International Journal of Research in Management

ISSN Print: 2664-8792
ISSN Online: 2664-8806
Impact Factor: RJIF 8.54
IJRM 2025; 7(2): 416-433
www.managementpaper.net
Received: 16-07-2025
Accepted: 19-08-2025

Pankaj Thakur
Research Scholar at Himachal Pradesh University Business School, HPU, Shimla, Himachal Pradesh, India

Dr. Santosh Kumari
Assistant Professor in Management at Himachal Pradesh University Business School, HPU, Shimla, Himachal Pradesh, India

Corresponding Author:
Pankaj Thakur
Research Scholar at Himachal Pradesh University Business School, HPU, Shimla, Himachal Pradesh, India

Bibliometric analysis of technostress and work performance: A decadal analysis

Pankaj Thakur and Santosh Kumari

DOI: https://www.doi.org/10.33545/26648792.2025.v7.i2e.478

Abstract
Every workplace is surrounded by technology, and it is inevitable to work without technology. The usage of technology in the workplace has accelerated the work processes. From communication platforms to data management systems, digital tools have accelerated work processes and reshaped professional environments. However, excessive use of technology is creating psychological strain, known as technostress, and has emerged as a critical factor influencing work performance. This bibliometric analysis examines technostress research over the last decade, key trends, influential authors, and thematic clusters. Using data from the Scopus database, we analyzed publication trends, citation networks and keyword mapping to provide insights into the relationship between technostress and work performance. Network visualizations underscore technostress as the central thematic node, closely linked to job satisfaction, job performance, and stress. The research recognizes its limitations, such as dependence on a singular database, omission of alternative terminology, and absence of qualitative content analysis, despite its contributions. This bibliometric analysis provides significant insights for researchers, practitioners, and policymakers, highlighting the increasing worldwide acknowledgement of technostress—particularly during 2018, during the rapid digital adoption associated with the COVID-19 pandemic. To make work settings healthier and more robust in a world that is becoming more digital, it is important to understand the dynamics of technostress.

Keywords: Bibliometric analysis, technostress, work-performance, digital work environment, and citation network

Introduction

Technology is rapidly expanding and transforming the workplace long before the concept of digitalisation existed (Borle *et al.*, 2021) [6]. Technology has become indispensable in our daily lives, and it is altering the ways we perform our jobs, get connected to each other, and how we are engaged in the broader world (Ewers & Kangmennaang, 2023) [11]. To remain competitive in the marketplace and to leverage competitive advantages in resources, organizations are being compelled to utilzse Information and Communication Technology (Urukovičová *et al.*, 2023) [32]. The technological use depends on the self-perceived competencies of people working in different domains. The integration of technology has enhanced the efficiency and productivity of human beings on the official and domestic front (Atrian & Ghobbeh, 2023) [2]. It has transformed business models and their relations with other industries (Cini *et al.*, 2023) [10] and works for the betterment of human life (Salnova *et al.*, 2013) [25]. The escalating integration of technology has reshaped the work culture in the modern workplace, offering opportunities for efficiency, connectivity, and innovation (Brynjolfsson & McAfee, 2014) [7]. Online collaboration through digital and sophisticated technology has enabled every orgazisation to utilise technology, making its use indispensable. Human beings have been benefitted from the fast growth of ICT and its use (Batmaz *et al.*, 2022) [4], but this growth has also resulted in problematic effects in the form of technostress (Hung *et al.*, 2015) [14]. “Technostress,” coined by Brod in 1984, refers to the stress caused by excessive use of technology, especially information and communication technology (ICT) and digital technology. Brod defined it as a condition in which a person using ICT fails to cope with it (Brod, 1984) [8]. With the advancement in technology in the workplace and its impact, it has gained the attention of researchers. It has become a significant concern for employee well-being and work performance. Technostress has been named as double-edged sword by researchers due to its both positive and negative consequences (Qi, 2019). The negative consequences have been reported more in literature (Raghu Nathan *et al*., 2008; Ayyagari *et al*., 2011; La Torre *et al*., 2019; Grummeck-Braamt *et al*., 2021) [22, 3, 17, 13]. Technology-induced stress has adverse effects on human behaviour, attitude, and psychological functioning, as stated by Tu *et al*. (2005) [31]. These effects are brought by the use of technology. The emergence of technostress is linked to various factors and variables known as techno stressors. Weil Rosen (1997) [33], Fisher and Wesolkowski (1999), and Tarafdar *et al*. (2008) [22] concluded in their research that technostressors can be classified into five distinct categories. In techno-overload, employees connected to technology have to perform multiple tasks over a more extended period. Techno-invasion is when employees cannot set clear boundaries between office work and leisure time. In techno-complexity, employees fail to adopt new technology as they feel it is more complex. Techno-insecurity is a behaviour in which employees have a fear of being replaced by those who are well-accustomed to technological use. Techno uncertainty arises among employees because it is subject to change due to advancement in it.

Table 1: Technostressors and Their Definitions

Technostressor	Definition
Techno-Overload	Workers who are connected to technology must perform multiple tasks over a more extended period.
Techno-Invasion	There is no distinction between work and leisure time due to the interruption of technology.
Techno-Complexity	Employees often feel that technology is too complex and, therefore, cannot adopt it.
Techno-Insecurity	Fear of being replaced by employees who are well-versed in technological usage.
Techno-Uncertainty	There is a continuous need to learn and update skills, as technology is constantly evolving.

Source: Tarafdar *et al*. 2008 [22]

Technostress has both physiological impacts, such as exhaustion (Yang *et al*., 2017) [34], anxiety and anger (Lee, 2016) [18], burnout (Park *et al*., 2020; Srivastava *et al*., 2015) [20, 27] and psychological impacts, such as eye strain (Boonjing & Chanvarasuth, 2017) [5], high blood pressure (Reidl, 2012) [23], and isolation (Boonjing & Chanvarasuth, 2017) [5] on the people working with technology. Technostress influences work performance. It results in lower job satisfaction (Boonjing & Chanvarasuth, 2017) [5], lower work performance (Tarafdar *et al*., 2010; Jena, 2015; Tams *et al*., 2018; Borle *et al*., 2021; Cahapay & Bangoc II, 2021; Syakina *et al*., 2023) [30, 15, 29, 6, 9, 28] and in some cases it has been positively associated with work performance (Jone *et al*., 2012; Li & Wang, 2021; Gerekan *et al*., 2024) [16, 19, 12].

Objective

This study aims to utilize bibliometric analysis to gain insights into the impact of technostress on work performance and encourage researchers to employ bibliometric analysis tools in interpreting their results.

Scope: This study examines technostressors and their impact on workers' performance across various organisations. To make this study more comprehensive, it will examine international and local contributions.

2. Methodology

This study employs the bibliometric mapping approach, a well-established tool in bibliometric research. The study utilises bibliographic data to visually portray the structure and features of a specific research arena, establishing connections between different research issues, contributors to research, and publications. The research was executed in the following five basic steps. These steps are: 1. Study Design 2. Data Gathering 3. Data Analysis 4. Visualization 5. Data Interpretation

3. Study Design

The study design started with the development of the research question. Keywords were used to identify relevant publications from the Scopus database about "technostress." The search query included the term “Technostress” “ AND” “WORK “PERFORMANCE” in titles, abstracts, and keywords. The study included English-language journal articles, reviews, and conference papers from 2015 to 2025. The selection of 2015 as the initial year of our analysis, despite the earlier emergence of the term “Technostress” in 1984, was based on several influential factors.

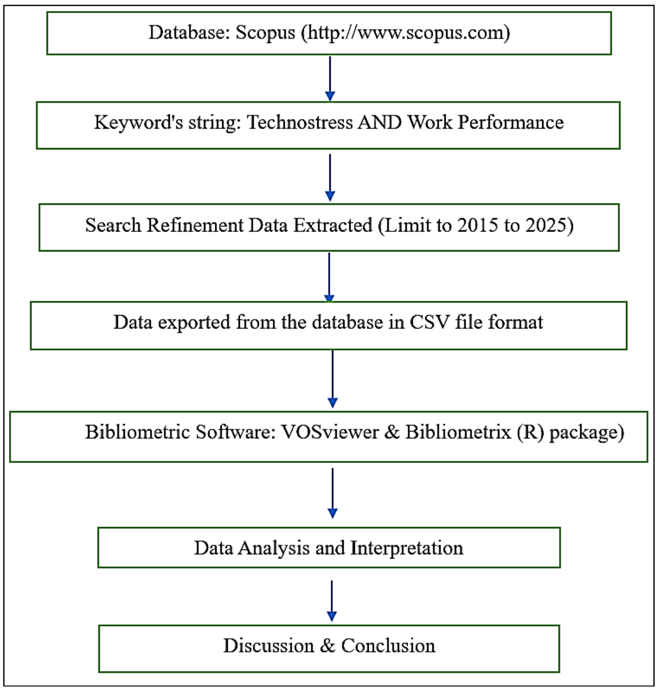


Fig 1: Flowchart of Study Source(s): Author's Own Creation

The search query included “Technostress” “AND” “Work Performance” in titles, abstracts, and keywords.

4. Data Collection

This phase starts with the implementation of the Research model using R, an open-source statistical tool. During this phase, the data collected from the Scopus database in the form of a “CSV” file has been utilized for further analysis and interpretation.

5. Data Analysis

The data have been analyzed using Biblioshiny, a Java software included in the Bibliometrix package of R (Aria &

Cuccurullo, 2017) [1]. This stage involved the use of R Software and Bibliometrix codes to conduct the descriptive bibliometric study. These tools were used to classify and organize the documents used for analysis. Biblioshiny, a web-based interface of Bibliometrix was used to develop networks, conceptual maps and visualizations.

6. Data Visualization

In this stage, data reduction methods were employed to graphically and comprehensively display the analysis results. It allowed for clear and concise visualization of the findings, making them easily understandable. All the figures and tables have been created by using Biblioshiny of the Bibilometrix package of R, except Table 1, Table 2, and Figure 1.

7. Interpretation

This stage involves interpreting data that have been analyzed. The analysis presents a bibliometric description, which represents the bibliometric statistics. The results display the relevant sources, types of documents, authors, affiliations, main keywords of authors, a thematic dendrogram, a collaboration map, and a d-network of the country. Investigating these categories offers insights into the influence and dissemination of scientific knowledge and research in the area.

8. Results

Table 2 presents the main information extracted from the Scopus database. The total number of documents extracted was 132 from 2010 to May 30, 2025. Three articles were excluded because they were in a language other than English. Two were in Spanish, and one was in Japanese. After exclusion, we were left with 129 articles, which were classified into distinct categories, including, articles (80), book chapters (9), conference papers (23), conference reviews (8), and reviews (9). The research period spans approximately one and a half decades of research contributions. However, a noticeable surge has been observed since 2018 (refer to Figure 2).

Table 2: Information about Data

Time	2010-2025
Total Documents	132
Excluded Documents	03 (Language other than English)
After Exclusion, Documents Remaining for Analysis	129
Articles	80
Book Chapter	09
Conference Paper	23
Conference Review	08
Review	09

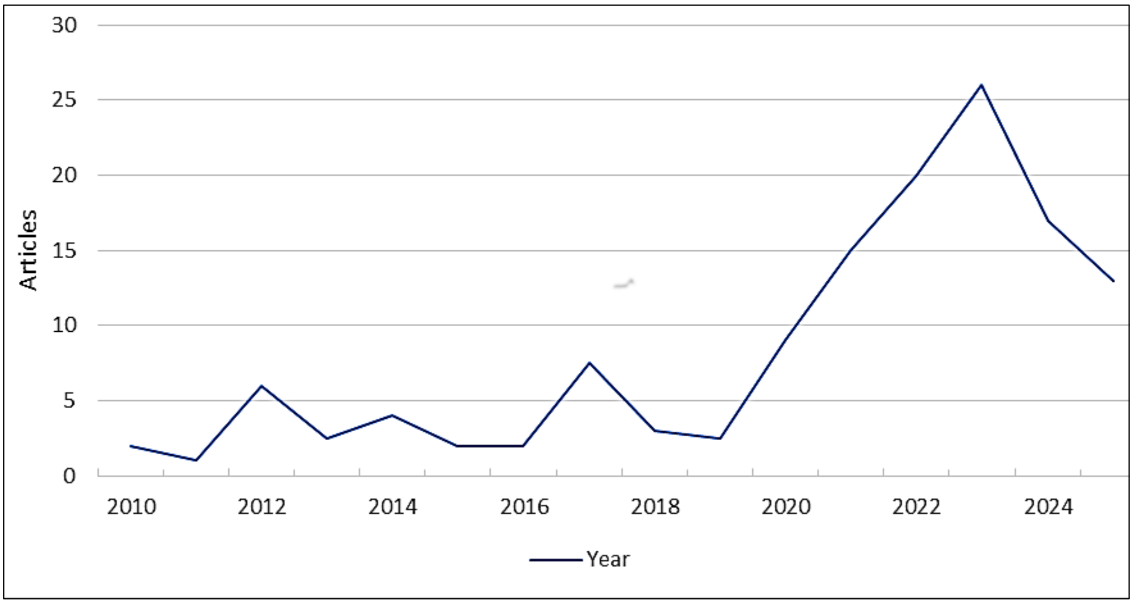


Fig 2: Annual scientific production-(2010-2025)

This figure graphically depicts the yearly scientific output of publications related to “technostress and work performance from the year 2010 to 2025. The significant growth coincides with advancements in digital technology and the rise of remote work. The peak in publishing occurred between 2020 and 2025, mainly due to the COVID-19 pandemic, which accelerated digital adoption.

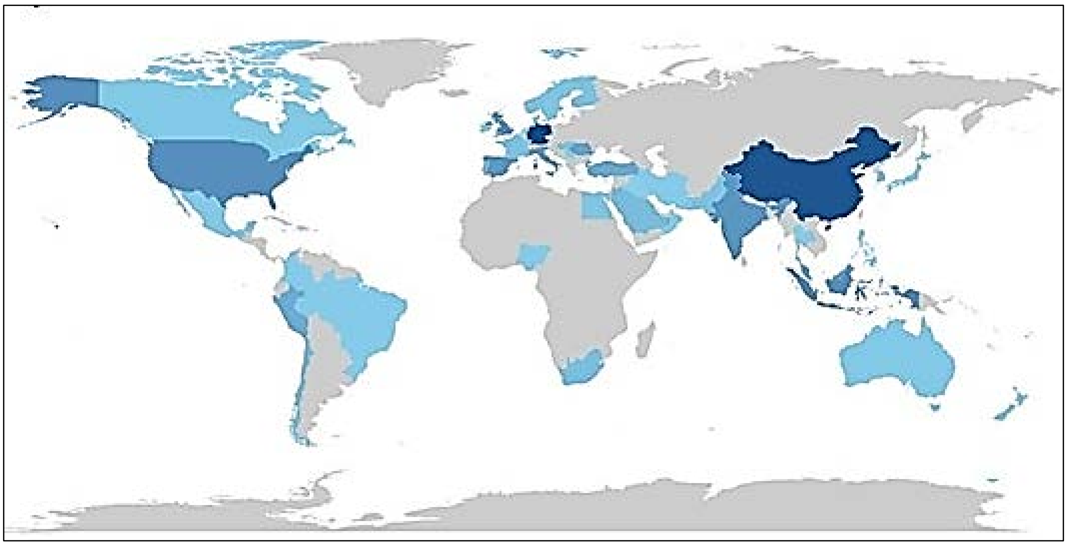


Fig 3: Country Scientific Production

In this figure, the world map displays the scientific production of papers related to technostress and work performance. The Map shows a range of values, with a maximum of 46 and a minimum of 1 paper produced by each country. In terms of scientific production, Germany is the nation with the highest numbers (n=46), followed by China (43), the USA (22), Indonesia (21), India (20), the UK (19), Spain (18), Italy (17), Malaysia (15), and Romania (14). These findings shed light on the fact that both developed and developing countries are actively engaged in researching and understanding technostress and its impact on work performance. These key contributing countries have the potential to establish future research collaborations and produce more comprehensive studies worldwide linked by digital technologies.

The data indicate the average number of citations in each year, with significant peaks in 2010, 2014, 2015, 2019, 2020, 2021, and 2022. The data show that there are fluctuations in the average number of citations per year. The lowest mean total citation was recorded in 2012 and 2016, as shown in Figure 4.

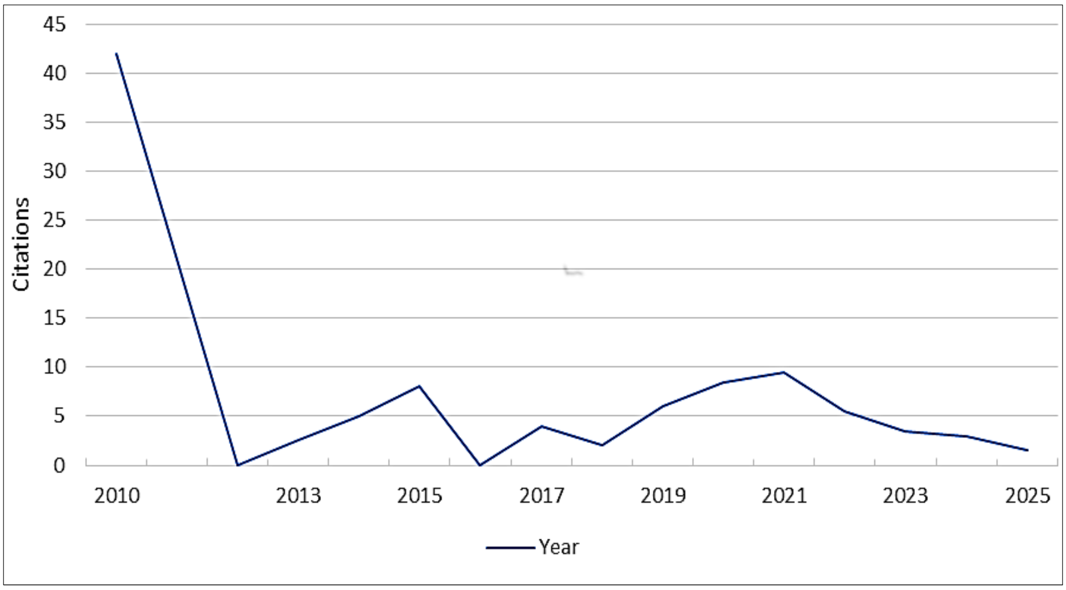


Fig 4: Average Citations per Year

The line graph presented in Figure 4 illustrates the average number of citations per year for Technostress and Work Performance. This graph provides a graphical illustration of the changes in citation frequency over time. Each point on the graph represents the average number of citations that scientific papers have received in a particular year.

Sankey Diagrams: Three Filed Plot on Technostress and Work Performance

A Sankey diagram or chart is a visualisation technique used to illustrate the flow of data or resources among different stages. These were traditionally used to visualize the flow of energy or material among various processes. These are used to explain the quantitative information of data flows, their relationship and transition (Reihmann *et al*., 2005) [24]. In Biblioshiny, three field plots are used to examine the interrelationship between various factors of scientific publications, including sources, country, leading authors, their affiliations, and collaboration among them (Yaqoub *et al*., 2023) [35].

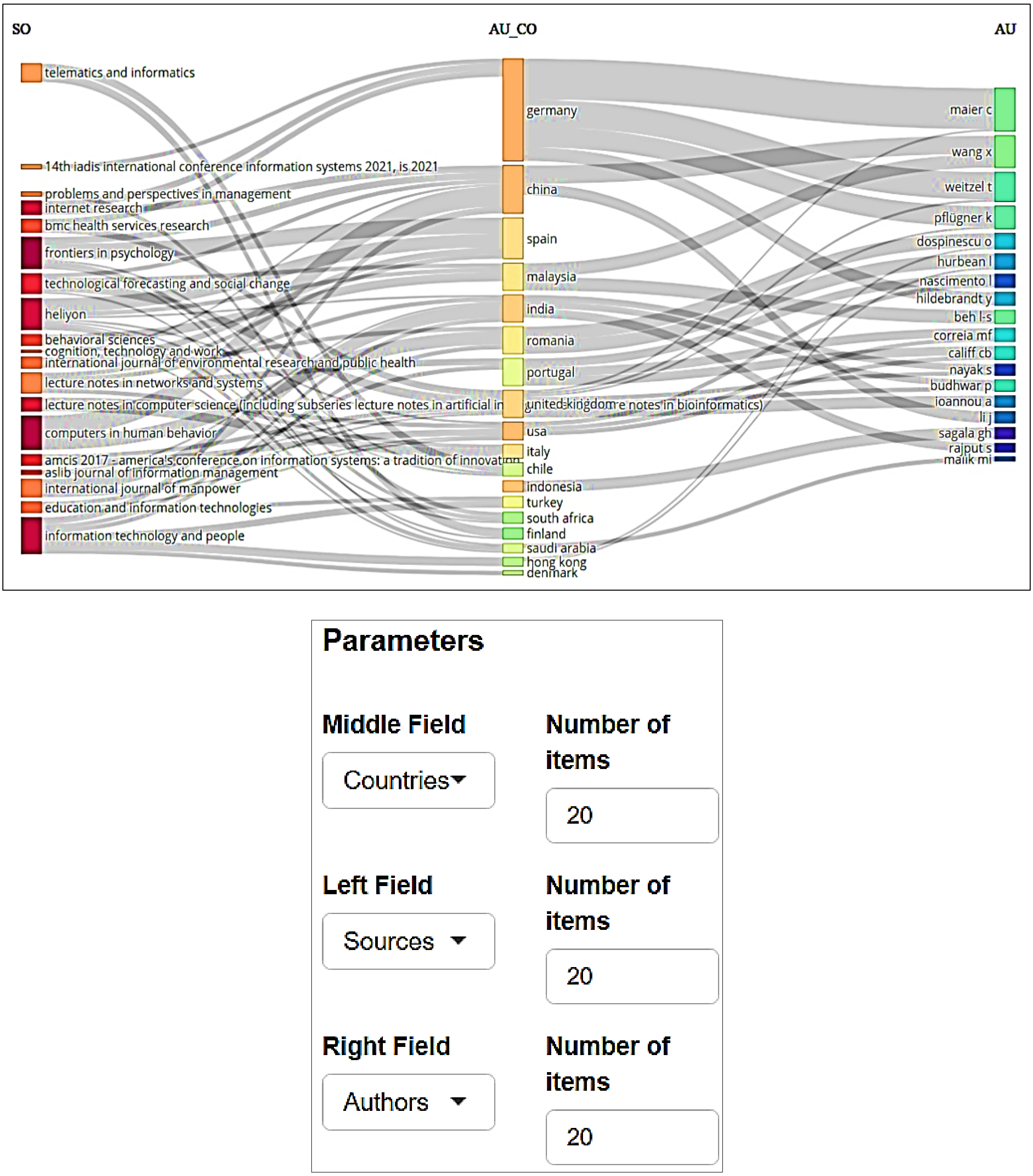


Fig 5: Three-Field Plot (sources, countries, and authors).

Figure 5 illustrates the interdependence of sources (on the left side), countries (in the middle), and authors (on the right side) in the research publishing process. This plot demonstrates that authors from Germany, China, Spain, Malaysia, India, and Romania are significant contributors. This helps to facilitate an understanding of the distribution of authors across different countries as well as the sources of their published research within those nations.

This study recognizes the top academic publications that publish and disseminate research on technostress. In this analysis, we have identified the most significant sources of publication in this area of study, shown on the left side of the diagram.

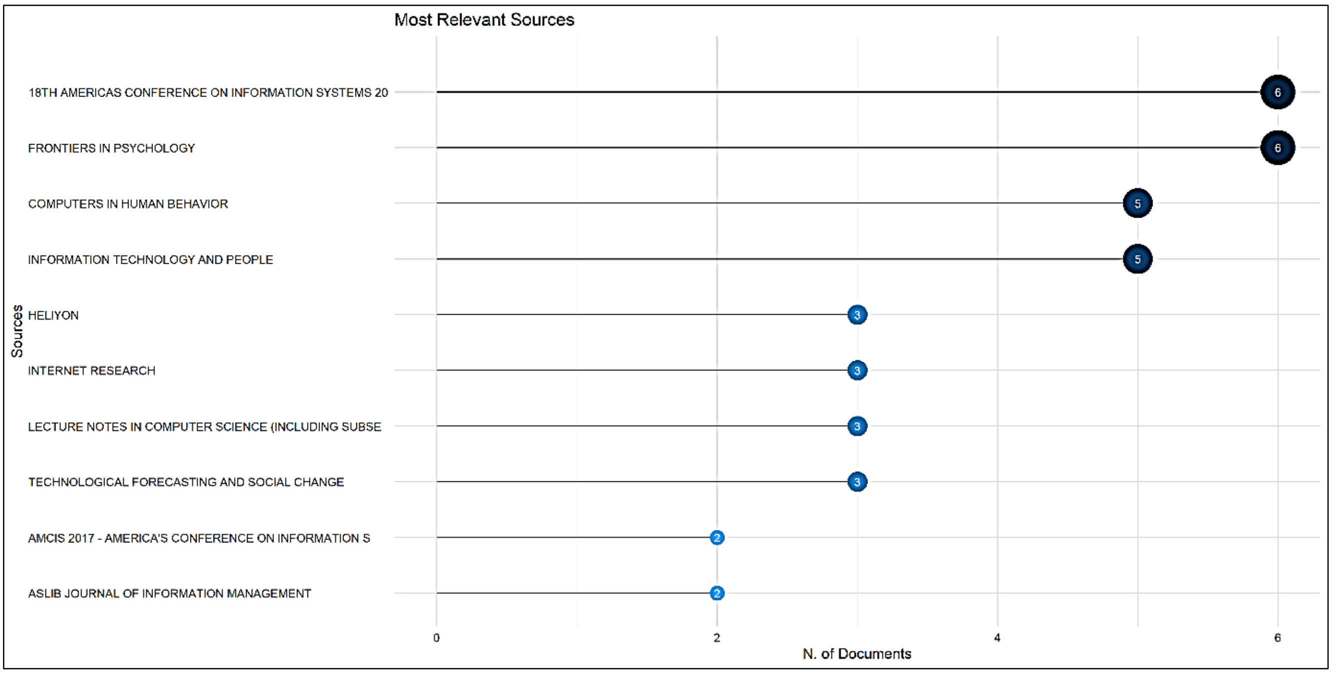


Fig 6: Most Relevant Sources

Figure 6 displays the top ten most relevant sources. These are ranked by number of publications published in each journal. Among these notables are the 18th Americas Conference on Information Systems 2012, AMCIS 2012 (6 Number of Publications), Frontiers in Psychology (6 number of Publications), Computers in Human Behaviour (5 number of Publications), Information Technology and People (5 Number of Publications), Heliyon (3 number of Publications), Internet Research Lecture Notes in Computer Science (3 number of Publications), and Technological Forecasting and Social Change (3 number of Publications).

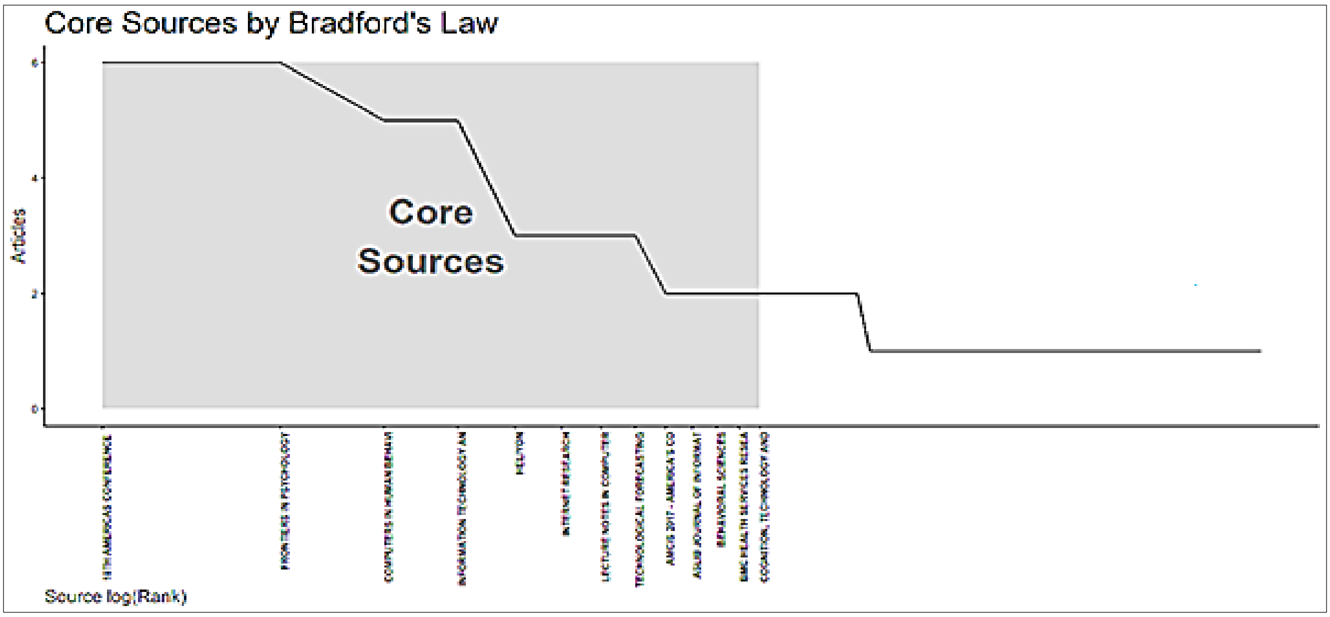


Fig 7: Core Sources by Bradford's Law

Figure 7 illustrates the primary sources of technostress and their impact on work performance, based on Bradford's Law. This figure provides an overview of the most significant and impactful resources, thereby helping researchers find relevant resources in their field of research.

Most Relevant Authors

Table 3: Most Relevant Authors

Authors	Articles	Articles Fractionalized
WANG X	6	2.67
MAIER C	5	1.37
BEH L-S	3	1.50
PFLÜGNER K	3	1.45
WEITZEL T	3	0.70
BENCSIK A	2	1.00
BUDHWAR P	2	0.83
CALIFF CB	2	0.67
CORREIA MF	2	0.67
DOSPINESCU O	2	0.45

Based on the number of publications and the degree of fractionalisation, Table 3 gives data on the most important authors. Wang X has published six works, making him the most prolific author with fractionalization of 2.67. Maier C is close to him with five articles. Beh L-S, Pflügner K, and Weitzel T have three articles each, followed by Bencsik A, Budhwar P, Califf CB, Correia MF, and Dospinescu O, who each have two articles. Their fractionalization ranges from 0.45 to 1.50. This reflects the degree to which their articles have been cited and their potential contribution to the research field.

Sources Local Impact

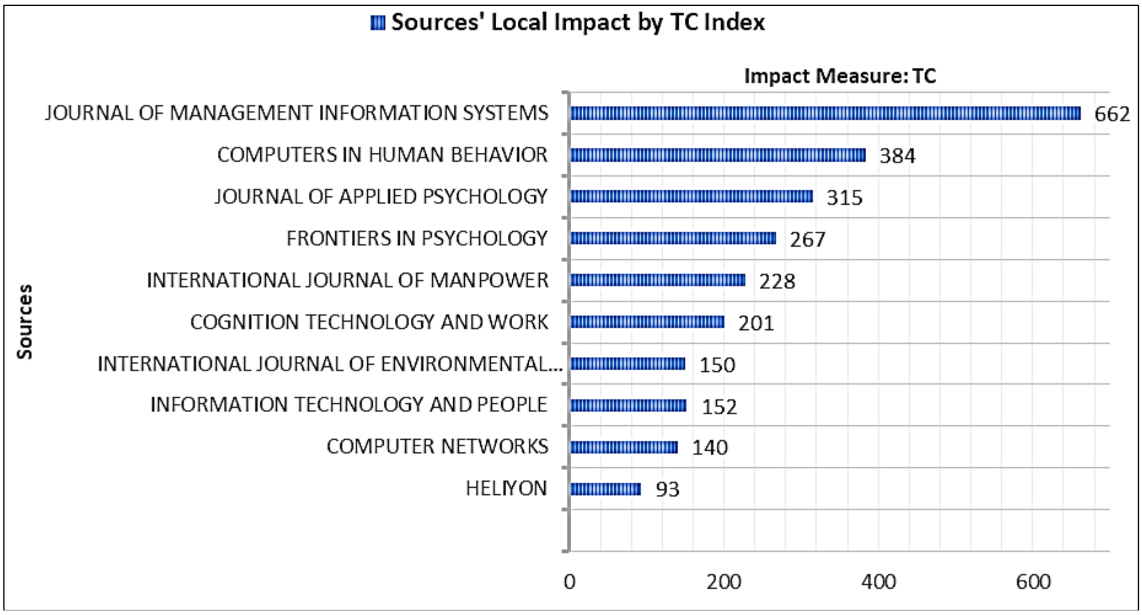


Fig 8: Sources Local Impact

Figure 8 displays the local impact of different resources in the field of Technostress. It displays the total citations (TC), the number of publications, and the year of publication started (Refer to Table 4). The "h-index" is a statistic used to measure scholars' productivity and the number of citations they have received for their published articles. The "g index" is the total scientific output of a scholar. The "m-index" integrates both the h-index and g-index, thus evaluating a scholar's performance. NP in the table represents the number of publications received by a source, and "PY-start" represents the start year of publication. The sources listed in the Table, such as Frontiers in Psychology, Computers in Human Behavior, Heliyon, and Information Technology and People, are high-impact sources as indicated by their h-index value, g-index value, m-index value and number of citations they received.

Table 4: Sources Local Impact

Source	h_index	g_index	m_index	TC	NP	PY_start
Frontiers In Psychology	6	6	0.857	267	6	2019
Computers In Human Behavior	4	5	0.333	384	5	2014
Heliyon	3	3	0.6	93	3	2021
Information Technology and People	3	5	0.231	152	5	2013
Amcis 2017-America's Conference on Information Systems: A Tradition of Innovation	2	2	0.222	31	2	2017
Aslib Journal Of Information Management	2	2	0.4	35	2	2021
Behavioral Sciences	2	2	0.5	25	2	2022
Cognition, Technology and Work	2	2	0.4	201	2	2021
International Journal of Environmental Research And Public Health	2	2	0.4	153	2	2021
International Journal of Manpower	2	2	0.5	228	2	2022

Author's Productivity

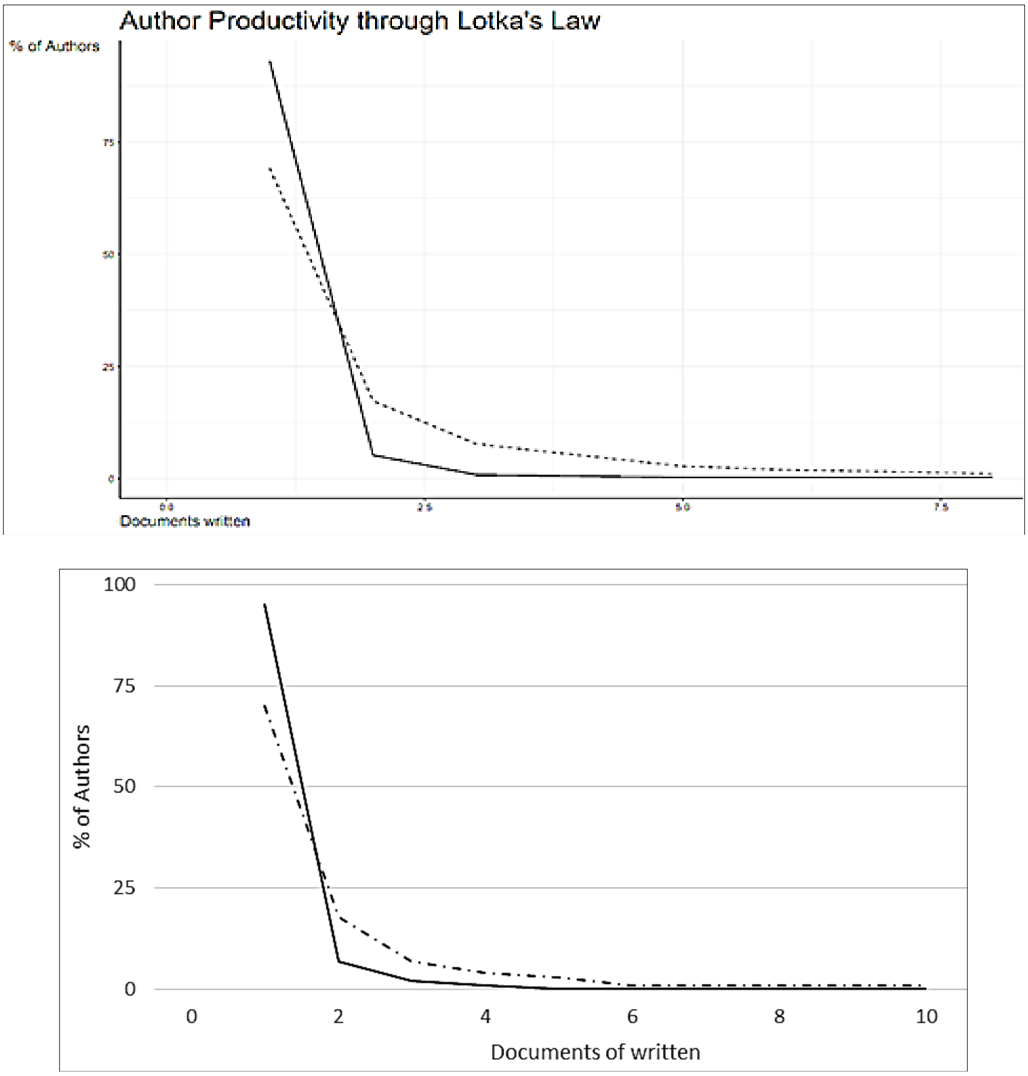


Fig 9: Author's Productivity Through Lotka's Law

Figure 9 illustrates Lotka's Law, describing the author's productivity in publishing. This graph shows the relationship between the number of documents written by authors, and the percentage of authors. The steep decline in the graph indicates that most of the authors contribute few documents, and there is a small percentage of prolific authors.

Most Relevant Affiliations

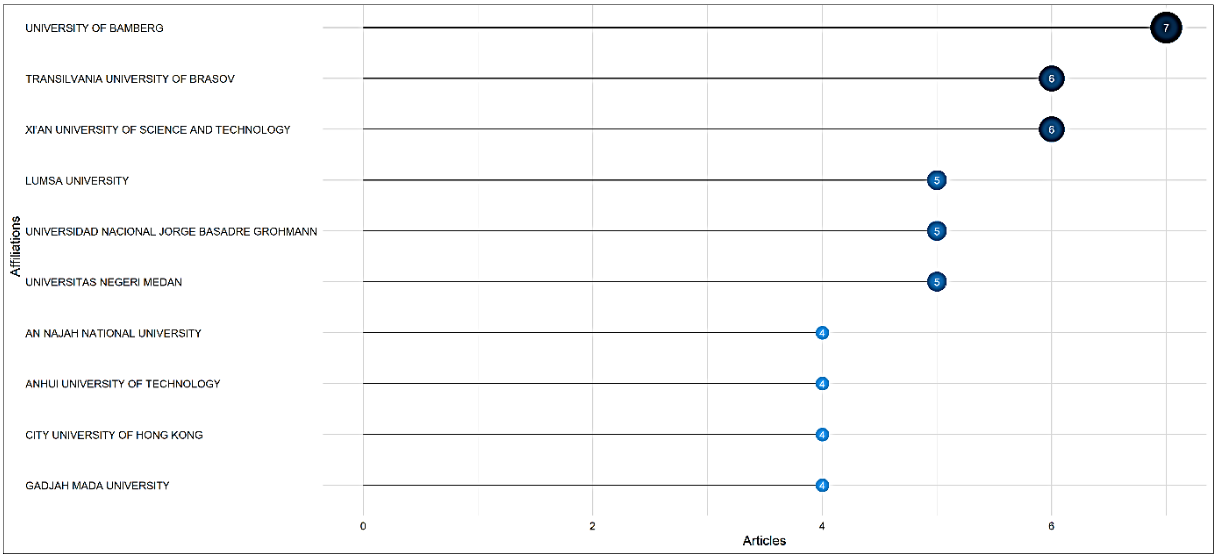
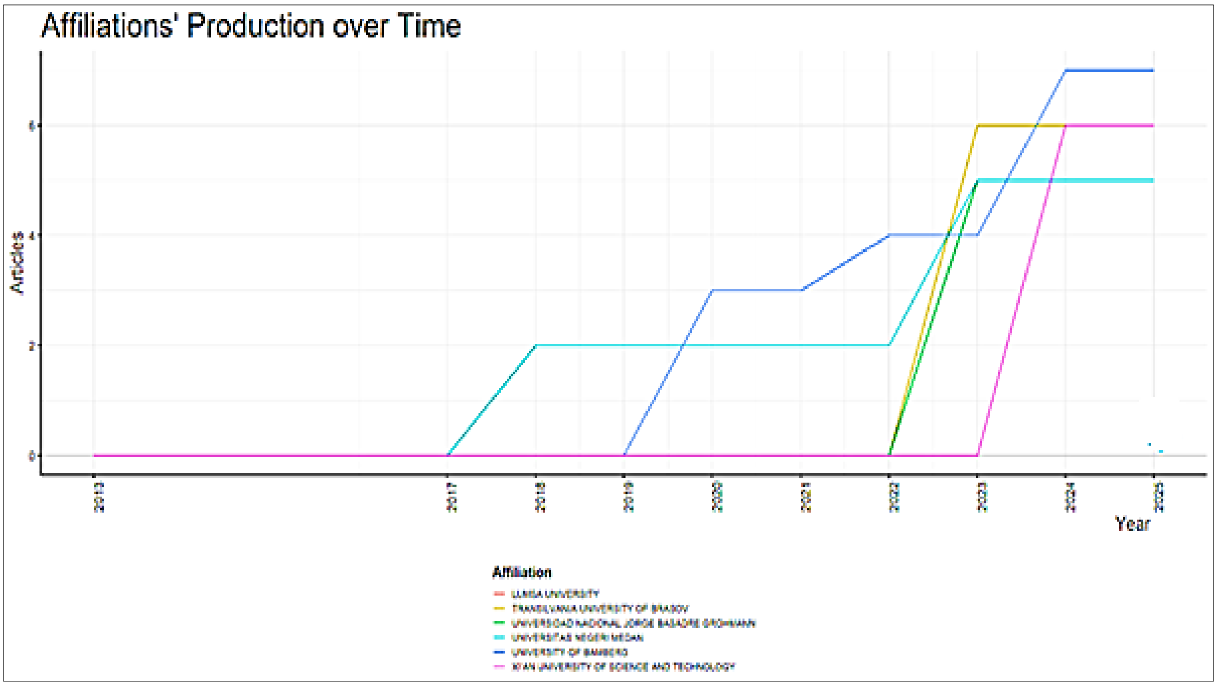


Fig 10: Most Relevant Affiliations

Figure 10 illustrates the various academic institutions, categorized by the number of articles associated with each. The graph analysis reveals that the University of Bamberg has the highest number of articles (7) among the listed affiliations. It is followed by Transilvania University of Brasov (6 Articles), Xi'an University of Science and Technology (6 Articles), Lumsa University (5 Articles), Universidad Nacional Jorge Basadre Grohmann (5 Articles), and Universitas Negeri Medan (5 Articles). The remaining affiliated institutions have four articles each.

Affiliation Production



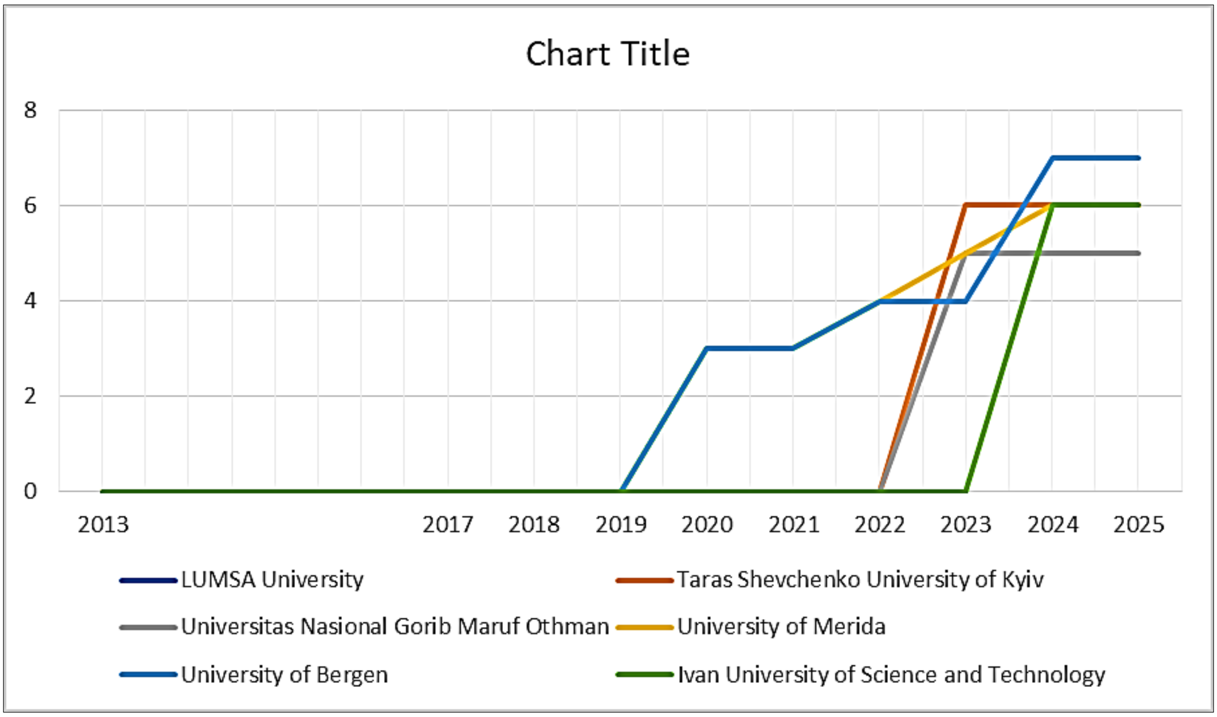


Fig 11: Affiliation Production over Time

Figure 11 illustrates the production of articles over time by different affiliations. It showcases the publishing trends of different academic institutions, showing when their research output began to appear and how it accumulated over time. It shows that Universitas Negeri Medan has been producing articles since 2018, with a consistent increase in article production since 2023. It is followed by the University of Bamberg, which has been consistently producing articles since 2020. Lumsa University, Transilvania University of Brasov, and Universidad Nacional Jorge Basadre Grohmann have been producing since 2023, and Xi'an University of Science and Technology has been producing since 2024. This information allows researchers to compare the research production of different universities over times and gives insights into the scientific output of various affiliations.

Corresponding Author's Companies

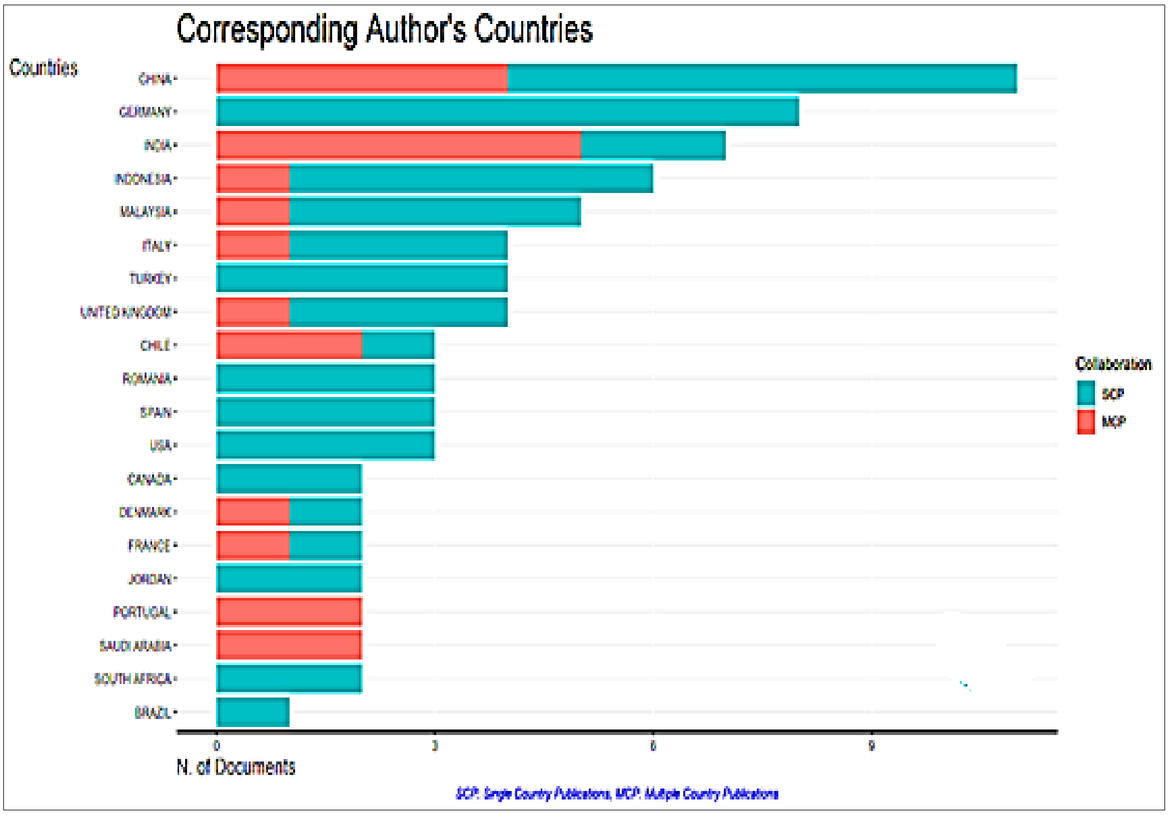


Fig 12: Corresponding Author Countries Overview

Figure 12 displays the publication of articles according to the nation of origin of the respective authors. It includes information regarding the publication of articles with single corresponding authors (SCP) and multiple corresponding authors (MCP), the frequency and ratio of MCP to SCP, and the number of documents. The data from the figure reveals that China has the highest number of publications, followed by India, Indonesia, Malaysia, Italy, the UK and Chile. Countries like China and Germany have a prevalence of Single Country Publication (SCP), indicating that a substantial portion of their research is conducted within their borders, with little international co-authorship among corresponding authors. Countries such as India, Indonesia, Italy, the United Kingdom, Chile, Denmark, and France have a significant proportion of Multiple Country Publications (MCP), indicating a higher proportion of engagement in international partnerships.

Most Cited Countries

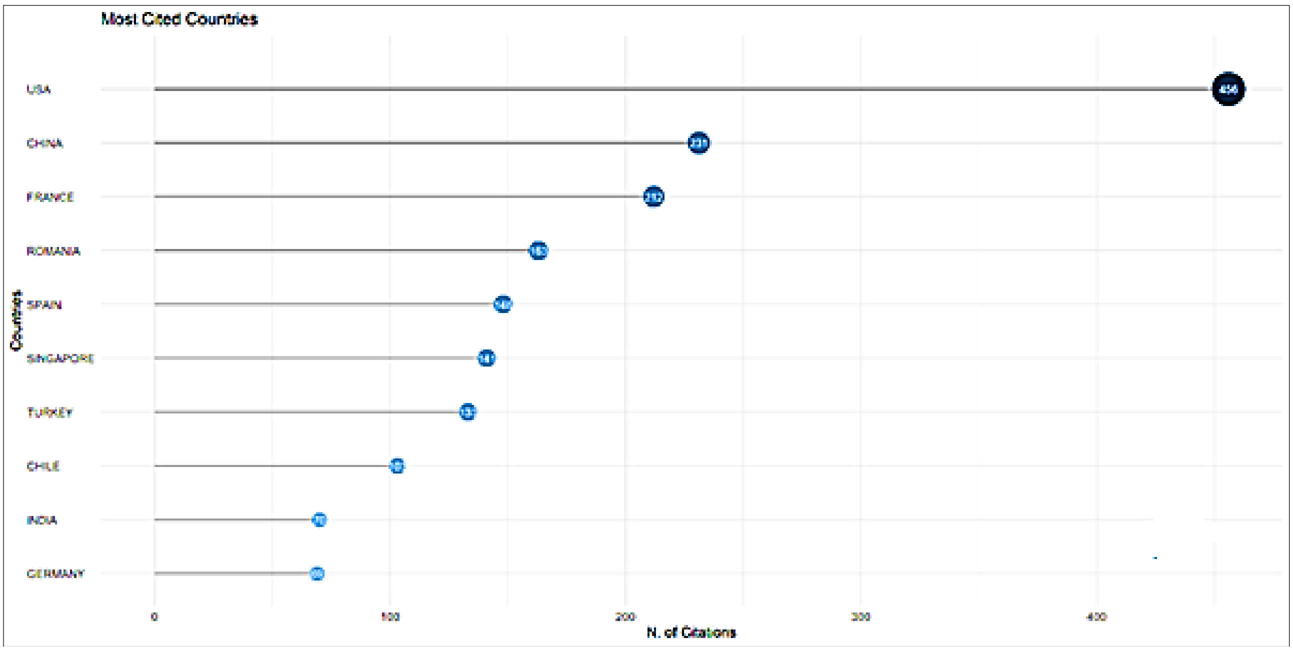


Fig 13: Most Cited Countries

Table 5: Most Cited Countries with Total Citations and Average Article Citation

Country	TC	Average Article Citations
USA	456	152.00
CHINA	231	21.00
FRANCE	212	106.00
ROMANIA	163	54.30
SPAIN	148	49.30
SINGAPORE	141	141.00
TURKEY	133	33.20
CHILE	103	34.30
INDIA	70	10.00
GERMANY	69	8.60

The most cited countries are listed in Figure 13, based on their total citations and average article citations (see Table 5). The country with the highest total citations is the USA, with 456 citations, and the average citation per article is 152. China follows it with 231 total citations and an average of 21.00 average citations per article. France is in third position with 212 total citations and an average of 106.00 citations per article. Then, it is followed by Romania, Spain, Singapore, Turkey, Chile, India, and Germany, with 163,148, 142, 133, 103, 70, and 69 total citations, respectively. From Table 5, it is clear that after Singapore, the average citation per article continues to decrease.

Most Global Cited Documents

Table 6: Globally Cited Documents

Paper	DOI	Total Citations	TC per Year	Normalized TC
Tarafdar M, 2010, J Manage INF SYST	10.2753/MIS0742-1222270311	662	41.38	1.00
Vaziri H, 2020, J APPL Psychol	10.1037/apl0000819	315	52.50	6.07
Fuglseth Am, 2014, Comput Hum Behav	10.1016/j.chb.2014.07.040	223	18.58	3.48
Malik N, 2022, INT J Manpow	10.1108/IJM-03-2021-0173	204	51.00	8.93
LI L, 2021, COGN Technol Work	10.1007/s10111-020-00625-0	141	28.20	2.93
Brooks S, 2017, Comput Networks	10.1016/j.comnet.2016.08.020	140	15.56	3.94
Nemteanu M-S, 2021, Int J Environ Res Public Health	10.3390/ijerph18073670	117	23.40	2.43
Penado Abilleira M, 2021, Front Psychol	10.3389/fpsyg.2021.617650	99	19.80	2.06
Lee M, 2015, J Physiol Anthropol	10.1186/s40101-015-0060-8	92	8.36	1.00
Yener S, 2021, INF Technol People	10.1108/ITP-09-2019-0462	86	17.20	1.79

Table 6 displays the most globally cited documents. It includes the author's name, publication name, digital object identifier (DOI), total citations (TC), average number of citations received per year, and normalized total citations. Tarafdar, M. (2010). J Manage Inf Syst. The author has received the highest total citations, with an average of 41.38 citations per year and a normalized total citation of 1.00. Similarly, the other publications have been ranked, as shown in the table.

Word Cloud

Figure 14 illustrates the set of text data that can be visualized and presented as a word cloud. The terms in Figure 15 have been ranked according to their frequency of occurrence. The most frequent term is technostress, with a frequency of 45, followed by males (18), females. (16), Job satisfaction (16), adult (14), human (13), work performance (12), information use (9), and task performance (8) (Refer to Figure 15).

Fig 14: Word Cloud of Keywords

In Figure 14, a word with a larger font size denotes a higher frequency of selected terms from the corpus of text data.

Word's Frequency over Time

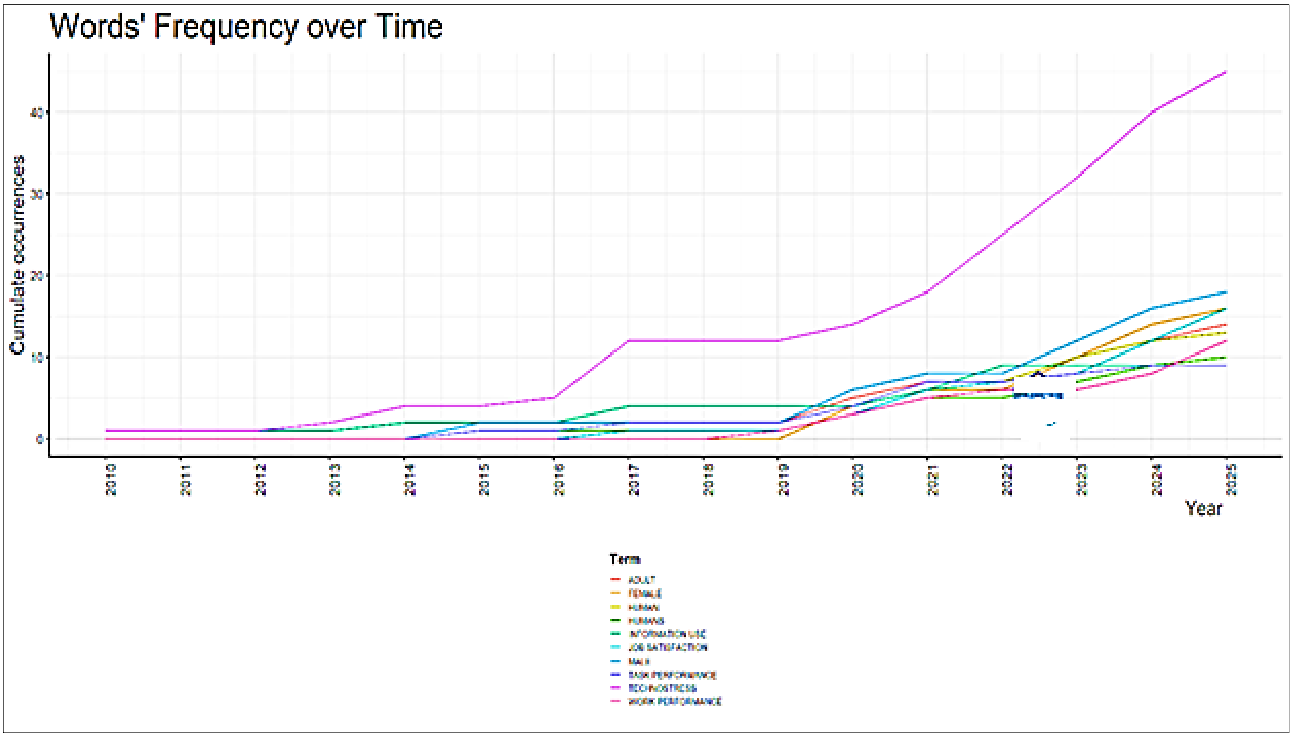


Fig 15: Word Frequency

Tree Map of Frequently Top 50 Terms

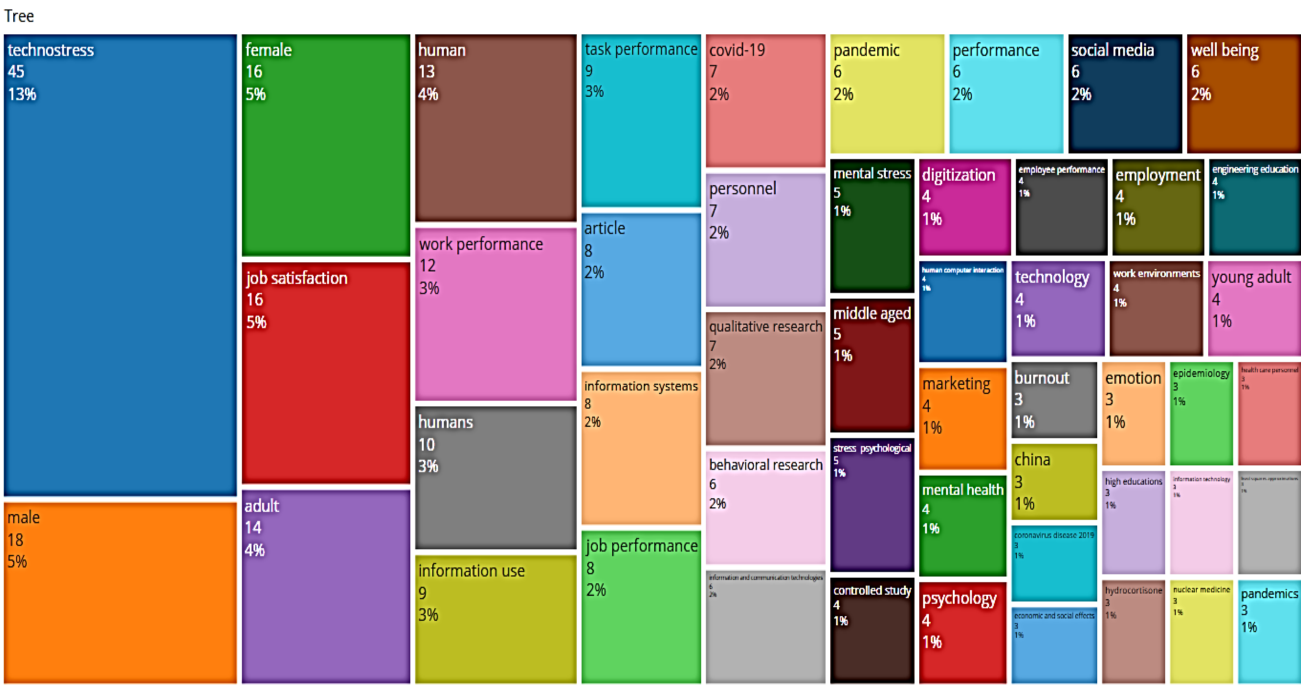


Fig 16: Tree Map

In Figure 16, the tree map represents the top fifty words that appear most often in the corpus of text data. The rectangles represent the frequency of phrases depending on their size, and the tree map itself represents the top fifty terms.

These figures (Figures 14, 15, and 16) provide insight into the themes that occur most frequently and can be used for further research and analysis.

Clustering By Coupling

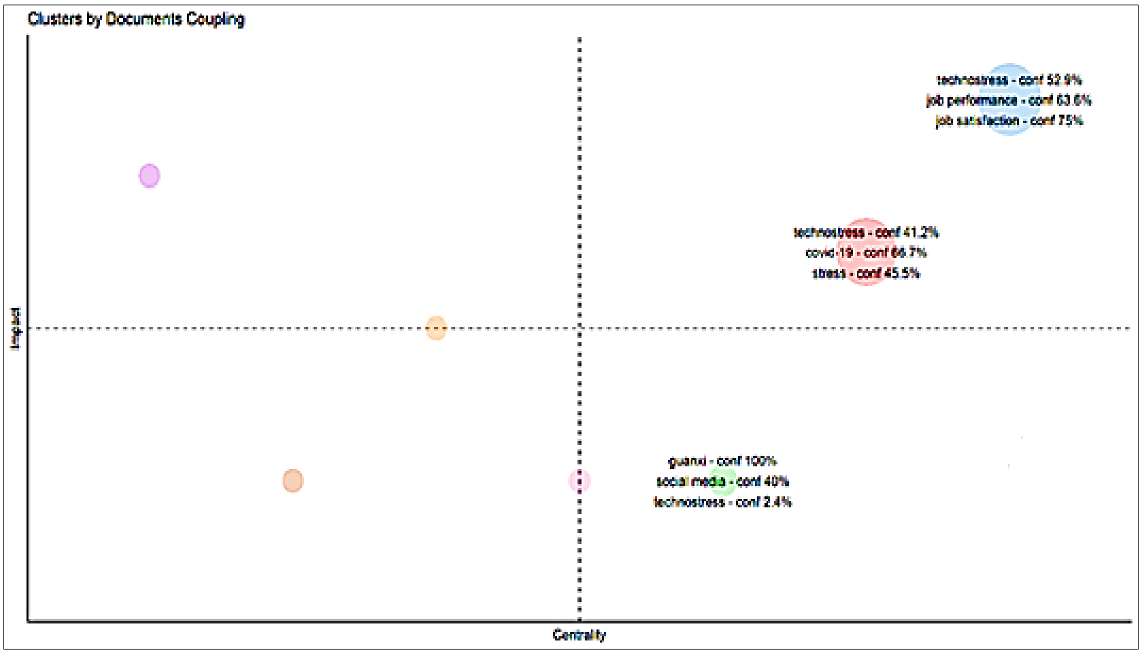


Fig 17: Clusters by Documents Coupling

Figure 17 shows the results of clustering by document coupling based on the global citation score of documents. On the X-axis, the centrality of documents is shown, and on the Y-axis, document impact is shown. The data analysis reveals three different clusters located on the right quadrant. In the top right quadrant, Cluster 1 is located, which exhibits a high impact level and high centrality. This indicates a high demand for documents with themes such as technostress, job performance, and job satisfaction. Cluster 2 is situated in the middle of the right quadrant, exhibiting a moderate level of impact and centrality, and includes themes such as technostress, COVID-19, and stress. Cluster 3 is located in the lower right quadrant and exhibits low impact and moderate centrality, encompassing themes such as social media and technostress.

Co-Occurance Network

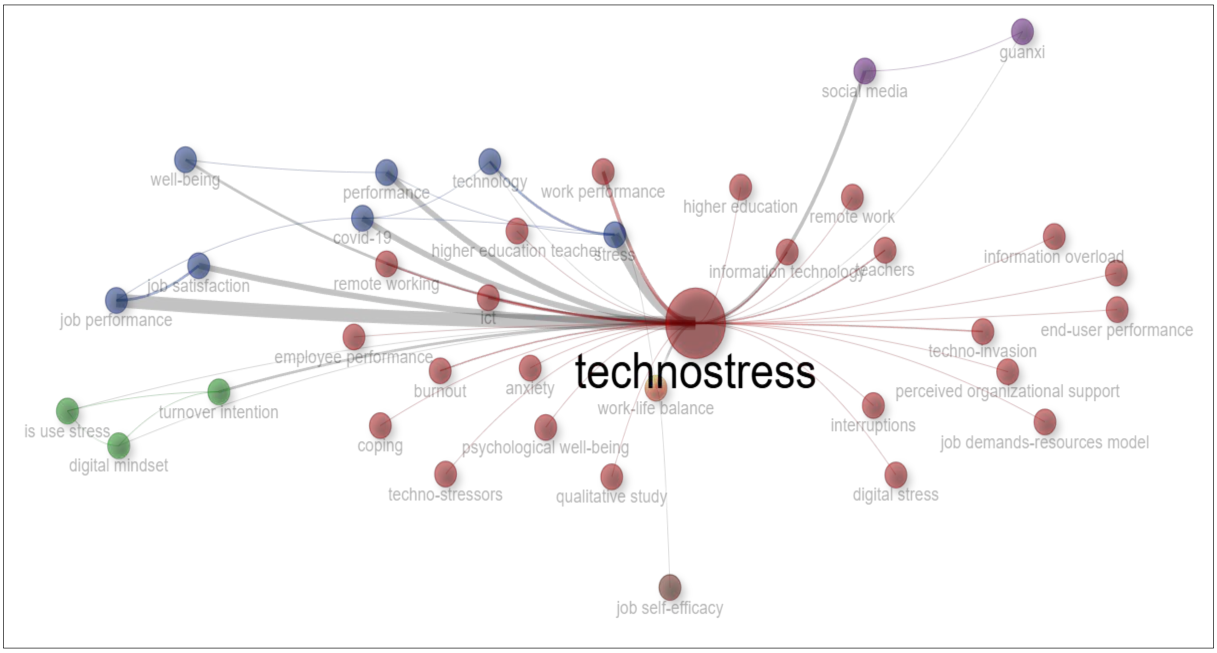


Fig 18: Co-Occurance Network

The co-occurrence network of the author's keyword is shown in Figure 18. It shows the relationship between different keywords. The keyword's frequency is reflected by node size. Larger nodes represent higher frequency, while the thickness of nodes represents the strength of co-occurrence between the author's keywords. The co-occurrence network shown in Figure 18 reveals that the central node is technostress, while other major nodes are job satisfaction, job performance, and stress. The technostress has the highest degree of impact and centrality.

Thematic Map

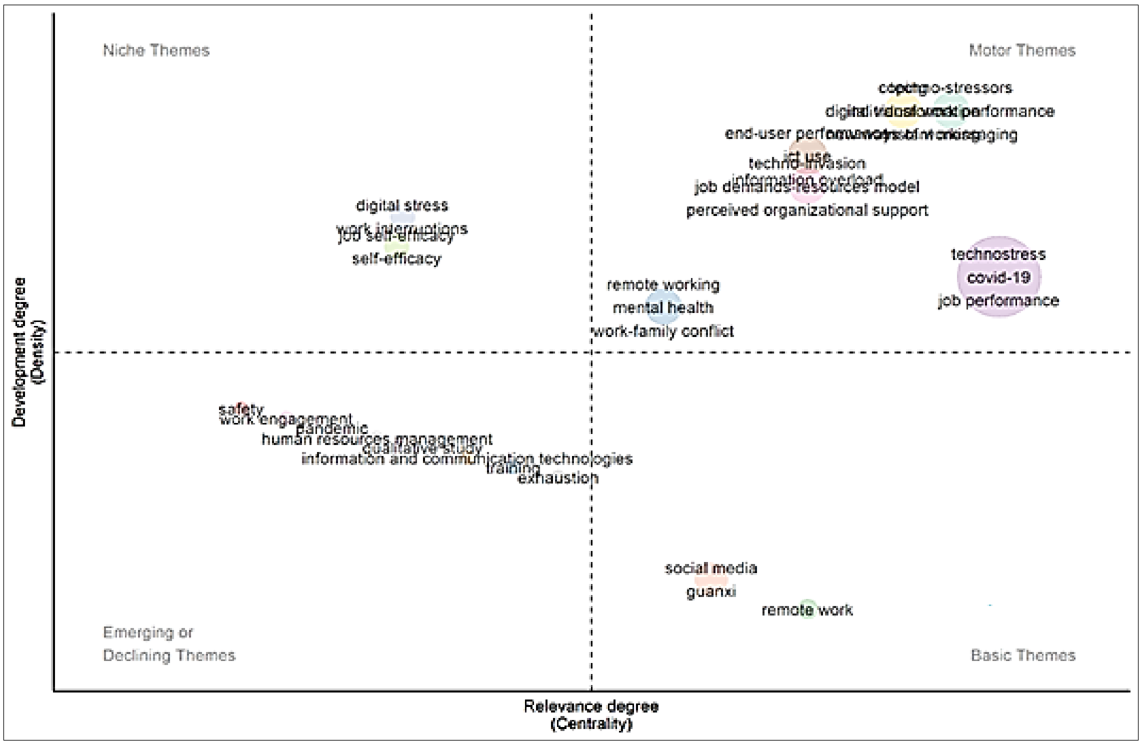


Fig 19: Thematic Map Based on Author's Keywords

The thematic map presented in Figure 19 plots different research themes based on their "relevance degree (Centrality)" and Development degree (Density)". The graph is divided into four quadrants. Motor Themes (Top-Right Quadrant) are the core, well-established, and impactful themes that are currently driving the research field. "Technostress," "COVID-19," "job performance," "digital transformation," "end-user performance," "work engagement," "coping," and "techno-stressors" are motor themes. They are clustered and show strong relationships. Niche Themes (Top-Left Quadrant) are characterized by Low Centrality but high density, meaning they are strong within themselves but isolated from the broader research landscape. "Digital stress," "work interruptions," "job self-efficacy," and "self-efficacy" are among the niche themes in this graph. Basic Themes (Bottom-Right Quadrant) are of High Centrality and low density and these are emerging ones. These include "social media" and "remote work." Emerging or Declining Themes (Bottom-Left Quadrant) are either newly emerging and have not yet gained significant internal coherence or external relevance.

This thematic map helps to identify the most influential, mature topics, specialized areas, and foundational concepts in the technostress research landscape. The clustering of themes in each quadrant indicates their conceptual relatedness.

Topic Dendrogram

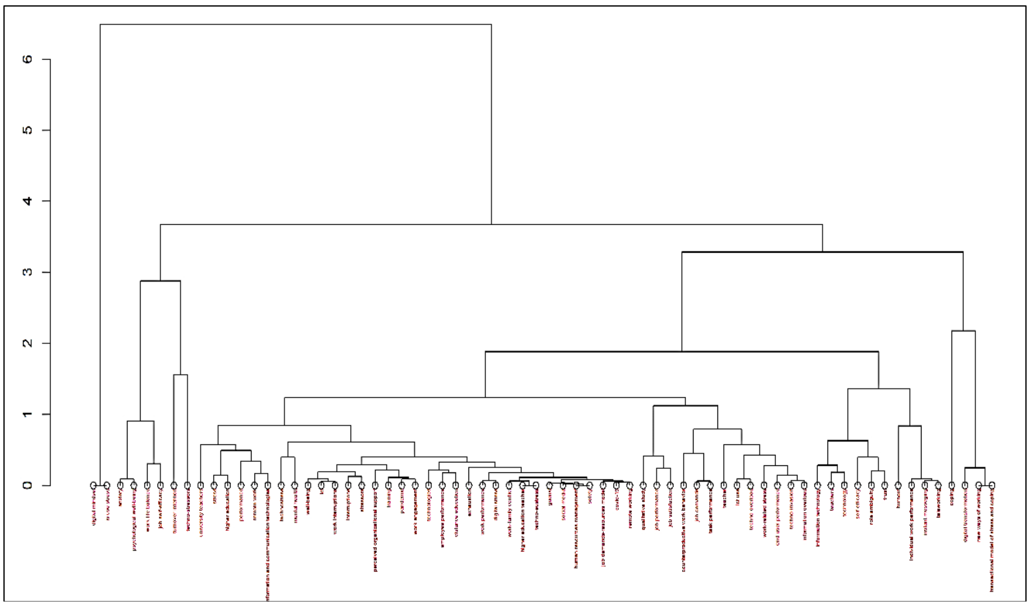


Fig 20: Dendrogram of Words

Figure 20 illustrates the topic dendrogram of words for technostress. It emphasizes both the global and local aspects of technostress, encompassing various subcategories that highlight areas of interest and connection. This dendrogram facilitates a deeper understanding of the relationships and clusters of keywords, offering insights into the key concepts and themes within this research field.

Co-Citation Network

The co-citation network is generated from a body of academic literature on a specific topic. It represents a network where authors linked to each other are frequently cited together in reference lists of other publications.

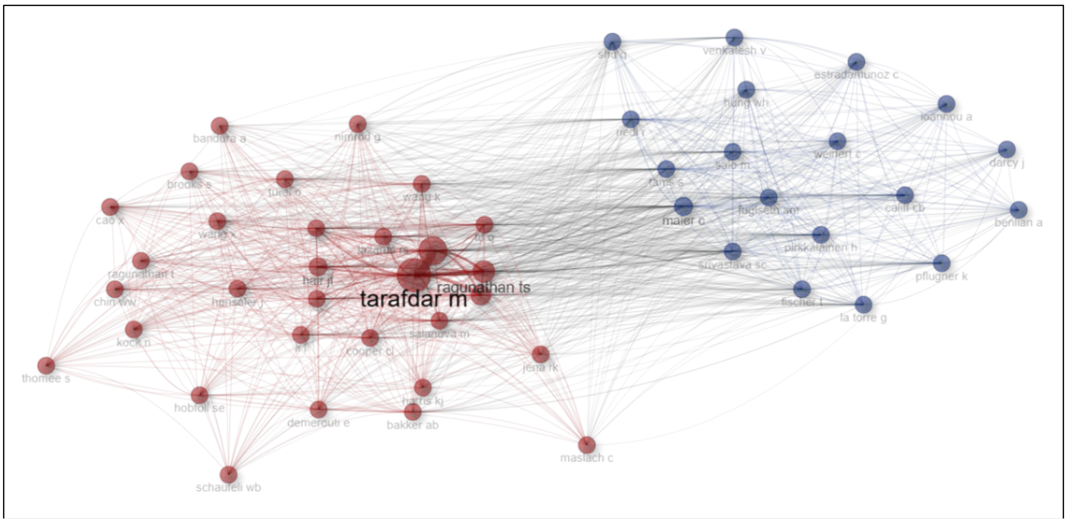


Fig 21: Co-citation Network

The co-citation network in Figure 21 reflects that Tarafdar, M. is the most prominent and highly cited author in the entire network. His work is widely referenced in different parts of the world. "Wang X," "Ragunathan T.S.," "Brown C," "Maier C.," and "Wagner G" are other authors with significant influence within their respective clusters.

Collaboration Network

This map is a density map that visualizes the network or co-occurrence of authors, researchers, or keywords based on their relationships or collaborations.

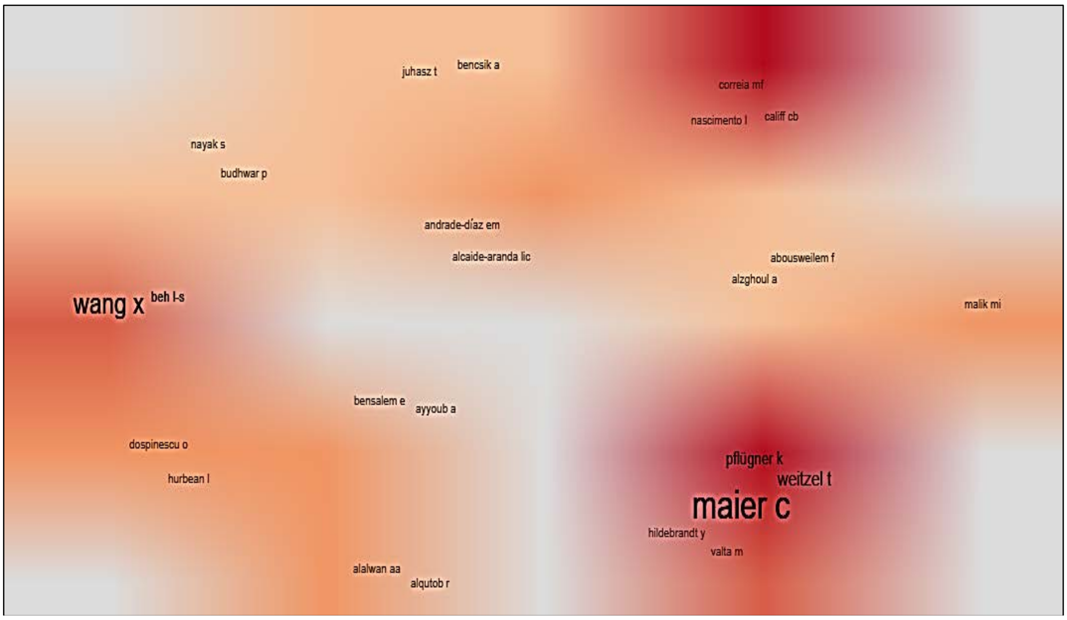


Fig 22: Collaboration Map

The density map in Figure 22 depicts that the top right cluster has a strong collaboration or thematic focus among Correia MF", "Nascimento l", and "Califf CB."Bottom Right Cluster is dominated by "Maier C", "Weitzel T", "Pflugner K", and "Hildebrandt Y". This is another prominent cluster that has strong collaboration. The left or Centarl cluster is a less dense cluster that includes collaboration between "Juhasz T", "Bencsik A", "Andrade-Diaz EM", and "Alcalde-aranda LIC". The scattered clusters have "Nayak S", "Budhwar P ", etc. and they have a smaller connection.

Country Collaboration Map

The “Country Collaboration Map" is a visual representation that showcases international collaborations in scientific, academic, or economic contexts.

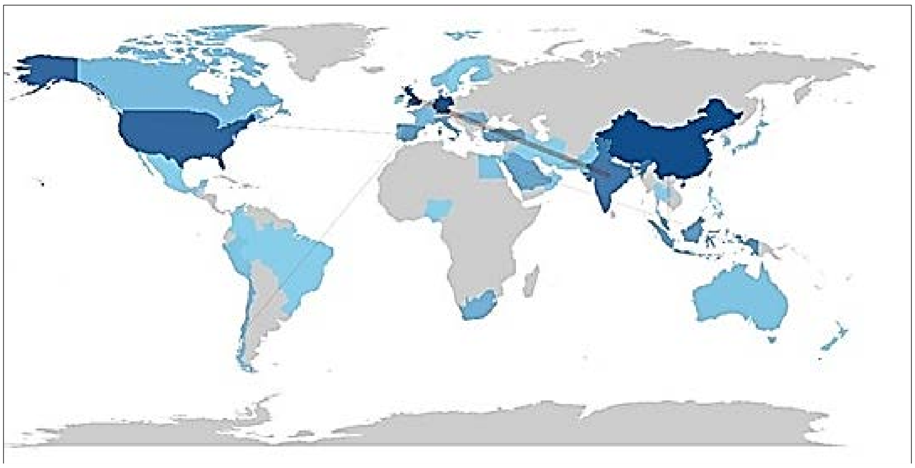


Fig 23: Country Collaboration Map

The Map presented in Figure 23 illustrates a network of international collaborations. It provides direct connections and strength of relationships between them. The Map suggests that Western Europe, the United States, China, and India are major players in these collaborations, with a powerful link between Europe and India.

Discussion

The primary objective of this research is to provide a comprehensive overview of technostress and work performance research, utilizing bibliometric analysis to enhance knowledge of the progress made in this field and to inform current scenarios and future directions. This study incorporates bibliographic data from the Scopus database for bibliometric analyses, utilising network visualisations to depict the current state of technostress and work performance research. It examines country, institution, and author contributions, as well as highly cited documents and keywords in this research field. The data shows that number of publications in the discipline has been steadily rising. The findings indicate that Germany has the highest number of scientific publications, followed by China and the United States. The largest source of publication is the Americas Conference on Information Systems 2012 (AMCIS 2012), followed by Frontiers in Psychology and Computers in Human Behaviour. In terms of country citations, the United States has the highest total, followed by China and France. The author with the highest total citations in the field of technostress and work performance is Tarafdar, M. (2010). J Manage Inf Syst. The author has received the highest total citations, with an average of 41.38 citations per year and a normalized total citation of 1.00. The sources, such as Frontiers in Psychology, Computers in Human Behavior, Heliyon, and Information Technology and People, have a high local impact as indicated by their h-index value, g-index value, m-index value and number of citations they received. The statistics on article distribution by authors' countries of origin indicate that China has the most significant number of articles. The co-occurrence network analysis reveals that the most central node is technostress, while other major nodes are job satisfaction, job performance, and stress. The co-citation network analysis identifies influential authors such as Tarafdar, M. Wang X," "Ragunathan T.S.," "Brown C," "Maier C.," and "Wagner G, who have significantly contributed to studying technostress and work performance.

This study has certain limitations, so its findings cannot be generalized. Firstly, the scope of the study is limited to a bibliometric analysis of all types of research publications. Thus, it limits the applicability of its results to specific domains. Second, the study primarily relies on the Scopus database as its primary source, thereby limiting the comprehensiveness and depth of analysis. Future studies may incorporate additional databases, such as Web of Science and Google Scholar, to further enhance comprehensiveness and gain deeper insights into understanding technostress and work performance. Thirdly, since it relies only on bibliometric data, it does not take into account the content or quality of the articles considered. Future research may benefit from employing qualitative methodologies to gain a deeper understanding of the study area's research contributions and limitations. Fourth, the search term did not include any alternative terms such as ICT-induced stress, Digital Stress, and other related terms to extract data from the Scopus database. Future studies can be done by including all related terms to make it more comprehensive in nature.

Conclusion

This study contributes to the ongoing discussion on bibliometric studies by analyzing the past decade of technostress research. In this study, we have highlighted key trends, identified influential contributors, and mapped the thematic landscape of this increasingly relevant research area. The findings highlight the contribution of authors and institutions to the research field. This study provides a valuable source for researchers and scholars interested in the field of technostress and work performance. It provides a foundation to build upon through future research investigation. The study reveals that significant and accelerating interest in technostress has surged since 2018, with the widespread digital adoption spurred by the COVID-19 pandemic. The research highlights the widespread recognition of technostress as a significant issue worldwide. This mirrors real-world experiences of people and organizations struggling with increased technological integration into professional life. This bibliometric study is a valuable resource for scholars, practitioners, and policymakers. It maps existing technostress and work performance, providing future direction. In this rapidly evolving technological context, it is crucial to comprehend the dynamics of technostress in order to foster a healthier and more productive work culture and environment.

Declarations

Ethical Approval

Not applicable as this study does not involve human or animal participants.

Funding

We have not received any funding or grants from any government or private agency.

Availability of Data and Materials

The bibliographic data examined in this research were obtained from the Scopus database. The data pertinent to this analysis are accessible within the publication or upon reasonable request to the corresponding author.

Conflict of Interests

We declare no conflict between authors at any point in the writing and publication of this research article.

References

1. Aria M, Cuccurullo C. Bibliometrix: A R-tool for comprehensive science mapping analysis. J Informetr. 2017;11(4):959-975. DOI:10.1016/j.joi.2017.08.007
2. Atrian A, Ghobbeh S. Technostress and job performance: Understanding the negative impacts and strategic responses in the workplace. 2023. DOI:10.48550/arxiv.2311.07072
3. Ayyagari R, Grover V, Purvis R. Technostress: Technological antecedents and implications. MIS Q. 2011;35(4):831-858.
4. Batmaz Y, Yüksel G, Aydoğan D, Yıldız A, Karaarslan E, *et al*. Cyberbullying and cyber victimization: Examining mediating roles of empathy and resilience. Curr Psychol. 2022;1-11. DOI:10.1007/s12144-022-04134-3
5. Boonjing V, Chanvarasuth P. Risk of overusing mobile phones: Technostress effect. Procedia Comput Sci. 2017;111:196-202. DOI:10.1016/j.procs.2017.06.053
6. Borle P, Reichel K, Niebuhr F, Voelter-Mahlknecht S. How are techno-stressors associated with mental health and work outcomes? A systematic review of occupational exposure to information and communication technologies within the technostress model. Int J Environ Res Public Health. 2021;18(16):8673. DOI:10.3390/ijerph18168673
7. Brynjolfsson E, McAfee A. The second machine age: Work, progress, and prosperity in a time of brilliant technologies. New York: W.W. Norton & Company; 2014.
8. Brod C. Technostress: The human cost of computer revolution. Reading: Addison-Wesley; 1984.
9. Cahapay MB, Bangoc II NF. Technostress, work performance, job satisfaction, and career commitment of teachers amid COVID-19 crisis in the Philippines. Int J Educ Res Innov. 2021;16:260-275. DOI:10.46661/ijeri.6145
10. Çini MA, Erdirençelebi M, Akman AZ. The effect of organization employees' perspective on digital transformation on their technostress levels and performance: A public institution example. Cent Eur Bus Rev. 2023;12(4):33-57. DOI:10.18267/j.cebr.331
11. Ewers M, Kangmennaang J. New spaces of inequality with the rise of remote work: Autonomy, technostress and life disruption. Appl Geogr. 2023;152:102888. DOI:10.1016/j.apgeog.2023.102888
12. Gerekan B, Şendurur U, Yıldırım M. Mediating role of professional commitment in the relationship between technostress and organizational stress, individual work performance, and independent audit quality. Employee Responsib Rights J. 2024;36(3):367-381. DOI:10.1007/s10672-023-09450-9
13. Grummeck-Braamt JV, Nastjuk I, Najmaei A, Adam M. A bibliometric review of technostress: Historical roots, evolution and central publications of a growing research field. 2021. DOI:10.24251/HICSS.2021.796
14. Hung SY, Chen CW, Lin MJ, Chen PC, Lee MC, *et al*. Does the proactive personality mitigate the adverse effect of technostress on productivity in the mobile environment? Telemat Inform. 2015;32(1):143-157.
15. Jena RK. Technostress in ICT enabled collaborative learning environment: An empirical study among Indian academicians. Comput Human Behav. 2015;51:1116-1123. DOI:10.1016/j.chb.2015.03.020
16. Jones SS, Heaton PS, Rudin RS, Schneider EC. Unraveling the IT productivity paradox—Lessons for health care. N Engl J Med. 2012;366(24):2243-2245. DOI:10.1056/NEJMp1204980
17. La Torre G, Esposito A, Sciarra I, Chiappetta M. Definition, symptoms and risk of techno-stress: A systematic review. Int Arch Occup Environ Health. 2019;92(1):13-35. DOI:10.1007/s00420-018-1352-1
18. Lee J. Does stress from cell phone use increase negative emotions at work? Soc Behav Pers Int J. 2016;44(5):705-715. DOI:10.2224/sbp.2016.44.5.705
19. Li L, Wang X. Technostress inhibitors and creators and their impacts on university teachers' work performance in higher education. Cogn Technol Work. 2021;23(2):315-330. DOI:10.1007/s10111-020-00625-0
20. Park JC, Kim S, Lee H. Effect of work-related smartphone use after work on job burnout: Moderating effect of social support and organizational politics. Comput Human Behav. 2020;105:106194. DOI:10.1016/j.chb.2019.106194
21. Qi C. A double-edged sword? Exploring the impact of students' academic usage of mobile devices on technostress and academic performance. Behav Inf Technol. 2019;38(12):1337-1354. DOI:10.1080/0144929X.2019.1585476
22. Ragu-Nathan TS, Tarafdar M, Ragu-Nathan BS, Tu Q. The consequences of technostress for end users in organizations: Conceptual development and empirical validation. Inf Syst Res. 2008;19(4):417-433. DOI:10.1287/isre.1070.0165
23. Riedl R. On the biology of technostress: Literature review and research agenda. DATA BASE Adv Inf Syst. 2012;44(1):18-55. DOI:10.1145/2436239.2436242
24. Riehmann P, Hanfler M, Froehlich B. Interactive Sankey diagrams. IEEE Symp Inf Vis. 2005;233-240. DOI:10.1109/INFVIS.2005.1532152
25. Salanova M, Llorens S, Cifre E. The dark side of technologies: Technostress among users of information and communication technologies. Int J Psychol. 2013;48(3):422-436. DOI:10.1080/00207594.2012.680460
26. Schauffel N, Schmidt I, Peiffer H, Ellwart T. Self-concept related to information and communication

technology: Scale development and validation. Comput Human Behav Rep. 2021;4:100149. DOI:10.1016/j.chbr.2021.100149
27. Srivastava SC, Chandra S, Shirish A. Technostress creators and job outcomes: Theorising the moderating influence of personality traits. Inf Syst J. 2015;25(4):355-401. DOI:10.1111/isj.12067
28. Syakina D, Rahma A, Rizal M. The role of technostress on educators' work performance at universities in the Special Capital Region of Jakarta. Psikodimensia. 2023;22(1):1-12. DOI:10.24167/psidim.v22i1.4935
29. Tams S, Thatcher JB, Grover V. Concentration, competence, confidence, and capture: An experimental study of age, interruption-based technostress, and task performance. J Assoc Inf Syst. 2018;19:857-908. DOI:10.17705/1jais.00511
30. Tarafdar M, Tu Q, Ragu-Nathan TS. Impact of technostress on end-user satisfaction and performance. J Manage Inf Syst. 2010;27(3):303-334. DOI:10.2753/MIS0742-1222270311
31. Tu Q, Wang K, Shu Q. Computer-related technostress in China. Commun ACM. 2005;48(4):77-81. DOI:10.1145/1053291.1053323
32. Urukovičová N, Rošková E, Schraggeová M, Smoroň J. Psychometric properties of the Technostress Creators Inventory among employed Slovak respondents. Comput Human Behav Rep. 2023;12:100324. DOI:10.1016/j.chbr.2023.100324
33. Weil M, Rosen L. Technostress: Coping with technology @work @home @play. New York: John Wiley & Sons; 1997.
34. Yang RJ, Yang JY, Yuan HR, Li JT. Techno-stress of teachers: An empirical investigation from China. DEStech Trans Soc Sci Educ Hum Sci. 2017;icesd. DOI:10.12783/dtssehs/icesd2017/11619
35. Yaqoub A, Khan M, Ali S, Tariq H, Farooq S, *et al*. Three decades of glocalization research: A bibliometric analysis. Cogent Soc Sci. 2023;9(2):2245239. DOI:10.1080/23311886.2023.2245239