Future of Work: Lesson from COVID-19 and Future Implication

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Abstract. The pandemic situation has created a challenge for working lives and career of millions of working people both from formal and informal sector. The encouragement to practice social distancing required most employers to do remote working. Even though the term of remote working is not new, but not all organizations are ready and prepared to support the implementation of remote working. This paper conduct a systematic review to explore the potential and issues of remote working implementation during the pandemic. The analysis of the co-occurrence network of the literature resulted eight clusters represent issues such as: unequal access to the digital technology might affect the productivity of the employee; the non-supporting remote working condition that contribute to the burnout and technostress; the extensive use of internet and technology increase the necessity of software, internet service provider, and data security; flexible working pattern for employee is in the need to discuss with HR in terms of clear work-home boundaries, job performance and how to overcome fatigue issues and mental demands; the emergence of telemedicine in the health industry; the potential of AI to compensate the unavailability of human worker; and consideration when worker need to return to the office after the pandemic.

Keywords: Future of work, remote working, bibliographic mapping, co-occurrence network analysis, business sustainability.

1 Introduction

Business as usual may not be an option. The prolonged pandemic situation has created an unprecedented challenging environment, pandemic fatigue, and disrupted economy globally that makes policy makers difficult to formulate an appropriate policy [38]. Business around the world, regardless of its size and type –formal or informal, is unprepared for the situation. Accommodation and food services; education services; art, entertainment, and recreation are examples of business sector that highly affected by COVID-19 pandemic.

Companies in every industrial sector are trying to respond toward the outbreak with some set of actions related to the workforce protection, their supply-chain stabilization, customer engagement, and financial aspect [1]. In terms of workforce, on September 2020, International Labor Organization (ILO) estimate the declining working hours (resulted from lay-off decisions, or changing on work shifts, or implementation of remote working) by 17.3 percent at the second quarter (around 2020) which are equivalent to 495 million full-time workers worldwide with workers in developing and emerging economies countries –especially those in informal employment– are highly affected [2]. In Indonesia, almost 2 million workers from 100 thousand companies have been affected by the outbreak since the first quarter, in which 1.5 million are come from the informal sector [3].

The encouragement to practiced social distancing required most companies to implement remote working or at that time known as "work-from-home". The original term for it was *telecommuting-teleworking* [4] which begin to reach its popularity in the middle of 90s in U.S along with the advancement of technology and the effort of reducing congestion resulted from the worker commute to the workplace of office [5]. Telecommuting-teleworker term was based on the spirit of work is something that worker do, not a place that they must go [6], [5], [7].

Previously, around 4.7 million people were already working remotely in U.S. After the COVID-19 declared as pandemic, 88 percent of the organization worldwide practice the remote working [8] and 62 percent of companies in Indonesia made It mandatory to encourage their employee

A. Farabi et al. (eds.), *Proceedings of the International Conference on Business, Management, Accounting and Sustainable Economy (ICBMASE 2023)*, Advances in Economics, Business and Management Research 275,
https://doi.org/10.2991/978-94-6463-394-8_27

but the current situation considers as a paradigm shift working [10] with employee have to endure harsh workplace condition such as irregular work hours, increased work demands, inadequate work benefits, limited social and work support [2]. With a number of nations has make relaxation on the lockdown policy at the end of 2020, followed by some businesses prepare to reopen, there are concern more than just physical health [11].

Hence, this paper describes a review of the concept of remote working during the COVID-19 and complementary to earlier review related to work and employment in the era of COVID-19 conducted by [12]. Furthermore, we demonstrate how bibliographic mapping can supplement a conventional literature review to identify the potential and issues of future of work related to the remote working and future implication.

Initially, this paper describes the literature research methodology. Then presented an overview of the remote working based on the literature review and followed by bibliographic mapping analysis and discuss the topic that are related to the future implication. Finally, the conclusions are presented.

2 Methodology

The literature search employed in two databases namely ABI/PROQUST and Science Direct. The search was conducted on October 12th 2020, restricted to the articles published in the peer-review journals (research) that were written in English. The keywords used in the literature search, the results returned, and included paper for the analysis from the search are presented in the Table1. The research about remote working and other term (e.g. telecommuting, mobile work, remote job, telework, working from home, flexible workplace, etc.) are quite enormous. But the search then limited to the time frame of pandemic COVID-19 to achieve the objective of this research.

Table 1. Keywords used in database searching and the number of returned articles

Code	Keywords	ABI/PROQUEST	ScienceDirect	Total
A	(telecomm! OR remote! OR telework! OR "working from home" OR "mobile work" OR "work from anywhere" OR "future of work")	187,197	584,620	771,817
B	("workforce" OR "employee")	6,666,082	397,769	7,063,851
C	"COVID-19"	2,333,317	25,425	2,358,742
D	A AND B AND C	203	315	518

The approach taken from the literature review is illustrated in Figure1. Using a PRISMA four-phase flow diagram [13]. It begins with data set D contains article relating to the remote working and already restricted to peer-review journal (research). Duplicates articles were removed comprising 439 articles. These articles were then screened individually to ensure its relevance using the following criteria. Firstly, the article must feature about keywords in "A" and "B". Secondly, the article should be in general context, not only related to health and health-related work for overcome the pandemic. Thirdly, the articles that discuss the remote work within the commuting activity were excluded.

The highlight of the remote working during COVID-19 situation then analyzed using VOSviewer software [14] to create co-occurrence network of the terms obtained from the title, abstract, and keywords in the data set D. Two terms are said to co-occur if they both occur on the same line. Terms with similar meaning were group together using the VOSviewer thesaurus. VOSviewer places the terms in the network in such a way that the distance between two terms indicates the number of co-occurrence of those terms. Based on this network, VOSviewer identifies eight number of clusters.

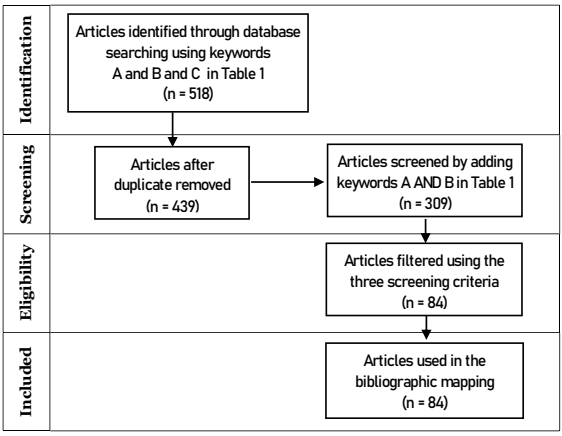

Figure 1. PRISMA flow diagram of the data collection process

3 Result and Discussion

From the amount of the articles used in the bibliographic mapping, almost half of the article that being analyzed are published in the business management journal type. Fifteen articles were published in the journal related to ICT, and twelve articles were published in the journal related to health (with scope of physical, psychological, or public health). The rest of the articles were published in the journal related to policy and sustainability, transportation, and others (see Table2 for detail).

Table 2. Distribution of journals that publish the remote working during COVID-19

Journal Type	Number of papers (percentage)
Business and Management	36 (42.86%)
ICT	15 (17.86%)
Health (physical, psychological, public)	12 (14.28%)
Policy and Sustainability	8 (9.52%)
Transportation	4 (4.76%)
Other	9 (10.71)

The co-occurrence network of the terms used in the data set D, then analyze using the VOS viewer, resulted in eight cluster presented in Figure2 (each color represents one cluster). In each clusters there were popular keywords that characterize the cluster. Table3 showed the top 10 popular keywords in every clusters related to the remote working during COVID-19.

Cluster 1 represents papers that focus on the potential issued related to the Industrial Revolution 4.0. Where the worker need to adapt to this shifting condition with motivation of lifelong learning during professional engagement [15]. Remote working in this cluster consider the role of digital literacy as key component in the industrial 4.0 where interconnection and internet of things is advanced. Especially when there is unequal access to the digital technology [16].

Cluster 2 consist of papers that discuss about the working from home become a permanent option for many business [17]. Including which occupations can be performed from home, using virtual office, and which cannot [18]. Also what leader can do to support the remote work such as maintaining communication, support for physical and mental health of the employee, adjusting schedule for work-life balance, and how to maintain the achievement of strategic priorities [19]. The permanent implementation of that scenario (remote working) brings positive affect toward climate change and environment [18] but also brings issue on the taxation of wage [20], [21].

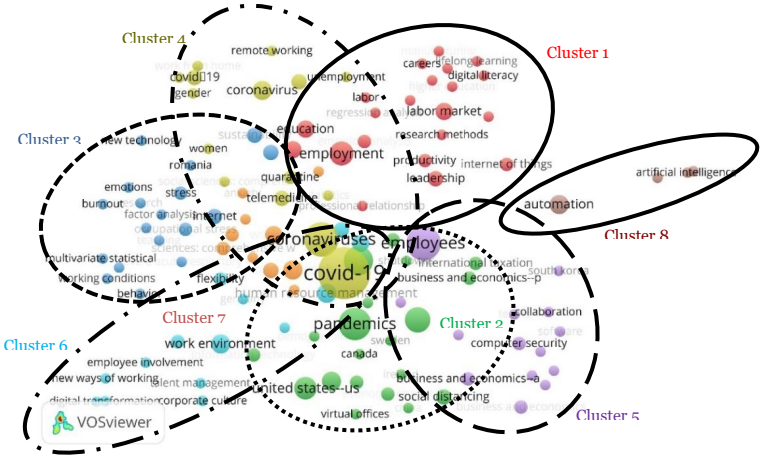

Figure 2. Bibliographic mapping of the research

Table 3. Distribution of journal that publish remote work during COVID 19 and top-10 keywords in each cluster

Cluster 1 (21 papers)	Cluster 2 (20 papers)	Cluster 3 (18 papers)	Cluster 4 (15 papers)
Career	Business and economics	Behavior	Covid-19
Digital literacy	Information technology	Burnout	Gender
Employment	International taxation	Emotions	Remote working
Higher education	Social distancing	Internet	Telemedicine
Labor market	Telework	Learning	Unemployment
Productivity	Telecommuting	New technology	Work from home
Professional development	Occupation	Stress	Comprehensive work
Professional relationship	Virtual offices	Sustainability	Quarantine
Skills	Work at home	Work engagement	Women
Leadership	Demographic	Working conditions	Statistics

Cluster 5 (14 papers)	Cluster 6 (14 papers)	Cluster 7 (10 papers)	Cluster 8 (4 papers)
Business and economics	Corporate culture	Anxiety	Artificial intelligence
Collaborations	Digital transformation	Health risks	Automation
Communication	Digital work	Job satisfaction	Machine learning
Computer security	Employee involvement	Medical personnel	Robotics
Digital technology	Employers	Mental health	
Employees	Flexibility	Occupational health	
Internet service provider	Human resource management	Mental disorder	
Professionals	New ways of working	Comprehensive work	
Software	Work environment	Questionnaires	
Teams	Working hours	Workers	

Cluster 3 focus on discussion the worker behavior doing the new way of working –NWW (other term used as remote working). The pandemic situation that require most employee to practice social distancing emerge some needs and require an adjustment of working condition. The physical environment (e.g. ergonomics, air quality, noise levels, temperature, ambient lighting) may increase the work engagement [22]. Although the implementation of remote working might require high cost –by providing supporting physical environment for the employee, the manager require new knowledge and skill in managing this situation. In the education industry where teacher need to conduct online teaching with small window of time left to adapt to the new technology, the organization need to teacher with professional support to be able to cope with

the stressor and resilience mechanism [23]. The small time to adapt in the pandemic situation may contribute to the burnout [24], [23] and technostress associated with the introduction of new technology [25].

Cluster 4 comprise of possibility for future work in the health sector. With the implementation of social distancing and the high level of risk for health workers, potential future of work in the health sector including the development of telemedicine [26], [27], [28], [29]

While the concept of remote working, will need a lot of technical and technological support, papers in cluster 5 discuss about the necessity of software, the internet service provider and security of data [30], [31].

Cluster 6 is about the challenge for human resource management for implement the options of teleworking or remote working or working from home [32]. Some issues related to the future for work with the new ways of working including option in flexible working pattern [33], work-home boundaries and mental demands [34].

Cluster 7 discuss aspects that being considered by worker for returning to work as previous to COVID-19 situation. Even though [35] study showed that only 25% of occupation require employee to use technology (e.g. technology administrative, financial and engineering), the rest of the occupation (e.g. health care –even some of the medical services are already available to be accessed in remote, manufacturing, retail, and food service) required their employee to be present and have a face-to-face meeting [35].

Last cluster consists of a few paper. The cluster discusses about the potential development of artificial intelligence (AI) to compensate the unavailability of human workers [36]. Study by [37] also investigate the implementation of AI in the organization and strongly suggest to consider the employee who will be working along with it and ensuring working with AI in the organization bring additional value.

4 Conclusion

The COVID-19 pandemic situation may trigger the likelihood of remote working, but the underlying drivers for work disruption are already established. The challenge of future of work will be put into three main perspectives. First, if the remote working become a permanent alternative way of work, the organization or company or employer need to consider which occupation can be done remotely, address the issue of technology literacy, data security, measuring the performance of remote working and the human aspects (e.g. potential of burnout, technostress, mental health and wellbeing).

Second, if the organization run their operational as previous to COVID-19, ensuring employee that the employer or the organization run the operational level using health protocol. Considering the physical aspects of the environment for the employee.

Last, the potential development of AI, automation, machine learning, and robotics will be accelerated with the preparation of employee's ability and skill to work with the AI. But should be put in mind that using those aspects for monitoring and observe employee's performance might be seen as over engineering the worker.

5 Limitation and Further Research

The pandemic is currently considered as epidemic and the practice of the remote working would have been differing from the beginning of the pandemic. Some company might adjust their management, facilities, or policies after the pandemic situation. Some might return to the previous pandemic conditions, but it is inevitable that the adoption of technology, development of AI is now blossoming in the industry. This changes need further study on how the adoption of new way of working is different in industrial sectors, which sector adopt the remote working as permanent way of working, what is the implication of the changes to the human resource management system in the industry.

References

[1] McKinsey & Company. (2020, February). COVID-19: Implications for business. Retrieved from mckinsey.com: https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/covid-19-implications-for-business.

[2] International Labour Organization. (2020). COVID-19 and the world of work. Retrieved from www.ilo.org: https://www.ilo.org/global/topics/coronavirus/lang--en/index.htm.

[3] Central Bureau of Statistics. (2020). Survei Dampak COVID-19 terhadap Pelaku Usaha. Retrieved from covid-19.bps.go.id: https://covid-19.bps.go.id.

[4] Mokhtarian, P. (1991). Telecommuting and travel: state of the practive, state of the art. Transportation, 319-342.

[5] Bernardino, A., & Ben-Akiva, M. (1996). Modeling the Process of Adoption of Telecommuting: Comprehensive Framework. Transportation Research Record: Journal of the Transporttion Research Board, 161-170.

[6] Leonard, W. (1995). The underground guide to telecommuting: Slightly askew advice on leaving the rat race behing. Addison-Wesley Pu.

[7] Hill, J.E., Miller, S.P., Weiner, J. Colihan. (1998). Influences of the virtual office on aspects of work and work-life balance. Personnel Psychology, 51, pp.667-683.

[8] Marinova, I. (2020, October 10). 28 Need to Know Remote Work Statistics of 2020. Retrieved from https://review42.com/resources/remote-work-statistics/

[9] Central Bureau Statistics. (2020, February). Perilaku Masyarakat di Masa Pandemi COVID-19. Retrieved from covid-19.bps.go.id: https://covid-19.bps.go.id

[10] Howe, D., Chauhan, R., Soderberg, A., & Buckley, M. (2021, October-November). Paradigm shift caused by the COVID-19 pandemic. Organizational Dynamics, 50(4), 100804. doi:https://doi.org/10.1016/j.orgdyn.2020.100804.

[11] Aranowski, J. (2020, August 04). Reopening offices is about more than just physical health for employees. Retrieved from ALM Benefits Pro.

[12] Hodder, A. (2020). New Technology, Work and Employment in the era of COVID-19: reflection on legacies of research. New Technology, Work and Employment, 35(3), 262-275. doi:https://doi.org/10.1111/ntwe.12173.

[13] Moher, D., Liberati, A., Tetzlaff, J., Altman, D., & The PRISMA Group. (2009). Preffered Reporting Items for Systematic Reviews and Meta-Analysis: The PRISMA Statement. PLoS Medicine, 6(7), e1000097. doi:https://doi.org/10.1371/journal.pmed.1000097.

[14] van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84, 523-538. doi:https://doi.org/10.1007/s11192-009-0146-3

[15] Piatkowski, M. (2020). Expectation and Challenges in the Labour Market in the Context of Industrial Revolusion 4.0. The Agglomeration Method-Based Analysis for Poland and Other EU Member States. Sustainability, 12(13), 5437. doi:https://doi.org/10.3390/su12135437.

[16] Ertl, B., Csanadi, A., & Tarnai, C. (2020). Getting closer to the digital divide: An analysis of impacts on digical competencies based on th German PIAAC sample. International Journal of Educational Development, 78 (October), 102259.

[17] Bana, S., Benzel, Seth G, & Solares, R. (2020, Summer). Ranking How National Economies Adapt to Remote Work. MIT Sloan Management Review, pp. 1-5.

[18] Cetrulo, A., Guarascio, D., & Virgillito, M. (2020). The Privilege of Working from Home at the Time of Social Distancing. Intereconomics, 55(3), 142-147.

[19] Sull, D., Sull, C., & Bersin, J. (2020). Five Ways Leaders Can Support Remote Work. MIT Sloan Management Review, 61, 1-10.

[20] Gibson, D. (2020). How to protect your workforce, operations and values during COVID-19 International Tax Review.

[21] Ey, & Maki-Hokkonen, M. (2020). How companies can prepare for the payroll of the future. International Tax Review.

[22] Duque, L., Costa, R., Dias, A., Pereira, L., Santos, J., & Nelson, A. (2020). New Ways of Working and the Physical Environment to Improve Employee Engagement. Sustainability, 12(17), 59-67.

[23] Obrad, C. (2020). Constraints and Consequences of Online Teaching. Sustainability, 12(17), 69-82.

[24] Peasley, M., Hochstein, B., Britton, B., Srivastava, R., & Stewart, G. (2020). Can't leave it at home? The ffects of personal stress on burnout and salesperson performance. Journal of Business Research, 117, 58-70.

[25] Molino, M., Ingusci, E., Signore, F., Manuti, A., Giancaspro, M., Russo, V., Zito, M., Cortese, C. (2020). Wellbeing Costs of Technology Use during Covid-19 Remote Working: An Investigation Using the Italian Translation of the Technostress Creator Scale. Sustainability, 12(15).

[26] Bergstrom, K. (2020). Responding to COVID-19. Benefits Quarterly, 36(2), 8-10.

[27] Faija, C., Connell, J., Welsh, C., Ardern, K., Hopkin, E., Gellatly, J., Rushton, K., Fraser, C., Irvine, A.,

Armitage, C.J., Wilson, P., Bower, P., Lovell, K., Bee, P. (2020). What influences practitioners' readiness to deliver psychological interventions by telephone? A qualitative study of behavior change using the Theoretical Domains Framework. BMC Psychiatry, 20, 1-16.

[28] Gutierrez, J., Kuperman, E., & Kaboli, P. (2020). Using Telehealth as a Tool for Rural Hospitals in the COVID-19 Pandemic Response. The Journal of Rural Health.

[29] Mihalj, M., Carrel, T., Gregoric, I., Andereggen, L., Zinn, PO., Doll, D., Stueber, F., Gabriel, RA., Urman, RD., Luedi, M. (2020). Telemedicine for preoperative assessment during a COVID 19 pandemic: Recommendations for clinical care. Best Practice & Research Clinical Anesthesiology, 34(2), 345-351.

[30] Bucsa, R.-C. (2020). Teleworking and Securing Data with VPN Technology. Economy Transdisciplinarity Cognition, 23(1), 78-85.

[31] Jiles, L., & Nathan, B. (2020). Technology and Business Continuity. Strategic Finance, 101(12), 60-61.

[32] Davidescu, A., Apostu, S.-A., Paul, A., & Casuneanu, I. (2020). Work Flexibility, Job Satisfaction, and Job Performance among Romanian Employees - Implication for Sustainable Human Resource Management. Sustainability, 12(15), 60-86.

[33] Kulak, F., & Tuzuner, V. (2020). A comparative analysis of flexible working patterns in Germany and Turkey. International Journal of Research in Business and Social Science, 9(4), 1-14.

[34] Kotera, Y., & Katia Correa, V. (2020). Psychological Impacts of the New Ways of Working (NWW): A Systematic Review. International Journal of Environmental Research and Public Health, 17(14), 5080.

[35] Baker, M. (2020). No relocatable Occupation at Increased Risk During Pandemic. American Journal of Public Health, 110(8), 1126-1132.

[36] Coombs, C. (2020). Will COVID-19 be the tipping point for the intelligent Automation of work? A review of the debate and implications for research. International Journal of Information Management.

[37] Makarius, E., Mukherjee, D., Fox, J., & Fox, A. (2020). Raising with the machines: A Sociotechnical framework for bringing artificial intelligence into the organization. Journal of Business Research, 120, 262-273.

[38] McKibbin, W., & Fernando, R. (2020). The Global Macroeconomic Impacts of COVID-19: Seven Scenarios. CAMA Working Paper (19/2020).