

## **Virtual Team Leadership: A Bibliometric Analysis**

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### **Abstract**

Organizations world over have enabled work-from-home facilities to the employees due to the COVID 19 pandemic. This is possible only because of the advancements in technology, and, it solely does not help mitigate the challenges that the leaders and their virtual teams face. A review of 58 articles has been conducted to find out the non-technological challenges faced by the virtual team leaders. A systematic literature review was done for a comprehensive literature search, followed by bibliometric analysis which includes performance analysis and network analysis for identification of imminent research themes. The results indicate the co-occurrence keywords co-citation network and vital bibliometric trends which add to the existing body of academic literature on virtual leadership. The study reveals that geographic, temporal and cultural dispersions are a few concerns in managing virtual teams. Organizational leaders need to revisit strategies to overcome these challenges and make their teams more efficient. The study is original in the area as bibliometric analysis in it is the novelty. The three dispersions found in the research are novel to the corporate and academic world.

**Keywords:** Virtual leadership, Challenges of virtual leadership, Virtual team, Bibliometric analysis, systematic literature review

### **Introduction**

Globalization has brought in new challenges and opportunities for the organizational workforce and also for the leadership. Organizations are witnessing a transition from traditional physical workplace to virtual work environments.<sup>1,2</sup> The developments in Information and Communication Technology (ICT) has empowered the organizations to creating dynamic jobs

and to share tacit knowledge.<sup>3</sup> The change has propelled the organizations to go virtual by creating virtual teams, who work together by being geographically apart. Accordingly, organizations have embedded this in their communication, structures, activities, policies and strategies so that the work flow is more streamlined.

Adding to the gradual mix model of working from home and office, the recent Covid-19 pandemic has changed the perception towards work.<sup>4</sup> Employees were confined to the boundaries of their house, as the offline activities are substantially replaced by the online work environment. Many countries had nationwide lockdown with rules of social distancing and in-house confinement leading to virtual options.<sup>5</sup> It is expected that even after the end of the pandemic, this virtual and remote work culture will persist as organizations and workforce have adapted the new normal.<sup>6</sup>

The technology in current times has facilitated to move to virtual work setting and the workforce is getting used to it. Small and medium enterprises are using social media applications for better visibility<sup>7</sup> apart from the academic world using it for scholarly communication.<sup>8</sup> Digital work connectivity is the magic bullet in the recent pandemic as it allows the digital technologies to perform work remotely irrespective of physical workplace and time.<sup>9,10</sup> Virtual work setting has many benefits that leads to enhanced productivity. Thus, optimization of team resources can be achieved by making best use of the talent available to them. These settings also reduce the unnecessary burden of the cost, time, and stress, of travelling to the workplace.

### ***Challenges of virtual workplace***

The new workspace settings revolving around virtual teams are a result of globalization and recent advancements in technology. The digital work connectivity involves usage of platforms and applications for work related engagements.<sup>11</sup> Even though virtual workplace has a lot of advantages, it also includes certain demerits. There exist several challenges while working in a virtual team as the digital and virtual technologies cannot replace the collocated teams. These technologies engage the worker but also result in withdrawal indicators leading to disengagement at the workplace.<sup>12</sup> Such disengagement also gives rise to turnover intention<sup>13</sup> and family problems.<sup>14</sup> Researches have also probed how the quick and easy access to digital technology leads to information overloading which disrupts the attention of the individual.<sup>15</sup> The individual members of a team who are separated geographically might have bandwidth issues that hinder the collaboration of the virtual team. Research explains how issues like workplace isolation is felt by the virtual team members because when compared to the physical office structure which acts as an activity centre.<sup>16</sup> These concerns have become a major challenge for leaders while managing and leading their virtual teams.

Understanding the resource requirement and problems faced by the workforce requires a dynamic leadership which should possess skills and competencies of a leader working and leading virtually. The virtual team leader should acknowledge the cultural and work environment differences so that the team can be lead effectively for the success of projects.<sup>17</sup> Thus, the need for virtual team leadership is evident because it is very crucial for the success of an organization. Therefore, this study explores the literature review thoroughly to comprehend the challenges of virtual leadership in managing virtual teams.

The topic is relevant in the current time as COVID-19 Pandemic has struck and most of the companies are working online in a virtual setting. This sudden transition has made it

quite difficult for the employees and leaders to be psychologically prepared for the virtual work environment. The access and usage of required technology, amicable working conditions, etc. were to be ensured. Organizations need to adopt novel and strategic steps to manage their virtual workforce in these unprecedented times.<sup>18</sup> It will be very interesting to get a deep insight into how the virtual leaders are leading individuals who are geographically separated with different time zones and diverse cultural backgrounds. Various techniques and strategies, leaders are using to engage their team members to get the best of out of the team performance needs to be researched.

The purpose of this research is to explore the challenges team leaders of virtual teams face in a virtual work setting. Based on this aim, three broad research questions are explored.

1. To explore the leadership challenges of managing teams in a virtual space.
2. What are the various dispersions in the leading virtual teams and how they affect the team performance?

The advancements in Information and Communication Technology have brought in novel challenges.<sup>19</sup> But these challenges can be converted into opportunities to create and manage the teams which function virtually.<sup>20</sup> The employees have different skills, belong to different ethnic cultures, have diverse working values and principles but have the similar objective of working efficiently for the organization. The challenges can range from building trust to improving cohesion among team members. Thus, effective leadership requires certain competencies to achieve success in diverse organizational projects.<sup>21</sup> The abruptness of this unprecedented situation has created furore for the leaders and employees who didn't have the habit of working virtually. Thus, the research question follows as -

**RQ1.** What are the specific challenges team leaders of virtual team face in a virtual workspace setting?

The virtual teams have their team members bifurcated across geographical locations working in cross functional areas<sup>22</sup> and this has become mandatory after the pandemic as most nations have ordered for full or partial lockdown. Learning and adjusting to collaborative technology for sudden impromptu sessions, problem solving meetings and having informal discussions in diverse culture are certain issues which need to be looked upon.<sup>18</sup> Working in different time zones could also be a huge challenge because the working hours and cycles have changed in today's time to meet the current requirement and demands. Similarly, there are certain dispersions pose unique challenges which the leader has to manage.

**RQ2.** What are the various dispersions in the leading virtual teams and how they affect the team performance?

There are various factors which are related to virtual leadership. The challenges which are being faced by virtual leader in exploring prospective solutions to mitigate them are maintaining brand building virtually, development of competencies,<sup>23</sup> role of trust,<sup>24</sup> effective communication.<sup>25</sup> Since the working environment is virtual, many such emerging areas have developed which needs to be probed further.

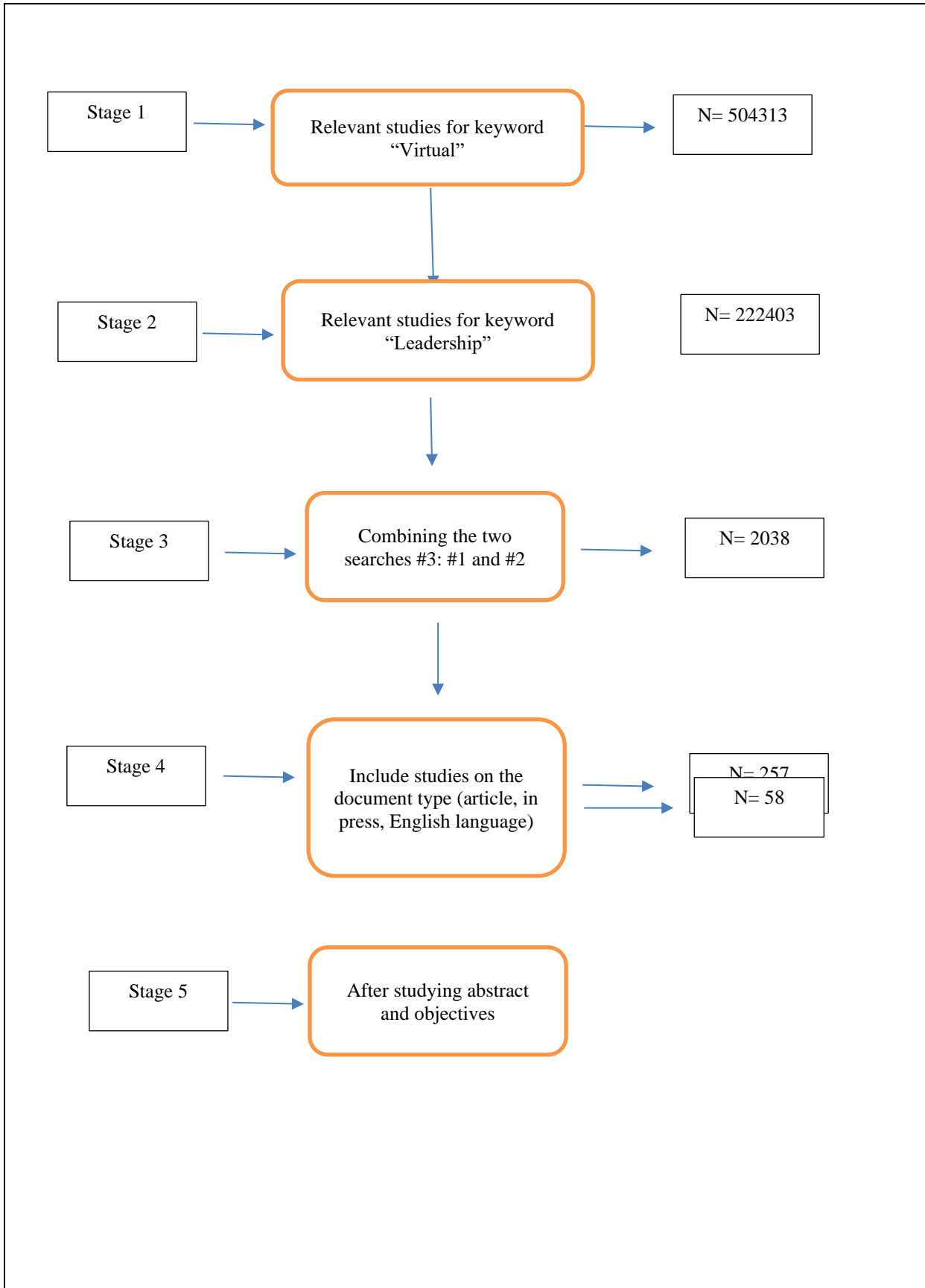
**RQ3.** What are the related emerging areas of research leading to managerial implication?

## Research Methodology

The study has reviewed the literature using guidelines of ‘Preferred Reporting Items for Systematic Reviews and Meta-Analyses’ (PRISMA). Bibliometric analysis was conducted for identification of research themes and trends in the area of virtual leadership. Many researchers have used this method for management research domain<sup>26,27</sup> technology road mapping<sup>28</sup> and blockchain.<sup>29</sup> This form of qualitative review of literature includes indicators like citations, authorships along with geographical and institutional patterns in a given time frame. This concept was first introduced as a scientific technique to observe a research areas’ evolution over time with respect to multi-disciplinary approach.<sup>30</sup> This provides author data, research domain data, journal data and emerging themes.<sup>31</sup> Bibliometric analysis considers the average of citation for authors’ publications, keyword and citation closeness and count of publication.

### *Identification of Literature Review*

A thorough and systematic literature review was done to explore the studies done in this area as shown in Fig 1. It was observed that the literature in this area is not structured and is scattered in nature. There is an obvious need to streamline the literature so that it can be studied systematically for further research inference. Hence, PRISMA model was used, which provides segregation of the researches and wider understanding of the past studies. The literature review is done in the area of virtual leadership from peer-reviewed academic journals. The objective of reviewing the related studies was to analyze the challenges faced by leaders in virtual environment. The literature was searched on SCOPUS which is a reputed and authentic database. It was selected because it contains more journals than any other databases like Web of Science or Emerald. It was ensured that only high-quality studies in the area would be included. The studies published from 2017 to 2022 was considered keeping in mind the recency of the search in the field. When only the keyword “Virtual” was searched, it fetched 504313 results and 222,043 in case of “Leadership”. In order to have advanced search, the articles with a combination of, the keywords “Virtual” and “Leadership” were combined with ‘AND’ operator, which fetched 2038 results. Further, certain exclusion criteria were applied and the results were from various research areas and the spectrum is shown in Fig 2. In our study, the subject areas which were included are Social Science, Business, Psychology and Arts. Only English language was considered for the search and the document type was limited to Article only. The articles which were in the final stage of the publication were also considered. Thus, finally 257 research papers were shortlisted based on the search syntax depicted in Table 1. Further, based on reading the abstract and objectives 58 research papers were finalized and read. The achieved numbers can be cross checked by copying in the databases mentioned, but it is well known that these mentioned databases are quite dynamic and updated frequently so the results might vary.<sup>32</sup>

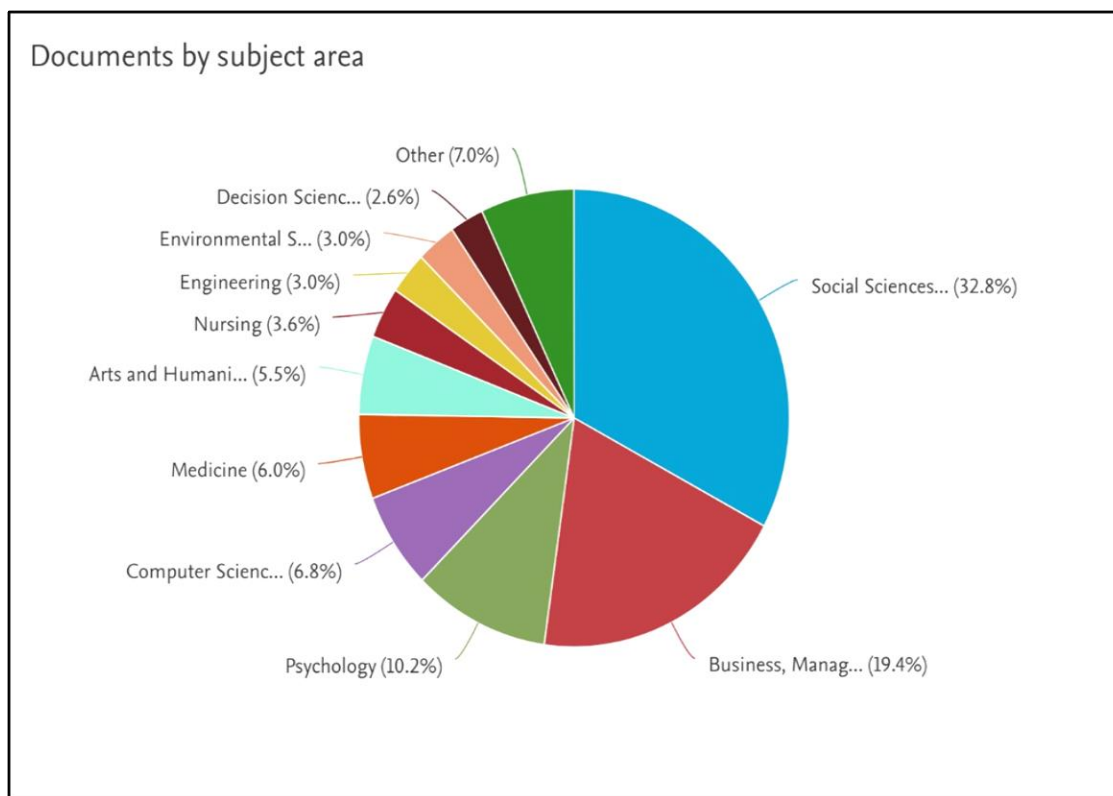


**Source:** Stages in data collection and compiled by authors  
**Figure 1:** Records Identified Through the Database Searches

**Table 1:** Search syntax on SCOPUS

Data Source	Source Syntax
SCOPUS Database: January 23, 2022 ( <a href="https://www.scopus.com">https://www.scopus.com</a> )	( TITLE-ABS-KEY ( leadership ) ) AND ( TITLE-ABS-KEY ( virtual ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "PSYC" ) OR LIMIT-TO ( SUBJAREA , "ARTS" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) )

Source: Authors compilation



\*Date – Jan 28 (00.30 hrs)

**Figure 2:** Spectrum of Journal papers

Most of the existing literature on the virtual team gives a pre-pandemic scenario when everything was normal, and people were willing to work in a virtual setting. Numerous studies in the literature have mentioned certain leadership practices which are practiced by the leaders in normal scenario. Certain common practices like enabling individuals to act, having and



inspiring a shared vision, creating the way, encouraging the heart, challenging the present process instil an advantage in leading and attaining new heights.<sup>33</sup> But these practices function and apply in normal times when everything is normal. In the current times, the modus operandi of working involves virtual teams and they comprises of collaborators who are separated geographically and depend on technology for communication, cooperation etc.<sup>34</sup> The virtual leaders lead their team members distantly to achieve the organizational goal. These leaders are prevalent in e-business where communication is done and businesses are managed via electronic medium.<sup>35</sup> There exists a very minute difference between the features of the manner of interaction of such electronic leadership and virtual leadership. It is the ability of the latter to manage the skills of the diversified team member in-spite of being distant.<sup>16</sup> For leaders working in a collocated team, it was easy to access the mood of their team members by looking at their faces or behaviour exhibited which is tough in a virtual setting. That is why virtual team leaders must have empathy for handling the problems and frustration of their team-mates. Virtual leaders require having a good rapport and relationship which resides on sustainable trust leading and enhanced spirit of the team. This also reflects in better customer relationships.<sup>36</sup> Apart from excellent leadership skills, they should also be adept in recent technical developments.<sup>16</sup>

But due to the pandemic, it is not necessary that only geographically distributed/dispersed team members are working in a virtual setting, but the traditional teams are also forced to work virtually. When it comes to leading from a distance a leader needs to adapt all the necessary leadership skills and a little bit more of everything. Furthermore, the literature highlights the issues of problems during collaboration faced by virtual teams.<sup>34</sup> Other challenges which the review highlights are working in different time zones, sense of isolation (since there is no face to face contact), the pressure to create trust in the team and among the leader and the team members, leading the team in the right direction, and creating a sense of connectedness.<sup>37</sup> There is also a major challenge for the leader to integrate his personal life with the demand of the virtual team, like adjusting oneself as per the different time zones of the team-mates. Creating a balance between work and family is important because now homes are new offices replacing colleagues with spouses and children and other family members.<sup>38</sup> Creating a collaborative and virtual culture having trust is a huge challenge because leaders have to guide virtually which makes it difficult for the whole team to coordinate with the leader and achieve the common goal. Inspiring and motivating the team from a distance is also a challenge because when all the work has become online and the majority of the employees are working virtually, it is difficult to know what motivates whom. Developing required technical competence among all the teams-mates is also very essential but is difficult in the virtual environment.

In a virtual team having diverse and heterogeneous cultural background helps in diverse knowledge and experiences but might result in a lot of conflict and collaboration challenges. A study<sup>39</sup> describes how individuals' attitudes towards success, their working habits, ways of living, everything is aligned with their culture which makes adjustments a bit difficult for the teams as well as the leaders. Also managing the team players' capabilities and job performance in an online setting is also a challenging issue for a leader because employees often take leverage when the leader can't supervise the team by walking around as it is done in a conventional organization with a collocated team. Geographically dispersed teams are also prone to conflicts arising due to interpersonal and intra-team setup. The interpersonal and task-based conflict in virtual teams remains unidentified for a longer period of time. This is because excessive reliance on the virtual team on computer-mediated technologies forms a perception of unfairness in the mind of the team-mates.<sup>34</sup> Security is also a challenge as, companies have

different security policies for teams working in an online setup, the security services must be deployed in the computers of the employees to counteract any threat causing a risk to the company's data.<sup>40</sup>

Thus, in these unpredictable times, the leadership needs to think beyond normal to cope up with the extraordinary challenges in tough times.

The word cloud as shown in Figure 3 can be used to understand and identify the latest and relevant themes in the literature. Sub areas like e-leadership, virtual teams, crisis management have come up in the times of COVID 19 pandemic and these areas can be seen in the periphery of the central construct. The tree map on Figure 4 is a diagrammatic representation of the hierarchy in data portrayed in set of rectangles varying in sizes as they appear in the literature review. Frequency of the text is mapped accordingly in the tree map. The figure depicts the various areas like virtual teams, e-leadership, crisis, affordances. So, future research endeavours can take up these literature gaps and explore the areas with the help of empirical researches.

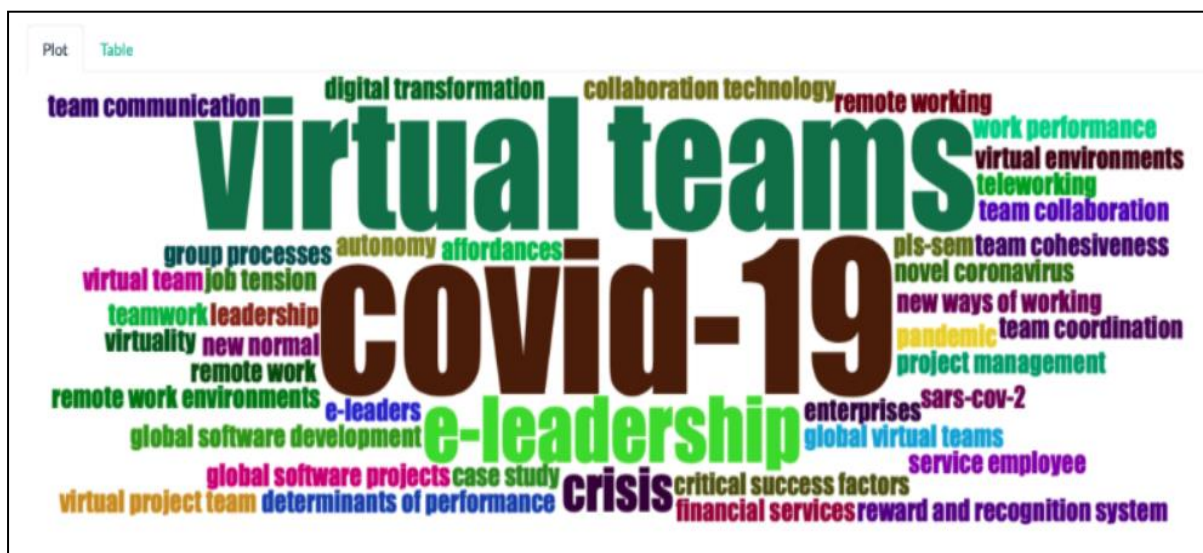


Figure 3: Wordcloud

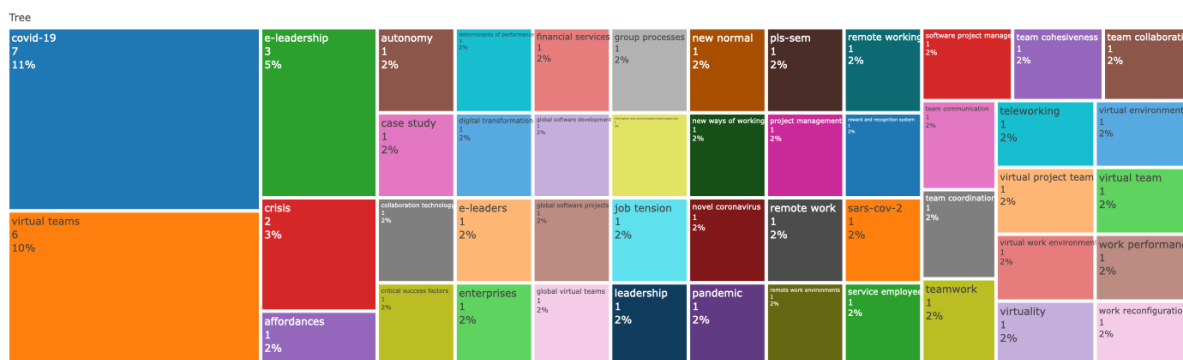


Figure 4: Treemap

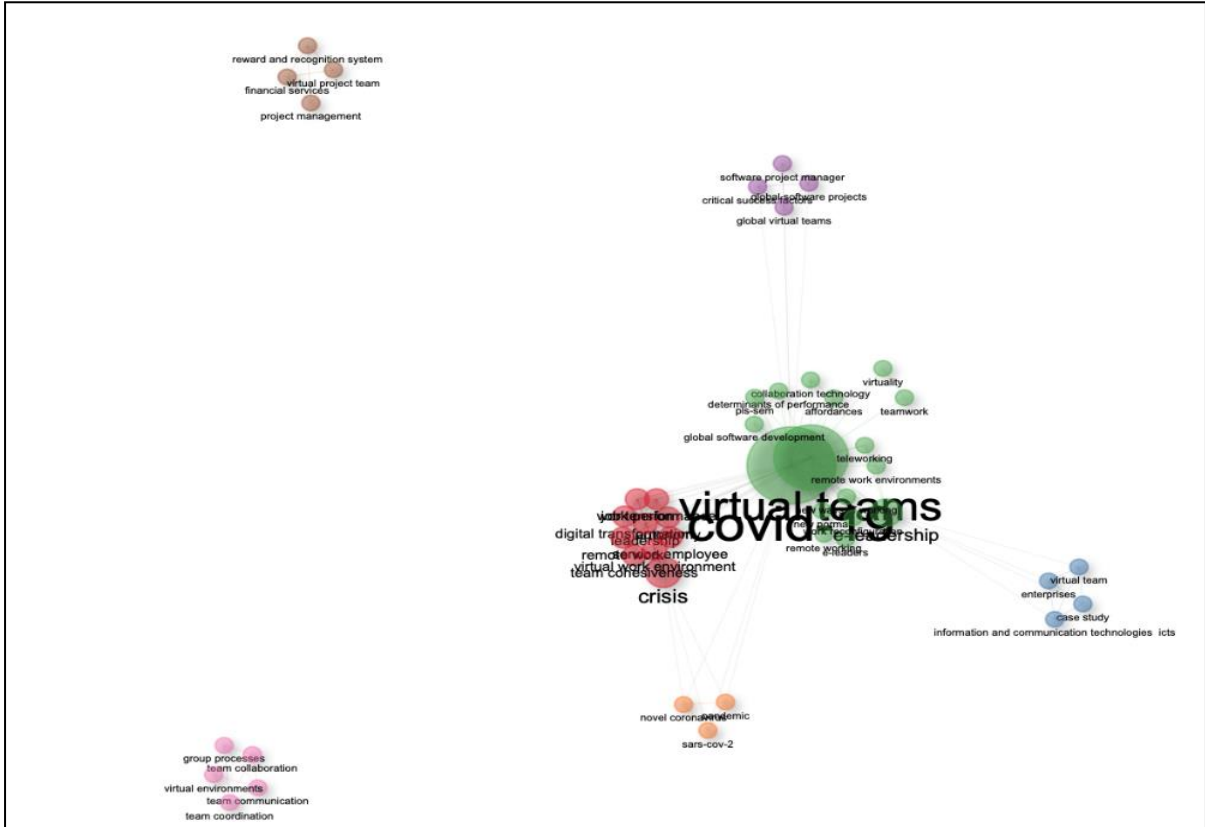
Social network analysis (SNA) is a representation for understanding the qualitative and quantitative measurement. The comprehension of complex systems is easy when it is the form of diagrams.<sup>41</sup> The edges of graphs portray the symmetric associations or causal relationships



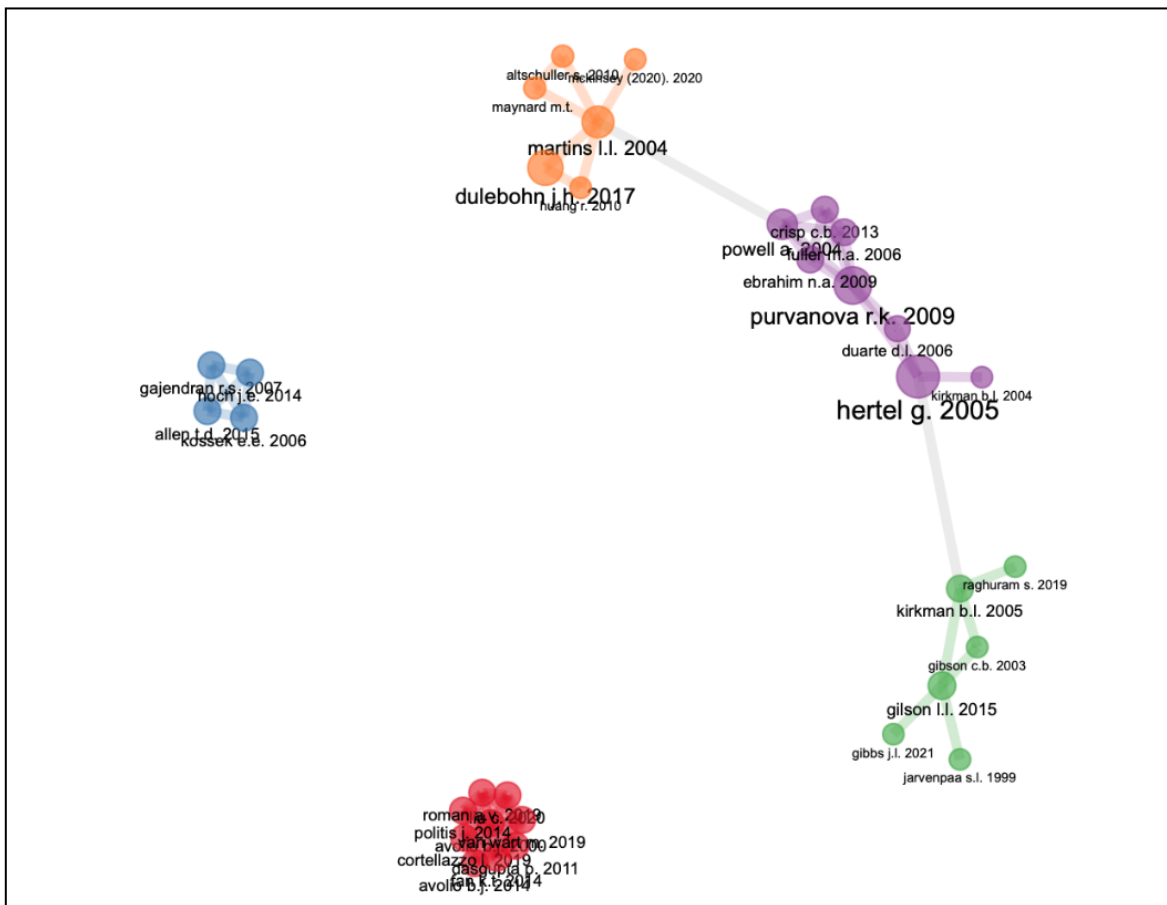
between the nodes. Weights are associated to the edges which signify the relationship strength. This methodology is a relevant tool for the planning and analysis of complex systems in which traditional techniques don't fit well.<sup>42,43</sup>

Figure 5 depicts the keywords co-occurrence network analysis. The macro clusters have been identified after the social network analysis. The various colours portrayed in the co-occurrence diagram depict the connectivity. These connect with the related keywords in other clusters. Co-occurrence keywords like COVID 19 and Virtual teams are the biggest in size which indicate that these are the keywords which are the central theme and other keywords are related to these. Other keywords which also have a significant size are teleworking, remote working environment, global software development etc. These are the upcoming terms and themes and are highly correlated with the main keywords. The optimization algorithm detects communities in huge networks by combination of nodes using heuristics.<sup>44</sup> The keywords co-occurrence analysis provides a distinct understanding through many areas and their application in certain domains of research.

Figure 6 shows the co-citation network analysis. The top authors research in the area is depicted. The authors have researched in the central theme and are connected by the related researches. As seen in the figure, 3 clusters having colour coding orange, violet and green are connected. The other two clusters – blue and red are not connected. The bigger the circle, the more connectivity that research work has with other researches in this area. The co-citation network of the cited references shows the papers which are most cited. The researches act as the starting interaction point for the domain of research. Researches<sup>45</sup> describe the impact of e-leadership on commitment and interpersonal trust of the workers and virtual teams who are working remotely. A study<sup>46</sup> proposed an input output framework to have an understanding of the virtual teams setting to improve on the effectiveness. Taking into account Leader member exchange theory, it was concluded that members influence on team decisions is shaped by the frequency of the communication.<sup>47</sup> The other noteworthy researches in each clusters have been cited and discussed in the research work at relevant places. The co-citation network in itself is the connecting link between the documents when the third document has its citation.<sup>48</sup>



**Figure 5: Co-occurrence keywords**



**Figure 6: Co-Citation network**

## Findings and Discussions

The most relevant research papers within the recent time frame (2017-2022) have been identified with the help of PRISMA Model and their description is as follows in Table No. 2.

**Table 2:** *Literature Review of Virtual Leadership after PRISMA model*

Sl. No.	Title of the Paper	Author	Findings
1.	Virtual Leadership In Small Businesses During The Covid-19 Pandemic: Challenges And Possibilities	49	Individual Leadership Styles Should Involve Strategic Thinking Again In These Times To Successfully Overcome Challenges
2.	Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic	50	To ensure work performance of employees in virtual setting that too in crisis, relation and task oriented leadership behaviour required
3.	Employee Adjustment And Well-Being In The Era Of Covid-19: Implications For Human Resource Management	51	Discussion on challenges and implications of COVID-19 on workforce coping and adjusting to newly altered work environment
4.	The influence of social distancing on employee well-being: a conceptual framework and research agenda	52	Proposed a framework regarding impact on well-being of employees due to social distancing
5.	Leader emotional intelligence and work engagement in virtual teams within a healthcare service setting: A quantitative study	53	Leaders' emotional intelligence and virtual team members' work engagement were significantly and positively correlated
6.	Virtual Work: Bridging Research Clusters	22	Emerging research clusters: Virtual Teams, telecommuting and computer-mediated work.
7.	Virtual Teams: Thematic Taxonomy, Constructs Model, And Future Research Directions	54	Numerous independent, dependent, and moderator constructs depicted in the research model
8.	E-Leadership: An Empirical Study Of Organizational Leaders' Virtual Communication Adoption	55	Responsibility, energy and analytical skills most important traits for e-leadership
9.	Are You Satisfied Yet? Shared Leadership, Individual Trust, Autonomy, And Satisfaction In Virtual Teams	56	Relationship of individual trust and autonomy with satisfaction was moderated by shared leadership
10.	Information Sharing And Creativity In A Virtual Team: Roles Of Authentic Leadership, Sharing Team Climate And Psychological Empowerment	57	To enhance creativity and information sharing, sharing team culture along with authentic leadership and psychological empowerment are required

Table 3 describes the most cited researches in the area. The citations count in total and the publications' total citations year wise has been depicted. The publications are arranged according to their weighted citation score which is the citations per year. The global citation publication has all the citations from the Web of Science Core Collection. This indicates the relevance of the mentioned publications with time along with their significance of contributions in the area of research.

**Table 3:** *Details of citations*

Sl. No.	Author	Total Citations	TC Per Year	Normalized TC
1.	58 - Ind Organ Psychol	67	67	5.7429
2.	50 - J Serv Manage	31	31	2.6571
3.	59 - Front Psychol	14	7	1.8667
4.	18 - Organ Dyn	5	5	0.4206
5.	60 - J Transnatl Manage	2	0.5	1
6.	61- Front Psychol	1	0.5	0.1333
7.	25 - Hum Factors	1	1	0.0857
8.	20 - Front Psychol	1	1	0.0857

## Dispersion in virtual teams

After the comprehensive review of literature, it was found that dispersion of the teams is one of the huge challenges for the leadership. Leading a team whether collocated or dispersed is a challenge for the leader. Although virtual teams are not affected by boundaries of space, they enable the organizations to work in a highly adaptive, responsive, and flexible way.<sup>62</sup> This is vital for the business environment for competitive advantage. Still, it is difficult for the leaders to execute their responsibilities without physical observation of the team members and it is not necessary that only geographically dispersed teams are virtual, even collocated teams can also show a high level of virtuality and complexity. So, the types of dispersions need to be discussed in detail in the current context.

### *Geographic Dispersion*

The various team members working in a virtual team are dispersed across geographically and hence they are a dispersed team in contrast to a collocated team which works in close proximity to one another. Teams that are geographically dispersed fail slower than non-dispersed teams<sup>63</sup> and this is a huge concern for the leadership. There is no physical proximity between them and collaboration is tougher to achieve when compared to face to face teams.<sup>64</sup> Recently, after the majority of the companies have communicated to the employees regarding working from home, geographic dispersion of teams has increasingly become common.<sup>46</sup> In this dispersion, the team members are located at different locations having different norms aligning with the culture and environment and it diminishes their ability to trust and one to one understanding which affects the quality of communication and collaboration.<sup>65</sup> There are various challenges that a geographically dispersed team faces while working in a virtual work setting. A recent study<sup>66</sup> reviewed a decade of on the field and empirical investigations of a collocated and non-collocated team of 200 organizations and compared the collocated work with the remote work and commented on the promises and challenges which the remote team will face in future. The advancement in technologies and their effectiveness in coping up with the technological challenges faced by teams while being in a virtual setting is quite relevant. There are

numerous other challenges that even the technologies cannot wipe off. Further it was concluded that there are certain factors which cannot mimic the face to face interaction. Although there is an extreme advancement in technology over the last two decades, still there are challenges that technologies cannot fully resolve in a virtually dispersed team. Problems like common ground which is essential for better communication in a team is missing in virtual settings. The sense of commonness and its awareness is very crucial. The observation of facial expression, behaviour, appearance and communication style also is a part of common ground which leads to collaboration. New team members in virtual team setting have least idea about existing ones and this makes the coordination between the team members difficult. In the absence of common ground, the social connectivity between the virtual team members diminishes which leads to social loafing in the group work. Leaders and other team members should know about the physical and mental status of the co-workers, which is absent due to not having a common ground. This may cause severe damage to the physical and psychological well-being of the employees. Another issue that virtual team leaders face in the virtual work-setting is of trust. When a team is geographically dispersed, trust is one of the greatest challenges faced by the leaders and their team members. A Study<sup>67</sup> defines trust as the “condition in which one exhibits behavior that makes one vulnerable to someone else, not under one's control.” Virtual teams are said to be less effective and reliable than face to face team<sup>66</sup> as trust needs touch.<sup>68</sup> It is essential to raise the issue of trust in a virtual team because teams cannot observe each other, and they have to rely on what the other person is saying. For example, if training is being imparted in a virtual team, there are chances that the team members may put themselves on mute keeping their videos off, in that case, the leader has no clue whether there is active participation in the team or the members are inactive. In this world of electronic communication, trust is very fragile. Trust is usually formed and established through an informal and non-work interaction which is almost missing in a virtual team.

### ***Temporal Dispersion***

Temporal dispersion means variation due to time zones based on the locations of the team members. Virtual teams have a benefit that they bridge space over time because they are separated across different time zones<sup>69</sup> where relationship between knowledge absorption and cognitive proximity has deviations. Previous research<sup>70</sup> discusses how for an individual team member, the time zone adjustment leads to job clarity but only in such global virtual teams which are highly open to cultural diversity. But there are many issues which need to be addressed which arise from temporal dispersion. "Temporal dispersion amplifies spatial separations, makes synchronous interaction less common and more difficult, and generally exacerbates the challenges of coordination",<sup>71</sup> where time zones serve as a standardized, impartially stable, recognizable descriptor of temporal dispersion. Although technology has wiped off most of the challenges of remote working still the differences in time zones of the teams working at different places can never be resolved. Teams working across the globe go through numerous difficulties while coordinating with their teams situated in a different location. Teams working in different locations like India and U.S.A. can face certain problem causing difficulty to get a real-time solution. Issues of work overlap while working on a similar project leads to burnout or exhaustion affecting the wellbeing of the team members and the leader. Temporal dispersion minimizes spontaneous communication and hinders real-time problem solving because of the decrease in the potential for synchronous interaction. Teams as well as their leaders face coordination difficulty because of the lack of real-time interaction.<sup>72</sup> Asynchronous communication is the feature of a temporally dispersed virtual team as it diminishes the coordination between the team members by degrading the quality of communication. Asynchronous communication lacks real time interaction due to which



there is a delay in the feedback, long pauses in communication and it becomes a challenge for the leader to coordinate the temporal pattern of the group behaviour.<sup>73</sup> Temporally distributed team members might not have the opportunity for real time interaction which might lead to misunderstanding as the interactions are limited.<sup>74</sup> These problems lead to improper conflict management and lack of coordination during deadlines creating challenges for leaders. A long pause in the communication of a global team working on a similar project can result in discontinuous discussion and delay in the decision making. Previous researches also show that a temporally dispersed virtual team has to bear increased coordination cost.<sup>75</sup>

### ***Cultural Dispersion***

The team members can belong to different countries thus having diverse cultural values. The national holidays, festivals seasons, break times, vacations slots might differ to some or great extent in cross cultural settings. The different culture of the team members in a virtual team has the possibility of increasing the psychological distance between team members.<sup>76</sup> The cultural intelligence of the team members adds to the social integration in the global virtual teams.<sup>77</sup> Although an intercultural virtual team is considered as an opportunity to exploit the specialists from diverse fields across the world, they also cause some challenges. The culturally diverse virtual team are those where individuals are geographically diverse at different places on the globe, and they generally do not meet physically but interact by using different technologies. Team structure and culture often affect the team collaborations so the managers need to be careful regarding these.<sup>78</sup> Cultural diversity causes many problems in virtual teams like arising conflict, isolation, discretion, and stress, etc.<sup>79,80,81</sup> Employees generally want to live and work in a culture or environment which is similar to their culture and environment. As per similarity interaction theory, it is the preference of the members in the team to collaborate and work with similar people in contrast to diverse culture causing less interaction, less communication and more conflict.<sup>81</sup> A recent study<sup>82</sup> gave four main dimensions of the difference in national culture: Power distance, Uncertainty avoidance, individualism-collectivism, and masculinity-femininity. The relative position of the culture of teams in a different location and Hofstede's dimensions of culture proves to be a good indicator for potential points of intercultural conflicts. Teams with individualistic cultures prefer to do the job independently and they generally have weak ties, whereas individuals belonging to collectivistic cultures want collective work which leads to bonding and long lasting ties with peers and co-workers. Teams working in different countries with some having individualistic and some with collectivistic culture can give rise to intercultural conflict and curbing this conflict becomes a major challenge for the virtual team leader. Similarly, cultures rating high on masculinity may have a contrasting effect on the teams rating high on femininity. A high-performing global team must have their cultures aligned with the culture of the other team.

Cultural differences also affect the cognition and attitude of people. People have their ways of expressing their emotions, moods, and feelings. Hence, motivation has a crucial role in recognizing the need for motivation, motivating the employees including rewarding or punishing the employee. It is evident that individuals with diverse cultural backgrounds react to various factors of motivational in different ways. Language is also an important factor that affects the functioning of a multicultural virtual work setting. Teams spread across the globe generally use English as a common language for communication but paralinguistic cues are absent in the cross-cultural setting<sup>83</sup> which causes difficulties like- approaches of referring back to the previous message, using vernacular conventions, politeness, emphasis modes, perception of relevance like the use of idioms, phrases or sayings at irrelevant places may be interpreted wrongly by the other team members.<sup>84</sup>

## Recommendations for future research

Based on the bibliometric analysis, certain themes have been identified which revolve around the central construct of COVID 19 and virtual teams. The upcoming themes and terms which were correlated to the central theme were global software development, remote working environment and teleworking. Certain terms related to team environment like teamwork, team cohesiveness, collaboration technology and crisis are certain area in which further researches can be done. The virtual work environment has been prevalent for the last two or three decades, but its practice was limited to a very small extent. Now, due to pandemic, the organizations are forced to work virtually. Team-mates might not meet each other physically but are working as per their scheduled time, or even overtime. This is the first time when 100% of work has been made online and teams are also facilitated to work only virtually. As the existing literature suggests that most of the technical challenges of the virtual work environment have been resolved by the advancement in the technology still there are some challenges discusses in this research work.<sup>85,86</sup> Future research needs to be done on changes that have been adopted to curb these non-technical challenges during the period of a pandemic. These non-technical challenges pose a threat to the leaders to which the response should be carefully planned and executed. Understanding the work culture and team requirements is a must for the leader so that a rapport can be created with the team. Future conceptual and empirical research also requires to study on the changes in the behaviour of team members after coming back to their workplace.

## Managerial Implications

The main purpose of this research endeavour was to focus on the challenges that a leader faces while working virtually. Being in the 21<sup>st</sup> century and highlighting the challenges related to technology will be a waste because technology is advancing every day and thus technological challenges could be overcome very easily. After having a close look at the visibility of the team members, managing their work life cycle and monitoring the progress of the team with the usage of technology is the need of the hour. The team members need to be briefed and explained regarding the new challenge and opportunities which emanate from it. In this critical and unprecedented period, the selection of leadership style should be relevant which dovetails with the situation. The considerations related to health, motivation, lack of resources etc. should be taken into account by the leader. The leadership should also take concrete steps for the training of the employees. The inspiration and leadership should be done by example by setting achievable goals and coordinating with team members. The trust and confidence reposed in the team members backed by time to time feedback and guidance will help to mitigate the communication problem during this tough time. The diversity at the workplace should be welcomed and appreciated so that the benefits of heterogeneity can be reaped and team members can benefit from the team. During the offline working sessions, interactions helped individuals to understand better and also to gel up. So, these informal sessions or any new form of communication need to be arranged which will lead to develop or repose intimacy and support.

## Conclusion

This conceptual paper provides a summary of the non-technological challenges leaders are expected to face working in the virtual setting. This review paper has utilized 58 articles highlighting the non-technological challenges faced by organizations. Based on the selected articles, the challenges have been divided into three sub-headings: Geographical dispersion,

Temporal dispersion, and Cultural dispersion. The findings reveal that only advancement in technology is not an optimum solution of the challenges faced by the leaders as there are certain cultural issues as discussed. The effort should be to engage the team, build trust, overcome cultural differences by imparting adequate training and design the work schedule keeping in mind the well-being of the team members is required.

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