

The Emergence of Remote Work and Its Effects on the Corporate Climate

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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INTRODUCTION

Remote work, commonly referred to as work from home or telework, contrasts from the traditional mode of work in that employees do not commute to a centralized work environment such as an office building. Employees instead usually opt to work from their place of residence. Remote work has recently become much more popular due to the COVID-19 pandemic, which required limited human-to-human contact to minimize the spread of the contagious disease (Galanti, 2021). Remote work continues to be prevalent in the present day, with many companies continuing to transition their employees to remote work.

In the present day, many companies have indicated a permanent transition to remote work, particularly technology and information technology companies such as Airbnb and Coinbase. These companies do not have permanent office spaces for employees, and only offer a work from home option for workers. Although recent and preliminary, the concept of remote work continues to grow in popularity and shows no signs of going away. The impact of the COVID-19 pandemic has ushered in one of the most drastic shifts in the workforce dynamic in the United States since World War 2 (Ozimek, 2020).

This research paper will examine the emergence of remote work from a holistic perspective. This paper will dive into the history of remote work prior to the pandemic, as well as the reasons for the explosive popularity of remote work during the COVID-19 pandemic. The paper will examine the effects of remote work on employees, including their productivity, mood, and collaboration. Moreover, the paper will examine the effect of remote work on the corporate climate, including how remote work has affected the finances of companies as well as the future

of remote work in the corporate climate. This paper will view the topic of remote work through the lense of the Social Construction of Technology (SCOT) framework in order to further examine the causes and effects of remote work as a product of the COVID-19 pandemic.

STS FRAMEWORK

The framework that will be used to analyze the emergence of remote work will the Social Construction of Technology (SCOT) framework. SCOT traces its origins to Wiebe Bijker and Trevor Pinch article “The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other.”, published in 1987 (Klein, 2002). SCOT poisits that instead of technology determining human action, technology instead is shaped by the actions of society. Thus, the uses of technology cannot be understood without its social context.

The first concept in SCOT is *interpretive flexibility*. Interpretive flexibility, as suggested by the name, refers to the fact that different groups perceive an artifact differently, depending on the social circumstances. Technology can produce multiple outcomes depending on social circumstances of that technology’s evolution. The second concept in SCOT is *relevant social group*. Members of specific relevant social groups have similar interpretations and sense of meanings to artifacts of technology. These relevant social groups negotiate over the design of a particular piece of technology, with each seeing it as a different object. The third concept in SCOT is *closure and stabilization*. Closure and stabilization refers to the development of the technological artifact into a final object. When multiple groups collaborate to develop a piece of technology, conflict can occur when those groups disagree on their interpretations and visions for that artifact. When there is no further modification, closure is said to occur, with the artifact

stabilizing into the final product (Klein, 2002). Broadly speaking, SCOT attempts to analyze how social forces affect the development of technology, as well as its meaning.

SCOT AND REMOTE WORK

As mentioned before, the emergence of remote work, both before and after the COVID-19 pandemic will be analyzed through the lens of SCOT. There is a direct correlation between the COVID-19 pandemic and the rise in relevancy of remote work and teleconferencing. Moreover, multiple groups, from companies to employees, influenced the development of remote work technology, making SCOT appropriate to analyze the phenomenon.

BACKGROUND

Remote work started to gain relevance with the emergence of software that allowed remote collaboration, with programs such as Zoom, Webex, Slack, and Skype allowing employees to communicate and host video conferences without the need to meet face-to-face. Even prior to the COVID-19 pandemic which saw the popularity of remote work skyrocket to never before seen levels, remote work was still commonplace, with an estimated 45 million Americans working remotely in 2006, up from 41 million Americans working remotely in 2003 (Gajendran, 2007). The federal government has facilitated remote work through legislation, with the passage of laws such as the *Telework Enhancement Act of 2010*, which requires the head of every executive agency to establish policies allowing eligible employees to work remotely.

Covid-19 and Remote Work

Coronavirus disease, or more colloquially referred to and known as COVID-19, is an infectious disease caused by the SARS-CoV-2 virus, with typical symptoms being fever, dry cough, and fatigue (Shi et al, 2020). COVID-19 first emerged in Wuhan City, China in December

2019, with the World Health Organization declaring the disease a pandemic on March 11, 2020. COVID-19 is highly infectious, with over 4.3 million cases and 290,000 deaths (Nicola, 2020). To prevent further spread of the disease during the pandemic, many companies and governments attempted to minimize human-to-human contact by issuing mask mandates and encouraging social distancing. Furthermore, most companies transitioned their employees from working in the office to working remotely. Prior to the COVID-19 pandemic, 5% of Americans worked from home, whereas at the beginning of the pandemic in April 2020, up to 37% of Americans worked remotely full time. Thus in a matter of weeks, a third of the corporate workforce switched to full-time remote work, representing a drastic shift in the work climate for much of the country (Yang, 2021). Taking the transition to remote work a step further, many technology companies such as Slack and Coinbase announced long-term or permanent plans for remote work, even past the timeline of the pandemic. Allowing remote work were telecommunication companies such as Zoom Video Communications, whose application allows video conferences and telecommunication. Zoom became much more popular due to the COVID-19 pandemic, with many educational institutions and companies switching primary communications to Zoom.

IMPLICATIONS OF REMOTE WORK ON WORKERS

The effects of the emergence of remote work on workers are still being studied, largely in part due the recency of the phenomenon, and because COVID-19 is still prevalent in the present day. A valuable metric to measure employees by is their work productivity. Generally, remote work has been shown to increase worker productivity on average. According to a survey by Vodafone, a telecom group, of the 75% of companies internationally that instituted remote work policies, 83% of employees reported improvements in productivity (Hunter, 2018). There are other benefits of remote work, of which are passed on to employees. Remote work eliminates the

need for commuting to the office, saving employees time and money spent commuting to work. This is rather beneficial on the personal level; employee reported improved work satisfaction, leading to lower attrition rates (Popovici, 2020). The explosive popularity of remote work during the COVID-19 pandemic has led to what is called a “Zoom town”. A zoom town is a town or city that experienced population booms as a result of remote work. Employees of companies no longer have to reside in the city of their office, they can instead move to any place in the country, as long as they can work remotely. Employees also tend to display more positive attitudes toward their employer, with 70% of remote workers stating they would not switch employers for higher pay, compared to 60% of in-person workers, indicating greater organizational commitment (Felstead, 2017).

The effects of remote work on employees are complex, with many reported downsides to remote work as well. One reported issue employees encountered with remote work is the inability to “switch off”. Employees report trouble separating the two hemispheres of their lives: work and personal. Employees have trouble unwinding at the end of the day, presumably due to the fact that most employees are working from their residences. Around 36% of in-person employees worried about work-related problems at least some of the time, but that figure is roughly 8% higher among full-time remote workers (Felstead, 2017). This suggests that transitioning to remote work carries a risk of a negative work-life balance. Remote work also presents challenges to the team environment. In a study among Microsoft employees, researchers found that the employee collaboration network became more siloed, with an increase in asynchronous collaboration and decrease in synchronous collaboration, resulting in communication issues among employees (Yang, 2021). This is logical; if employees are not meeting face-to-face, communication will become delayed, even with live videoconferencing.

Remote work also presents challenges socially. Employees may experience social isolation and declines in mental health as a result. Social isolation is commonplace among remote workers, as employees are unable to commute to the office to socialize with their team or with fellow coworkers. This can have a strain on workers' mental health. Research found that remote work increases the probability of feelings of sadness and depression (Bertoni, 2022). Given that remote work is becoming embedded in the work dynamic of the country, this is of particular concern. In households where both spouses worked remotely, this effect was further exacerbated. This in turn has potential to affect productivity and work satisfaction in the long run, further making the effects of remote work on workers more obscure (Toscano, 2020).

IMPLICATIONS OF REMOTE WORK ON COMPANIES

On the other side, it is also important to view the impacts of remote work in order to get a more holistic perspective of its effects. It is important to note that the employees and employers have a symbiotic relationship. That is, generally, if employees are happy and are more productive, that benefit also goes to the employer. However, it is also important to note that the explosion of remote work coincided with the COVID-19 pandemic, so it is also important to look at the effect of the pandemic on corporate America.

One of the most obvious benefits of remote work is decreased demand for office space. Remote work has been shown to increase productivity by up to 15-20% for employees, while saving companies significant funds that would otherwise be dedicated to renting office spaces. Virtual offices offer companies flexibility in location, workforce size, and reductions in overhead spending (Snizek, 1995). Moreover, remote work allows companies to recruit more highly qualified candidates who would otherwise not join the company due to preference for remote work. On the environmental side, decreased need for commuting helps save on use of natural

resources such as oil or gasoline. As said before, if employees benefit from remote work, then so do their employees, and vice versa.

However, it is difficult to quantify the exact benefits of remote work for companies. This is due to the fact that the emergence of remote work was a direct result of the COVID-19 pandemic. On February 20, 2020, equity markets across the world crashed due to instability from the COVID-19 pandemic, severely hampering the finances of most sectors of the economy. In the worst such drop, on March 16, the DJI dropped 12.93%, hurting the economy. Many companies. As such, because there were many factors at play during the time of the emergence of remote work, research is still ongoing as to the effects of the pandemic and remote work on companies.

SCOT AND REMOTE WORK

This paper will use SCOT to explain how social forces coalesced to influence the development of technology used to enable remote work. It is important to understand that the development of technology occurs through multiple intermediate stages, with each of the relevant social groups, also called *stakeholders*, contributing to the iterative process. In the case of the development of remote work, there are multiple stakeholders that contributed to the stabilization of remote work technology, namely videoconferencing technology. Shown below is a diagram of the stakeholders in the development of videoconferencing technology.

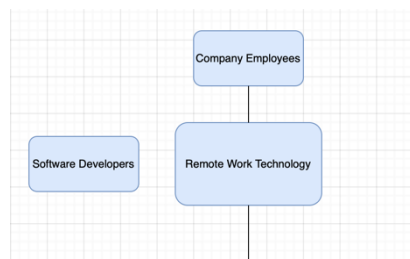


Figure 1: SCOT diagram of relevant social groups (Tran, 2023)

The main stakeholders in this case are the companies who would prefer to use videoconferencing to enable remote work for their employees, the employees, and the software developers who create the software. It is also important to state the social context for which development is occurring. Videoconferencing and videotelephony technology existed prior to the COVID-19 pandemic which ushered in its popularity. For example, services such as Skype became extremely popular in the early 2000s, allowing users to communicate with each other wirelessly. Even prior to the pandemic, there was demand, although limited in scope, for remote work. IBM was one of the earliest pioneers in remote work, when they moved five of their employees to full-time remote work, and by 2009, moved 40% of its workforce to remote work (Allen, 2020). Other companies such as J.C. Penney, American Express, and General Electric also experimented with remote work. This indicates that there was non-trivial demand for remote work technology such as teleconferencing, even before the pandemic. As mentioned before, one of the possible reasons for this is due to the fact that companies may need to save funds that would be dedicated to renting office space. Nevertheless, a plethora of companies had a demand for remote work technology.

Employees also had a demand for remote work technology. Shorter or nonexistent commute times as mentioned before in the paper coupled with improved productivity and mood are contributing factors. Both stakeholders required the ability to host a “virtual conference”, that is, a meeting of employees that allowed collaboration similar to in-person conferences. Services such as Zoom and Microsoft Teams offered the ability to do videoconferencing, and as such, exploded in popularity during the COVID-19 pandemic.

CONCLUSION

It is safe to say that remote work is not going anywhere anytime soon. What is interesting to note however, is that many companies are instituting a “hybrid” work option, where employees commute to the office some days of the week and work remotely the rest of the week. This has become more prevalent in the postpandemic era, and seeks to combine the benefits of both in-person and remote work. Examples of companies integrating into a hybrid work environment are Microsoft, Amazon, and Uber (Verma, 2023). The emergence of hybrid work coincides with the present day, and as such, research is still being conducted regarding its effects.

REFERENCES

- Yang, L., Holtz, D., Jaffe, S., Suri, S., Sinha, S., Weston, J., Joyce, C., Shah, N., Sherman, K., Hecht, B., & Teevan, J. (2021). The effects of remote work on collaboration among information workers. *Nature Human Behaviour*, 6(1), 43–54. <https://doi.org/10.1038/s41562-021-01196-4>
- Galanti, T., Guidetti, G., Mazzei, E., Zappalà, S., & Toscano, F. (2021). Work from home during the COVID-19 Outbreak. *Journal of Occupational & Environmental Medicine*, 63(7). <https://doi.org/10.1097/jom.0000000000002236>
- Ozimek, A. (2020). The future of remote work. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3638597>
- Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, 92(6), 1524–1541. <https://doi.org/10.1037/0021-9010.92.6.1524>
- Shi, Y., Wang, G., Cai, X.-peng, Deng, J.-wen, Zheng, L., Zhu, H.-hong, Zheng, M., Yang, B., & Chen, Z. (2020). An overview of COVID-19. *Journal of Zhejiang University-SCIENCE B*, 21(5), 343–360. <https://doi.org/10.1631/jzus.b2000083>
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A Review. *International Journal of Surgery*, 78, 185–193. <https://doi.org/10.1016/j.ijssu.2020.04.018>

Hunter, P. (2018). Remote working in research. *EMBO Reports*, 20(1).

<https://doi.org/10.15252/embr.201847435>

Flores, M. F. (n.d.). Understanding the challenges of remote working and it's impact to workers.

ijbmm. Retrieved March 17, 2023, from <http://www.ijbmm.com/paper/Nov2019/824043604.pdf>

Popovici, V., & Popovici, A. (n.d.). Remote work revolution: Current opportunities and

challenges for ... Retrieved March 17, 2023, from [https://stec.univ-](https://stec.univ-ovidius.ro/html/anale/RO/2020/Section%203/35.pdf)

[ovidius.ro/html/anale/RO/2020/Section%203/35.pdf](https://stec.univ-ovidius.ro/html/anale/RO/2020/Section%203/35.pdf)

Felstead, A., & Henseke, G. (2017). Assessing the growth of remote working and its

consequences for effort, well-being and work-life balance. *New Technology, Work and*

Employment, 32(3), 195–212. <https://doi.org/10.1111/ntwe.12097>

Bertoni, M., Cavapozzi, D., Pasini, G., & Pavese, C. (2022). Remote working and mental health during the first wave of the COVID-19 pandemic. *SSRN Electronic Journal*.

<https://doi.org/10.2139/ssrn.4111999>

Toscano, F., & Zappalà, S. (2020). Social isolation and stress as predictors of productivity perception and remote work satisfaction during the COVID-19 pandemic: The role of concern about the virus in a moderated double mediation. *Sustainability*, 12(23), 9804.

<https://doi.org/10.3390/su12239804>

William E. Snizek Virginia Polytechnic Institute and State University, Snizek, W. E., Virginia Polytechnic Institute and State University, & Metrics, O. M. V. A. (1995, September 1).

Virtual offices: Some neglected considerations: *Communications of the ACM*: Vol 38, no 9.

Communications of the ACM. Retrieved March 17, 2023, from

<https://dl.acm.org/doi/10.1145/223248.223252>

Klein, H. K., & Kleinman, D. L. (2002). The social construction of Technology: Structural Considerations. *Science, Technology, & Human Values*, 27(1), 28–52.

<https://doi.org/10.1177/016224390202700102>

Joseph Klett. 20 July 2018, "SCOT", STS Infrastructures, Platform for Experimental Collaborative Ethnography, last modified 20 July 2018, accessed 17 March 2023.

<https://stsinfrastructures.org/content/scot>

Allen, N. (2020, December 7). The pioneers of modern remote work. wrkfrce. Retrieved March 17, 2023, from <https://wrkfrce.com/the-pioneers-of-modern-remote-work/>

Verma, A., Venkatesan, M., Kumar, M. and Verma, J. (2023), "The future of work post Covid-19: key perceived HR implications of hybrid workplaces in India", *Journal of Management Development*, Vol. 42 No. 1, pp. 13-28. <https://doi.org/10.1108/JMD-11-2021-0304>