

# REMOTE WORK BEFORE AND AFTER COVID-19: A SYSTEMATIC REVIEW AND BIBLIOMETRIC ANALYSIS

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## ABSTRACT

*While many studies have examined remote work, a comparative analysis of its themes before and after the COVID-19 pandemic remains underexplored. Therefore, this research aims to contribute to the literature by systematically examining publications on remote work in the Web of Science (WoS) database through a bibliometric analysis. The data were downloaded on December 31, 2025, and include 106 publications with an annual growth rate of 6.94% from 1995 to 2019 (pre-COVID-19) and 182 publications with an annual growth rate of 49.63% from 2020 to 2025 (post-COVID-19). The analysis conducted in RStudio demonstrated a significant increase in the annual growth rate of publications after COVID-19, more than 7 times that of the period before COVID-19. The most cited countries in both periods were the United States and the United Kingdom. While the United States and the United Kingdom had the most-cited authors before the COVID-19 pandemic, Singapore, Canada, and France had the most-cited authors after the COVID-19 pandemic. The current study categorized the main topics into three clusters for both periods. The key themes, such as work-family, flexibility, and company performance before COVID-19, have emerged as well-being, work-life balance, and leadership after COVID-19. This study contributes to organizational studies by comparing key themes related to remote work through a bibliometric analysis of the literature before COVID-19 and after COVID-19, and provides insights into how the transition to remote work has changed workplace practices and organizational dynamics. Limitations and recommendations for future research are also presented.*

**Keywords:** Remote Work, Telework, COVID-19, Pandemic, Bibliometric Analysis, WoS, RStudio.

## INTRODUCTION

The term “telework”, often associated with “remote work”, is thought to have been coined by Nilles in 1973, while he was stuck in traffic in Los Angeles (Bailey & Kurland, 1999). With this perspective, companies used telecommunications to allow employees to work closer to home, thereby decreasing commuting costs (Nilles, 1975). However, Olson (1982) noted that available software solutions were slow to adapt to remote work. As technology continued to advance, several alternative work arrangements, such as telecommuting and mobile work, began to emerge, particularly in Europe (Huws, 1993).

Building on these early developments, studies in the early 2000s further highlighted the organizational impact and growing importance of flexible work arrangements, positioning remote work as a broader shift towards new working models (Baruch, 2001, Clauwaert, 2002). In the United States, remote work term was primarily used to refer to working from home. In 1999, between 3 and 9 million Americans worked remotely, and it was estimated that the number would rise to 15 to 44 million by 2000 (Bailey & Kurland, 1999). Later, in 2017, remote work and ICT-based mobile work were defined by Eurofound and the International Labour Organization (ILO), as the use of information and communication technologies to complete tasks independently of the employer’s location, thereby promoting flexible work arrangements and reducing reliance on physical offices (Llave & Messenger, 2018).

More recently, the COVID-19 further accelerated the adoption of remote work. According to Belzunegui-Eraso and Erro-Garcés (2020), COVID-19 in 2020 accelerated businesses’ shift to remote work,

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primarily to protect employee health and well-being. This shift led organizations to implement remote work arrangements and incorporate them into collective bargaining agreements. As a result, Toscano et al. (2022) noted that remote working has emerged as a key component of digital transformation and increasing employee productivity and facilitated agile working practices. Accordingly, integrating remote work into organizational cultures is now recommended because it supports employee health and overall well-being, positively impacting quality of life (Morán et al., 2022).

In parallel with the expansion of remote work, this topic has been studied by many scholars using both narrative and bibliometric literature review approaches. Some prominent scholars, including Abarca et al. (2020), Šimová and Zychová (2023), Bağdoğan and Özdemir (2024), and Singh, R., and Das, R. (2024), have conducted reviews using a bibliometric approach. However, despite the growing body of literature, there is currently no bibliometric study comparing remote work practices before and after the COVID-19 pandemic. This gap highlights the importance of the current study. Accordingly, this research focuses on research questions examining the presentation and growth rate of the remote work literature during the pre-COVID-19 period (1995-2019) and the post-COVID-19 period (2020-2025). With the help of bibliometric analysis, this study seeks answers to the following research questions regarding remote work:

*RQ1.* What is the historical development of publishing in remote work literature?

*RQ2.* Which authors, journals, and countries are the most influential in remote work research?

*RQ3.* Which keywords are the most frequently used by authors?

*RQ4.* What guidelines for future research can be derived that will open new avenues for researchers in remote work studies?

## LITERATURE REVIEW

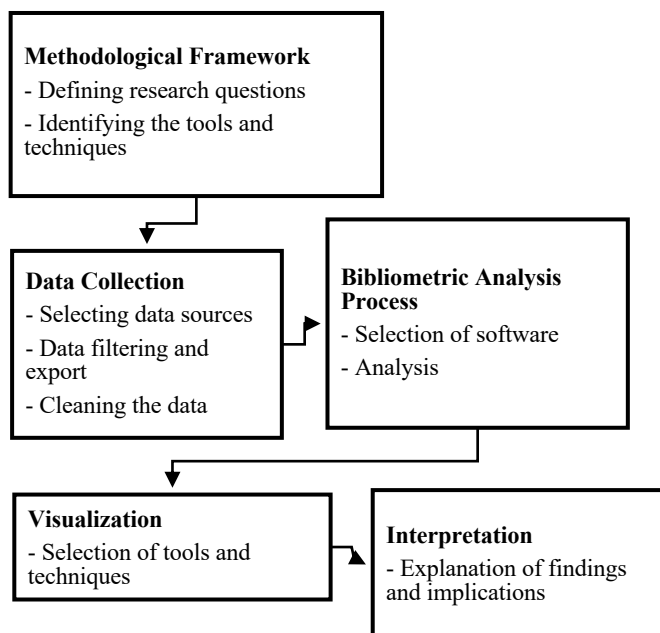
Technology plays a significant role in shaping new work practices. Advances in information and communication technologies and remote work practices have accelerated this (Örücü & Yıldız, 2014). This transformation was further amplified during the COVID-19 pandemic, which restricted face-to-face interaction and forced various units to adopt remote communication. However, while technology plays a significant facilitating role in modern work environments, some challenges arise, such as distractions and inefficiencies in remote access. According to Gartner's 2021 report, 58% of employees struggle with successfully setting up remote access. Similarly, approximately 62% of remote workers encounter daily distractions during their working hours, and a significant portion of employees spend time on activities unrelated to remote work (Nadeem, 2021). Furthermore, a study at Stanford University reveals that 6 out of 10 employees visit non-work-related websites during remote working hours. As a result, such inefficiencies cost organizations billions annually (Chowdhury et al., 2020). Therefore, limiting productivity losses with remote work has become a crucial issue. In line with this discussion, Wang et al. (2022) noted that structuring digital work environments and expanding the scope of online distribution elements can increase employee breadth.

Divided into performing job responsibilities outside of traditional office environments through digital technologies (Allen et al., 2015), remote work has seen increasing attention in both the academic and professional literature in recent years. Early studies in the remote work literature focused more on systematization and distribution. For example, Fritz et al. (1995) developed a comprehensive distribution system by examining the spatial distributions, coordinates, and temporal structures of different forms of remote sales. Over time, the interest in this research area has increased significantly. For instance, publications in 2019 were approximately eight times higher than in 1995 (see Figure 2). Growth during this period has focused on the impacts of remote work on employee well-being and outcomes. While Grant et al. (2019) examined the well-being of remote workers in terms of productivity, distribution, and work-life equity, Müller and Niessen (2019) emphasized that self-goal setting has a positive impact on occupational health in part-time remote workers.

The initial stages of the COVID-19 pandemic focused primarily on remote emergency care. For example, Chong et al. (2020) examined emotional burnout and disengagement that emerged during the pandemic. As the pandemic progressed, the focus of research shifted more towards long-term and technological issues. Kuruzović et al. (2021) found that software systems can mitigate problems associated with remote

work. Similarly, Baker et al. (2022) examined the impact of job control and loneliness on employee well-being and job performance. Pianese et al. (2023) emphasized that managerial devices play a significant role in the perceptions of remote workers. Recent growth also highlights the role of digital platforms and technological tools in supporting remote work environments. For example, Bhatti et al. (2024) demonstrated how digital platforms enhance people's creativity by facilitating information sharing. In addition to individual processes, some research has examined the remote work literature using bibliometric and systematic methods. Abarca et al. (2020) analyzed publications on virtual teams using bibliometric techniques and found that while publication counts in previous periods indicated currency, scientific interest increased during the COVID-19 period. Furthermore, studies have identified understudied research areas such as emotions, communication, technology, and trust. Similarly, Šimová and Zychová (2023), based on an analysis of 1,996 publications from the World Health Organization, emphasized that trust, communication, leadership, and information sharing were supported in virtual team dynamics. From a broader bibliometric perspective, Bağdoğan and Özdemir (2024), in their analysis of the Web of Science database, included 960 publications between 1982 and 2023. Similarly, Singh and Das (2024) analyzed keywords related to remote work across multiple databases and identified 430 publications from 2012 to 2022. Studies in this region are effective. While presenting the authors, countries, and sources, the study also highlighted the growing thematic diversity in remote work research.

Despite the increase in bibliometric and systematic literature studies, significant research gaps remain. In particular, comprehensive studies comparing how remote work research evolved before and after the COVID-19 pandemic are limited. For example, while Abarca et al. (2020) largely focused on virtual teamwork during the pandemic, Šimová and Zychová (2023) examined publications between 2010 and 2020 but did not address the structural changes that emerged after COVID-19. Similarly, although Bağdoğan and Özdemir (2024) and Singh and Das (2024) identified influential authors, countries, and research themes in the field, they did not directly examine how the pandemic transformed the intellectual framework of remote work research. Based on these limitations, the present study aims to address the remote work literature from a more holistic perspective. As shown in Figure 1, the present research aims to answer these questions using the bibliometric analysis approach proposed by Aria and Cuccurullo (2017) and Nasir et al. (2020).



**Figure 1.** Bibliometric analysis process

## METHODOLOGY

### Data Source and Search Strategy

In this research, the PRISMA 2020 workflow model was used to standardize the stages of identifying, screening, and including relevant studies, thereby increasing the consistency and accuracy of the analysis (Page et al., 2021). The publications were divided into two periods: 1995-2019 (pre-COVID-19) and 2020-2025 (post-COVID-19). The starting year of 1995 was chosen because publications in the WoS database are available from that year, while the 2020-2025 period represents the post-COVID-19 period. The comparison is based on two periods of unequal duration (1995-2019 and 2020-2025). This temporal distinction was deliberately adopted because the COVID-19 pandemic constitutes a significant turning point in the evolution of remote work research. While unequal time intervals may affect bibliometric indicators such as publication counts, citation frequencies, and annual productivity, this classification provides a conceptually meaningful framework for examining the structural transformation of pre- and post-pandemic literature.

The literature search was conducted in the Web of Science (WoS) using the Advanced Search option. The following search string was applied:

TI=(“remote work\*” OR “telecommut\*” OR “telework\*” OR “tele-work”\*)

AND LA=(English)

AND DT=(Article)

AND SU=(Business Economics)

AND WC=(Management)

Boolean operators “AND” and “OR” were used in the search strategy (Letourneau et al., 2022). A title-only search strategy was adopted to ensure that remote work was the primary focus of each publication, rather than appearing incidentally in abstracts or keywords. This approach improved the accuracy of the dataset by reducing the inclusion of studies where remote work is only a secondary topic.

To ensure methodological consistency and disciplinary homogeneity, the dataset was limited to SSCI-indexed articles in the Management category and the Business Economics research area. This limitation allowed for a focused comparison of the evolution of remote work research within the management discipline, while reducing the inclusion of studies from unrelated fields.

Full citations were saved in “TXT” format, a plain text document type. The data were cleaned, processed, and listed in Microsoft Excel before being subjected to bibliometric analysis using the Biblioshiny interface in RStudio, with visualization in RStudio. Finally, the WoS literature on remote work was compared across the two periods: 1995-2019 (pre-COVID-19) and 2020-2025 (post-COVID-19).

### Eligible Criteria

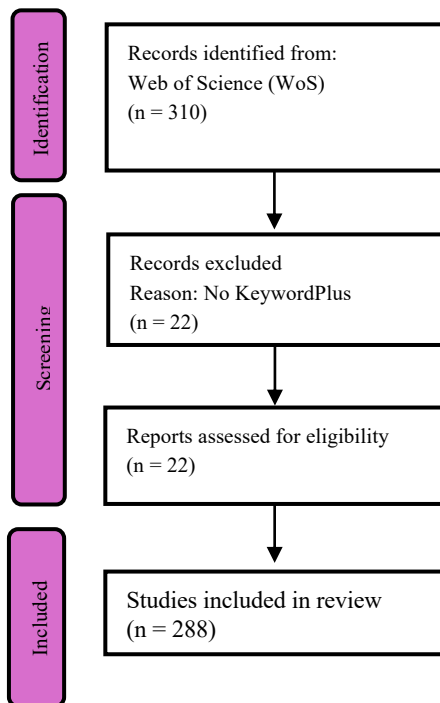
The inclusion and exclusion criteria were applied to ensure the dataset’s relevance. The inclusion criteria were:

- (1) articles were selected only those containing “remote work\*,” “telework\*” and “telecommut\*” in the article title,
- (2) articles published in English;
- (3) articles indexed in the “Social Sciences Citation Index (SSCI);
- (4) research areas grouped under “Business Economics”; and
- (5) categories grouped under “Management”.

Accordingly, the present study initially identified 310 research articles from 1995 to 2025. After the review, 22 articles were retained that did not include any Keyword Plus information. As a result, 288 articles were obtained. These articles were exported in plain text format and prepared for computer-

assisted analysis. The detailed screening procedure is summarized in Table 1, while the detailed search and screening procedure is illustrated in Figure 1.

**Table 1.** Comparative analysis: PRISMA 2020 screening process



## Study Selection and Data Management

The data extraction and selection process was performed by the author. All records were retrieved from the WoS database and processed in an Excel sheet. During this step, the missing bibliographic information was excluded. To minimize name-related errors, the Digital Object Identifier (DOI) numbers of the papers were carefully checked. In addition, the publication's city names were converted to country names to ensure geographical consistency. Following these processes, the finalized dataset was prepared for bibliometric analysis.

## Data Analysis

This bibliometric analysis was conducted in RStudio, using the Biblioshiny package for visualization (Aria & Curcurullo, 2017). The publication characteristics, such as title, keywords, authors, countries, journals, and institutions, were retrieved from the Web of Science database. All data were exported in an Excel sheet. *RStudio* software was utilized to analyze the most productive authors, countries, journals, institutions, and keywords. The analyses were conducted at four stages: data collection, data cleaning and preparation, descriptive analysis, and science mapping.

## RESULTS

### Descriptive Analysis

Initially, the data search was conducted for the period 1980-2019; however, the first publication on the subject was found in 1995. Therefore, the analysis covers the period 1995-2025. For comparison purposes, the data set is divided into two periods: 1995-2019 and 2020-2025 in Table 2. The findings show a significant increase in research output in recent times. There has been a significant increase in the number of documents, sources and authors in the post-COVID-19 period (2020-2025). The annual growth rate has also increased noticeably from 6.94% to 49.63%. Although the average number of citations per document decreased from 108 to 22 in the post-COVID-19 period (2020-2025), the main reason is that these publications are still new and have not had enough time to receive sufficient citations.

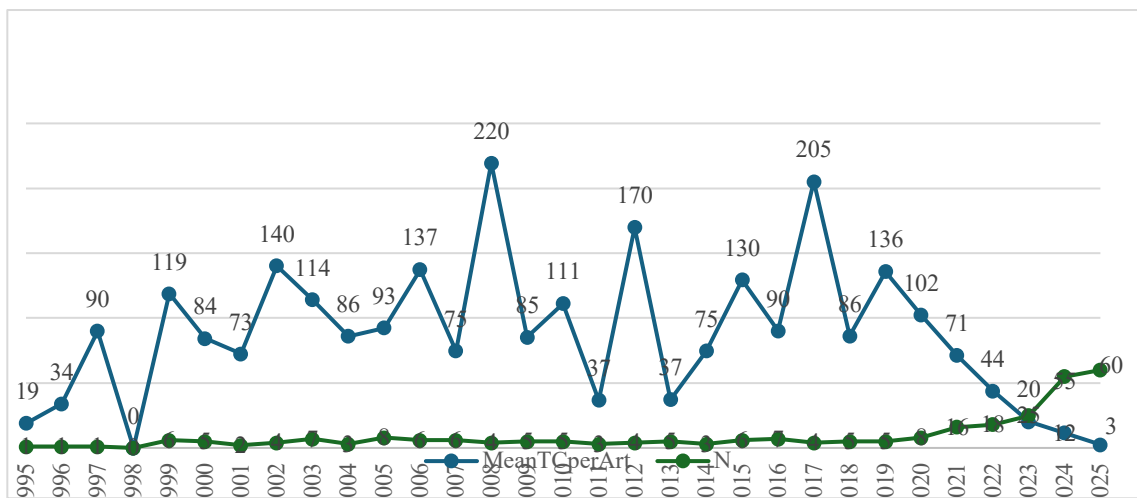
There has also been an increase in collaboration: the number of co-authors per article and the international co-authorship rate have risen. In general, the findings in Table 2 indicate that the field has grown rapidly in recent years, with the number of publications increasing.

**Table 2.** Descriptive analysis: Main information regarding the collection

| Description                          | Statistics | Statistics |
|--------------------------------------|------------|------------|
| Period                               | 1995-2019  | 2020-2025  |
| Sources                              | 41         | 63         |
| Documents                            | 106        | 183        |
| Annual growth rate                   | 6.94%      | 49.63%     |
| Document average age                 | 17.4       | 2.45       |
| Average citations per document       | 108        | 22         |
| Authors                              | 224        | 517        |
| Authors of single-authored documents | 15         | 19         |
| Single-authored documents            | 16         | 19         |
| Co-authors per document              | 2.41       | 3.09       |
| International co-authorships rate    | 16.98%     | 28.02%     |

Figure 2 shows a significant break in the literature between the pre- and post-COVID-19 pandemic periods. The literature from 1995-2019, prior to the COVID-19 pandemic, shows a very limited number of publications, with annual output ranging from 2 to 8 between 2000 and 2008. Particularly after 2008, the average citation times reached high values of 220 in 2017, 205 in 2012, 170 in 2006, and 140 in 2002. This indicates that before the pandemic, remote work had achieved a limited number of influential studies in the academic literature, but it had a significant impact on the published literature.

Following the COVID-19 pandemic, academic interest in remote work increased significantly. Figure 2 shows a significant rise in publications, increasing from 8 in 2020 to 60 in 2025. This increase encompasses the academic research discussion on the widespread adoption of remote work practices worldwide during the pandemic. However, a significant decrease in the average citation value per article is observed during the same period. Indeed, while the mean citation value was 102 in 2020, it returned to quite low levels on average in 2024 and 2025. However, this situation should not be interpreted as a decrease in the impact of research; on the contrary, the main reason for the change is that the citation structure of newly published series has not yet formed due to insufficient time. After a comprehensive evaluation, this can ensure rapid development and detailed management of the remote work literature in the post-COVID-19 period, and make the subject a central research topic in academic literature.



**Figure 2.** Times cited and publications over time

**Notes:** N: Number; MeanTCperYear: Mean total citation per year

In conclusion, the bibliographic dataset from the Web of Science (WoS) demonstrates a rapidly expanding research field. It shows how research on remote work evolved over time, between the periods 1995-2019 (pre-COVID-19) and 2019-2025 (post-COVID-19). The increase in publications before COVID-19, followed by the sharp rise in publications in the subsequent period, highlights the growing academic interest in this field. Although the citation window for publications is shorter in the post-COVID-19 period, the rapid growth in publication volume and early citations demonstrates active, strong, and increasing academic interest. These key bibliometric indicators provide a solid foundation for defining remote work as a dynamic and increasingly influential research area and for conducting further bibliometric analyses focusing on intellectual structure, thematic development, and leading contributors.

## Authors and Journals

To examine the author productivity of the articles, local and global citation analysis were performed. These metrics demonstrate the author's contribution in each field. The most-cited 10 documents on remote work research, both globally and locally, before the COVID-19 period, are presented in Table 3.

Golden's (2008) seminal article, which examined the relationship between remote work intensity and job performance, leads 483 total global citations, serving as a benchmark reference (LC = 15; NGC = 2.20). This study is frequently cited by other researchers because it is one of the foundational empirical works systematically analyzing performance in a remote work context. Golden's other contributions (2005, 2006) similarly exhibit sustained resonance.

Mid-period studies, such as Cooper's (2002) examination of work stress in flexible work contexts also demonstrate strong normalized citation impacts (GC = 416; NGC = 2.97), indicating their theoretical contribution to understanding workplace stress dynamics in evolving work environments. Similarly, Baruch (2000) shows one of the highest normalized global citation scores (NGC = 3.87, GC = 327), highlighting its foundational role in shaping the remote work literature.

Earlier empirical works, such as Sullivan (2003) (NGC = 2.31), which explored the implications of remote work boundary management between work and life, also reflect academic attention (GC = 164; NGC = 1.44). Dimitrova (2003) also examined the organizational and social implications of remote working, contributing to the early theoretical framing of remote work practices (GC = 87; NGC = 0,76).

Additional influential studies include Golden (2006) in both the *Journal of Organizational Behavior* (GC = 329; NGC = 2.40) and the *Journal of Organizational Behavior*, Sullivan (GC = 238; NGC = 1.73), which further advanced the understanding of remote work intensity and professional isolation. (2003) (NGC= 2.31) also reflects sustained scholarly influence during the pre-COVID-19 period.

More recent pre-COVID-19 contributions, such as Lautsch (2009) examining flexible work environments and employee control over work schedules (GC = 159; NGC = 1.86), demonstrate growing academic interest in flexibility and autonomy in work arrangements prior to the widespread expansion of remote work practices.

**Table 3.** Most global and local cited 10 documents 1995-2019 (pre-COVID-19)

| Author (s)       | Journal                             | LC | GC  | NLC  | NGC  |
|------------------|-------------------------------------|----|-----|------|------|
| Baruch (2000)    | New Technology, Work and Employment | 24 | 327 | 3.75 | 3.87 |
| Cooper (2002)    | Journal of Organizational Behavior  | 19 | 416 | 3.30 | 2.97 |
| Dimitrova (2003) | New Technology, Work and Employment | 18 | 87  | 1.80 | 0.76 |
| Sullivan (2003)  | New Technology, Work and Employment | 18 | 164 | 1.80 | 1.44 |
| Golden (2006)    | Journal of Applied Psychology       | 15 | 329 | 2.00 | 2.40 |
| Golden (2008)    | Journal of Applied Psychology       | 15 | 483 | 1.82 | 2.20 |
| Golden (2006)    | Journal of Organizational Behavior  | 14 | 238 | 1.87 | 1.73 |
| Bélangier (1999) | Information Management              | 13 | 130 | 2.17 | 1.09 |
| Golden (2005)    | Journal of Management               | 13 | 285 | 2.54 | 3.08 |
| Lautsch (2009)   | Human Relations                     | 13 | 159 | 2.32 | 1.86 |

Notes: LC: Local citation; GC: Global citation; NLC: Normalized local citation; NGC: Normalized global citation

The most-cited 10 documents on remote work research, both globally and locally, after the COVID-19 period were presented in Table 4. The most-cited studies in the post-COVID-19 period (2020-2025) show that the literature was rapidly reshaped after the pandemic. It is particularly notable that several of the pandemic studies achieved high normalized citation counts in a short period.

Chong (2020) has the highest citation count (LC = 19) and a strong global citation performance (GC = 285; NGC = 2.78). Its high normalized local citation score (NLC = 3.62) suggests that the study became a central reference, not only globally, but also within the sample literature. Its early focus on employee performance and behavior outcomes during large-scale remote work likely explains this strong impact. Similarly, Carillo et al.'s (2021) study shows a high normalized global citation score (NGC = 3.30). Studies examining digital infrastructure, information systems, and technological aspects of remote work gained visibility rapidly during the pandemic, when organizations depended heavily on digital tools.

Among the 2022 publications, Becker et al.'s (2022) study stands out with the highest NGC (3.25) and NLC values (3.31). This indicates that research on human resources practices, hybrid policies, and organizational adaptation became highly influential in the post-COVID-19 period. Likewise, Van Zoonen and Sivunen (2022) demonstrate strong normalized scores (NGC = 3.25; LC = 3.04). Together, the studies show the important role of human resources management and organizational psychology perspectives in shaping post-COVID-19 remote work discussions.

Other contributions, such as Donnelly and Johns (2021) (NGC = 1.61) and Wöhrmann and Ebner (2021) (NGC = 1.46), show moderate but stable influence. While they are clearly part of the core discussion, their normalized impact is lower than that of the leading studies of the period. Research on gender and inequality issues, such as Anderson and Kelliher (2020), indicates that the social and equality dimensions of remote work have begun to receive more attention (GC = 83). However, these topics have not yet reached the same citation intensity.

**Table 4.** Most global and local cited 10 documents 2020-2025 (post-COVID-19)

| Author(s)         | Journal  | LC | GC  | NLC  | NGC  |
|-------------------|--|----|-----|------|------|
| Chong (2020)      | Journal of Applied Psychology                          | 19 | 285 | 3.62 | 2.78 |
| Carillo (2021)    | European Journal of Information Systems                | 16 | 235 | 3.56 | 3.30 |
| Van Zoonen (2022) | European Journal of Work and Organizational Psychology | 11 | 133 | 3.25 | 3.04 |
| Becker (2022)     | Human Resource Management                              | 11 | 145 | 3.25 | 3.31 |
| Delanoiej (2020)  | European Journal of Work and Organizational Psychology | 10 | 121 | 1.90 | 1.18 |
| Donnelly (2021)   | The International Journal of Human Resource Management | 10 | 115 | 2.22 | 1.61 |
| Wöhrmann (2021)   | New Technology, Work and Employment                    | 8  | 104 | 1.78 | 1.46 |
| Anderson (2020)   | Gender in Management                                   | 7  | 130 | 1.33 | 1.27 |
| Franken (2021)    | Journal of Management & Organization                   | 7  | 92  | 1.56 | 1.29 |
| Ollo-López (2021) | International Journal of Manpower                      | 7  | 83  | 1.56 | 1.16 |

Notes: LC: Local citation; GC: Global citation; NLC: Normalized local citation; NGC: Normalized global citation

Collectively, these findings indicate that post-COVID-19 studies achieved relatively high normalized citation scores within a short time frame. The fact that several studies published between 2020 and 2022 have NGC values above 3.0 indicates that the pandemic served as a turning point, accelerating the academic impact of research on remote and hybrid work.

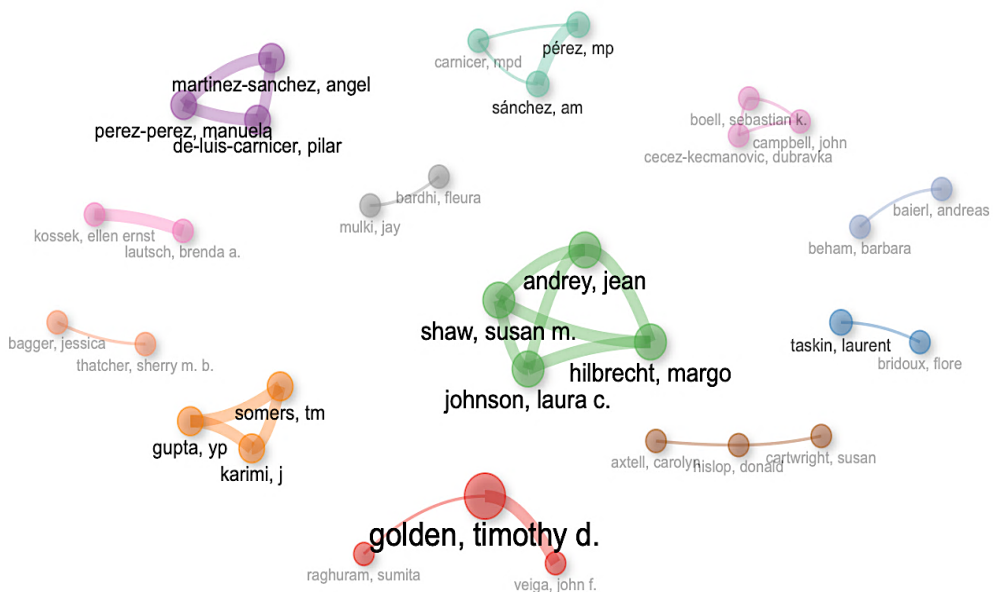
To examine the social relationships among the authors in the period before COVID-19, author collaboration networks were assessed (see Figure 3). Association was chosen as the normalization method, and edge betweenness was used as the clustering algorithm. After removing the isolated nodes, 12 clusters among 32 authors were identified, with each color representing a different cluster. The size of the labels and the thickness of the links demonstrate the strength of the collaboration of the network.

The results in Table 5 show that the most central actor in the network, Golden, has the highest betweenness (1.000) and PageRank (0.046) values, indicating that it acts as a bridge between different research groups and occupies a critical position in the network. In terms of closeness centrality, Taskin, L., and Bridoux, F. have the shortest average distance to other researchers with a value of 1.000. It can be said that the collaboration network consists of several small clusters and exhibits a partially centralized structure around Golden, T. D.

**Table 5.** Collaboration network analysis results for top 10 authors 1995-2019 (pre-COVID-19)

| Author(s)               | Cluster | Betweenness | Closeness | PageRank |
|-------------------------|---------|-------------|-----------|----------|
| Golden, Timothy D.      | 1       | 1.000       | 0.500     | 0.046    |
| Raghuram, Sumita        | 1       | 0.000       | 0.333     | 0.018    |
| Veiga, John F.          | 1       | 0.000       | 0.333     | 0.031    |
| Taskin, Laurent         | 2       | 0.000       | 1.000     | 0.031    |
| Bridoux, Flore          | 2       | 0.000       | 1.000     | 0.031    |
| Andrey, Jean            | 3       | 0.000       | 0.333     | 0.031    |
| Hilbrecht, Margo        | 3       | 0.000       | 0.333     | 0.031    |
| Johnson, Laura C.       | 3       | 0.000       | 0.333     | 0.031    |
| Shaw, Susan M.          | 3       | 0.000       | 0.333     | 0.031    |
| De-Luis-Carnicer, Pilar | 4       | 0.000       | 0.500     | 0.031    |

According to the network cluster structure in Figure 3, collaborative relationships form around several sub-research groups. The research group consisting of Golden, T. D., Raghuram, S., and Veiga, J. F. represents a significant portion of the network, while the subgroup formed by Taskin, L., and Bridoux, F. exhibits a smaller but densely interconnected collaborative structure. Overall, the collaborative network can be defined as a structure centered around a few core researchers and further subdivided. The high mediation and PageRank values for Golden, T. D. in Table 5 indicate that this researcher is a key author connecting different research groups. This demonstrates that some researchers play a significant role in the development of the field, not only in terms of publication output but also through their strategic positions in shaping collaborative networks.



**Figure 3.** Author collaboration network 1995-2019 (pre-COVID-19)

To examine the social relationships among the authors in the period after COVID-19, author collaboration networks were used (see Figure 4). Relationship was used as the normalization method, and inter-edge connectivity was used as the clustering algorithm. After removing the isolated nodes, 11 clusters among 36 authors were identified, with each color representing a different cluster. The size of the labels and the thickness of the connections indicate the strength of the network's collaboration.

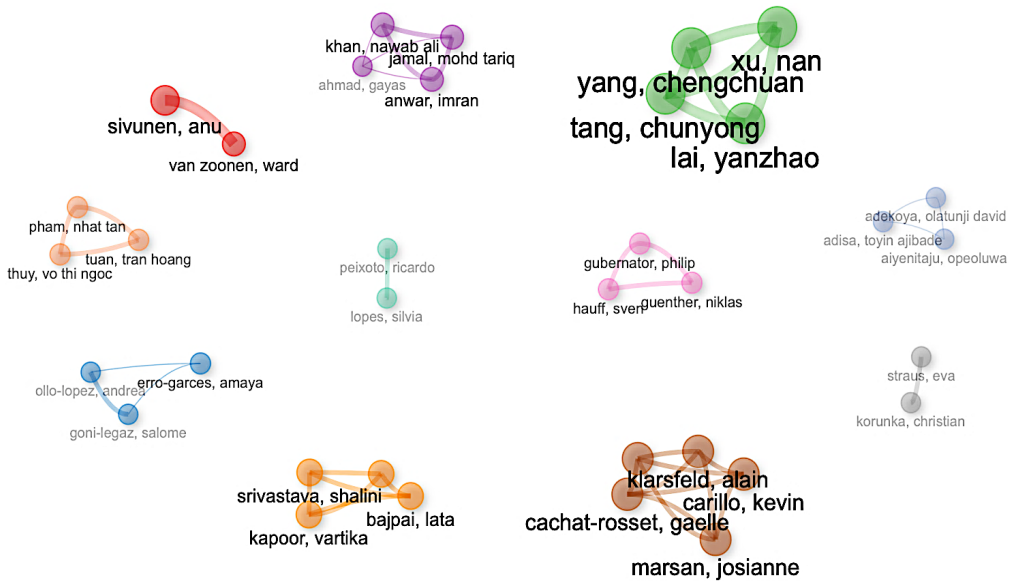
According to the collaboration network analysis results in Table 6, Sivunen, A. and Van Zoonen, W. have the highest closeness value at 1.000, indicating they have the shortest average distance to other researchers. In terms of PageRank, Anwar, I. has the highest value at 0.031, showing a relatively more influential position in the network compared to other authors. All authors have the same betweenness value at 0.000, indicating that none of them acts as bridges. Therefore, the collaboration network consists of several small clusters and does not exhibit a strongly centralized structure.

**Table 6.** Collaboration network analysis results for top 10 authors 1995-2019 (pre-COVID-19)

| Author(s)          | Cluster | Betweenness | Closeness | PageRank |
|--------------------|---------|-------------|-----------|----------|
| Sivunen, Anu       | 1       | 0.000       | 1.000     | 0.029    |
| Van Zoonen, Ward   | 1       | 0.000       | 1.000     | 0.029    |
| Erro-Garces, Amaya | 2       | 0.000       | 0.500     | 0.029    |
| Goni-Legaz, Salome | 2       | 0.000       | 0.500     | 0.029    |
| Olló-Lopez, Andrea | 2       | 0.000       | 0.500     | 0.029    |
| Lai, Yanzhao       | 3       | 0.000       | 0.333     | 0.029    |
| Tang, Chunyong     | 3       | 0.000       | 0.333     | 0.029    |
| Xu, Nan            | 3       | 0.000       | 0.333     | 0.029    |
| Yang, Chengchuan   | 3       | 0.000       | 0.333     | 0.029    |
| Anwar, Imran       | 4       | 0.000       | 0.333     | 0.031    |

According to the clustering structure in Figure 4, collaborative relationships are evident around several main sub-research groups. The research group consisting of Yang, C., Xu, N., Lai, Y., and Tang, C. represents the densest and most prominent part of the network. Similarly, the subgroup consisting of Klarsfeld, A., Carillo, K., Cachat-Rosset, G., and Marsan, J. also exhibits a central collaborative structure. This collaborative network can be described as a structure centered around a few core researchers and divided into independent subgroups. Based on the font sizes and connection densities of the names in the image, it can be said that names such as Yang, Chengchuan, and Klarsfeld, Alain, have strategic importance within their groups and play a key role in the development of these subgroups.

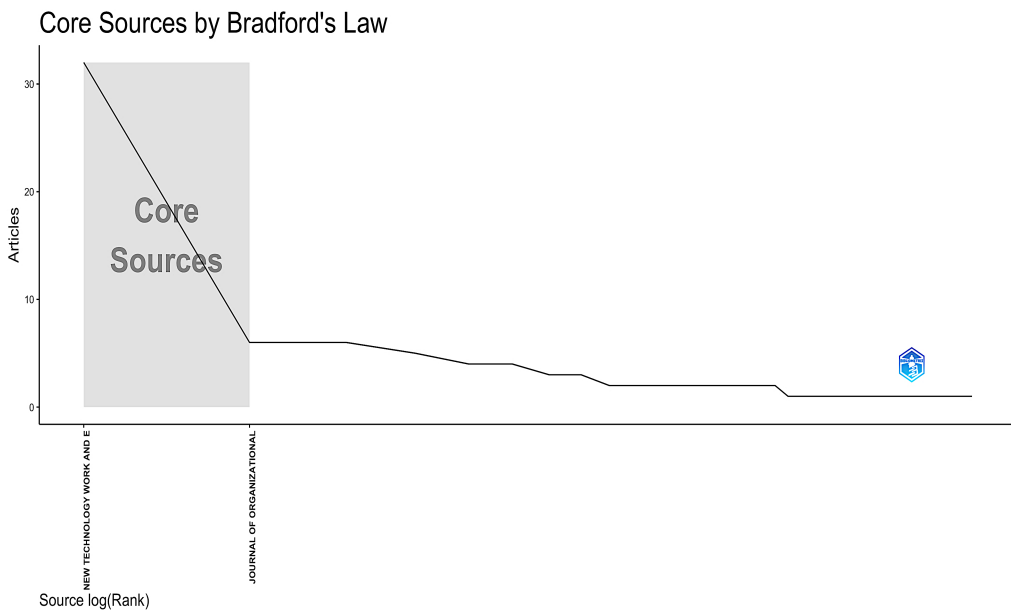
The cluster including Sivunen, A., Van Zoonen, W., and Srivastava, S., demonstrates the existence of more micro-level working groups as smaller-scale clusters within the network. This structure shows that the network progresses through the contributions researchers make to its shaping via such strategic groupings.



**Figure 4.** Author collaboration network 2020-2025 (post-COVID-19)

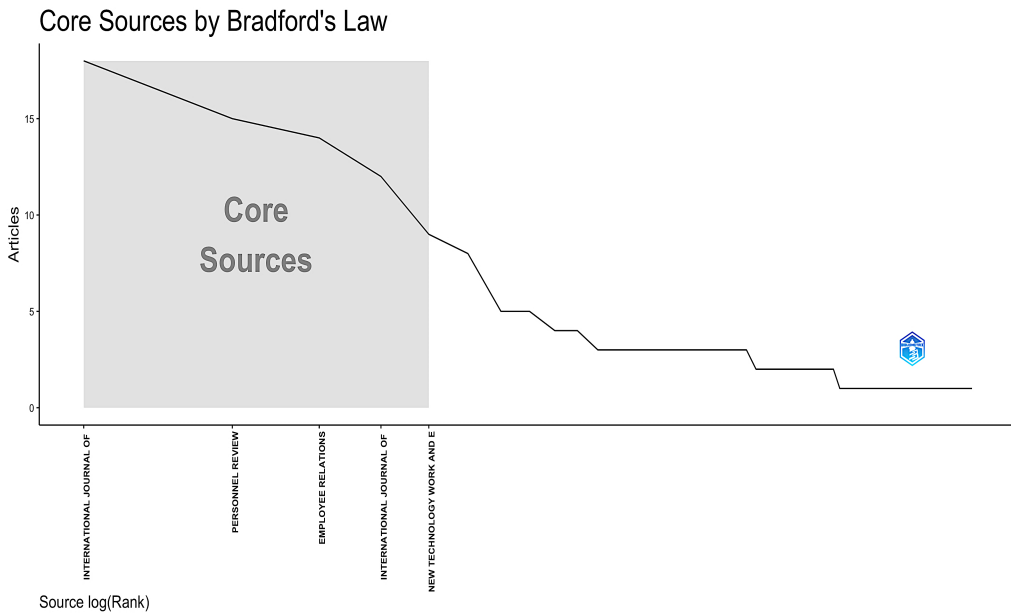
In conclusion, in the pre-COVID-19 period (1995-2019), the collaboration network exhibited a more centralized structure where certain key figures, such as Golden, T. D., acted as bridges; however, in the post-COVID-19 period (2020-2025), the network expanded by dividing into more numerous, highly concentrated but independent subgroups such as the Yang, C. and Klarsfeld, A. groups, and the collaboration dynamics evolved towards a multipolar specialization rather than a single center.

Bradford's law has been used to analyze journal contributions to the current literature (Bradford, 1948). According to this law, it is possible to determine whether only a small number of core sources will contain only a small number of core sources. As seen in Figure 5, there are two journals, namely New Technology, Work and Employment ( $k = 32$ ) and Journal of Organizational Behavior ( $k = 6$ ), which are located in the core zone of the plot in the pre-COVID-19 period.



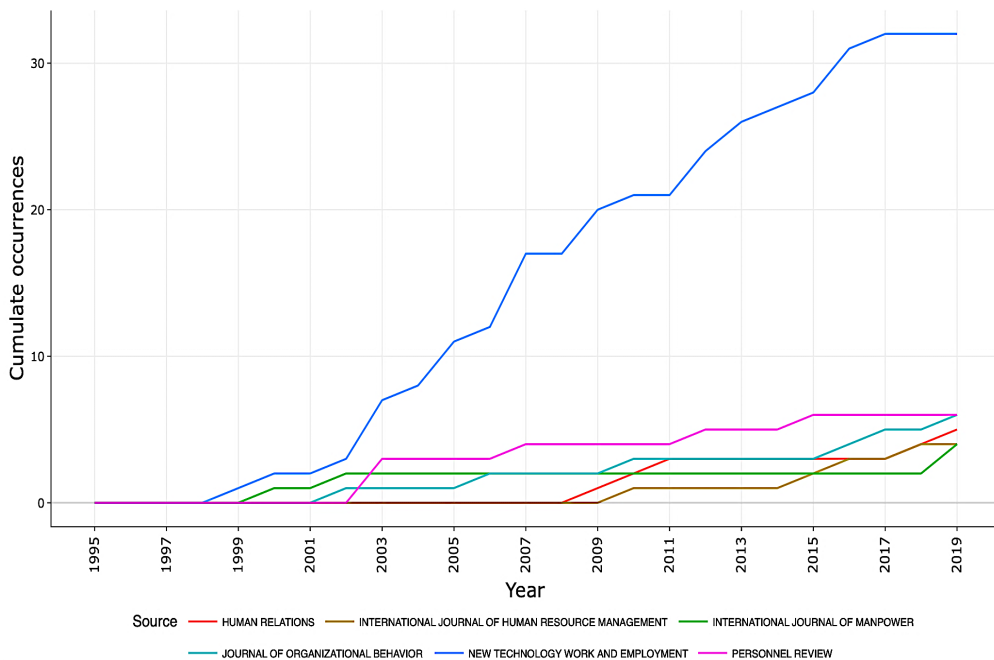
**Figure 5.** Bradford's law distribution 1995-2019 (pre-COVID-19)

As seen in Figure 6, there are five journals namely International Journal Of Manpower (k = 18), Personnel Review (k = 15), Employee Relations (k = 14), International Journal Of Human Resource Management (k = 9) and New Technology, Work and Employment (k = 18) are located in the core zone of the plot, in the post-COVID-19 period.



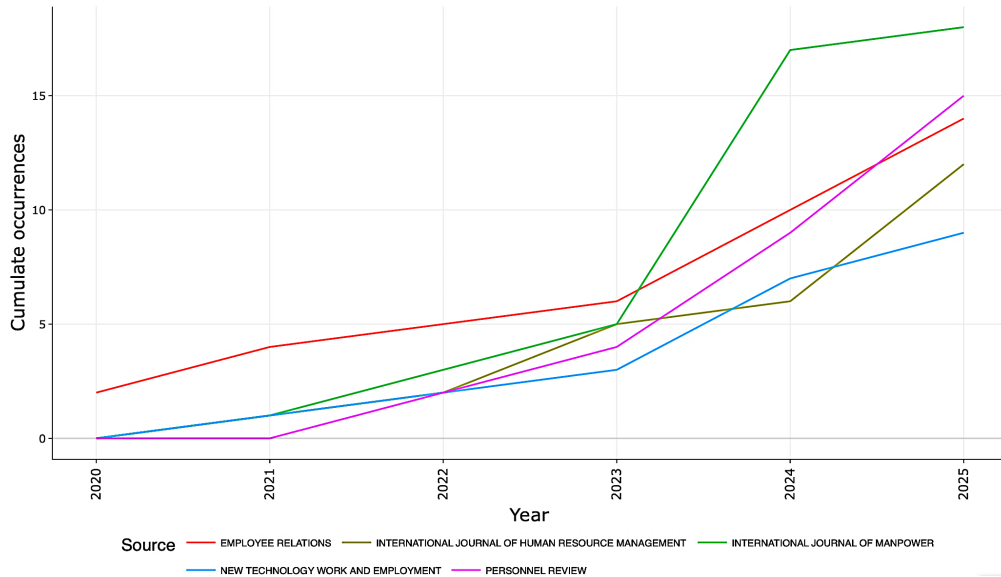
**Figure 6.** Bradford’s law distribution 2020-2025 (post-COVID-19)

Figure 7 shows the cumulative publication trends over time for selected journals between 1995 and 2019, the pre-COVID-19 period. While the journal *New Technology, Business and Employment* has become significantly more prominent over time, interest in this topic has been limited or increasing gradually in other journals.



**Figure 7.** Cumulative rate of the sources 1995-2019 (pre-COVID-19)

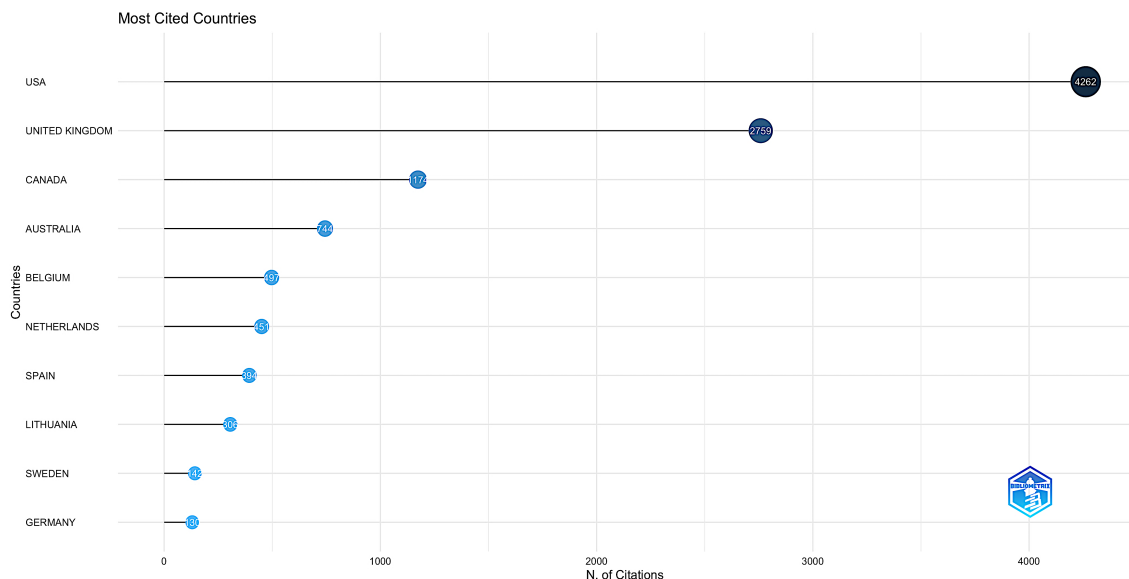
Figure 8 shows the cumulative publication trends over time for selected journals between 2020 and 2025, the pre-COVID-19 period. The results show that *Employee Relations* exhibits relatively early and consistent growth, maintaining a leading position throughout the period examined. The *International Journal of Manpower* shows a remarkable acceleration in publication output, particularly after 2023, making it the most rapidly growing source in recent years. *Personnel Review* also exhibits a noticeable acceleration in publication output after 2023. Meanwhile, *International Journal of Human Resource Management* and *New Technology, Work and Employment* display more gradual and moderate growth trajectory throughout the period. Overall, the trend suggests that the focal research theme has gained scholarly attention across multiple journals, with a marked expansion in publication activity after 2023.



**Figure 8.** Cumulative growth rate of the sources 2020-2025 (post-COVID-19)

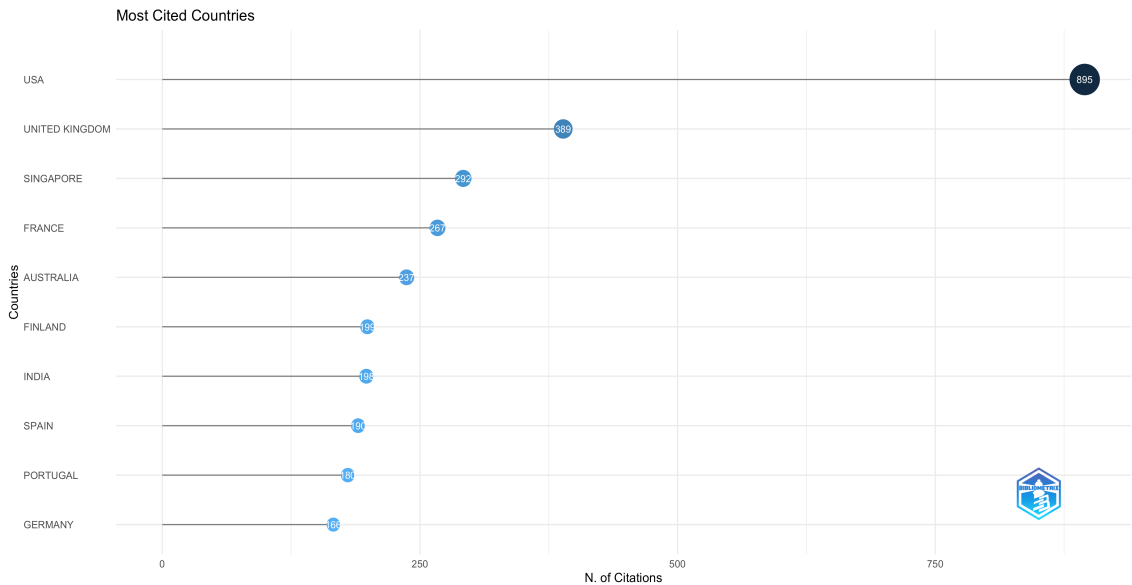
### Countries/Provinces (Areas)

Figure 9 shows the 10 most-cited countries for remote work research in the pre-COVID-19 period. The findings demonstrated that the USA is the most-cited country with 4262 citations, followed by the UK with 2759 citations and Canada with 174 citations. The remaining countries in the top ten are European.



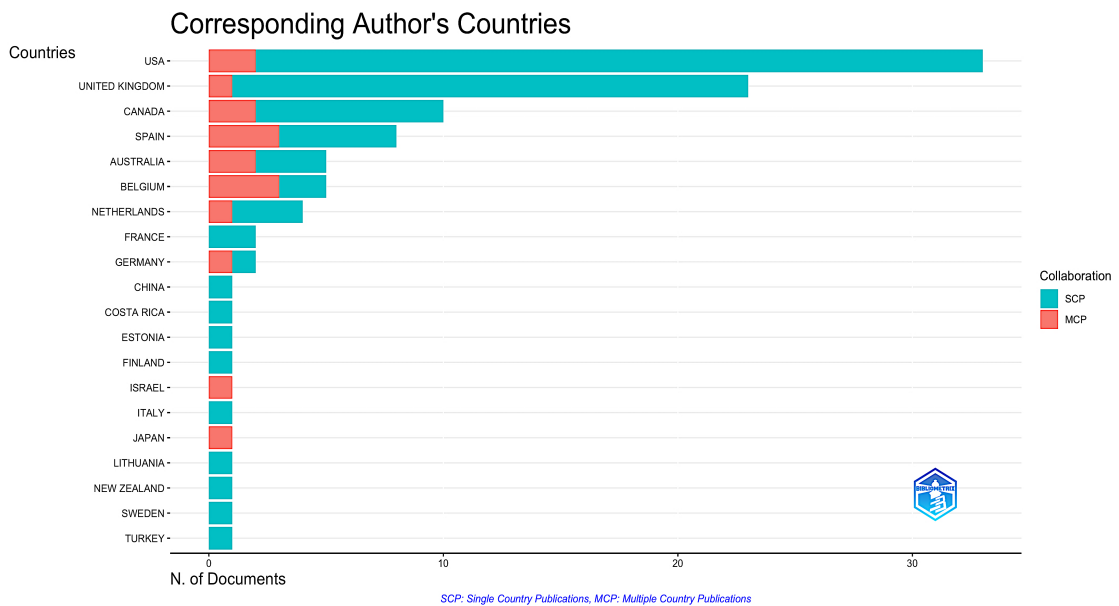
**Figure 9.** The top 10 countries 1995-2019 (pre-COVID-19)

Figure 10 shows the 10 most-cited countries for remote work research in the post-COVID-19 period. The findings show that the USA remains the most-cited country, with 895 citations, followed by the UK with 389. Consistent with pre-COVID-19, the USA and the UK maintain the top two positions, Singapore appears to be the third most cited country with 292 citations, replacing Canada. The remaining countries in the top ten are again European.



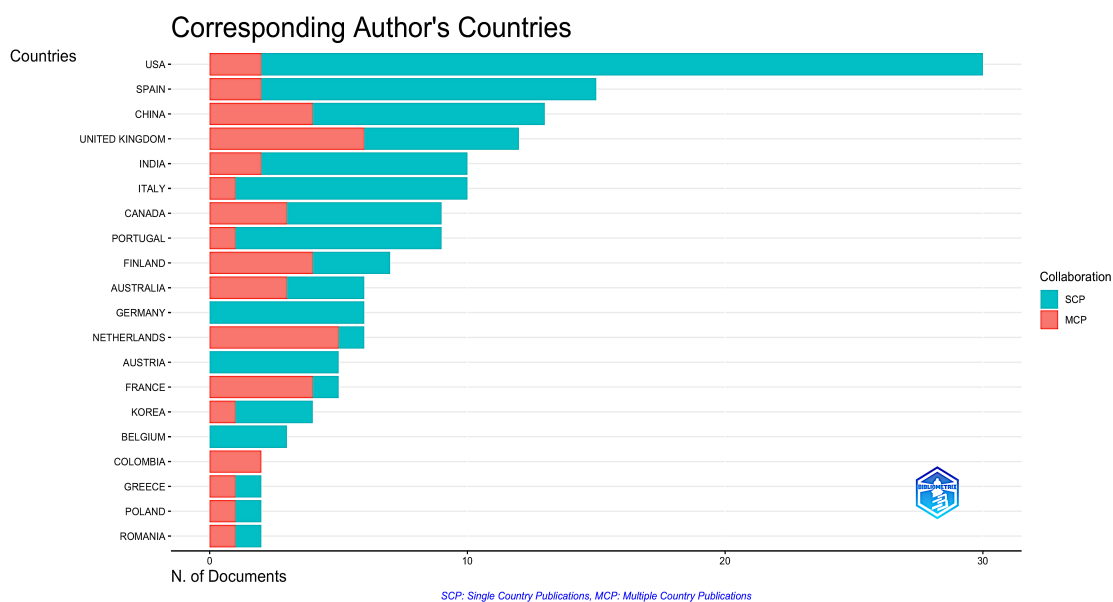
**Figure 10.** The top 10 countries 2020-2025 (post-COVID-19)

Figure 11 shows the corresponding authors' countries, and the results show that only half of the most productive countries have multiple country publications in the pre-COVID-19 period (1995-2019). On the other hand, some countries focus primarily on local research initiatives. While the US and the UK lead in overall output with a balanced approach to local and international research, countries with low publication volumes, such as Israel and Japan, stand out with exceptionally high international collaboration rates reaching 100%.



**Figure 11.** Most productive countries 1995-2019 (pre-COVID-19)

Figure 12 shows that, excluding Germany and Belgium, the most productive countries in the post-COVID-19 period (2020-2025) have varying levels of multi-country publications. Although most publications are single country, the proportion of multi-country publications in total output remains low. It is also noteworthy that the Netherlands (83%) and France (80%) have relatively higher rates of multi-country publications compared to other top-productive countries. In summary, while the US and Spain lead in overall output, with a balanced mix of local and international research, smaller research economies such as Greece, Poland, and Romania stand out for relatively high levels of international collaboration.



**Figure 12.** Most productive countries 2020-2025 (post-COVID-19)

## Co-Occurrence Network of Keywords

A co-occurrence map was created using the 'all keywords network' with 50 nodes. The network was generated using 'association' normalization and the 'Louvain' clustering algorithm, which helps identify densely connected groups of keywords representing distinct research themes (Zhang et al., 2016).

The keyword co-occurrence analysis shows five interrelated thematic clusters that clearly emerge in the pre-COVID-19 period between 1995 and 2019 (Figure 11).

The first and most prominent cluster focuses on the home-centric dimension of work experience. *Home* is central to this cluster and is associated with concepts such as *flexibility*, *work-life balance*, *time*, *family*, *gender*, *perceptions*, *boundaries*, and *work*. This cluster demonstrates the impact of working-from-home arrangements on employees' daily lives and their relation to issues such as work-life balance, time management, and family relationships. It also shows how remote work practices reshape the boundaries between individual life and workspaces.

The second cluster represents the organizational context of work. At the center of this cluster is *work*, associated with concepts such as *conflict*, *managers*, *workplace*, *virtual office*, *attitudes*, *behavior*, *email*, *flexibility*, and *model*. This cluster reflects research examining the organizational structure of the work environment, management practices, and employee behavior. It also demonstrates how business processes are being restructured through digital communication tools and virtual office applications.

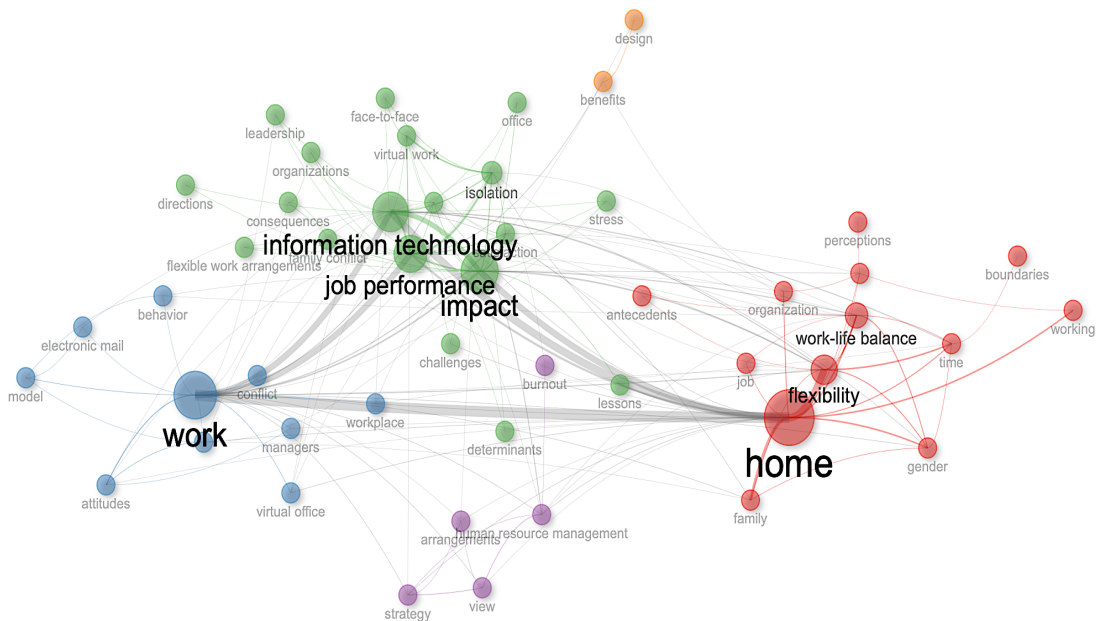
The third cluster focuses on technological infrastructure and the digital work environment. In this cluster, *information technology*, *impact*, and *job performance* are central concepts; *virtual work* is linked to *office*, *organizations*, *leadership*, *isolation*, *stress*, and *outcomes*. This cluster shows how information

technologies have shaped the remote work environment and the impact of this transformation on employee performance. It also shows that technology is both a facilitator of business processes and a source of new problems, such as isolation and stress.

The fourth cluster reflects the human resources and organizational management perspective. This cluster includes concepts such as *human resources management*, *regulations*, *strategy*, *perspective*, and *determinants*, and is concerned with managing business arrangements, organizational strategies, and human resources policies. This cluster represents research examining how organizations plan and manage remote or flexible work models.

A fifth, smaller cluster focuses on the design and employee experience dimension. This cluster includes the concepts of *benefits* and *design*, focusing on the advantages they provide to employees and on the design of business systems.

When the overall network structure in the pre-COVID-19 period (1995-2019) is examined, the concepts of home and work performance serve as bridges between clusters. This shows that different research areas, such as technological infrastructure, the work-from-home experience, organizational management, and employee behavior, are ultimately related to employee performance and business outcomes. Furthermore, strong connections between home and work clusters demonstrate that the boundaries between work and private life are increasingly intertwined in the modern work environment.



**Figure 11.** Density of co-occurrence network 1995-2019 (pre-COVID-19)

The keyword co-occurrence analysis shows four interrelated thematic clusters that clearly emerge in the post-COVID-19 period between 2020 and 2025 (Figure 12).

The first and the most central cluster addresses job results and organizational behavior. *Job performance* is central to this cluster and strongly linked to concepts such as *leadership*, *job satisfaction*, *social support*, *behavior*, *organizational identification*, *challenges*, *commitment*, *face-to-face contact*, *turnover*, *perceived organizational support*, *virtual teams*, and *work*. This structure demonstrates that employee performance is not merely an individual outcome; it is a multidimensional process shaped by factors such as leadership style, organizational commitment, social support, and virtual team dynamics.

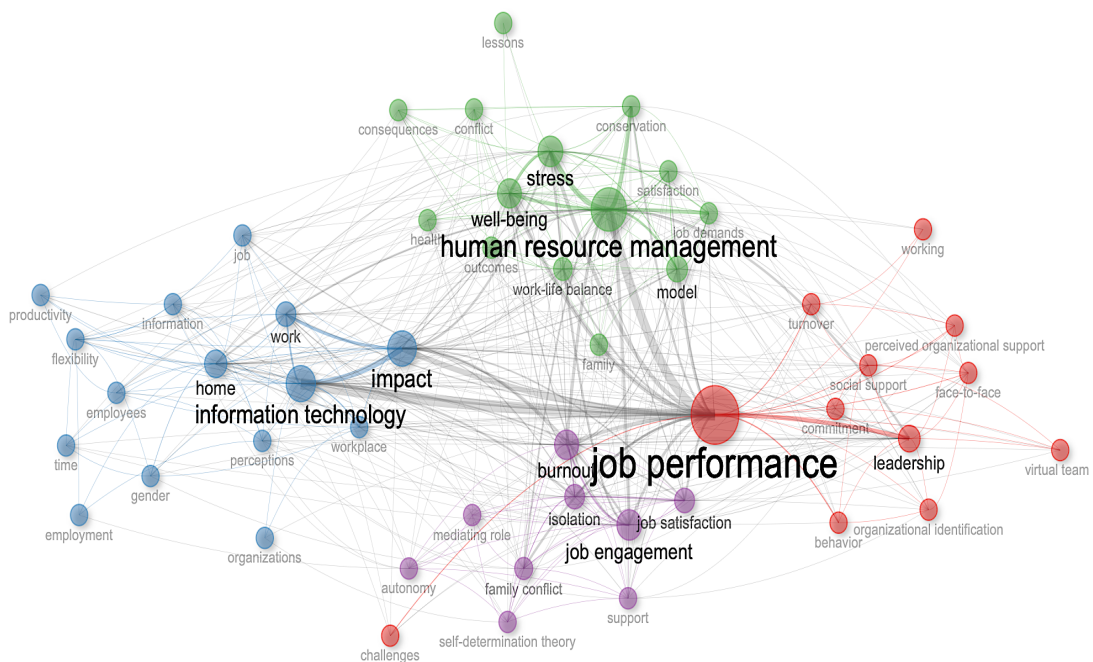
The second cluster focuses on the technological and contextual dimensions of the work environment. *Information technology* and *impact* are central to this cluster, related to concepts such as *home*, *work*, *flexibility*, *gender*, *workplace*, *job*, *information*, *time*, *employees*, *productivity*, *perceptions*, *employment*, and *organizations*. This structure shows how information technologies are transforming working methods

and affecting organizational processes, particularly through factors such as work-life balance, flexibility, employee productivity, and perceptions. Therefore, this cluster represents studies examining the role of technology in the work environment and the effects of digitalization on employee behavior.

The third cluster reflects the perspective of human resource management and employee well-being. At the center of this cluster is *human resource management*, and it is related to concepts such as *stress*, *well-being*, *work-life balance*, *satisfaction*, *conservation*, *job demands*, *outcomes*, *conflict*, *consequences*, *family*, *health*, and *lessons*. This structure reveals how issues such as employees' psychological health, work-life balance, and stress management are related to human resource policies.

The fourth and final cluster focuses on *employee motivation* and *psychological* states. In this cluster, *job engagement* and *burnout* concepts are prominent and are related to concepts such as *burnout*, *isolation*, *job satisfaction*, *family*, *conflict*, *autonomy*, *support*, *self-determination theory*, and the *mediating role*. This cluster emphasizes the impact of isolation, work-family conflict, and support mechanisms on employee engagement.

When the network structure in the post-COVID-19 period (2020-2025) is examined in general, job performance serves as a bridging concept among different clusters. This shows that employee performance lies at the intersection of research areas such as technology use, human resources practices, and employee psychology. At the same time, the connections between the clusters show that performance, technology, employee well-being, and commitment are increasingly addressed in an integrated manner in modern work environments.



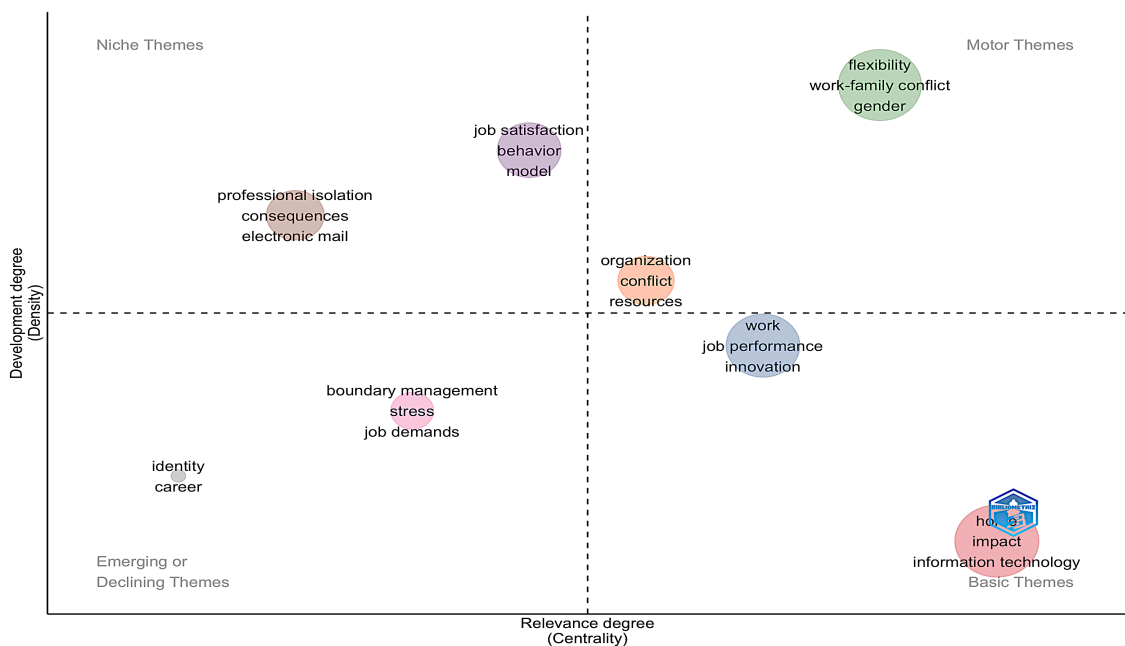
**Figure 12.** Density of co-occurrence network 2020-2025 (post-COVID-19)

## Thematic Map

Thematic maps have two axes: centrality and density. The combination of these two axes forms four standard categories: niche themes (highly developed but isolated themes), emerging or declining themes, motor themes, and core themes. Emerging or declining themes are research topics with low density and low centrality. These themes are those that can be further developed within the research area or may become obsolete over time. Core themes are areas with low density but high centrality. Several studies have been conducted on these themes. Niche themes are in areas with high density but lower centrality; they are well-developed but also distant from other themes. Finally, motor themes are found in areas with both high density and high centrality and are therefore both developed and core to the research area (Aria

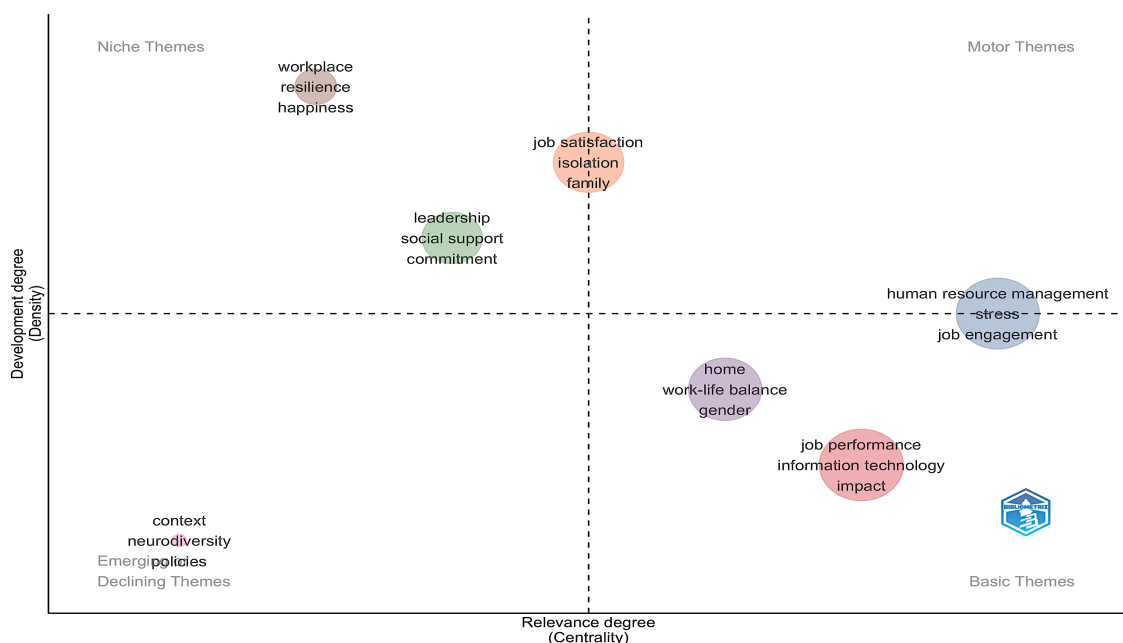
& Cuccurullo, 2017; Nasir et al., 2020). Accordingly, each bubble represents a network cluster. The size of the bubbles is determined by the cluster's higher occurrence value. The name placed on the bubble is the keyword with the highest occurrence value in the relevant cluster.

The thematic map created based on bibliometric analysis results from the pre-COVID-19 period, shown in Figure 13, shows that the cluster “flexibility, work-family conflict, gender” has high centrality and density values, indicating that these are the main motor themes driving the development of the field. Topics such as “information technology, home, impact” and “work, job performance, innovation” are considered basic themes forming the conceptual foundation of the discipline. Topics in the upper-left quadrant of the diagram, such as “job satisfaction, behavior, model” and “professional isolation, consequences, electronic mail,” are defined as niche themes that are highly saturated within their own domains but have weak ties to the general literature. The low density and centrality values of the variables “boundary management, stress, job demands,” and “identity, career,” clustered in the lower-left quadrant, indicate that these topics fall into the category of emerging or declining themes, either newly relevant or becoming outdated in the literature. In particular, the central position of the “organization, conflict, resources” cluster in the diagram demonstrates that this theme serves as a strategic bridge between organizational building blocks and individual outcomes.



**Figure 13.** Thematic map 1995-2019 (pre-COVID-19)

According to the bibliometric thematic map results for the post-COVID-19 period in Figure 14, the “human resource management, stress, job engagement” cluster stands out as the motor theme guiding the development of the field, with its high centrality and density values. Basic themes such as “job performance, information technology, impact,” and “home, work-life balance, gender” are widely accepted but continue to evolve within the discipline. The upper-left quadrant of the strategic diagram contains the “workplace, resilience, happiness” and “leadership, social support, commitment” clusters, which are highly saturated within themselves but are defined as niche themes with relatively limited connections to other networks. The “context, neurodiversity, policies” cluster, located in the lower-left quadrant, is categorized as an emerging or declining theme, which is just beginning to attract attention in the literature, given its low density and centrality values. In particular, the position of the “job satisfaction, isolation, family” cluster at the very center of the diagram, in the transition zone between motor and niche themes, indicates that these topics represent a critical point of balance linking individual well-being to organizational dynamics.



**Figure 14.** Thematic map 2020-2025 (post-COVID-19)

In conclusion, as shown in Figures 13 and 14, while concepts such as “flexibility” and “work-family conflict” were the most developed motor themes in the field before COVID-19, the focus has shifted to a more managerial and psychological axis in the post-COVID-19 period, transforming into a cluster of “human resource management, stress, and job engagement.” In particular, the fact that “information technology” and “impact,” which were among the basic themes before the pandemic, have retained their place afterward demonstrates that technology has become a standard framework for the discipline. The most striking change is that the concept of “isolation,” which was a niche area of expertise before the pandemic, has risen to the center of the diagram after the pandemic, merging with “job satisfaction” and “family” to become a strategic bridging theme. Furthermore, concepts such as “neurodiversity” and “resilience,” which emerged in the post-pandemic period, indicate that the literature is now focusing not only on operational processes but also on deeper psychological layers, including individual well-being and inclusion. This transformation confirms that the literature is evolving from a technical/operational focus on ‘how the job is done’ to a psychological/human focus on ‘how the employee feels’.

## DISCUSSION

This study systematically compares changes in the remote work literature before and after COVID-19 through a bibliometric analysis. It examined 106 studies published between 1995 and 2019 and 183 studies published between 2020 and 2025, revealing publication trends, influential authors, and thematic developments within the field over time.

The findings indicate that the COVID-19 pandemic marked a turning point for remote work research. The annual growth rate of publications increased from 6.94% before the pandemic to 49.63% afterward, indicating a significant rise in academic interest during this period. This can be explained by the pandemic’s rapid and necessary shift to remote work systems. Alternatively, this situation can be attributed to the rapid and widespread adoption of remote work as a mandatory work arrangement during the pandemic, which in turn led to a rapid expansion in the academic literature. This finding aligns with previous studies showing that the pandemic has expanded the scope and reach of remote work research (Abarca et al., 2020; Šímová & Zychová, 2023; Bağdoğan & Özdemir, 2024; Singh & Das, 2024).

Country-based reviews show that the remote work literature has been shaped by significant events. The USA and the UK are the most influential research countries in both periods. However, the literature, shaped by only a few individuals before the pandemic, has since transformed into a research field with increasingly broad international participation. Contributions from countries such as Singapore, France,

and Australia appear strong, indicating that remote work has attracted greater attention from researchers globally. This may be related to the pandemic, which has led to similar work experiences worldwide and drawn various researchers into the current study of this new work arrangement. At the same time, the growing geographic spread reveals that remote work research is becoming increasingly international. This is linked to the widespread adoption of digital platforms and the growing body of research on remote and hybrid work practices across diverse cultural contexts. Indeed, Ahmed and Smith (2023) emphasized that digital platforms play a significant role in organizing remote and hybrid work practices in culturally diverse contexts.

The transformation in the literature has not been limited to distribution but has also shown significant developments in research topics and the authors contributing to the literature. In the pre-COVID-19 period, the work of researchers such as Golden and Cooper was central in the literature, focusing on professional isolation in remote work environments and its effects on employee performance, development, and workplace interactions. These themes reflect an early research approach in which remote access was considered an alternative work model rather than a pandemic response and was examined within the framework of decreased employee performance and engagement. In contrast, a significant shift in research focus was observed during the pandemic. In particular, the work of researchers such as Chong et al. (2020) emphasized the psychological and behavioral aspects experienced by remote workers, including daily work interruptions, emotional burnout, and exclusion, during the pandemic. This change shows that remote work is now considered not only in terms of performance and productivity but also from a perspective that supports and evaluates people's psychological well-being.

A similar transformation is also emerging in the development of the literature's thematic structure. Before COVID-19, concepts like "flexibility, work-family conflict, and gender" held significant importance in remote work research, largely rooted in organizational behaviour and work-life balance research. In contrast, post-pandemic concepts such as "human resource management, stress, and job engagement" have gained prominence. This shift indicates that remote work is no longer viewed solely as a flexible work arrangement but rather as a multidimensional phenomenon that requires consideration of employee experience and human resources practices. This literature highlights the strength of a more human-centered approach to employee well-being, organizational support, and leadership practices, rather than focusing solely on remote work and expansion.

The most cited documents are published in the *Journal of Applied Psychology* with the 983 global citations written by Golden et al. (2008) in the pre-COVID-19 period and 285 global citations written by Chong et al. (2020) in the post-COVID-19 period. The largest proportion of scientific output was published in *New Technology, Work and Employment* in the pre-COVID-19 period and in *Employee Relations* in the post-COVID-19 period.

Overall, the pre-COVID-19 literature on remote work primarily focused on flexibility and work-life balance, while post-pandemic issues have shifted the focus toward employee well-being, leadership, and sustainable organizational support to the forefront. This shift indicates that research on remote work has evolved into a more human-centered and multidimensional structure. Future research would benefit from examining the impacts of remote and hybrid work models on employee well-being, leadership approaches, organizational resilience, and digital collaboration across different sectors and cultural contexts. Furthermore, longitudinal studies can reveal the continuity of this thematic transformation over time, while comparative studies across countries can provide a more comprehensive understanding of how remote work practices are affected by corporate, cultural, and organizational dynamics.

Beyond identifying publication trends, this study makes an original contribution by providing a direct bibliometric comparison of the remote work literature before and after the COVID-19 pandemic within a unified methodological framework. Previous bibliometric studies have generally examined the remote work literature as a whole or focused on publication performance, influential authors, collaboration networks, or thematic trends within a single time period. In contrast, this study demonstrates that the COVID-19 pandemic fundamentally reshaped not only publication output but also the intellectual structure, collaboration networks, and thematic priorities of the field. While previous studies also reported a rapid increase in remote work publications after the pandemic, the findings of this study show that this growth was accompanied by a significant shift from themes focused on flexibility and work-life balance to employee well-being, leadership, human resource management, and organizational resilience. This

transformation can be explained by the widespread adoption of remote work during the pandemic, which shifted remote work from an optional work arrangement to a strategic organizational practice. Therefore, this comparative perspective extends the existing bibliometric literature by identifying the COVID-19 pandemic not merely as a period associated with increased publication activity, but as a conceptual turning point in the evolution of remote work research.

## Research Gaps and Possible Future Research Direction

While research on the comparative transformation of remote work before and after COVID-19 is developing, it remains inconclusive in some respects. For example, in some pre-pandemic studies (1995-2019), some researchers found positive relationships between remote work and employee performance (Negui-Eraso & Erro-Garces, 2020), while others identified negative relationships such as the effects of occupational isolation (Golden et al., 2008; Golden, 2006). More meta-analytic research is recommended to clarify this inclusivity. While some studies emphasize flexibility as a supportive force for job satisfaction (Lautsch, 2009), others have presented occupational isolation as a solution to the negative effects of office distractions (Golden et al., 2008). On the other hand, while Müller and Niessen (2019) determined that self-goal setting has a positive effect on occupational health, Chong et al. (2020) identified emotional burnout and disengagement during the pandemic. These findings indicate that the impact of remote work on employee job satisfaction and motivation has been underresearched in the post-pandemic period. Future studies should therefore examine how different digital leadership styles influence employee motivation, psychological well-being, work engagement, and job performance across remote and hybrid settings, as well as across different industries.

Interestingly, leadership and well-being are of profound importance as both predictors and outcomes of remote work success. This finding is thought to stem from the positive and negative aspects of digital transformation. In line with this view, Bhatti et al. (2024) found that digital platforms positively impact creativity through information sharing. According to Miletic et al. (2025), with information and communication technologies (ICT) becoming more prevalent in daily and business life, it is likely that more studies will be conducted on the positive aspects of remote work in the future. Future research should also examine the role of emerging technologies, including AI-powered collaboration tools and intelligent digital platforms, in enhancing collaboration, creativity, and organizational performance among employees in remote work environments.

On the other hand, while structural remote work research has not yet been sufficiently addressed, the socialization aspect of this structure should be investigated more comprehensively. For example, according to Šimová & Zychová (2023), digital leadership and social support are new topics. Others have noted that remote work is indirectly and positively related to quality of life by protecting employees' mental health (Belzunegui-Eraso & Erro-Garcés, 2020; Morán et al., 2022). Another study supporting this view (Toscano et al., 2022) identified remote work as a significant component of digital transformation and productivity. These results suggest that remote work can be seen as a double-edged sword. Commuting helps neutralize stressors (Nilles, 1975), but if not managed effectively, it can lead to devastating consequences such as loneliness (Baker et al., 2022). There is still insufficient information on which leadership styles are most effective for remote teams and how organizational cultures can be reshaped to reduce isolation. Future studies could address these questions through longitudinal, mixed-methods, and cross-country comparative research to better understand how organizational, cultural, and institutional factors have shaped remote work experiences over time.

Thematic and co-occurrence analyses show a conceptual fragmentation between daily remote work practices and deeper psychological layers. Pre-COVID approaches to research focused on work-family conflict and resilience (Baruch, 2000; Sullivan, 2003) are rarely examined within a unified theoretical framework in the post-COVID period, alongside themes such as well-being and leadership (Becker et al., 2022; Van Zoonen, 2022). This gap highlights the need for future research to explore boundary conditions such as self-goal setting, resilience, or professional isolation (Müller & Niessen, 2019; Golden, 2006). Longitudinal and mixed-methods research designs will be particularly valuable for examining how these behavioral and psychological mechanisms have evolved over time.

Finally, research on employee productivity and digital work policies appears to be a mature yet narrowly defined niche that reflects pre-pandemic norms. Future studies could revitalize this field by examining how the permanent shift to flexible work arrangements, remote and hybrid work models, and emerging

technologies such as AI-powered technologies, and digital monitoring systems is reshaping employee productivity, organizational performance, social norms, privacy perceptions, and ethical boundaries related to remote work. Future bibliometric studies could broaden the scope of analysis by combining multiple databases and interdisciplinary perspectives to provide a more comprehensive understanding of the evolution of remote work research.

## Limitation

The study has several limitations. First, the data were retrieved from the Web of Science (WoS) database, as other databases, such as Scopus, Google Scholar, and other academic databases, include different sources. A second limitation is the inclusion of only English-language articles and specific article types; this could lead to the exclusion of findings in other languages or from different publication types. A third limitation is the selection of only studies with “remote work\*”, “telework\*”, and “telecommut\*” in their titles; some related studies may have been excluded from the analysis due to the lack of abstract or full-text searches. A fourth limitation is the selection of only studies indexed in SSCI, within the “Business Economics” research area and the “Management” category; this resulted in the exclusion of multidisciplinary approaches or remote work research in different contexts.

Another limitation of this study is the unequal length of the comparison periods. The pre-COVID-19 period spans twenty-five years, while the post-COVID-19 period covers only six years. Consequently, direct comparisons of publication numbers and citation rates should be interpreted cautiously, as these indicators are naturally affected by the length of the observation period. However, this distinction has been maintained because it reflects the conceptual turning point created by the COVID-19 pandemic and allows for a meaningful assessment of the changes in the evolution of remote work research. The bibliometric analysis was conducted using the titles, authors, countries, citations, abstracts, and keywords of 288 remote work publications. Analyzing full records could yield alternative results. Analyses were performed using RStudio. Therefore, the analytical capacity of this study is limited by the capabilities of the bibliometrix package (bibliometrix 5.2.1) implemented in RStudio.

Furthermore, the remote work literature is concentrated in economically advanced countries such as the USA and the UK; this limits the generalizability of the findings. Future studies should use international and comparative designs to capture contextual differences in global work practices.

## CONCLUSION

This study contributes to the remote work literature by thematically clustering articles and identifying new research trends. The most influential authors (e.g., Golden, T. D.), articles, journals, institutions, and countries were identified through the bibliometrix and biblioshiny packages in R. Subsequently, three clusters were identified for both periods: pre-COVID-19 operational dimensions (flexibility, work-family balance, performance) and post-COVID-19 psychological/managerial dimensions (well-being, work-life balance, leadership). In conclusion, under-researched aspects of remote work were identified, and new insights were gained through an in-depth examination of the structural disruption caused by the pandemic.

Overall, this study expands the existing bibliometric literature by offering a comprehensive “before and after” perspective on the evolution of remote work research, thus providing a useful foundation for future studies investigating the long-term academic impact of the COVID-19 pandemic.

## Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy or ethical restrictions.

## Conflict of interest

The author declares no conflict of interest.

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