree of technology dependence since interaction is mostly via technology.	Experimental	Emergent Leadership	Five-item, five-point Likert scale from Lord and Alliger (1985)	In low virtuality contexts, ascription factors (extraversion, conscientiousness, cognitive ability) are more effective as antecedents of leadership emergence. On the other hand, in high virtuality contexts, achievement factors (action and monitoring behaviors) are important antecedents for leadership emergence shifts.	**** (80%)
Serban et al. (2015)	UK	To explore which antecedents of emergent leadership is more effective considering different team types (co-located/face-to-face or non-co-located/virtual).	201 Students	Face-to-face (co-located) vs virtual (non-co-located) teams can be distinguished for temporal distribution, boundary spanning, lifecycle, and member roles.	Experimental and Quasi-Experimental	Emergent Leadership	*Ad hoc* single-item	In virtual contexts, cognitive ability and self-efficacy are more effective antecedents of emergent leadership. In co-located teams, extraversion and group participation are more salient antecedents.	***** (100%)

Authors and year of publication	Country	Main goals	Participants	Definitions (FTF, virtuality)	Research design/ Method	Leadership styles/ Themes	Leadership measures	Main results	Quality
Wilson et al. (2021)	USA	To explore how team interaction mode (virtual versus face-to-face) moderates the impact of extraversion on leadership emergence	108 students	Virtual teams: members communicating from different locations. Face-to-face teams: communicating in the same room.	Experimental	Emergent Leadership	Participants ranked the relative contributions of each other member to leadership roles	Extraversion is more salient for leadership emergence in FtF teams.	***** (100%)
Zimmermann et al. (2008)	Netherlands USA UK Malaysia Germany	To explore the effectiveness of leaders' task-oriented and relationship-oriented behaviors in virtual and face-to-face settings.	419 technical engineers	Virtual setting: people working at different locations and different time zones, and communication is mainly computer-mediated. Face-to-face setting: people interact in the same location and at the same time.	Quantitative	Unspecified style or type of leadership	Lists of behaviors	In virtual settings, task-oriented leadership behaviors become more important. It is a greater challenge for leaders to promote group identification in a virtual setting than it is in a FtF setting. More task-oriented leadership behaviors as well as relationship-oriented leadership behaviors are perceived to be somewhat more important in virtual communication settings than in FtF ones.	**** (80%)

RESULTS

LEADERSHIP MODELS ADOPTED IN MANAGING FTF AND VIRTUAL WORKGROUPS

We address the first research question (RQ1) by identifying the primary leadership models that scholars have used to study the simultaneous management of FtF and virtual teams in the reviewed studies.

Transformational leadership was found to be the most commonly studied, but not always with the same research purposes. For instance, Balthazard and colleagues (2009) explored how transformational leadership emerges in virtual and FtF settings among undergraduate business students, focusing on the predictive role of personality traits and communication. Although the study considered students, it is one of the few that has addressed leadership and highlighted that some personality traits, such as extraversion and emotional stability, favored the emergence of this style in FtF teams (where participants received the paper materials for the tasks and gathered around a table), but not in virtual teams (where participants were dispersed throughout a computer facility and randomly assigned to a computer-mediated team). On the other hand, the quality of written communication (grammatical complexity) through media was found to determine transformational leadership in virtual environments. Numerical scores were assigned to the degree of grammatical complexity, and the use of this quantitative methodology showed, in a regression analysis, the positive relationship of this characteristic with the emergence of transformational leadership (Balthazard et al., 2009). On the other hand, Purvanova and Bono (2009) conducted a study among psychology students to examine how specific and classic transformational leadership behaviors (i.e., idealized influence, inspirational motivation, intellectual stimulation, individualized consideration) vary depending on whether the teams operated in virtual or FtF settings. Some students chose to sign up as leaders, and their behaviors were rated both by trained observers and by followers. In particular, the authors showed that leader behavior was not consistent across teams: some leaders increased their transformational behavior in virtual teams, while others decreased it or did not change it at all. Their results have also shown that transformational leadership had a stronger impact on team performance in virtual teams than in FtF teams. Furthermore, when leadership behaviors are assessed, leaders tend to adapt their behaviors in response to situational demands.

More recently, Eisenberg and colleagues (2019) also examined team performance, in this case, among innovation teams of industrial R&D companies using an online survey. Unlike Purvanova and Bono (2009), who compared face-to-face and virtual teams, these researchers used a more complex measure of team dispersion (calculated using the Blau Index) and conducted their study on real work teams rather than student teams. Eisenberg and colleagues (2019) investigated the moderating effect of transformational leadership (evaluating idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration) on the relationship between team dispersion, team communication, and team performance and, in contrast to Purvanova and Bono (2009), they found that transformational leadership had a less positive influence on team communication and team performance in highly dispersed teams than in collocated teams.

The study by Joshi and colleagues (2009) specifically examined the role of the inspirational dimension of transformational leadership on team performance involving teams of organizations' customer service divisions. Inspirational leadership is a component of transformational leadership that emphasizes communicating a compelling vision, expressing trust in team members, and energizing the team, particularly effective in fostering socialized relationships, which can lead to beneficial outcomes for the team as a whole. The results of their survey indicated that inspirational leadership (assessed by team members) appears to be particularly conducive to increased individual team member commitment and trust in team members in highly dispersed teams. Finally, Kelley and Kelloway (2012), after conducting their survey, analyzed the mediational role of transformational leadership by comparing remote and proximal teams. They found that, for remote teams, the four contextual characteristics of

control over surroundings, manager-initiated communication on an unplanned basis, prior knowledge of the manager, and regularly scheduled communication predicted perceptions of transformational leadership. This, in turn, predicted job satisfaction, organizational commitment, and perceptions of manager trust. In contrast, in proximal teams, prior knowledge of the manager and regularly scheduled communication did not predict transformational leadership.

Unlike the previously cited articles that use transformational leadership in their research models, Gajendran and Joshi's (2012) study drew on the *Leader-Member Exchange (LMX) theory*. The results of this study show that, in highly dispersed groups where communication between leader and members was frequent, high-quality LMX was effective in promoting member involvement and participation in team decision-making.

In contrast to studies referring to traditional leadership approaches, Busse and Weidner (2020) developed a new framework of *augmented leadership*. Augmented leadership consists of a leadership that is able to anticipate change, builds trust, acts proactively, fosters a free collaborative mindset, and keeps a continuous improvement process going.

Moreover, two studies in this review refer to *shared leadership*, a leadership style that does not assume a top-down approach, but rather several people share the function of a leader in a team according to a collective form of leadership (Drescher & Garbers, 2016; George et al., 2022; Zappalà et al., 2018). Drescher and Garbers (2016) showed that performance and satisfaction were lower in virtual teams with hierarchical leadership (rather than shared leadership) than in FtF teams. Moreover, the perception of higher similarity among team members who believe they share the same attitudes, arguments, and beliefs led to higher performance and greater satisfaction in FtF teams than in virtual teams.

Most of the remaining studies in this review examined the process of leadership emergence: together with the contributions on shared leadership, they confirm the growing interest in informal rather than formal approaches to leadership (Hanna et al., 2021).

Leadership Emergence in FtF and Virtual Workgroups

This section addresses the second research question (RQ2), focusing on the factors that promote the informal emergence of leadership in face-to-face and virtual workgroups.

Emergent leaders can be defined as individuals who exercise a leadership role without being vested in formal authority (Charlier et al., 2016). A total of five articles (Charlier et al., 2016; Purvanova et al., 2021; Serban et al., 2015; Wilson et al., 2021) addressed how emergent leadership was predicted by different factors in the two settings of interest.

According to the findings of Purvanova and colleagues (2021), in low virtuality contexts, personality factors such as extraversion and conscientiousness appeared to explain leadership emergence to a greater extent. Whereas, in high virtuality contexts, it was leader behaviors such as monitoring and coordination that predicted leadership emergence.

Serban and colleagues (2015) and Wilson and colleagues (2021) showed that the team type (co-located versus virtual teams) moderated the relationship between extraversion and leadership emergence, suggesting that this relationship is stronger in FtF teams. Serban and colleagues (2015) also found that team type moderated the relationship between cognitive ability and the emergence of leadership qualities. As with extraversion, the relationship was stronger in FtF teams. In contrast, regarding the moderation of the team type on self-efficacy, the results showed that self-efficacy in virtual environments was more strongly related to the emergence of leadership qualities in environments characterized by uncertainty and ambiguity.

The study by Charlier and colleagues (2016) finally showed that team configuration affected the emergence of leadership. In particular, co-located teams had a higher rating of emergent leadership than non-co-located teams. Unexpectedly, however, as the amount of dispersion among virtual teams grew, so did emergent leadership.

Strategies for an Effective Management of Face-to-Face (FtF) and Virtual Teams

In this section, we address our last research question (RQ3), which aims to identify effective leadership features, skills, and behaviors in managing hybrid teams comprising both FtF and virtual members. Many of the studies included in the review emphasize the numerous challenges associated with highly virtual environments.

For instance, geographically dispersed contexts make informal and spontaneous communication more challenging, which is crucial for strengthening social ties within the team (e.g., Braun et al., 2019; Joshi et al., 2009). Communication through various channels (chat, email, videoconference) in virtual teams can be associated with increased uncertainty, information dispersion, cognitive load, ambiguity, lower social presence, reduced conversational participation, and fewer opportunities to gather personal information and cues compared to FtF situations enriched by emotional expressiveness and nonverbal behavior (e.g., Balthazard et al., 2009; Purvanova & Bono, 2009; Serban et al., 2015; Zimmermann et al., 2008).

Braun and colleagues (2019) found that leaders who communicate FtF with their teams are perceived as more effective and more closely identified with employees, which is not the case when digital communication is used frequently. However, George and colleagues (2022) emphasized that communication mediated by technologies may improve team members' communication due to a higher perception of freedom and a relative degree of anonymity. Although these papers approach communication from different perspectives, it remains a crucial element in the effective management of teams, with notable differences between FtF and virtual contexts (e.g., Balthazard et al., 2009; Gajendran & Joshi, 2012; George et al., 2022; Kelley & Kelloway, 2012; Purvanova & Bono, 2009; Zimmermann et al., 2008).

Both regular and frequent scheduled interactions and unplanned communications between team leaders and members could help reduce ambiguity, potential misunderstandings, errors, and social isolation. At the same time, they could improve support, feedback, and attention to development and mitigate the lack of serendipitous encounters typical of FtF situations for informal exchanges (Gajendran & Joshi, 2012; Kelley & Kelloway, 2012; Zimmermann et al., 2008). Leaders are required to ensure quality written communication that is rich in ideas, clear, and grammatically and semantically correct (Balthazard et al., 2009; Zimmermann et al., 2008).

In virtual environments, or when the degree of virtuality increases, task-oriented behaviors focused on ensuring a common understanding of the scope, setting clear tasks for team members, and stimulating information sharing may become more critical than in FtF situations (Zimmermann et al., 2008).

Aside from task clarity, fostering a sense of team belonging is crucial, and relationships-oriented behaviors are appreciated. Leaders should promote social events or meetings to allow team members to spend time together, socialize, and build shared values (Zimmermann et al., 2008). Periodic physical meetings with teammates in FtF situations are important for effective remote working, as is prior knowledge of their manager (Kelley & Kelloway, 2012; Zimmermann et al., 2008).

Additionally, Busse and Weidner (2020) found that a balance between FtF leadership and distant leadership is essential to improve employee engagement. The level of employee engagement peaks in agile organizations that apply digital collaboration tools while displaying moderately high levels of "leadership richness." The appropriate use of digital tools, such as modern platforms, facilitates task structuring, coordination across time zones, and the location of team members.

DISCUSSION

This systematic literature review fills crucial gaps in the research by focusing on the underexplored area of leadership processes in hybrid teams. The review reveals transformational leadership as the most commonly studied model in hybrid teams, with shared leadership also emerging as a crucial process in both virtual and FtF settings. Although the desire to discover which leadership style is most effective in hybrid work remains unfulfilled, a significant shift toward exploring collaborative and adaptive leadership approaches beyond traditional hierarchical models can be observed in hybrid teams' management.

In terms of leadership emergence in FtF and virtual workgroups, the second focus of this work, this review highlights the importance of personality factors like extraversion and conscientiousness in low virtuality contexts and specific behaviors such as monitoring, coordination, and self-efficacy in high virtuality contexts. The team type (co-located vs. virtual) seems to change the relationship between extraversion and leadership emergence, with a stronger association in FtF teams. On the other hand, individual self-efficacy may be more relevant in leadership emergence in virtual environments of uncertainty and ambiguity. Notably, "extreme" contexts like co-located or highly dispersed teams show a higher rating of emergent leadership, which is less typical in teams with medium virtuality.

Finally, the identified strategies for effective management of hybrid teams emphasize addressing challenges like limited informal communication and social ties in virtual environments. In particular, the reviewed studies suggest that leaders should strike a balance between FtF and digital communication, ensure quality written communication, and provide task clarity while stimulating information sharing. Task-oriented behaviors and ensuring a common understanding of goals appear crucial in more virtual settings while fostering team belonging, and relationships-oriented behaviors are essential for both FtF and virtual collaboration. Striking a balance between FtF and distant leadership and leveraging digital collaboration tools can enhance employee engagement in hybrid teams. Leaders should adopt what has been understood in the literature as the "right distance" from their employees (Garzaro et al., 2021). Fostering team membership through social events and regular physical meetings with teammates is also essential. Overall, this research highlights the importance of adopting collaborative leadership approaches in the dynamic context of hybrid teams.

LIMITATIONS

This study acknowledges several limitations that may impact the validity and generalizability of the conclusions. First, being the first systematic review on this specific topic, the inclusion of heterogeneous research questions may have introduced challenges in providing focused and conclusive results. Additionally, the scarcity of available studies on this emerging topic could have limited the depth and breadth of the evidence synthesized.

Another major limitation of the study lies in the diversity of methodologies, participant characteristics, and settings among the included research contributions. This heterogeneity may be beneficial, as it allows for comprehensiveness in the review process, but it also makes comparison and synthesis of results difficult. Furthermore, the use of student samples, while offering valuable insights, may not fully capture the complexities and dynamics of real-world working environments, where, for instance, factors like work pressures and team dynamics play significant roles. However, studies using students as participants provide a significant understanding of how leadership functions in both FtF and virtual communication contexts. Simulating work environments with student samples serves as a practical approach when more representative samples are not available. This method allows researchers to gain a preliminary understanding and draw meaningful conclusions about leadership dynamics. Finally, the variability in the quality of the included studies, a common challenge in systematic reviews, could have influenced the overall strength and reliability of the traced conclusions.

Theoretical and Practical Implications

The theoretical implications of this systematic review are significant as it provides a comprehensive systematization of leadership constructs, behaviors, and skills of utility in managing hybrid teams. Unlike focusing solely on e-leadership, which is a specific and still not well-defined leadership style (Avolio et al., 2014), the goal of the present study was to explore the differences and the coexistence of diverse leadership styles in groups with varying degrees of virtuality. By examining these diverse contexts and considering different leadership styles and behaviors, the review presents a detailed snapshot of how leadership has been investigated in hybrid teams.

Transformational leadership is the most widely used model, and its positive impact on job satisfaction and quality of work has been found by numerous researchers (Dolce et al., 2022). Therefore, individual consideration fueled by personalized communication remains important. Intellectual stimulation is seen as 'the way' to motivate followers, independent of formal recognition systems; inspirational motivation refers to giving meaning to daily work, identifying challenges for the future and goals to pursue; idealized influence focuses on trust, which represents a role model with which employees can identify. Leadership emergence seems to be influenced by team dispersion (Charlier et al., 2016). Additionally, the effectiveness of various leadership traits depends on the degree of virtuality of the teams. For instance, extraversion facilitates leader emergence in FtF teams (Purvanova et al., 2021; Wilson et al., 2021). Lastly, studies in review confirmed that shared leadership is more effective than hierarchical leadership in managing both FtF and virtual teams (Drescher & Garbers, 2016). This is especially true when the degree of virtuality is high and interactions are mediated and limited by technology (George et al., 2022).

The practical implications of this review are valuable for managers and leaders. Rather than advocating for a particular leadership style that is better for either FtF or virtual teams, the review offers practical insights into effective behaviors and skills when leading different groups. Managers can use this information to understand the factors that facilitate leadership emergence in each context. For instance, they can leverage personality, cognitive, or interpersonal factors depending on the group's characteristics to foster effective leadership. Moreover, inspirational leadership behaviors can serve as a foundation for developing key competencies for managing dispersed teams. Additionally, the ability to share leadership powers becomes increasingly effective as the degree of virtuality rises. Therefore, training modules for team leaders should consider the specific aspects of the team's configuration. Another suggestion is that the one-size-fits-all approach is not useful in managing such different kinds of teams, according to our findings. Managers could also benefit from shifting from one leadership approach to another, according to the team's characteristics. The answers to the third research question can serve as a valuable guide for managers, providing strategies that can be practically applied to effectively manage FtF and virtual teams.

Overall, this study provides actionable guidance for managers to become more aware of the leadership dynamics in diverse workgroup settings and tailor their management approach accordingly. It highlights the importance of adaptive leadership and encourages leaders to be mindful of the unique challenges and opportunities present in both FtF and virtual team environments.

Conclusion

This systematic review fills crucial gaps in the literature by extensively exploring leadership dynamics in teams working through both virtual and FtF channels. The insights gained provide valuable guidance for individuals and organizations, emphasizing the need for leaders to be adaptable and effectively manage these diverse groups, also considering their ability to transfer positive states to followers (Caputo et al., 2023). By leveraging these insights, leaders can foster cohesion and success in hybrid team settings, ultimately cultivating a dynamic and thriving workforce.

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APPENDIX

Detailed evaluation of the quality of studies according to the MMAT standard

Authors and year of publication	Adopted criteria	Criterion #1	Criterion #2	Criterion #3	Criterion #4	Criterion #5	Overall evaluation
Balthazard et al. (2009)	2 - Quantitative randomized controlled trials	1	1	1	0	1	**** (80%)
Braun et al. (2019)	3 - Quantitative non-randomized studies	0	1	0	1	1	*** (60%)
Busse and Weidner (2020)	1 - Qualitative studies	1	1	1	1	1	***** (100%)
Charlier et al. (2016)	2 - Quantitative randomized controlled trials	1	1	1	0	1	**** (80%)
Drescher and Garbers (2016)	2 - Quantitative randomized controlled trials	0	1	1	0	1	*** (60%)
Eisenberg et al. (2019)	3 - Quantitative non-randomized studies	1	1	1	1	1	***** (100%)
Gajendran and Joshi (2012)	3 - Quantitative non-randomized studies	1	1	0	1	1	**** (80%)
George et al. (2022)	3 - Quantitative non-randomized studies	0	1	1	1	1	**** (80%)
Joshi et al. (2009)	3 - Quantitative non-randomized studies	1	1	0	1	1	**** (80%)
Kelley and Kelloway (2012)	3 - Quantitative non-randomized studies	0	1	0	1	1	*** (60%)
Purvanova et al. (2021)	2 - Quantitative randomized controlled trials	1	1	1	0	1	**** (80%)
Purvanova and Bono (2009)	2 - Quantitative randomized controlled trials	1	1	1	0	1	***** (100%)
Serban et al. (2015)	5 - Mixed methods	1	1	1	1	1	***** (100%)
Wilson et al. (2021)	2 - Quantitative randomized controlled trials	1	1	1	1	1	***** (100%)
Zimmermann et al. (2008)	1 - Qualitative studies	1	1	1	0	1	**** (80%)

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