

A Bibliometric Analysis of Work from Home Research

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Abstract

Covid-19 has made an effect on the lives of individuals all around the world. Each sector is unable to accomplish their activities from home, and they are unable to convert to a work-from-home model. The purpose of this study is to investigate work from home as a remote working model and to evaluate the function of work from home in light of current research, nations, authors, and publications in the field. VOSviewer software (version 1.6.16) is used to do bibliometric analysis for this aim. The study is relied on the studied keywords, important authors, regions, and publishers in the area. As a result, this paper provides a more comprehensive analysis of this booming subject, highlighting recent developments through the usage of scientific maps employing a bibliometric method.

Keywords: Work from home, Bibliometric Analysis, Co-Occurrence, Co-Citation, Bibliographic Coupling, Citation, VOS viewer.

Introduction

Covid-19 has had a significant impact on people's lives all across the world. Nations have made extreme efforts to halt the spread of the disease. Sudden outbreak of Covid-19 has shut down many businesses and collapses various economies. Every industry or business is not capable to perform their tasks from home and transitioning towards work from model is not possible for them. The industries which are largely hit by coronavirus outbreak are Entertainment, Hospitality, Travel and Tours, Educational Institutions, etc. The Indian government had outlined a number of defensive steps to prevent the corona virus from entering and spreading within the country. The closure of schools, colleges, and institutions by separate state governments was an essential requirement given the existing scenario in India. Both the virus and the tactics employed to combat its spread have serious societal consequences. The conditions have created a one-of-a-kind situation where people have had to drastically alter their everyday lives, frequently within a short period of time. People's work habits, as well as

how they work and the manner in which people travel are three aspects of regular living that have shifted dramatically. This forced some of the industries to make the better use of available technologies and tried to perform their tasks innovatively and remotely. We now have the technology to stay in touch all the time, and we can hold conferences and lectures with hundreds of individuals from all over the world. Adoption of digital technologies has become one of the ways for the businesses to transit for thriving and performing their tasks efficiently. Working from home is becoming increasingly popular around the world, primarily in light of the recent COVID-19 pandemic. Even though it is widely used in a variety of countries and business kinds, it has proven to have a number of shortcomings.

'Work From Home' (WFH) may be defined as the work which is performed remotely, instead of a work premises. "WFH" is used as an acronym for Work From Home. Most of the organizations to the extent possible, have come up with a work from home model for their employees and board members, in order to achieve their objectives, goals, output during the outbreak of Covid-19 pandemic. Traditionally, work is performed by an employee in an office premises at designated work space for related tasks. With the advancement of digital age, software has become more compatible performing complex tasks as various processes of a business can be run at fast pace. Companies have found new ways using Internet more convenient and productive getting work output from their employees efficiently from any remote location. These advancement in technologies make work from home and telecommuting more effective and reliable. Access, awareness and action are necessary to perform work from home successfully. The employees should have access to the required technology for performing the tasks efficiently, the organization should have provided various programs to create awareness and understanding related to the technology to be used, and employees should not feel any technostress and readily adopt and utilize the best use of provided technology. Globally, all schools, colleges and other educational institutions are shut down due to the covid-19 pandemic. It has led to drastic change in education system as teachers

are taking classes remotely through digital platforms, resulting rising of e-learning mode. As per researchers, online learning has greater information retention in less time taking. These changes will eventually contribute to the capabilities of the institutions.

Literature Review

Despite the fact that research on the effect of covid-19 on working from home is expanding rapidly, the topic has a limited scope. Baines (1999) has examined the working condition of people who provide media services as freelancer. As these freelancers work from home and required an extensive network to provide the information for media services. These freelance workers are heavy users of electronic mediums and the internet facility is not accessible to most of them. They are working virtually for the media houses which increase their dependency on family resources which causes insecurity and affect their personal relationship with their family members. Raghuram & Weisenfeld (2004) have explained the conflict in work & non work and job stress of virtual workers. Workers who are working from home are called virtual workers and they experience work & non work conflict as there is no specific boundary for work space and non-work space separately. As when employees perform their work virtually from home there is less chances of job stress in comparison to when they are working from office premises. But there are high chances of work interference with non-work and non-work interference with work for virtual workers. Halford (2006) has explained the impact of working from home on parenting and the performance of organization. As in the current modern world working scenario, businesses allow single parents or newly made parents to work from home so they can maintain a work life balance and able to provide required attention to their children. But it is found that working from home disrupts the fatherhood and organisation performance. As while working from home boundary between work and home vanish, they do not get a distinctive space and time to perform their work which in a way impacts their productivity and leads decrease in organisational performance. Golden (2008) has explored the disparities in flexible work schedules and work from home. It is found

that employers provide flexible work schedules to only some employees who carry either high position or any kind of privilege. And in some organisations, married employees and employees who have parental responsibilities have higher access for flexible work schedules and even allowed to work from home. Some organisations used these facilities to reward the employee and also use it for employee retention. These policies in organisation must be accessible to either all employees or to none of them irrespective of their marital status as this practice is the only way to remove these disparities.

Blake et al. (2010) have explained that whenever there is a pandemic outbreak that simultaneously cause instability in workplace in many businesses and during this time its business leaders' responsibility to maintain employee's health and safety. In these difficult situations employees are unable to comply with the work recommendation due to issues which are associated with work like job insecurity, financial burdens and inability to work from home. Fonner&Stache (2012) have analysed the method through which teleworkers can do easy transition between home and work and through which relationship with both family members and work colleagues can be maintained. The working role of tele workers is such that they need to work from home as well in order to accomplish their tasks, so they need to flexible in managing and segmenting work and home roles. And it is found that tele workers who have children are tend to less flexible in managing work and home roles in comparison to those who are unmarried or do not have children. Bloom et al. (2014) have explored whether allowing employees work from home is beneficial for businesses or not as businesses are concerned that employees sneak out from work which leads to decrease in company performance. But the results are kind of opposite as during work from employees take less breaks and their work efficiency also increased, they tend to feel home is more comfortable environment then the work place and majority of employees willing to work extra their shift timings during work from home which double ups the gains for company. Messenger & Gschwind (2016) have explored the ICTs and how they revolutionised the work from home to virtual office. As due to the technological advancement

most of the work is supported by internet and can be performed from anywhere, employees are not required to travel to employer's office and perform the work. There is location independent technology which can be used by employees to perform their work from their home and it works as their virtual office which is more comfortable to the employees than their office space. Mas & Pallais (2017) have explained how employees value alternative work arrangement. Majority of employees does not value flexible scheduling they found to be comfortable with their regular 9 to 5 schedule. But workers give high value to the option of working from home and does not like if schedule is shared on a short notice. The major reason for the employees to dislike the short notice schedule because they do not want to work on late evenings and on weekends. They want to spend their weekends on leisure time in order to maintain a work life balance. There are some organisations which share their schedule at least 2 weeks before in order to work smoothly.

Dingel & Neiman (2020) have explored in their study what kind of jobs can be performed at home. As employees are unable to travel to their offices during covid-19, it is important to classify jobs which can be performed at home and jobs which can only be done from their respective offices. It is also important to know the economic performance based on the jobs performed at home. It is found that productivity of a worker differs significantly when they are working from home instead of their workplace. Izumi et al. (2020) investigated the key issues were a lack of effective pandemic preparedness and pandemic-specific advanced simulation exercises. The change in teaching modality to online lectures and working from home were the next big hurdles. This study has contributed to a greater understanding of the issues that HEIs face as well as the opportunities that are accessible to them. HEIs will need to critically explore post-COVID-19 situations and how they can remain relevant to their students and society at large. Internet-based teaching is new to most Asian colleges and, to some extent, mandatory. This, however, opens the door to a discussion on the usefulness of HEIs in fostering a knowledge society. Waizenegger et al (2020) have explored the issues which

are created when government enforced work from home after sudden outbreak of covid-19 and how technological means are used to achieve work goals. When work from home is enforced knowledge workers does not have required technological means to continue the same work virtually. It is crucial for the business to make affordable technology so that business goals must be achieve and must ensure employee well-being and their domestic condition. Majumdar et al. (2020) have explained the concerns that are raised during the lockdown and covid-19 pandemic. The lockdown has a severe impact on the economy and shuts down many businesses, and it also make some quick changes in the life style of everyone. These sudden changes have a direct impact on daily life routine of people which leads to sleep disruption, anxiety, health issues. Working person who are working in a 9 to 5 job, working from home experience stress related to both family and work. Haas et al. (2020) have presented the effect of corona virus on work and travel activities of people. Covid-19 has drastically changed the lifestyle of people around the globe. During the pandemic, majority of people decrease their outdoor activities and it contains a stronger share of older people as they are the most vulnerable in this pandemic. People who are working from home tend to work for more hours than their shift timings and spend more time in remote meetings. People become more positive to travel in their personal transport instead of public transport. There are some activities that people will continue to do in future also but some will get back to same routine once the pandemic is over.

Kramer (2020) has analysed the impact of covid-19 pandemic on status of occupation, occupational mobility and work from home. Covid-19 has both macro and micro impact on the working avenue. There are three occupational domains which are affected by the pandemic. These are value and status of an occupation which changes the meaning of a occupation, other is experiment of work from home and is it compatible for the organization or not and what are the characteristics on which a person is identified whether he will be able to work from home or not and last is the segmentation of job in the labour market in order to determine which job is good and which is bad. Molino et al.

(2020) have explored the various factors that raised in remote working conditions during covid-19 pandemic. As government instructed small and large business to shut down their offices and start working remotely, if possible, in their particular industry. But working remotely poses many challenges and one of the most common challenge is technostress as working remotely need access and awareness towards technology which enables employees to work smoothly from their home. The other factors which are taken into consideration are workload, work – family conflict and behavioural stress. Gupta &Goplani (2020) have inspected that to avoid and eliminate the darkness caused by the COVID-19, the Government of India has implemented a number of preventive measures, including the closure of all educational institutions, a one-day nationwide curfew to combat the virus, and a 21-day lockdown to combat the corona virus, among others. Many circulars/notices/letters were issued by the relevant authoritative regulatory authorities, demonstrating their deep concern for students, teachers, and other stakeholders. On the other side, the lockdown period has resulted in some serious concerns, such as disruptions in normal lectures, delay of exams, and so on, which may result in a lack of time during the next academic year. Seshadri et al. (2021) have examined the work-from-home problems faced by stakeholders in educational institutions during the COVID-19 epidemic. The survey identified numerous significant concerns, such as internet connectivity issues affecting 83 percent of stakeholders in urban and semi-urban areas. Because of its usability, the security risks of disruption during the Zoom did not detract from its general popularity among stakeholders. The study found that classroom-based methods were favoured over digital platforms during the COVID 19 platforms, maybe due to more effective interactions. Treve (2021) have investigated the impact of the most recent new Coronavirus (COVID-19) on higher education, particularly the shift from face-to-face sessions to online and interactive learning methods. Technical resources and asymmetrical access to education are the main barriers to a transition to distance learning during COVID-19. COVID-19 was difficult for students, but it also acted as a springboard for more practical options including artificial intelligence, public-private educational

alliances, and digitalization. According to the findings, universities should investigate measures to offset the negative consequences of COVID-19 while remaining committed to creativity and large-scale improvements in practise.

Research Objectives

The current study seeks to add to the developing subject of Work from Home by presenting new knowledge. The following are the study's objectives:

- To comprehend the concept of work from home as well as its current state.
- To conduct a bibliometric analysis of work from home studies.

Research Methodology

The current study employs an exploratory research design. The primary purpose of exploratory research is to investigate a phenomenon in more depth. This field of study is still in its early stages because it is a novel concept. To further understand the concept of "Work from Home," a preceding research standpoint is applied. Secondary data from related journals, periodicals, and websites is used to meet the study's objectives. The VOSviewer software is utilised to conduct a bibliometric analysis in order to determine the important subjects addressed in the literature.

Bibliometrics is a discipline of library and information science concerned with the quantitative examination of bibliographic content (Broderus, 1987; Pritchard, 1969). Bibliometric analysis is a powerful tool for examining the influence of publications, scholars, or organisations in the field of research. To do this, bibliometric techniques that permit for the analysis of the precious support and evolution of the research topic are applied. As a result, bibliometric analysis is applied in this study to identify the most influential research or authors engaged, along with their connections.

Data Collection

The Scopus dataset is utilised to obtain information about the papers considered for the study. Scopus, a well-known index that encompasses a broad spectrum of peer-reviewed papers, provides reliable references (Mingers

&Leydresdorff, 2015). Numerous findings with relevant keywords on work from home are used to scan the title, description, and sentences of the publications in the database. To ensure that all necessary document information are examined for the study, the findings are sorted by relevancy. The outcomes are restricted to English-language books and journal articles. Their titles and abstracts were reviewed, and chosen as appropriate. Theoretical and empirical papers on the application of work from home are chosen, with an emphasis on studies that used work from home as the primary construct.

Findings

To depict the development of literature in general and to study the growth of research interests, the findings begin with the creation of a chart demonstrating the co-occurrence of keywords produced by popular papers in the research area. A bibliographic coupling of countries is performed, followed by a search for core authors using co-citation analysis. Finally, the primary research documents are identified using a citation analysis.

Co-occurrence of keywords

This has been done to examine the most used author's keywords in the previous literature. In the fig. 1, it can be seen that "co-vid 19" is the most frequently used keyword followed by "work from home". So, we can say that the work from home is not explored much and we can show its impact on the co-vid 19 to add into the theoretical base of the literature.

Figure 1: Co-occurrence of top 36 author's keywords used in the literature

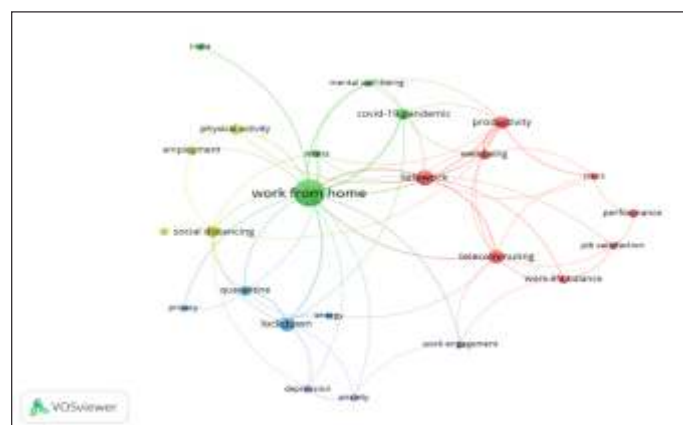


Table 1 Co-occurrence of each author's keywords

Keyword	Occurrence	Total link strength
Work from home	70	49
Telework	22	22
Lockdown	19	15
Telecommuting	17	16
Productivity	16	18
Social distancing	14	10
Covid-19 pandemic	12	10
Physical activity	11	5
Quarantine	10	9
Well-being	9	9
Employment	7	4
Performance	7	2
Work-life balance	7	7
Depression	6	7
Machine learning	6	1
Stress	6	7
Anxiety	5	6
Crisis	5	7
Energy	5	4
India	5	3
Job satisfaction	5	5
Mental well-being	5	7
Privacy	5	3
Public health	5	0
Work engagement	5	6

Each keyword is sorted in terms of its occurrence. Keywords with zero link strength are not included to provide a clear visualisation of the map. Table 1 shows the each keyword with its connection to other keywords. It has been stated in the table that “Work from Home” is the mostly used keyword in the literature with 70 occurrences. The next mostly occurred keyword is “Telework” have been used 22 times.

Bibliographic coupling of countries

Bibliographic coupling is used when two articles, together,

have used a single reference source as a connecting point between themselves. In the current study, it has been explored to know the various geographies where this topic has been explored and to examine from which country majority of literature belong. Figure 2 represents the bibliographic coupling of top nations and their connections. In the map, it's clearly seen that the “United States” has explored the research on the study area followed by “India” and “United Kingdom”.

Figure 2: Bibliographic coupling of nations

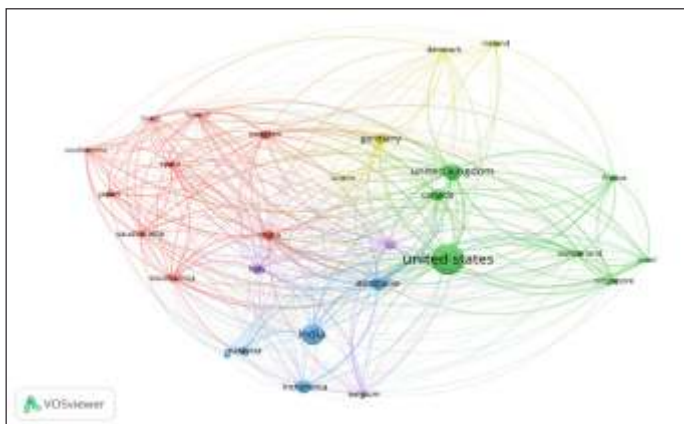


Table 2 Bibliographic coupling of countries

Country	Documents	Citations	Total link strength
United States	187	1888	4815
India	89	238	1438
United Kingdom	58	402	4046
Australia	41	462	4170
Indonesia	35	134	740
Canada	31	296	3002
Germany	25	80	2108
Netherlands	24	281	3995
Italy	22	112	2787
China	18	226	2811
Sweden	18	182	1985
Malaysia	17	16	568
South Africa	13	174	2131
Ireland	11	49	472
Japan	9	12	1055
Switzerland	9	121	1587
France	8	96	1380
Pakistan	8	25	242
Saudi Arabia	8	16	1696
Singapore	8	96	1282
Belgium	7	24	1378
Denmark	7	13	955
Spain	7	73	1630
Brazil	6	13	1240
Israel	6	77	1362
South Korea	6	14	1447
Austria	5	39	472
Finland	5	14	1540

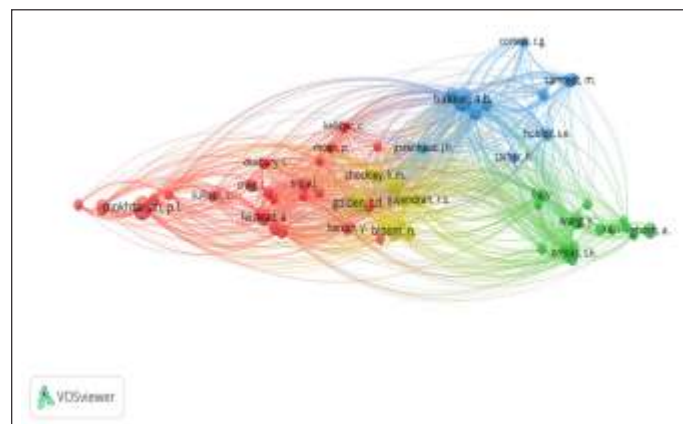
Table 2 shows the bibliographic coupling of each nations and their link strength to each other. The countries are sorted by number of documents published. It has been stated in the table that “United States” has 187 highest

number of published research documents in the current area followed by “India” which has published 89 documents and “United Kingdom” has 58 published documents in the field.

Co-citation of authors

Another important representation is the co-citation map of prominent authors in the field. Co-citation analysis refers to the researches that are referenced together in the third source. Here, this map has been used to see the work of prominent authors across the world. Figure 3 represents the results of countries of the literature and their co-cited connections. It is shown that the “Bloom” is the key authors in the research area followed by “Golden” and “Gajendran”.

Figure 3: Co-citation of authors of the literature



Citation of documents

Here, this has been used to assess the most cited documents in the field which can be helpful in the current study to have a better understanding and knowledge. The map represents the mostly cited documents in the literature and the network connection show their link strength. Figure 4 represents the results of the 7 most cited documents in the literature and their connections.

Figure 4 Citations of documents



Table 3 Citation of documents

Document	Citations	Total linkstrength
bloom n. (2015)	183	2
kramer a. (2020)	151	1
dingelj.i. (2020)	118	1
fonnerk.l. (2012)	89	2
messenger j.c. (2016)	71	2
waizenegger l. (2020)	41	3
troup c. (2012)	37	1
molino m. (2020)	33	2
hook a. (2020)	23	3
fu m. (2012)	22	1
duxbury l. (2014)	21	2
allenby b. (1999)	17	1
atchison c. (2021)	16	1
savi d. (2020)	16	2

Each document in terms of its citations and link strength to other documents have been identified. The documents with zero link strength have been excluded for the analysing purpose. Table 3 clearly states each document with their connection to one another. It has been shown that document by "bloom n. (2015)" is highly cited in the literature with 183 citations. "kramer a. (2020)" is the next highest cited document with 151 citations.

Conclusion

The purpose of this research was to look into the literature that works from home plays a significant role in the telecommuting era. Data for this study has been acquired from the Scopus index, and relevant studies are chosen. The software VOSviewer (1.6.16 version) is used to do bibliometric analysis on work from home publications. According to a bibliometric research of keyword co-occurrence, "Work from Home" is the most studied term in the academic sector, followed by "Telework." Using bibliographic coupling, it is determined that publications produced in the "United States" are regularly mentioned by other countries worldwide. The author co-citation analysis shows that "Bloom" is the most co-cited author, followed by "Golden" and "Gajendran," indicating that they are the

leading writers in the consumer happiness study field. Furthermore, document citation analysis found that the biggest number of papers on work from home are highly cited by varied writers from around the world. The study is significant from an academic standpoint since it adds to the small amount of knowledge about work from home.

Limitations and Future Research

There are a few limitations to this study that indicate that more research is necessary. These maps and timelines could have been compromised by writers inserting arbitrary keywords into their articles that did not adequately reflect their content. Because the study relied on Scopus, a few papers that were indexed by WoS but not Scopus may have been overlooked. Due to the limits of VOSviewer, it was not possible to merge both datasets for this experiment. Researchers in the future will be able to study numerous datasets using more advanced tools and techniques. However, the similarities between the two databases are significant (Martin-Martin et al., 2018), and future research should incorporate a bibliometric analysis of both datasets. The findings of this study will have a significant impact on theory and future research. Because the researcher's rigorous study of earlier literature publications may not be

an exhaustive list, numerous studies may be missed. A new investigator or individual can quickly gain a birds-eye view of the foundational articles as well as how the research challenges have developed. Co-citation network maps, co-word network maps, and bibliographic coupling maps change over time. As a result, additional research is required to chronicle the changes in the conceptual framework and important research topics of this field of study over time.

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