

ANALYZING THE IMPACT OF TELEWORKING FACTORS ON
EMPLOYEE PRODUCTIVITY DURING THE COVID-19
PANDEMIC AMONG OFFICE WORKERS IN
FENGTAI DISTRICT, BEIJING, CHINA



MASTER OF BUSINESS ADMINISTRATION IN DIGITAL ECONOMICS AND
MANAGEMENT INNOVATION
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A INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS
ADMINISTRATION
IN DIGITAL ECONOMICS AND MANAGEMENT INNOVATION (INTERNATIONAL
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ACADEMIC ADMINISTRATION AND DEVELOPMENT MAEJO UNIVERSITY
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SIYU PENG

THIS INDEPENDENT STUDY HAS BEEN APPROVED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION
IN DIGITAL ECONOMICS AND MANAGEMENT INNOVATION (INTERNATIONAL PROGRAM)

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ชื่อเรื่อง	การวิเคราะห์ผลกระทบปัจจัยการทำงานทางไกลต่อประสิทธิภาพการทำงาน ในช่วงการแพร่ระบาดของโควิด-19 ของพนักงานออฟฟิศ ในเมืองเฟิงไถ กรุงปักกิ่ง ประเทศจีน
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บทคัดย่อ

โควิด-19 ส่งผลกระทบอย่างมีนัยสำคัญต่อสุขภาพการทำงานทางสังคมและอุตสาหกรรมทั่วโลก ซึ่งนำไปสู่การล็อกดาวน์และการทำงานจากที่บ้านเพิ่มชิ้นการศึกษาที่ใช้วิธีการเชิงปริมาณเพื่อกำหนดความสัมพันธ์ระหว่างตัวแปรอิสระเช่นปัจจัยการทำงานทางไกลปัจจัยทางประชากรศาสตร์และตัวแปรที่ขึ้นอยู่กับเช่นผลผลิตของพนักงานผู้เขียนใช้พนักงานที่ทำงานจากที่บ้านในเขตเฟิงไท่กรุงปักกิ่งในช่วงที่มีการแพร่ระบาดเป็นประชากรวิจัยสำรวจพนักงานที่ทำงานจากที่บ้าน 400 คนจากเขตเฟิงไท่กรุงปักกิ่งนักวิจัยแจกจ่ายแบบสอบถาม 400 ชุดแบบสอบถามแบ่งออกเป็นสี่ส่วนซึ่งได้รับการออกแบบโดยปัจจัยตัวแปรอิสระและปัจจัยตัวแปรที่ขึ้นอยู่กับและใช้ SPSS เวอร์ชัน 27.0 สำหรับการวิเคราะห์ข้อมูลผลการวิเคราะห์จะถูกนำเสนอในการวิเคราะห์เชิงพรรณนาและการวิเคราะห์การถดถอยหลายครั้งผลลัพธ์ข้อมูลแสดงให้เห็นว่าสมมติฐานทั้งสามได้รับการจัดตั้งขึ้นและทั้งหมดส่งผลในเชิงบวกต่อตัวแปรที่ขึ้นอยู่กับกับบทความนี้วิเคราะห์และสรุปสถานการณ์ปัจจุบันของการทำงานจากที่บ้านในประเทศจีนในช่วงที่มีการแพร่ระบาดชี้ให้เห็นถึงปัญหาหลายประการที่ต้องเผชิญกับรูปแบบโฮมออฟฟิศในประเทศจีนและหารือเกี่ยวกับวิธีการพัฒนาที่ยั่งยืนของโฮมออฟฟิศหลังการแพร่ระบาดและส่งเสริมการดำเนินงาน ทางเศรษฐกิจที่มั่นคงของรัฐบาลและรัฐวิสาหกิจ แต่เอกสารยังคงมีข้อจำกัดบางประการเช่นขอบเขตของการ ศึกษาที่มีจำกัด

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ABSTRACT

COVID-19 has significantly impacted global health, social functioning, and industries, leading to lockdown and increased work from home. This study used a quantitative method to determine the relationship between independent variables, such as teleworking factors, demographic factors, and dependent variables, such as employee productivity. The authors used employees working from home in Fengtai District, Beijing during the epidemic as the research population, surveyed 400 work-from-home employees from Fengtai District, Beijing. The researcher distributed 400 questionnaire. The questionnaire is divided into four parts, which are designed around independent variable factors and dependent variable factors. and use SPSS version 27.0 for data analysis. The analysis results are presented in descriptive analysis and multiple regression analysis, the data results show that all three hypotheses are established, and all positively affect the dependent variable. This paper analyzes and summarizes the current situation of work from home in China during the epidemic period, points out several problems faced by the home office model in China, and discusses how to develop the sustainable development of home office after the epidemic, and promote the stable economic operation of the government and enterprises. But the paper still has some limitations, such as the scope of this study is limited.

Keywords : work from home, teleworking, employee productivity, covid-19, digital technology



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CHAPTER I

INTRODUCTION

Research Background

Globally, as of 11:43 PM CEST, 9 August 2023, the World Health Organization (WHO) has reported 769,369,823 confirmed cases of COVID-19, resulting in 6,954,336 deaths. China, as a significant contributor to these numbers, has reported 99,300,923 cases. As we approach 2022, the continued prevalence of COVID-19 and its concomitant economic and social impacts present a persistent and severe threat to the world. The ongoing global economic recovery is uneven, exacerbated by disparities in vaccination opportunities, potentially deepening societal divisions and geopolitical tensions. Alarming, only 6% of the poorest 52 countries, which represent 20% of the global population, have achieved significant vaccination rates.

With these global disparities widening, the international and domestic landscape is becoming increasingly tense, amplifying the chain effects of the pandemic and giving rise to a set of common challenges necessitating intricate coordination. These challenges encompass critical areas such as strengthening climate action, enhancing digital security, facilitating recovery, fortifying social cohesion, and effectively managing space competition (World Economic Forum, 2022). Among these challenges, China faces considerable pandemic-related risks. According to a survey of opinions by executives conducted by the World Economic Forum (EOS, as cited in World Economic Forum, 2022), the primary risks in China include extreme weather events, asset bubbles in major economies, infectious diseases, and potential collapse or inadequacy of the social security system in conjunction with geopolitical and strategic resource challenges. Since December 2019, China has maintained continuous surveillance of influenza and related diseases, leading to the identification of numerous cases of viral pneumonia, all diagnosed as viral pneumonia or lung infection. On January 20, 2020, Chinese President Xi Jinping issued significant directives concerning the pandemic caused by the novel coronavirus, underscoring the paramount importance of prioritizing people's life safety and health, and unequivocally advocating for curtailing the spread of the pandemic (360 Encyclopedia, 2020). In response, the State Council's joint defense and joint control mechanism conducted a pivotal video conference, orchestrating a comprehensive deployment strategy for the prevention and control of pneumonia caused by the novel coronavirus. To further guide local responses to

the pandemic, the National Health and Health Commission established a leading group dedicated to the response and management of pneumonia caused by the novel coronavirus (360 Encyclopedia, 2020). On January 31, 2020, the Beijing Municipal People's Government issued guidelines regarding the flexible arrangement of work for enterprises during the prevention and control of Novel Coronavirus Pneumonia. The directive mandated that, "before 24:00 on February 9, 2020, other enterprises must arrange for employees to work from home through telephone or online means. Enterprises unable to facilitate work from home should adopt flexible working hours to avoid personnel congregations or concentrations" (The people's government of Beijing municipality, 2020). Additionally, the directive stated that employees from enterprises in Hubei, who were in Hubei due to business trips, visiting relatives, or returning to their hometown, must strictly adhere to the pandemic prevention and control measures imposed by the local Hubei government. They were not permitted to leave Hubei in violation of the regulations. Workers returning to Beijing from Hubei, within 14 days prior to departing the Hubei region or those who had contact with individuals from the Hubei area, were instructed to comply with the guidelines outlined by the General Office of the Beijing Municipal People's Government to reinforce pandemic prevention and control efforts for key groups, locations, and organizations (Beijing ZhengBan, 2020). As depicted in Table 1, China witnessed a significant 8.7% decline in GDP growth rate during the first quarter of 2020, causing substantial international repercussions. The impact was particularly evident in the subsequent quarter of 2020, as businesses grappled with supply chain disruptions, facing delays in the supply of intermediate and manufactured goods. However, a growing concern emerged regarding the potential transformation of virus-induced supply shocks into longer-term and more extensive demand shocks. This concern stemmed from reduced consumer and business activity, leading to lower economic growth rates across various countries and regions.

During the second quarter of 2020, economic activity experienced a decline in nearly all nations, except China, which displayed a remarkable 10% growth rate rebound from the preceding quarter. China stood out as one of the few countries reporting an upswing in economic activity, ultimately contributing to an overall positive growth trend in 2020. In stark contrast, many countries faced a historic decline in economic growth during the same period. Notably, India witnessed a substantial 25% decline in GDP (Congressional Research Service, 2021).

Table 1 Change in Gross Domestic Product by Major Country

Country	2019	2010	2020				2021	
			Q1	Q2	Q3	Q4	Q1	Q2
Argentina	-2.1%	-9.9%	-4.1%	-15.8%	13.2%	4.4%	2.6%	-
Australia	-0.3	-2.5	-0.3	-7.0	3.6	3.2	1.9	0.7
Austria	1.4	-6.3	-2.6	-10.6	11.6	-3.1	-1.1	4.3
Belgium	1.8	-6.3	-3.3	-11.9	11.8	-0.1	1.1	1.7
Brazil	-	-	-2.3	-9.0	7.7	3.1	1.2	-0.1
Canada	1.9	-5.3	2.0	-11.3	9.1	2.2	1.4	-0.3
Chile	0.9	-5.8	1.9	-12.7	5.4	6.5	3.4	1.0
China	6.1	2.3	-8.7	10.0	2.8	3.0	0.4	1.3

Source: Organization for Economic Cooperation and Development, Quarterly National Accounts Dataset, September 17, 2021.

In the context of the Chinese economy, the Congressional Research Service has highlighted the enduring economic impacts of the COVID-19 pandemic. These impacts encompass sluggish domestic consumption, a gradual recovery in key export markets, and a reliance on government spending and exports to initially stimulate growth. To bolster economic growth, China has allocated an estimated \$506 billion in stimulus since February 2020, concurrently raising the government's budget deficit target to a historic 3.6% of GDP, a significant increase from 2.8% in 2019 (Congressional Research Service, 2021).

The COVID-19 pandemic, which commenced in December 2019, has sustained its spread in China and numerous countries globally, sparking widespread concern across societies. To mitigate the adverse effects of this pandemic, most provinces and cities in China have implemented preventive measures, such as home isolation, transportation restrictions, and extensions of the Spring Festival holiday. These actions have significantly impacted China's output across various sectors, international trade, and labor employment, ultimately resulting in substantial losses to the Chinese economic system throughout 2020 (Tan, Wu, Guo, & Santibanez-Gonzalez, 2021).

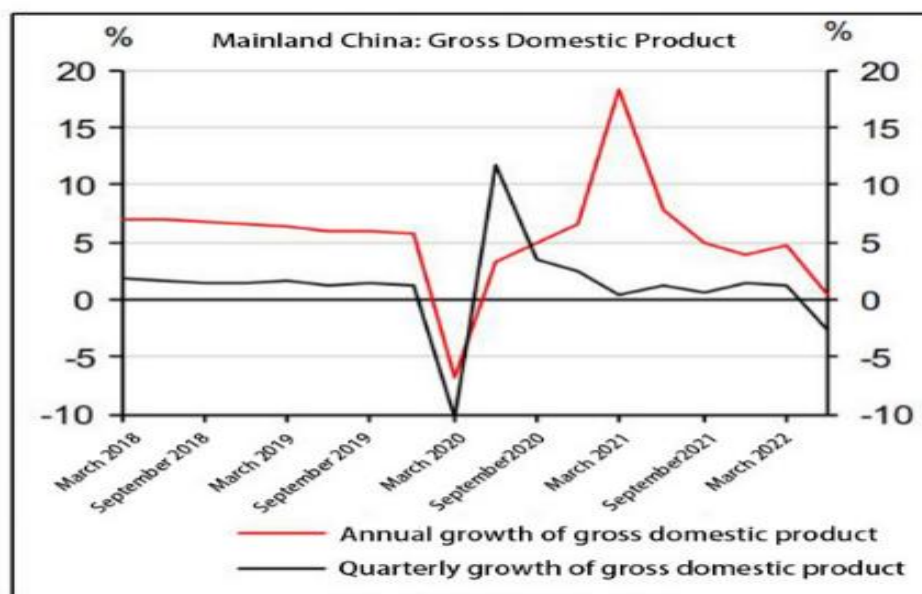


Figure 1 Mainland China: Gross Domestic Product

Source: CEIC, HSBC, August 5th, 2022

The recurring waves of the pandemic have presented considerable challenges, impacting both the daily lives and spatial dynamics of individuals. Simultaneously, the pandemic and the subsequent series of government policies have exerted substantial effects on economic development. In the realm of the global economy, the Congressional Research Service noted a pivotal turning point: "As infectious cases surged in late February 2020, governments implemented unprecedented measures in March 2020, initiating social activity lockdowns to curb the pandemic's spread, inadvertently triggering a worldwide economic recession" (Congressional Research Service, 2021).

On June 3, 2020, the State Council of China issued the economic policy "Further Improving the Rent Reduction Work for Small and Micro Enterprises and Individual Industrial and Commercial Businesses in the Service Industry." This policy aimed to alleviate the rent burden on small and micro enterprises and individual businesses in the service sector, aligning with the directives outlined during the 91st executive meeting of the State Council. In adherence to the guidance issued by the National Development and Reform Commission and other relevant departments, the policy was crafted to support these entities, ultimately easing the pressure of housing rent. The State-owned Assets Supervision and Administration Commission of the State Council (2020) emphasized the importance of implementing effective rent

relief measures within central enterprises, providing vital support to small and micro enterprises, and individual industrial and commercial establishments, thus alleviating operational burdens. The imperative for all central enterprises to grasp the significance of addressing the pandemic's repercussions and proactively aiding small and micro enterprises, along with individual businesses in the service sector, in alleviating rent pressures, cannot be overstated. It necessitates a proactive approach in supporting small and micro enterprises within the service industry, playing a pivotal role in contributing positively to society's collective response to the pandemic's impact and ensuring the stable functioning of the national economy.

Moreover, in a bid to minimize crowds and potential spread of the virus, the Beijing government instituted widespread cancellations of various events, including dinners and wedding banquets during the Spring Festival. This led to the closure of a substantial number of restaurants and supermarkets. During the 2019 Spring Festival Golden Week, the retail and catering industry recorded nationwide sales totaling 1005 billion yuan. However, the onset of the COVID-19 pandemic drastically altered the landscape, with consumption nearly coming to a halt during the 2020 Spring Festival holiday that spanned ten days. Consequently, a significant decline in revenue for the retail and catering industry was anticipated (Xiaoyan, 2020). In February 2020, Jia Guolong, president of Xibei Oat Noodle Village, conveyed a grim outlook, stating, "If the pandemic persists, Xibei may not survive three months, even with financial support from a bank." By 3:30 PM on February 1, among the 367 Xibei outlets nationwide, a total of 45 normal stores were operational (5 without takeout services, primarily airport-based, and 40 providing in-store takeout), 195 were partially open, and 127 remained closed. What heightened Xibei's concerns was the plight of over 20,000 unemployed employees. Abiding by national regulations, normal salaries should be disbursed, amounting to 156 million yuan monthly. With the current financial situation, factoring in loans and existing funds, Xibei could sustain its operations for a mere three months. This stark reality faced by a leader in the catering industry sheds light on the immense challenges confronting smaller catering and retail enterprises.

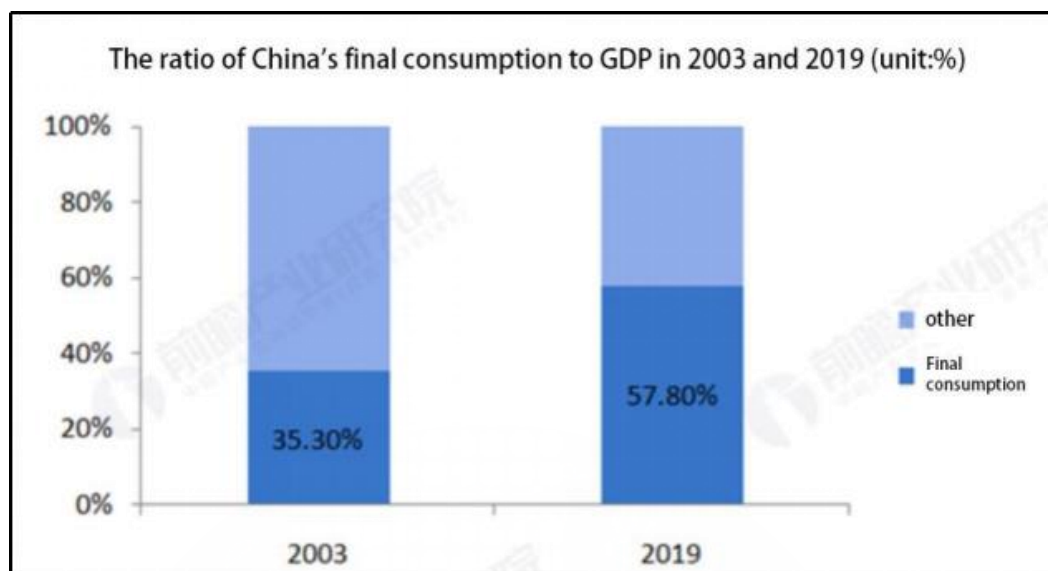


Figure 2 The ratio of China's final consumption to GDP in 2003 and 2019

Source: National Bureau of Statistics, February 07, 2020

According to the National Bureau of Statistics, the continuous expansion of the tertiary sector has triggered a decline in investment, concurrently fostering a steady increase in consumption, constituting 57.8% of the economy. Consumption has emerged as the primary engine of economic growth, signifying a structural shift in China's economy from being investment-driven to consumer-driven. This shift has underscored the profound impact that consumption wields on the economy (Xiaoyan, 2020).

As we grapple with an uncertain return to normalcy, our nation must persist in its development efforts. To invigorate the economy, both the government and corporations are actively seeking an effective organizational and employee model that aligns with government policies and fulfills work objectives. In this pursuit, the widespread adoption of the home office model has emerged as a viable solution. Even post the initial COVID-19 outbreak, organizations began to embrace this work model due to its potential for cost savings in infrastructure and management, traditionally associated with physical establishments (Deepa, Babe, Balvinder, Sujatha, and Danish Khan, 2022).

Digital technology has played a pivotal role in propelling the development of the digital economy and facilitating the practice of remote work. Amidst the influence of COVID-19, digital systems have given rise to numerous office and

communication channels. The Telecommuting Report (2020) highlighted that telecommuting product consistently ranked among the top downloads across app stores since work resumed on February 3. By February 5, Alibaba's mobile office app had surpassed WeChat for the first time, claiming the top spot in Apple's App Store list. Recently, Tencent conference also secured a position on the App Store's free list, surpassing both DingTalk and enterprise WeChat. Whether it's remote life, telecommuting, remote learning, remote medical consultations, or even remote leisure and entertainment, these facets are becoming increasingly intertwined with our daily lives. Office software like OneNote, Slack, Zoom, Tencent's enterprise WeChat, Alibaba's DingTalk, ByteDance's Feishu, among others, have become familiar to us (Hou and Zhang, 2022). According to QuestMobile data for March 2022, DingTalk's monthly active users (MAU) reached 220 million, with daily active users (DAU) exceeding 100 million, securing the top spot in the efficient office track, surpassing the peak in 2021. Enterprise WeChat had an MAU of 98.86 million and a DAU of 50.77 million, ranking second. Tencent conference recorded an MAU of 77.95 million and a DAU of 12.41 million, while ByteDance's Feishu also achieved an MAU of 6.11 million (Ruolin, 2022).

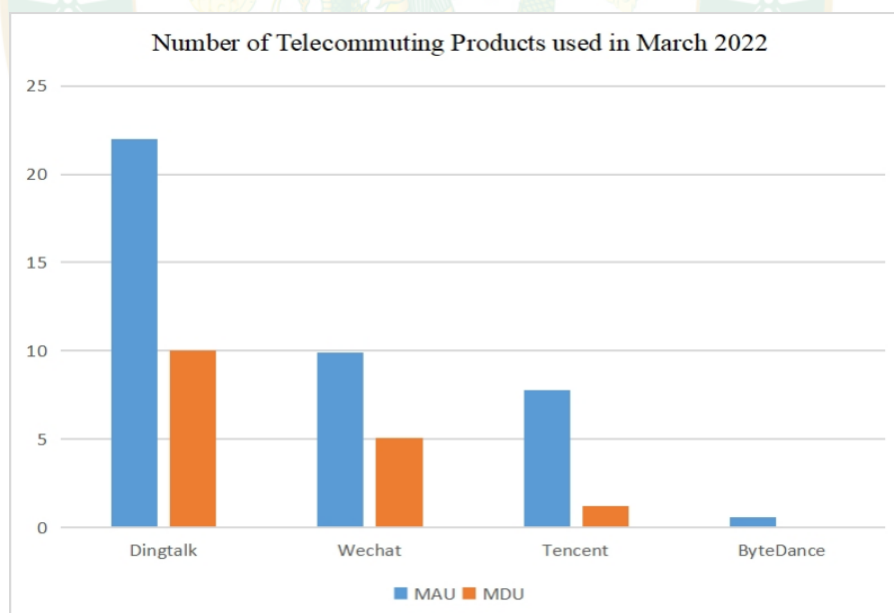


Figure 3 Number of Telecommuting Products used in March 2022

Source: QuestMobile data April 18, 2022

Since the outbreak of the COVID-19 pandemic, policies and technologies have progressively matured and diversified, significantly escalating the number of individuals engaged in remote work. This trend reached its pinnacle in July 2021.

Simultaneously, Zhaopin identified a substantial surge in the recruitment of remote jobs triggered by the pandemic. Among various company sizes, those with 20-99 employees exhibited the highest release of remote job opportunities—constituting 45% in 2019, 37% in 2020, and 36% in 2021. Following closely were companies with 100-499 employees, accounting for 30% of their remote job listings in 2019, 26% in 2020, and 22% in 2021. Notably, the pandemic has propelled larger companies to embrace remote hiring practices. Enterprises with 1000-9999 employees experienced an upsurge in their share of telecommuting job listings, increasing from 7% in 2019 to 14% in 2020 and stabilizing at 13% in 2021. Moreover, businesses with over 10,000 employees, initially contributing a mere 2% of telecommuting job openings in 2019, saw a considerable rise to 7% in 2020 and a continued increase to 14% in 2021 (Zhaopin Recruitment and National School of Development, 2022).

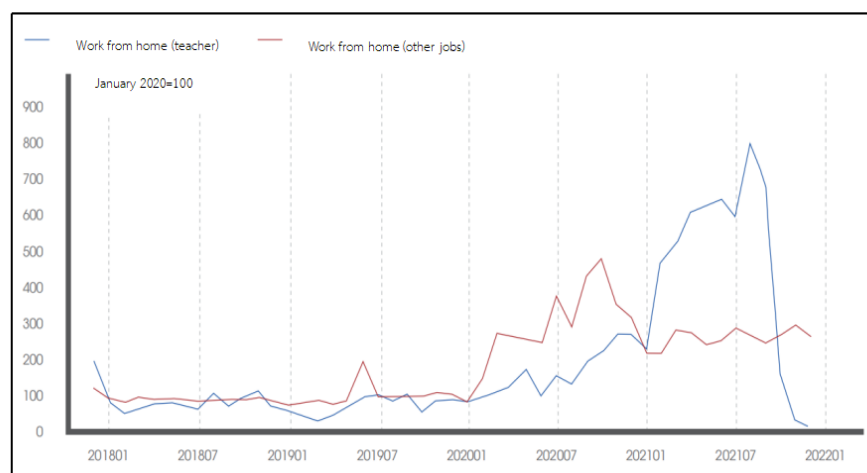


Figure 4 Number of remote home jobs recruited.

Source: Zhaopin recruitment, May 13, 2022

In conclusion, considering the unique economic circumstances and resulting policy shifts outlined above, it becomes evident that the home office mode holds significant research value and is sustainable. This model is not only viable during current emergency situations but also stands to consistently generate value for both

society and the nation in routine work settings. Research Problem. On October 19, 2021, in response to a new confirmed COVID-19 case in Fengtai District, Beijing, the local government promptly activated the emergency response mechanism:

First, we swiftly initiated the pandemic prevention and control emergency response. All establishments in the area suspended leaves, and all personnel returned to their duties to reinforce the frontline workforce and effectively manage pandemic prevention and control."

With the advent of a second pandemic outbreak, on January 28, 2022, the People's Government of Fengtai District, Beijing, issued a notice titled "Notice on Enhancing Control Measures":

In order to curb the transmission of the pandemic and ensure effective control measures, the following actions have been prescribed for certain areas within the region: Employees are, in principle, required to work from home. Only essential personnel are allowed to operate within office premises" (Fengtai District People's Government of Beijing Municipality, January 28, 2022). The state and local government in Fengtai District, Beijing, have implemented flexible employment policies and regulations, prompting public institutions to issue pandemic prevention and control advisories. In the author's company, the HSE (Health, Safety, and Environment) department issued a notice on June 6, stating that all personnel, except those residing or working in specific sealed (control) areas in Fengtai District and Changping District (as designated by the government), were to resume on-site office work. If residential communities required employees to work from home, these community guidelines were to be followed ("Fengtai Office area continues to work at home"). Additionally, commuters residing in Tianjin were instructed to return to on-site work the following Monday, provided they produced a negative nucleic acid test report. Those living in the affected areas of Jinnan District in Tianjin were restricted from entering Beijing, while others were encouraged to work remotely, unless their presence on-site was essential. Furthermore, individuals working from home were required to register their health status using the "Beijing Health Treasure" APP.

During the pandemic, telecommuting emerged as a vital approach to ensure economic stability and sustained employment. Lockdowns and quarantines necessitated remote work, making online work the prevailing norm. In March 2020, the General Office of the State Council issued the first Opinions on the Implementation of Strengthening Stable Employment in response to the Impact of COVID-19. This directive advocated for flexible employment through various avenues, aligning with the employment-first policy. Subsequently, in July 2020, the General

Office of the State Council released further opinions supporting flexible employment through multiple channels. These opinions emphasized the need to endorse new employment forms and create conducive conditions for employees to work from home, engage in remote work, or pursue part-time roles (Zhaopin Recruitment and National School of Development, 2022). Consequently, both governmental bodies and companies adapted their office policies to accommodate flexible working arrangements, including remote work from home.

Telecommuting reflects the evolving landscape of economic development and embodies the imperative of capital expansion through technological advancements, aligning with contemporary labor relations (Kailiang and Xia, 2021). Moreover, it represents a strategic response to major public health crises and embodies a flexible societal and economic adjustment mode, applicable in both normal and abnormal circumstances (Ruoxuan and Siyan, 2020). Notably, telecommuting employment has seen substantial growth in China. In 2005, China had approximately 1.8 million telecommuting employees, a number that escalated to 3.6 million by 2014, reflecting an average annual compound growth rate of 8% over nine years. Assuming this growth trajectory, the number of telecommuting employees was estimated to be around 4.9 million in 2018. The proliferation of the internet, big data, cloud computing, and other foundational technologies in China suggests a sustained high growth rate for the telecommuting market in 2018-2019. Preliminary estimates indicate that the market size in 2019 nearly reached 22.94 billion yuan, encompassing close to 5.29 million telecommuters.

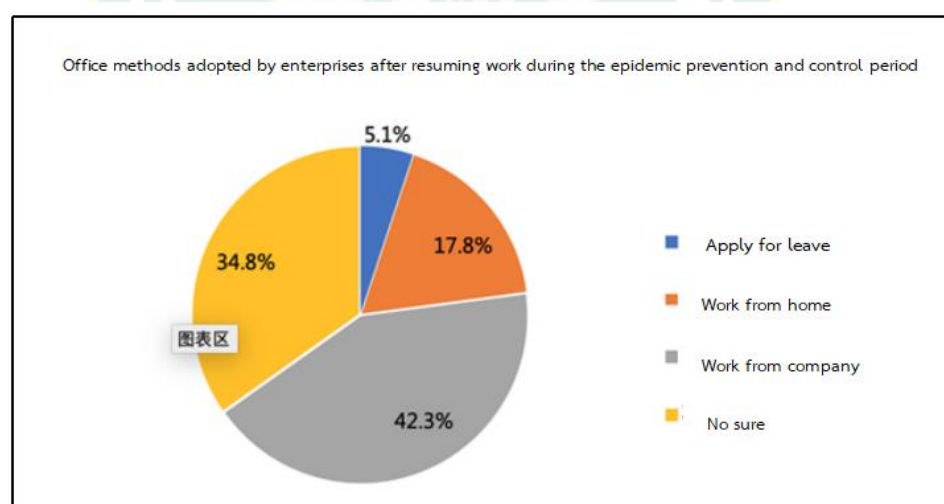


Figure 5 Office methods adopted by enterprises after resuming work during the pandemic prevention and control period

Source: Zhaopin recruitment, March 03, 2020

The impact of the COVID-19 pandemic has been instrumental in accelerating the adoption and growth of telecommuting, significantly influencing the market size and rate of increase in 2020. China experienced a notable surge in the penetration rate of telecommuting due to the pandemic. Data from Alibaba's online office platform revealed that, upon the resumption of work on February 3, over 10 million enterprises and more than 200 million individuals embraced telecommuting (Xinhua Finance, 2020).

Regarding work arrangements upon returning to offices, survey data targeting professionals indicated that 42.3% of companies leaned towards maintaining the traditional work mode, while 17.8% preferred adopting a work-from-home approach. Additionally, 5.1% were inclined to allow employees to apply for continued leave, and 34.8% had yet to finalize their decisions regarding the future work mode (Tencent, 2020).

The outcomes of this study are of particular interest to researchers due to the efficacy of remote work as a means to drive organizational, governmental, and economic growth during emergency situations. From a national standpoint, remote telecommuting aligns with the broader strategy of promoting long-term population growth and achieving demographic balance (Zhaopin recruitment and National School of Development, 2022). On the enterprise front, telecommuting showcases heightened efficiency, especially within the evolving paradigm of the remote era, where data allocation, technological advantages, and platform synergies offer abundant possibilities for both organizations and individuals. By embracing telecommuting, enterprises can significantly reduce operational costs (Hou Yinxia, Zhang Qingtong, 2022). However, the impacts of remote work (WFH) on employee productivity and performance remain only partially understood, with existing studies being fragmented and contextualized differently (Anakpo, Nqwayibana, and Mishi, 2023). While these studies exhibit variations, it is encouraging that working from home presents more advantages than drawbacks and has the potential to unlock employee capabilities, becoming a driving force for organizations. In the context of COVID-19 and the aforementioned policies, China has conducted extensive analyses on the pros and cons of working from home, exploring various tools, technologies, and the delicate balance between work and home life. However, there is a dearth of research focusing on the factors affecting the efficiency of remote work, especially within the domestic setup in Beijing during COVID-19.

Therefore, this study aims to investigate the fundamental aspects and traits of individuals working from home in Beijing, with a specific emphasis on analyzing the

factors influencing the willingness and efficiency of remote work. Additionally, it seeks to discuss the feasibility of implementing a home office mode for daily professional activities, aiming to help employees adapt to changes in their living and working environments. This adaptation is a critical research direction in contemporary times.

Research Questions

1. How do demographic factors influence employee productivity during the COVID-19 pandemic among office workers in FENGTAI City, China?.
2. What is the relationship between teleworking factors and employee productivity during the COVID-19 pandemic among office workers in FENGTAI City, China?.

Research Objectives

1. To investigate the level of demographic factors, teleworking, behavioral and employee productivity
2. To assess the influence of teleworking factors on employee productivity

Expected the Results

1. Enhanced Efficiency and Productivity for Enterprises: Anticipate that enterprises, guided by research insights, will implement teleworking strategies and tailor their policies to improve efficiency. This will lead to heightened employee productivity, aiding in the recovery and sustainable operation of businesses post-pandemic.
2. Demographic Factors and Employee Productivity: Anticipate that certain demographic factors, such as age, income, and job position, will have varying effects on employee productivity during the COVID-19 pandemic in FENGTAI City. Predict that higher income levels and certain job positions may positively correlate with increased productivity.
3. Teleworking Factors and Employee Productivity: Expect that specific teleworking arrangements, such as a well-equipped home-based telecommuting setup, may positively impact employee productivity. Envisage that the accessibility

and convenience offered by teleworking options like satellite office and mobile work may enhance overall productivity.

4. Combined Influence of Demographics and Teleworking: Foresee an interactive effect where certain demographic factors might interact with teleworking arrangements, affecting employee productivity differently. For instance, younger employees might benefit more from mobile work options compared to older age groups.

5. Balanced Approach for Optimal Productivity: Envision that achieving a balance between teleworking and demographic factors is essential for optimizing employee productivity. Predict that finding the right mix of teleworking arrangements based on demographic profiles will lead to improved overall productivity.

6. Policy Implications and Recommendations: Envision providing recommendations to policymakers based on the research findings. Suggest strategies to tailor teleworking policies considering demographic diversity for enhancing productivity and fostering a conducive work environment during the COVID-19 pandemic.

Scope of the Study

Scope of Demography

400 employees in Fengtai District, Beijing, WFH

By the end of 2019, 148,000 people were employed in Fengtai District of Beijing (Fengtai District People's Government of Beijing Municipality, 2019). At the end of 2022, the permanent resident population of Fengtai District of Beijing was 2,012,000 (Fengtai District People's Government of Beijing Municipality, 2023). This study used the cluster sampling method. In addition to the author's unit, two work units in Fengtai District, Beijing, which have been working with people at home during the COVID-19 pandemic, were randomly selected to investigate all the employees of these units.

Scope of Area

This study is mainly aimed at the investigation of the employees in Fengtai District of Beijing during the pandemic period, and the discussion on the efficiency of homework under the support of digital technology.

Scope of Contents

The study content and scope of the research will be carried out under 2.2.1 Demographic concept, Teleworking concept, The Theories of work from home concept concepts, Demographic factors, Behavioral factors, Teleworking factors, and the other related theories, concepts, and research framework.

The variables related to the study “the Impact of Teleworking Factors on Employee Productivity during the COVID-19 Pandemic Among Office Workers in FENGTAI City, Beijing, China” are as follows:

1. Independent Variables: Demographic factors, Behavioral factors and Teleworking factors;
2. Dependent Variables: Employee’s productivity

Scope of Time

Table 2 Timeline

No	Task	Start Date	End Date
1	Finish Ch1-Ch3	2023 January 7	2023 January 10
2	Defense Ch1-Ch3	2023 January 10	2023 January 17
3	Questionnaire first draft	2023 January 18	2023 January 31
4	Pretesting (pre-collection activity)	2023 February 1	2023 February 5
5	Pretesting (Data coding and analysis)	2023 February 6	2023 February 31
6	Modify the questionnaire	2023 March 1	2023 March 3
7	Data collection	2023 March 4	2023 March 20
8	Data coding	2023 March 21	2023 April 31
9	Data analysis	2023 May 1	2023 July 1
10	Paper writing	2023 July 2	2023 October 2
11	Dissertation review	2023 October 3	2023 December 3

Research Significance

1. Workplace Resilience Enhancement: This research contributes to enhancing workplace resilience by identifying factors that optimize employee productivity during remote work. Insights gained can guide organizations in developing strategies to effectively operate and adapt to changing circumstances, such as during the COVID-19 pandemic.

2. Policy and Strategy Formulation: By analyzing the impact of demographic and teleworking factors on productivity, this study provides essential insights for policymakers and business leaders. It supports informed decision-making, aiding in the development of policies and strategies that improve employee well-being and enhance organizational performance in remote work settings.

3. Academic Enrichment and Future Research: The research enriches academic understanding of teleworking's effects on productivity, setting the stage for future research in this domain. It offers a foundation for further investigations into the dynamics of remote work, allowing for the continuous evolution of strategies that maximize productivity and balance work-life dynamics.

Definition of Terms

Work From Home

Working from home is the term used to describe an employee who performs their role from home instead of in an office environment (JOIN Solutions AG, 2023). Given the potential for cost efficiencies in comparison to the traditional office and the aim of providing people with more flexibility in choosing where to work, organisations have announced their aim to reduce their office space and introduce blended home-office working conditions postCOVID-19. Insight into how people experience WFH is now even more important than before (Ipsen, van, Kirchner, and Hansen, 2021).

In this article, working from home refers to the employees who work remotely at the request of the Fengtai District government and the corporate notice during the pandemic period. Compared with the regular home working model, they also face dangerous environment, economic policy and psychological burden.

Teleworking

It refers to a flexible working method that is not limited by time, location, type of communication technology, and the use of information. The successful implementation of this requires technology, social, and organizational support specifically in the form of e-leadership practices where the emergence of digital technology and Internet services has facilitated the progress of teleworking (Contreras, Baykal and Abid, 2020).

Employee productivity

Productivity is a performance measure encompassing both efficiency and effectiveness. It is important, therefore, to know who the productive workers are. Productivity is a performance measure encompassing both efficiency and effectiveness. High performing, effective organizations have a culture that encourages employee involvement (Khalid and Masood, 2007).

COVID-19

COVID-19 (Coronavirus disease 2019) is a contagious disease caused by the virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In Wuhan, China, in December 2019, authorities discovered the first recorded case. The pandemic soon spread throughout the world, be named COVID-19 pandemic. China's crown pneumonia pandemic is a significant public health emergency with the fastest spread, widest range of infections, and most difficult prevention and control since New China's founding (Guoxin Network, 2020). The virus has caused policy changes, including lockdown measures, remote work, economic decline, and the adoption of WFH models. China has also implemented policies to stimulate the economy and develop digital technologies for work communication.

Fengtai District

Fengtai District of Beijing is one of the six urban districts of Beijing, and it is the central urban area and core function main bearing area of Beijing, the capital of China (Fengtai District People's Government of Beijing Municipality. n.d.).

Performance

Performance could be defined simply in terms of the achievement of quantified objectives. But performance is not only a matter of what people achieve but also how they are achieving it. A high-performance result comes from appropriate behavior and the effective use of required knowledge, skills and competencies. The action or process of carrying out or accomplishing an action, task, or function (tutorialspoint. n.d.).

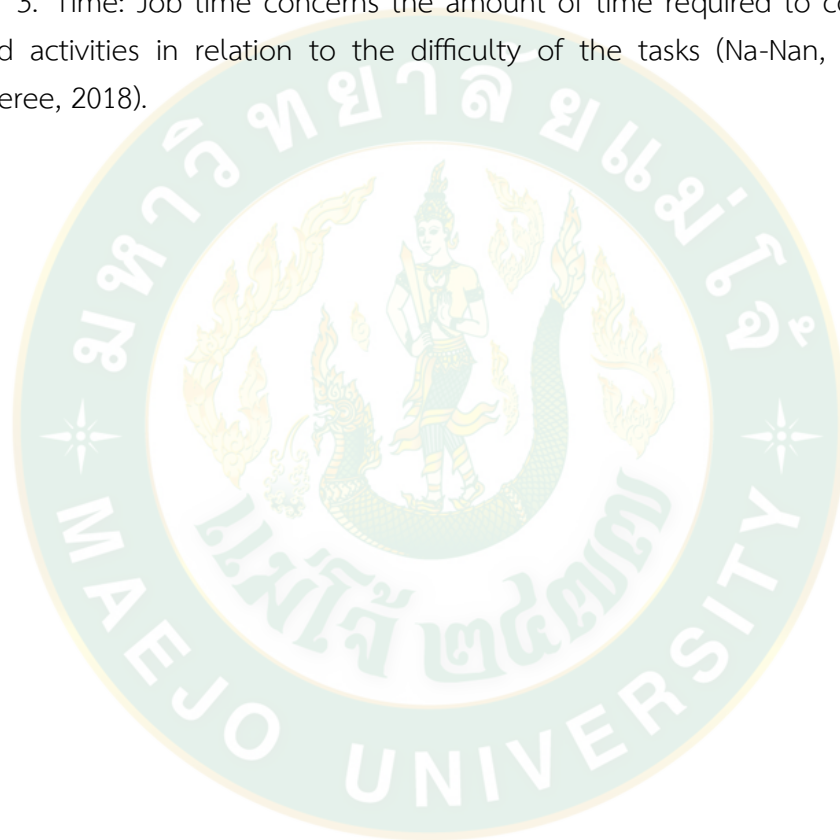
This paper adopts the organizational performance concept of Peterson and Plowman (1953) to measure the performance of employees working from home. Among the first to conduct research on job performance, Peterson and Plowman (1953) and Na-Nan and Chalermthanakij (2012) stated that the measurement of EJP requires the consideration of three job performance dimensions: (Na-Nan, Chaiprasit

and Pukkeeree, 2018) job time, job quantity, and job quality. The concept framework of Peterson & Plowman (1953) includes:

1. Quality: According to Peterson and Plowman (1953), job quality involves meeting the set criteria and standards with regard to the procurement, production, quality inspection and delivery of 2437 EJP scale goods and services.

2. Quantity: Job quantity refers to the units of output produced by employees' behaviors, such as the product quantity, waste quantity and sales figures (Peterson and Plowman, 1953, Sin in Na-Nan, Chaiprasit and Pukkeeree, 2018).

3. Time: Job time concerns the amount of time required to complete work-related activities in relation to the difficulty of the tasks (Na-Nan, Chaiprasit and Pukkeeree, 2018).



CHAPTER II

LITERATURE REVIEW

This chapter mainly describes the related theories and Research Framework. This paper adopts the digital economy theory, behaviorism theory, demographic concept, The concept of working from home as well as the telework theory, through demographic concept and teleworking theory factors (Nakrosiene, Buciuniene and Gostautaite, 2019) to performance quality, quantity, time, cost (Peterson & plowman, 1953), whose performance was studied.

The subsequent sections provide further details:

1. Working from home in Fengtai District, Beijing, under the influence of the COVID-19 epidemic in China
2. Teleworking
 - 2.1 Defintion of teleworking
3. Concepts, theories, and research related to demographic
 - 3.1 Demographic Concepts
 - 3.2 Demographic Theories
 - 3.3 Demographic-Related Research
4. Concepts, theories, and research related to teleworking
 - 4.1 teleworking concept
 - 4.2 The Theories of teleworking
 - 4.3 Teleworking-Related Research
5. Concepts, theories, and research related to employee productivity
 - 5.1 employee productivity Concepts
 - 5.2 employee productivity Theories
 - 5.3 Service Satisfaction -Related Research
6. Related Research
7. Research Framework
8. Research Hypotheses

Working from home in Fengtai District, Beijing, under the influence of the COVID-19 epidemic in China

The World Health Organization reported 769,369 COVID-19 cases and 6,954,336 deaths globally, with China contributing significantly. Economic recovery is

uneven, with disparities in vaccination opportunities and societal divisions deepening. Only 6% of the poorest 52 countries have achieved significant vaccination rates.

The COVID-19 pandemic has significantly accelerated the adoption and growth of telecommuting, with China experiencing a surge in penetration, with over 10 million enterprises and 200 million individuals adopting it post-pandemic. Remote work is proving effective in driving organizational, governmental, and economic growth, especially during emergencies, and aligning with national strategies for long-term population growth and demographic balance.

Teleworking

Definition of teleworking

Teleworking, also known as telecommuting, is a flexible work arrangement where employees perform their work physically separate from their employer's location, using IT for operation and communication. It has the potential to address issues like commuting time, peak hour traffic congestion, and vehicle emissions but has not gained widespread adoption.

The COVID-19 pandemic has provided citizens with a unique opportunity to experience a drastic decrease in urban traffic. This glimpse into an alternative mode of urban life may serve to motivate residents to rethink and change their commuting practices to take better advantage of alternative transportation possibilities. In addition, the experience of teleworking on such a large scale could shift working from home from being a marginal to a widespread formalized practice (Bojovic, Benavides and Soret, 2020).

Concepts, theories, and research related to demographic

Demographic concept

Demography and anthropology go back a long way and many foundational anthropologists were acute observers of demographic patterns (Classical demography is broadly concerned with the size, distribution, structure, and change of populations). 'Demography' literally means 'description of the people' and has long been centered around the study of human populations (Marlène, Gamelon and Froy, 2020). Demography is an independent social science, admired and sometimes feared; it has opened up to new questions, has undergone methodological change, and has

gradually turned towards explanation. It also trains people to become demographers (Dominique Tabutin, 2007).

Development of any scientific discipline depends to an increasing extent on its organizational infrastructure, which includes several components. In the case of demography these are the following: (1) professional and affiliated organizations, (2) professional journals that serve as outlets for results of demographic research; and, most recently, (3) Internet sites that facilitate communication among demographers, access to research ideas and reports, and retrieval of demographic data; and (4) the application of knowledge produced to resolve societal problems. Each of these infrastructure components has shown dramatic development since the publication 45 years ago of *The Study of Population* (Poston and Micklin, 2019).

While traditionally conceived as the study of human populations, today the field of demography encompasses any study—human, plant, or animal—in which individual patterns of fertility, growth, recruitment, dispersal, and mortality are collectively analyzed for their population-level consequences (Lawler, 2011). Demographic theory aims at explaining how population systems regulate themselves given available resources. Population ethics is concerned with demography in the sense that the analytical objects of interest are births, deaths, and populations (Kolk, 2019). Demographic theory aims to clarify how populations self-regulate in light of available resources. Anthropological specialities, like evolutionary anthropology, archaeology, and palaeodemography, use demographic techniques to comprehend the bio-demographic composition of historical or modern populations (Varghese Thomas, 2023).

Demographic concept of this paper, the author mainly uses the following factors: Gender; Age; Income; Number of family members; The number of personnel of the organization you belong to; Job position/ department level; Period of work from home; Number of working days; Work break time during working; Location used for working; Materials and equipment; Digital technologies for WFH.

Age and sex are defined more straightforwardly than most demographic variables. Age is an ascribed, yet changeable, characteristic (Dudley and Poston, 2005). For the demographic data of the remote-home office, “Although numerous studies have addressed the role of remote work during this crisis, as of yet we lack thorough research jointly addressing the question on how occupations/job characteristics on the one hand and family/household responsibilities on the other are associated with the propensity of working from home, and how gender cuts across those aspects. He mentioned the variables in the study: Occupations, care work, and gender before

and during the pandemic.” (Minkus, Groepler and Drobnič, 2022)” In the next part, there are closed questions concerning gender, age, job, and children.”, “The disadvantages of HO (home office) include e.g. worse connection of employees with the organization, extended working hours due to more frequent breaks, and difficult communication between employers and employees.”(Balková, Dvořáková, and Borovková, 2023).

The family mode of social organization has been altered with other, far-reaching social changes, including the rise of the market economy, vast increases in productivity with concomitant increases in real income (Fogel, 2000, sin in Dudley and Michael, 2005), Changes in marriage and family structure are combined with the development of the human species. Our future is closely linked to the future of our family, this is an ongoing phenomenon and, therefore, the authors included family size as one of the demographic data factors.

At present, with the increasing number of home office, countries according to different environmental changes advocate different working mode, enterprises according to the policy support, digital technology resources, the regulation of staff home office labor behavior, at the same time, scholars constantly study new digital technology, explore new patterns, to create maximum value, which highlights the theory of demographic concept. In this paper, the author selected 12 independent variables according to the above population theory research to explore the relationship between the efficiency of work from home.

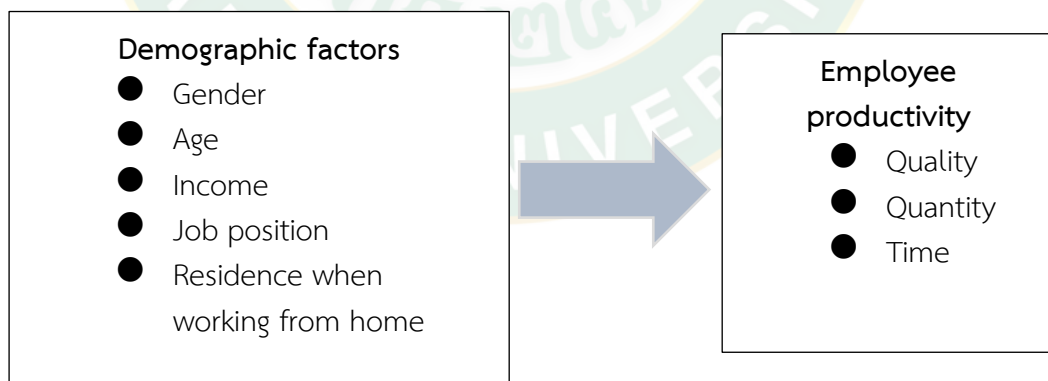


Figure 6 Variable

Demographic theories

Of all the characteristics of human populations, age and sex are arguably the most important and relevant for demographers. Age and sex are defined more straightforwardly than most demographic variables. Age is an ascribed, yet

changeable, characteristic. (Poston and Micklin, 2019). Working from home: Occupations, care work, and gender before and during the pandemic (Minkus, Groepler and Drobnič, 2022). According to the proposed demographic information characteristics, I selected the basic information of gender, age, income and job position as the demographic factors of this paper.

Šmite, Moe, Klotins and Gonzalez-Huerta (2022) discussed the relationship between Job satisfaction and well-being, they use Ergonomics, Work hours and daily routines, Physical activity and breaks, Loneliness, Work-life balance as Productivity factors, so as to make useful adjustments to WFH (Working-From-Home) and prompts to WFX (working-from-anywhere).

Demographic-Related Research

Table 3 Characteristics of working from home

No.	Author	Characteristics of working from home
1	Dudley and Poston (2005)	Age; sex
2	Minkus, Groepler and Drobnič (2022)	Occupations; care work; gender before and during the pandemic
3	Balková, Dvořáková, and Borovková(2023)	Gender; age; job; children; working hours; breaks
4	Danilova,Ulfsten,Eikebrokk, Iden, Johannessen and Johanson (2022)	Job Office Quality; Digital Platform Use; Digital Platform Reach; Digital Communication Quality; Autonomy; Professional Isolation; Prior Preference for Home Office; Home office quality;

Concepts, theories, and research related to behavioral

Behavioral Concepts

The term behavior sometimes denotes such phenomena as the action of oxygen or the motion of a comet, just as at other times it refers to the actions of organisms. Consequently, it is not possible clearly to mark off the subject-matter of psychology by this term alone, because it is not possible to do whatever we please

with the established meanings of words. Accordingly, it has been suggested that psychology be defined as the science of the kind of behavior that exhibits character and intelligence (Tawney, 1915).

Behavioral principles are analytic concepts that allow us to parse complex situations into functional units. They have served us well in applied psychology, but in many situations higher level concepts are needed to provide effective guidance (Shenk and Vilardaga, 2007).

Behavioral theories

What is behaviorism, and how did it begin? The word was made famous by flamboyant Johns Hopkins psychologist John Broadus Watson (1878–1958, Plate 1.2). (Staddon, 2014). Behaviorist theory, which is basically a psychological theory in its essence, founded by J.B. Watson, is actually a theory of native language learning, advanced in part as a reaction to traditional grammar (Mehmet and Rezen, 1988). Behaviorism has had a powerful impact on the evolution of American psychology. Not only did it produce some of psychology's most renowned luminaries in Watson and Skinner, but it was also a dominant force in mid-twentieth-century research and its applications remain in widespread use today in education, business, psychotherapy, and throughout our daily lives (Goodwin, 2008).

More than other intellectual pioneers, John B. Watson's views have been so simplified and distorted by successive generations of authors that it is difficult to discern his actual message. Watson founded behaviorism in 1913 (John, 2017).

Skinner's version of behaviorism continues to exert a significant influence on psychology and the culture at large. Skinner's view that the essence of scientific behavior is prediction and control comported with his position on the epistemological question of the nature of scientific knowledge. In the midst of discussions of operationism in psychology, Skinner (1945) argued against intersubjective agreement as the major criterion for the acceptance of scientific knowledge. He suggested that "whole-hearted agreement on the definition of psychological terms . . . makes for contentment but not for progress" (1945b, p.293) (Dennis Delprato, Bryan and Midgley, 1992). Watson Change from the study of the mind to the study of behavior, but Skinner to behavioral science. In summary, behaviorism arose in reaction against introspection as a scientific method (Staddon, 2014).

In 2022, Danilova, Ulfsten, Eikebrokk, Iden, Johannessen and Johanson (2022) built a model about individual job performance in WFH arrangements, includes

seven variables that they hypothesise impact individual job performance at the home office, as well as a set of control variables:

Job Office Quality; Home Office Quality; Prior Preference for Home Office; Digital Platform Use; Digital Platform Reach; Digital Communication Quality; Autonomy; Professional Isolation; Control Variables.

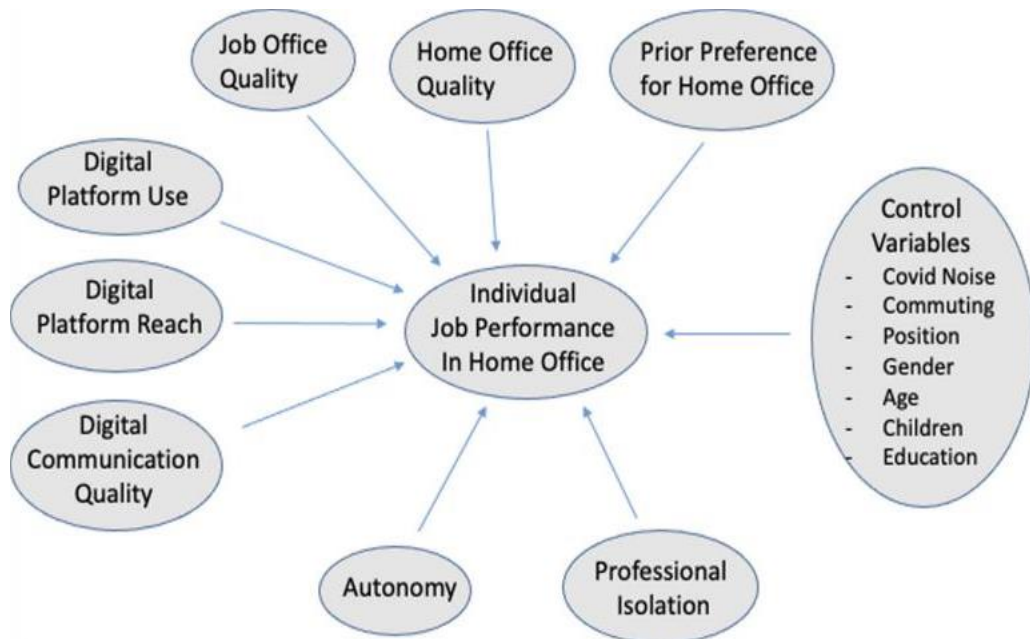


Figure 7 Research model - individual job performance in WFH

Source: Danilova, Ulfsten, Eikebrokk, Iden, Johannessen and Johanson (2022).

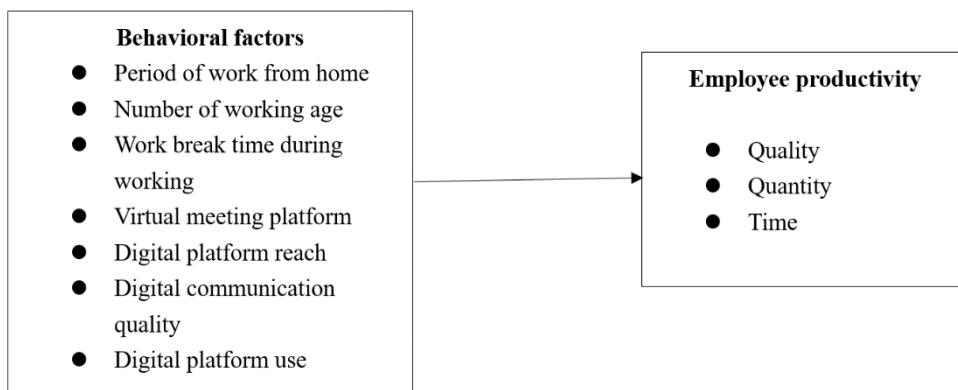


Figure 8 variable

In this paper, a series of behavioral activities of working from home are studied based on behavioral theory. For example, the production behavior of employees is not only realized by government policies and company notices, but also involves cognitive and behavioral processes in the work. Psychological state, emotion and perception are also essential considerations, which are closely related to the behavior theory.

Behavioral-Related Research

Table 4 Characteristics of working from home

No.	Author	Characteristics of working from home
1	Šmite, D., Moe, N. B., Klotins, E., & Gonzalez-Huerta, J. (2022)	Work hours and daily routines; Physical activity and breaks;
2	Nakrošienė et al., (2019)	Time-planning skills; Possibility to work during the most productive time; Supervisor's support and trust; Reduced time for communication with co-workers; Possibility to take care of family members; Possibility to work from home in case of sickness; Suitability of the working place at home; Possibility to access the organization's documents from home; Possibility to save on travel expenses

Concepts, theories, and research related to teleworking

Teleworking concept

The definitions of telework and work from home concept are similar, but the factors affecting telework are different among scholars. For example, Nakrošienė et al., (2019) proposed Theoretical grounding of telework factors and their linkage with telework outcomes:

Time-planning skills. Time planning skills of teleworkers: teleworkers work longer hours than non-teleworkers, necessitating the management of both their personal and professional lives.

Possibility to work during the most productive time. This feature should be used to determine the most efficient time for teleworkers to engage in their task. This concept is similarly related to job autonomy.

Supervisor's support and trust. Teleworkers must earn the trust of their superiors and coworkers since they receive less supervision and assistance than regular employees. Teleworkers' job chances may suffer as a result of this.

Reduced time for communication with co-workers. Teleworkers may become isolated as a result of a lack of communication, which can have a negative impact on information efficiency and hinder the decision-making process.

Possibility to take care of family members. Work-related demands and home demands seem to deplete individuals' resource base, which may overwhelm employees, leaving them with fewer resources to allocate to personal lives, which in turn makes it difficult for them to achieve WLB(work life balance) (Ugwu, Enwereuzor and Mazei, 2022). Teleworkers who struggle to manage work and family life may have family troubles as a result of the long hours they work.

Possibility to work from home in case of sickness. Employers have a duty of care for all their workers and need to, insofar as it is reasonably practicable, provide a working environment that is safe and without risks to physical and mental health. This includes assessing, controlling and mitigating risks in locations other than the normal workplace, such as the worker's home during WFH. Employers should also remind workers of their duties and obligations under their contracts of employment and applicable policies, in particular, their obligations and duties in relation to health and safety (International Labour Office, 2020).

Suitability of the working place at home. This reflects the most appropriate environment (home or well-organized working environment) for the teleworker in terms of working efficiently.

Possibility to access the organization's documents from home. "As WFH or teleworking became the norm, the challenge organizations now face is protecting valuable data from risky employee behaviors targeted by hackers and social engineers." "Although two-step password authentication and Virtual Private Networks (VPN) are frequently implemented by organizations, WFH employees tend to develop security amnesia, abandoning routine office security practices, such as forwarding suspicious Emails, SPAM, Vlogs, Texts, Invitations, links, and attachments to the IT Department." (Borkovich and Skovira, 2020)

Possibility to save on travel expenses. WFH activity is more flexible in completing work, does not follow office hours, does not need to spend money to

pay for transportation costs or gasoline costs, can minimize the level of stress experienced besides traffic jams traffic (Cahyono, Fahlevi, Purwanto, Asbari, Mufid, Agistiawati and Suryani, 2020).

In addition, Nakrosiene et al., (2019) believes that the factors affecting remote work are Gender and Number of children.

In this paper, the author will adopt the model factors of Kurland and Bailey (2014), and we will use four remote work factors as independent variables during the pandemic period to show operational efficiency:

Home-Based Telecommuting. Home-based telecommuting refers to employees who work at home on a regular basis, though not necessarily (and, in fact, rarely) every day. For example, in today's Internet companies such as Netease Cloud, you can choose how many days to work in the company a week. Moreover, some companies have even stipulated that those employees who do not meet the number of working from home days will receive performance appraisal. However, according to the Kurland and Bailey (2014) study, Home-Based Telecommuting was conducted after the home-based office employee entered the object of the company, rather than a self-employed flexible employment personnel.

Satellite Office. It means that employees work both outside the home and away from the conventional workplace in a location convenient to the employees and/or customers. A Satellite Office houses only employees from a single firm; it is in some sense a branch office whose purpose is to alleviate employees' commute. It is a partition set up by the company headquarters for employees to work, and employees do not have to go to the company headquarters to work. Under the concept, the term "telework" is defined as working at home, away from an employer's place of business, using information technology appliances, such as the Internet, computers, or telephones. Teleworkers include people who work at home full-time or part-time and those who work at a remote location other than their employer's central office full-time or part-time. Excluded from our definition are people who own homebased businesses and conduct much of their work from their private residences and the purely "mobile workforce," the traveling sales force and consultants of the 21st Century (Van Horn and Heldrich, 2011).

Neighborhood work center. It is essentially identical to a satellite office with one major difference: the neighborhood work center houses more than one company's employees. In Beijing, China, this situation is often found in office buildings, there are different units on each floor, it is not home office, but it reduces the transportation cost and trouble of going to regular workplaces.

Mobile work. It like marketing managers, sales-persons, investment bankers, investigative reporters, and any other personnel who need to be on the move to get their jobs done.

TABLE 1: ORGANIZATIONAL ADVANTAGES AND CHALLENGES OF TELEWORKING			
	Advantages	Challenges	
Home-Based Telecommuting	<ul style="list-style-type: none"> ● Greater productivity ● Lower absenteeism ● Better morale ● Greater openness ● Fewer interruptions at office ● Reduced overhead ● Wider talent pool ● Lower turnover ● Regulation compliance 	<ul style="list-style-type: none"> ● Performance monitoring ● Performance measurement ● Managerial control ● Mentoring ● Jealous colleagues ● Synergy ● Informal interaction ● Organization culture ● Virtual culture 	<ul style="list-style-type: none"> ● Organization loyalty ● Interpersonal skills ● Availability ● Schedule maintenance ● Work coordination ● Internal customers ● Communication ● Guidelines (e.g. expenses) ● Technology
Satellite Office	<ul style="list-style-type: none"> ● Greater productivity ● Better morale ● Wider talent pool ● Lower turnover ● Customer proximity ● Regulation compliance ● Corporate culture intact 	<ul style="list-style-type: none"> ● Performance monitoring ● Performance measurement ● Managerial control 	<ul style="list-style-type: none"> ● Jealous colleagues ● Virtual culture ● Internal customers
Neighborhood Work Center	<ul style="list-style-type: none"> ● Greater productivity ● Better morale ● Wider talent pool ● Lower turnover ● Customer proximity ● Regulation compliance 	<ul style="list-style-type: none"> ● Performance monitoring ● Performance measurement ● Managerial control ● Mentoring ● Jealous colleagues ● Synergy 	<ul style="list-style-type: none"> ● Informal interaction ● Organization culture ● Virtual culture ● Organization loyalty ● Schedule maintenance ● Work coordination ● Internal customers
Mobile Work	<ul style="list-style-type: none"> ● Greater productivity ● Lower absenteeism ● Customer proximity 	<ul style="list-style-type: none"> ● Performance monitoring ● Performance measurement ● Managerial control ● Synergy ● Informal interaction ● Organization culture ● Virtual culture 	<ul style="list-style-type: none"> ● Organization loyalty ● Availability ● Schedule maintenance ● Work coordination ● Communication ● Guidelines (e.g. expenses) ● Technology

Figure 9 Organizational Advantages and Challenges of Teleworking

Source: Kurland and Bailey (2014)

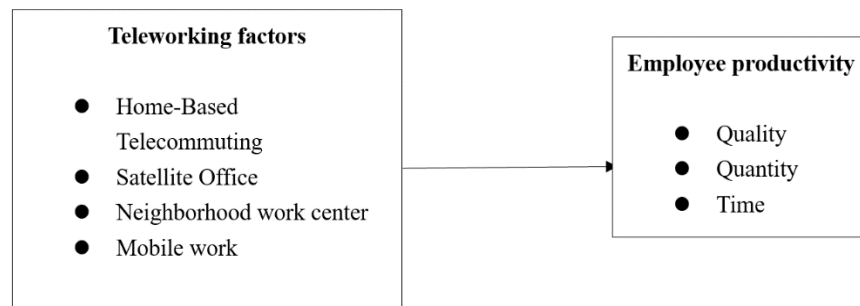


Figure 10 Variable

The Theories of teleworking

Variety of telework terms are found in the scientific literature: teleworking, home-based work, working from home, home-based telework, homeworking, telecommuting, virtual office, virtual work, e-work, flexiplace, flexible work (Nakrošienė and Butkevičienė, 2016; Brinzea and Secara, 2017).

In the 1970's Jack Nilles was the first person to use the term "telecommuting" and was a pioneer in coming up with the first telecommuting concept (Nilles, 1998). Initially the main motivation and push for telecommuting was to minimize traffic congestion and lessen pollution in the environment and give workers some flexibility and better work- life balance. In the 1980's there were small number of pilot telecommuting programs in the United States, and by the mid-nineties telecommuting there was a considerable increase in the number of telecommuters, with many federal, state and private sector organizations supporting the practice of telecommuting (Narayanan, Menon, Michel and Bernard, 2017).

"Remote work is not a new concept, and it certainly didn't begin in light of the current pandemic. Remote work has been present since before the industrial revolution, but it took its modern form when the concept of telecommuting was first introduced." "Remote work does not necessarily entail working from home. Somewhat related to moving out of big cities is the decision to take a break from big city living and hit the road. Thanks to wide-spread internet connectivity, remote work provides a work from 'almost anywhere' atmosphere" (David, 2021).

The basic difference between telework and remote work is that a teleworker uses personal electronic devices in addition to working physically remotely from a place other than an office or company premises, whereas remote work does not require visits to the main workplace or the use of electronic personal devices.

“Mobile tele- and remote workers” use several other places in addition to home for working (Matti, 2021).

Working from home can be defined in two stages:

The first phase dates back to before the COVID-19 pandemic. work from home (also called telecommuting, Remote work, telework, hybrid work and other terms) is the practice of working from one's home or another space rather than from an office.

In the quarter century since Nilles first coined the term ‘telecommuting’, the practice of telecommuting, or alternatively telework, has been heralded as a cure for a variety of organizational and social ills (Bailey and Kurland, 2002).

Following him, Work From Home (WFH) is now a dream of many people, especially for the current millennial generation does not need to wake up in the morning then take a shower and get ready to go to the office by crashing the road jams that take up a lot of time. Enough to use makeshift clothes then open the laptop from home and work. (Cahyono, Fahlevi, Purwanto, Asbari, Mufid, Agistiawati and Suryani, 2020) Thanks to innovations in information and computer-mediated communication technologies that support remote work and make it possible, more and more companies adhere to it to some extent (Popovici and Popovici, 2020).

The second phase of widespread adoption was during the pandemic. In the context of the COVID-19 pandemic.

The growth of this movement—a true revolution in the way we work and its practicalities—terms from the assumption that remote work can guarantee a win-win situation for employers and employees (Popovici and Popovici, 2020).

The term “working from home” is used to refer uniquely to home-based teleworking as a temporary, alternative working arrangement. It requires a shared responsibility and commitment by both employers and workers to ensure business continuity and employment (International Labour Office, 2020). Most tech companies in the world forced their employees to work from home in response to the COVID-19 pandemic, marking the turn of the history in the magnitude of experience and perception of work from home (WFH) (Smite, Moe, Hildrum, Gonzalez-Huerta and Mendez, 2023).

However, many employees who have experienced working from home have different attitudes towards the home working model. Many of the employed express an unfulfilled need for more individualized working time, to set their work schedules and location according to their family constraints or natural work rhythms (Golden, 2008).

Compared to Working from the Office [WFO], WFH has the potential to reduce commute time, provide more flexible working hours, increase job satisfaction, and improve work-life balance. Some employees may find it easier to concentrate if they have a quiet space at home (Gibbs, Mengel and Siemroth, 2021).

For my opinion, work from home is In the digital era, due to the pandemic, it quickly enters the working mode of employers and employees. It breaks the limitations of time and space, and also provides new ideas for the development of maximizing the company's interests. However, at the same time, challenges also exist. Performance problems, corporate solidarity, discipline problems, and personal WLB (work life balance) problems are also pouring out.....In the paper, the paper mainly studies the factors influence efficiency when working from home, so as to explore the possibility of sustainable development of home office mode in the future.

Teleworking-Related Research

Table 5 Characteristics of working from home

No.	Author	Characteristics of working from home
1	Kenett, R. S., & Shmueli, G.	Home-Based Telecommuting; Satellite Office; Neighborhood work center; Mobile work

Concepts, theories, and research related to employee productivity

Employee productivity Concepts

Productivity can be defined in many ways. In construction, productivity is usually taken to mean labour productivity, that is, units of work placed or produced per man-hour. The inverse of labour productivity, man-hours per unit (unit rate), is also commonly used. Productivity is the ratio of output to all or some of the resources used to produce that output. Output can be homogenous or heterogeneous. Resources comprise: labour, capital, energy, raw materials, etc (Attar, Gupta and Desai, 2012).

Suitable motivation of labour can be hypothesized as a key contributor to maximizing productivity. The motivation concept is generally defined as a composition of powers and mechanisms which help to direct human behavior in a desired manner, or with a more specific context it is described as the all convincing and encouraging actions which help workers fulfill their tasks willingly and to come closer to project objectives (Kazaz, Manisali and Ulubeyli, 2008).

Employee productivity Theories

Employees' productivity in any organization is a key area in the work environment. It assists the business to develop the capability of the human resources in the system to be competent. Productivity means the end result of an activity of a person or organization. (We're going to refer to employee productivity as knowledge worker productivity. Not only is it more relevant to the 21st century, but the work characteristic of knowledge workers is more known to work in remote sites that are inherently suitable with the WFH concept (Martinez-Amador, 2016, sign in Prasetyaningtyas, Heryanto, Nurfauzi and Tanjung, 2021).

Employee productivity -Related Research

Table 6 Characteristics of working from home

No.	Author	Characteristics of working from home
1	Abioro, Oladejo and Faderera (2018)	Flexitime; Telecommuting; Compressed work weeks; Part time work; Job Sharing; telework; employee productivity
2	Prasetyaningtyas, Heryanto, Nurfauzi and Tanjung (2021)	Work from Home; Employee Productivity; Work-Life Balance (WLB); Job Satisfaction

Research related

Table 7 Related Research

No.	Author	Characteristics of working from home
1	Dudley and Poston (2005)	Age ; sex
2	Minkus, Groepler and Drobnič (2022)	Occupations; care work ; gender before and during the pandemic
3	Balková, Dvořáková, and Borovková(2023)	Gender ; age ; job ; children ; working hours ; breaks
4	Danilova,Ulfsten,Eikebrokk, Iden, Johannessen and Johanson (2022)	Job Office Quality; Digital Platform Use; Digital Platform Reach; Digital Communication Quality; Autonomy; Professional Isolation; Prior Preference for Home Office; Home office quality;
5	Šmite, D., Moe, N. B., Klotins, E., & Gonzalez-Huerta, J. (2022)	Work hours and daily routines;Physical activity and breaks;
6	Nakrošienė et al., (2019)	Time-planning skills;Possibility to work during the most productive time;Supervisor's support and trust;Reduced time for communication with co-workers;Possibility to take care of family members;Possibility to work from home in case of sickness;Suitability of the working place at home;Possibility to access the organization's documents from home;Possibility to save on travel expenses
7	Kenett, R. S., & Shmueli, G.	Home-Based Telecommuting;Satellite Office; Neighborhood work center;Mobile work
8	Abioro, Oladejo and Faderera (2018)	Flexitime; Telecommuting; Compressed work weeks; Part time work; Job Sharing; telework; employee productivity
9	Prasetyaningtyas, Heryanto, Nurfauzi and Tanjung (2021)	Work from Home; Employee Productivity; Work-Life Balance (WLB); Job Satisfaction

Conceptual Framework

The research framework of the integrated model is shown in Figure 11.

Research Hypotheses

H1: Demographic factors has an influence on productivity with the employee who work from home among in FENGTAI City, Beijing, China.

H2: Behavioral factors has an influence on productivity with the employee who work from home among in FENGTAI City, Beijing, China.

H3: Teleworking factors has an influence on productivity with the employee who work from home among in FENGTAI City, Beijing, China.

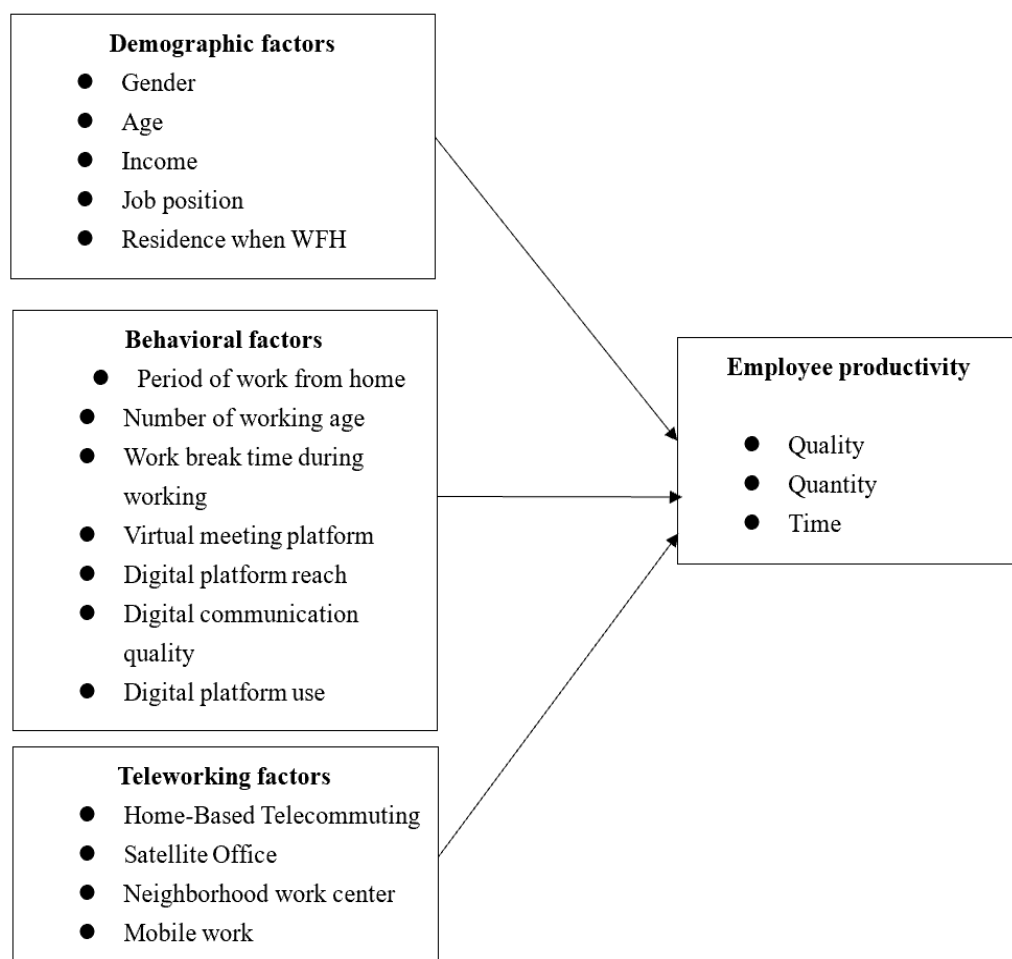


Figure 11 The Conceptual Framework

CHAPTER III RESEARCH METHODOLOGY

In this chapter, a comprehensive exposition of the research methodology utilized in the study titled "the efficiency of working from home with digital technology under coronavirus pandemic situation" is presented. It mainly introduces the purpose, quantity and scope of the author's investigation. The author calculates the sample size according to the formula, and then carries out the steps of data classification and analysis through the questionnaire. This paper is quantitative research.

The subsequent sections of this chapter will delve into the specifics as follows:

1. Research Design
2. Population and Sampling
 - 2.1 Population
 - 2.2 Sample
 - 2.3 Sampling Methods
3. Research Instrument
 - 3.1 Development Process for the Questionnaire
4. Quality Testing of Research Instruments
 - 4.1 Content Validity Testing
 - 4.2 Content Validity Testing
5. Data collection
 - 5.1 Primary data
 - 5.2 Secondary data
6. Data Analysis
7. Research Duration

Research Design

In this section, the research design of this study is presented using a quantitative approach. The purpose of this study is to assess the productivity factors that affect employees working from home, and to analyze the impact of demographic information, behavioral elements, and telecommuting forms on employee productivity. The study design was consistent with the research objectives, which included a quantitative assessment of these factors and their relationships.

Quantitative methods were used to collect data using questionnaires. Statistical data analysis was performed using the SPSS program, and the results were summarized and discussed in tabular form.

Population and Sampling

Population

400 employees in Fengtai District, Beijing, WFH

By the end of 2019, 148,000 people were employed in Fengtai District of Beijing. At the end of 2022, the permanent resident population of Fengtai District of Beijing was 2,012,000. This study used the convenient sampling method, investigating employees who work from home in Beijing's Fengtai district.

Sample

$$n = \frac{N}{1 + Ne^2}$$

Follow by :

- n = calculated sample size
- N = the number of known populations
- e = error as equal to 5% or 0.05.

$$n = \frac{148000}{1 + 148000 (0.05)^2}$$

$$= \frac{148000}{371}$$

$$= 398.92 = 400$$

From the calculation of the sample size, the minimum is 398 people. However, to prevent data loss or incomplete response data, a total of 400 questionnaires will be distributed and screened only for the target group that is consistent with the study in this research.

Sampling Methods

Convenient Sampling Method (Convenience Sampling), collect data from Fengtai District, Beijing, because is the central urban area and core function main bearing area of Beijing, the capital of China. This area has a large number of working-age people, including a very large number of people working at home. During the pandemic period, Fengtai District of Beijing also became a closed and controlled area and adopted the work from home policy. Due to the convenience of Convenience Sampling, I collected two forms of questionnaires: online questionnaires and on-site questionnaires in Fengtai District. For the people working in Fengtai District, 398 people were selected, but in order to ensure the integrity of the questionnaire data, I sent the questionnaire in the work from home group of Sina Weibo, a total of 400 samples, through wjx.cn, sent through the application, let people communicate to each other to complete the questionnaire.

Research Instrument

The instruments used for the study and for collecting study data are questionnaires about the factors affecting home work. The authors obtained information from relevant theories and studies and self-studied by collecting data, The questionnaire is divided into three parts: part 1: personal information of the respondents; part 2: Home working behavior performance of the respondents; part 3: Teleworking factors.

Part 1: Demographic Characteristics

According to the term definition, the questionnaire part 1 is the personal basic information survey questionnaire. To examine the factors that individual demographic characteristics support homework. The questionnaire includes gender, age, income, job position, specifically as follows:

The first gender, a closed questionnaire with 2 answers to alternative questions, Gender is measured using a nominal scale in the questionnaire, which presents questions with multiple answers to choose from (Two-Way Question) as follows: 1) Male 2) Female.

The second Age, a closed questionnaire. There are many answers to choose from (multiple questions). The questionnaire divided age into five stages, less 18 in the first, 19 to 30 in the second, 31 to 40 in the third, and 41 to 50 in the fourth, more than 51 in the last, with the main population between 29 and 37. The nature of the questionnaire comprises Multiple Choice Questions and employs an Ordinal

Scale type of data measurement. There are answers to choose from as follows (5 items): 1) Less than 18 years old 2) From 19 to 30 years old 3) From 31 to 40 years old 4) From 41 to 50 years old 5) More than 51 years old

The third Income, a closed questionnaire. There are many answers to choose from (multiple questions). There are answers to choose from as follows (5 items): 1) Less than 5000 Yuan 2) From 5001 to 10000 Yuan 3) From 10001 to 20000 Yuan 4) From 20001 to 30000 Yuan 5) More than 30001 Yuan

The fourth Job position, a closed questionnaire. The nature of the question with multiple alternative answers (Multichotomous Question) is a data model. The identity information for using the ordinal table (Pornpen Petchsukiri, 1997) is as follows: 1) Staff 2) Supervisor 3) Manager 4) Senior Manager 5) Director 6) C-Level, VP

Part 2: Home working behavior performance of the respondents

This section comprises questions about the behavior performance of the respondents, including Period of work from home, Work break time during working, Virtual meeting platform, and Digital platform reach. It employs closed-ended questions with multiple-choice options and the satisfaction scale (likert scale questions), divided into five measurement intervals (interval scale) to calculate the results of each stage. Respondents are instructed to select a single answer for each item. The questionnaire employs a checklist format and consists of 7 questions;

1. Work break time during working. Work break time during working is a Closed-ended Question. The nature of the questionnaire comprises Multiple Choice Questions and employs an Ordinal Scale type of data measurement. There are answers to choose from as follows (6 items): 1.1) Less than 1 hour 1.2) 1 hour 1.3) 2 hours 1.4) hours 1.5) 4 hours 1.6) More than 4 hours

2. Virtual meeting platform. Virtual meeting platform is a measurement of Ordinal Scale data. Specify the current in 5 items as follows: 2.1) Tencent conference 2.2) Zoom 2.3) Huawei Cloud meeting 2.4) Teams 2.5) Ding Talk

3. Digital platform reach. The authors used the satisfaction scale (likert scale questions), divided into five measurement intervals (interval scale) to calculate the results of each stage, including:

score	level
5	Strongly agree
4	Agree
3	Neutral
2	Disagree
1	Strongly disagree

The 5-point Likert scales, which are rating scales widely used for asking respondents' opinions and attitudes, are utilized to ask the employee of work from home to evaluate the degrees of their efficiency with the factors toward the work from home. The 5 points on the scale are, respectively, from 1 to 5: highly disagree, somewhat disagree, somewhat agree, highly agree, and extremely agree. The evaluation criteria for each class interval can be calculated using a formula to calculate the width of each class as follows:

$$\text{Class interval} = \frac{\text{Highest Value} - \text{Lowest Value}}{\text{Number of Classes}} \dots\dots\dots (1)$$

$$\text{Class interval} = \frac{5 - 1}{5}$$

$$\text{Class interval} = 0.8$$

Therefore, the class stratification is 0.8 and is used to classify the mean and criterion scores with the following descriptions:

Range of Score	Level of agreement
4.21 – 5.00 =	extremely agree with the statement
3.41 – 4.20 =	highly agree with the statement
2.61 – 3.40 =	somewhat agree with the statement
1.81 – 2.60 =	somewhat disagree with the statement
1.00 – 1.80 =	highly disagree with the statement

Therefore, the average standard that affects the work efficiency of the home office work mode can be divided into the following five levels:

Average 4.21—5.00 meaning Teleworking factors are at the highest level.

Average 3.41—4.20 meaning Teleworking factors is good level.

Average 2.61—3.40 meaning Teleworking factors is medium level.

Average 1.81—2.60 meaning Teleworking factors is lower level.

Average 1.00—1.80 meaning Teleworking factors is floor level.

Part 3: Teleworking factors

The teleworking factors questionnaire affects the work efficiency of the staff in Fengtai District, Beijing. The authors used the satisfaction scale (likert scale questions), divided into five measurement intervals (interval scale) to calculate the results of each stage.

Development Process for the Questionnaire

The research instrument employed in this study was crafted in the form of a questionnaire. To ensure the development of a comprehensive and high-quality tool, the researcher followed these steps:

1. Literature Review: The initial step involved an extensive review of questionnaire construction methods, drawing insights from various relevant sources, including theories and concepts. These sources guided the creation of a questionnaire aligned with the research framework and provided clear definitions of terms for key variables.

2. Variable Integration: Variables identified through a synthesis of pertinent literature were incorporated into the questionnaire's structure. The resulting tool took the form of an opinion questionnaire featuring a 5-level rating scale.

3. Advisor Consultation: The questionnaire, developed in accordance with the research framework, was submitted to the chairperson/advisor for review and feedback. Subsequently, the questionnaire was revised based on the advisor's recommendations.

4. Expert review: The questionnaire was presented to experts to evaluate the research instrument's quality in terms of accuracy and comprehensiveness in covering the research content.

Quality Testing of Research Instruments

The following steps were undertaken for quality testing:

Content Validity Testing

The questionnaire created was reviewed by three experts to assess the accuracy of the questions in relation to the research objectives, research framework, and definition of terms. The experts evaluated the consistency between the questions and the research objectives using the Index of Item-Object Congruence (IOC). For each question, IOC values were collected from the opinions of all experts.

The Index of Item Objective Congruence (IOC) was employed as a measure of question-to-content consistency.

The scoring criteria for IOC assessment were as follows:

- +1: When there was a clear correspondence between the questions and the research objectives.
- 0: When uncertainty existed regarding the alignment between the questions and the research objectives.
- 1: When the questionnaire exhibited inconsistency with its objectives.

The IOC value for each question was calculated using the formula:

$$\text{IOC} = \frac{\sum R}{N}$$

Where:

IOC (or IC) represents the question-to-content consistency index.

$\sum R$ is the sum of expert opinion scores.

N denotes the number of experts.

For a question to be considered valid, it needed to have an IOC equal to or greater than 0.60. Any question with an IOC below 0.60 underwent either elimination or revision until reaching the required threshold.

Content Validity Testing

The research tool's quality was assessed through a Try Out phase involving a group of university students not included in the sample.

Questionnaire testing using Cronbach's method the resulting α coefficient of reliability ranges from 0 to 1 in providing this overall assessment of a measure's reliability. If all of the scale items are entirely independent from one another (i.e., are not correlated or share no covariance), then $\alpha = 0$; and if all of the items have high covariance's, then α will approach 1 as the number of items in the scale approaches infinity, showing that the questionnaire has high confidence. Coefficients that are less than 0.5 are usually unacceptable, especially for scales purporting to be unidimensional (Cronbach, 1951). In addition, Nunnally (1978) offered a rule that reliability should be greater than or equal to 0.7.

To examine the accuracy and suitability of the questionnaire reliability test the researcher will use the questionnaire to test the pilot test with the test group of 30 samples before using the questionnaire to collect data on the real sample. So that it can be notified to the respondents so that they understand it, the researcher will use the formula of Cronbach (1970) as follows:

$$\alpha = \frac{n}{n-1} \left(1 - \frac{\sum s^2(X_i)}{s^2(Y)} \right) \quad (3.3)$$

In this case;

α refers to Questionnaire reliability value

n refers to the number of scale items

$s^2(X_i)$ refers to the variance associated with item

$s^2(Y)$ refers to the variance associated with the observed total scores

Data collection

Literature research was conducted through questionnaires. Participants and procedures conducted an online self-report questionnaire on the remote worker work-life study during COVID-19.

Using SPSS 27.0 tool, we analyzed the influencing factors of work from home efficiency improvement during Fengtai District, Beijing, China. After entering data for the independent and dependent variables, regression analysis was performed.

All participants were WFH full-time in enterprises, Fengtai District, Beijing, China at the time of data collection. Participation in the study was entirely voluntary, anonymous, and uncompensated. Respondents completed informed consent forms before completing the questionnaire.

After collecting all the information, the authors analyzed the collected questionnaire data in the following steps:

1. Data validation (Editing), conduct a questionnaire, check the completeness of the answers, and organize incomplete questionnaires.
2. Data encoding (Coding) to import the recorded data into the computer.
3. Data processing by recording and processing encrypted data SPSS for descriptive analysis and hypothesis testing.

Primary data

400 primary data samples were collected by questionnaire. The questionnaire was divided into 2 parts. After a study of Convenience Sampling in Fengtai District, Beijing, the questionnaire was checked. Data was recorded and the study hypotheses were further tested.

Secondary data

This study used data from compiled sources, including office statistics, The People's Government of Beijing Municipality, articles and interviews, books, journals, searches for information from the Internet, papers, or related studies.

Data Analysis

The questionnaire will be derived from a previous research questionnaire with certain modifications. Data analysis will be conducted through factor analysis in SPSS, incorporating structural equation modeling. The analyses involved in this study will include:

1. Descriptive Statistics Analysis will be conducted using the following statistical measures. Descriptive analysis will encompass the utilization of mean, median, mode, percentages, frequency, and range:

1.1 Percentage (Percentage): This section will describe the nature of employee personal information and behavior. Respondents in Parts 1 and 2 will provide personal characteristics data, including gender, age, marital status, education, job position, and working hours.

1.2 The mean score (Mean) and standard deviation (Standard Deviation) will be employed to interpret the information pertaining to Teleworking factors.

2. Inferential Analysis involves the study of sample data and the testing of hypotheses using the SPSS statistical package.

The analysis involves multiple regression to assess the influence of independent variables, namely Demographic, Behaviorist, and Teleworking factors, on the dependent variable, which is Efficiency.

3. Multiple Regression Analysis is conducted to explore the relationships between dependent variables and one or more independent variables. This statistical method is employed to test hypotheses and can be represented as a linear equation. The raw score format is presented as follows:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \dots + b_kX_k$$

When;

\hat{Y} = Predictive score of dependent variable Y

b_0 = Fixed effects of the prediction equation in raw score format

b_1b_k = Score weights or regression coefficients of the variables

x_0X_1 = Independent variable score 1 to k
 k = number of independent variables

Research Duration

Table 8 Research Duration

No	Task	Start Date	End Date
1	Finish Ch1-Ch3	2023. January 7	2023. January 10
2	Defense Ch1-Ch3	2023. January 10	2023. January 17
3	Questionnaire first draft	2023. January 18	2023. January 31
4	Pretesting (pre-collection activity)	2023. February 1	2023. February 5
5	Pretesting (Data coding and analysis)	2023. February 6	2023. February 31
6	Modify the questionnaire	2023. March 1	2023. March 3
7	Data collection	2023. March 4	2023. March 20
8	Data coding	2023. March 21	2023. April 31
9	Data analysis	2023. May 1	2023. July 1
10	Paper writing	2023. July 2	2023. October 2
11	Dissertation review	2023. October 3	2023. December 3

CHAPTER IV RESULTS AND DISCUSSION

Summary

This chapter discusses the demographic information profiles, behavioral theory profiles, and remote working of respondents to the study, followed by the results of the study. Six of this study achieved the research objectives. First, study the quality performance level of employees while working from home. Second, to study the quantitative performance level of employees while working at home. Third, to study the time performance level of employees during working at home. Fourth, to determine the relationship between the home office population situation and staff efficiency in Beijing Fengtai District. Then determine the relationship between home office employee behavior and employee efficiency in Beijing Fengtai District. Finally, the paper discusses the remote working situation and staff efficiency of home office employees in Fengtai District, Beijing. Descriptive analysis of respondent respondents, reasoning analysis, divided into correlation analysis and regression analysis, the results of this study are shown in the table. Finally, the conclusion of this chapter. This chapter is divided into three parts:

1. Description of the questionnaire design
2. Test of the reliability and validity of the questionnaire
 - 2.1 Reliability analysis
 - 2.1.1 Reliability of the X1 value
 - 2.1.2 Reliability of the X2 value
 - 2.1.3 Reliability of the Y value
 - 2.1.4 Reliability of X 1, X2 and Y values
 - 2.2 Effectiveness analysis
3. Analysis of the results
 - 3.1 Descriptive statistical analysis
 - 3.1.1 Description of the demographic factors
 - 3.1.2 Description of the behavioral factors
 - 3.2 Multiple Regression analysis Model
 - 3.3 Correlation Analysis
 - 3.4 Collinearity
 - 3.5 Durbin-Watson statistic
 - 3.6 Normal P-P Plot of Regression Standardized Residual
 - 3.7 Scatterplot

Description of the questionnaire design

Table 9 Questionnaire

Part	classify	Question number	content	analytic procedure
Part 1: Demographic factors	Q1-Q5	Q1	1.Gender	Descriptive analysis
		Q2	2.Age	
		Q3	3.Income	
		Q4	4.Job position	
		Q5	5.Residence when working from home	
	Q6-Q9	Q6	6.Period of work from home during Covid19 pandemic	Descriptive analysis
		Q7	7.Number of working age	
		Q8	8.Work break time during working	
		Q9	9.Virtual meeting platform	
		Q10	I have had access to the information I need to do my job.	
Part 2: Behavioral factors	Q10-Q15	Q11	I have had access to the digital technology I need to do my job.	Multiple Regression analysis
		Q12	Digital technology (virtual meetings/collaborative platforms) has contributed to effectivecollaboration between me and my co-workers.	
		Q13	By means of digital technology (virtual meetings/collaborative platforms), I can easily contactmy leader or a co-worker.	
		Q14	By means of digital technology (virtual meetings/collaborative platforms), we are able tocommunicate informally within my unit.	
		Q15	By means of digital technology (virtual meetings/collaborative platforms), I get sufficientaccess to essential information.	

Table 9 (Continued)

Part	classify	Question number	content	analytic procedure
Part 3: Teleworking factors	Q16-18 Digital commu nication quality	Q16	In virtual meetings, it is easy to achieve a good discussion in smaller groups.	
		Q17	Virtual meetings is an efficient type of meetings.	
		Q18	It is easy to explain different issues in virtual meetings.	
		Q19	During the period in which you have been working from home since lockdown began in the middle of March 2020. Please indicate the percentage of your work week you spent on video meetings on average.	
	Q19- Q21 Digital platform for use	Q20	During the past three months before March 2020. Please indicate the percentage of your work week you spent on meetings, on average.	Multiple Regression analysis
		Q21	During the past three months before March 2020. Please indicate the average percentage of meetings that were conducted as video meetings.	
		Q22	Home-Based Telecommuting: If you compare the productivity of working in an office building (before the pandemic) and working from home (Work From Home), do you think these two different ways of working make your work tasks different?	Multiple Regression analysis
		Q23	Satellite Office: If the organization has a return-to-work policy in the building, do you think it will affect productivity if you switch offices between teams A and B?	Multiple Regression analysis

Table 9 (Continued)

Part	classify	Question number	content	analytic procedure	
Part 4: Employee productivity		Q24	Neighborhood work center: When you work in the neighborhood work center, do you think your supervisor values evaluating your productivity?	Multiple Regression analysis	
		Q25.1	Mobile work: 1.To what extent do you perceive it would increase the productivity of your work?	Multiple Regression analysis	
	Q25.1- 25.3 Mobile work	Q25.2	Mobile work: 2.To what extent do you perceive it would improve the performance of your work?		
		Q25.3	Mobile work: 3.To what extent do you perceive it would be useful for your work?		
		Q26	While working from home, I am more efficient.	Multiple Regression analysis	
	Q26- Q29	Q27	I performed better while working from home.		
	Quality	Q28	I have self-motivated to keep productive when work from home.		
		Q29	Family task interferes with my ability to perform job-related duties.		
		Q30	Working from home allows me to do my tasks in my own schedule.		
		Q30- Q33	Q31	During WFH, I am not disturbed and I can concentrate much more on my tasks.	Multiple Regression analysis
	Quantity	Q32	During WFH, my job quantity has decreased.		
		Q33	Work plans often change in mid-course while working from home.		

Table 9 (Continued)

Part	classify	Question number	content	analytic procedure
		Q34	I spend too much time in meetings, rather than at work when working from home.	
	Q34-	Q35	I dedicate long hours, but I still accomplish very little, when working from home.	Multiple
	Q37		My colleagues and I spend a lot of time	Regression
	Time	Q36	talking about personal matters when working from home.	analysis
		Q37	During WFH, I have work outside working hours.	

Test of the reliability and validity of the questionnaire

Reliability analysis

Reliability of the X1 Value

Case Processing Summary			
		N	%
Cases	Valid	409	100.0
	Excluded ^a	0	.0
	Total	409	100.0
A. Column deletion based on all variables in the procedure.			
Reliability Statistics			
	Cronbach's Alpha ^a	N of Items	
	.919	12	

Figure 12 Reliability of the X1 Value

X1 variable reliability > 0.7 with reliability.

Reliability of the X2 Value

Table 10 Reliability of the X2Value

Case Handling Summary		N	%
Cases	Valid	409	100.0
	Excluded ^a	0	.0
	Total	409	100.0

A. Column deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach Alpha ^a	N of Items
.700	6

X2 variable reliability=0.7 with reliability.

Reliability of the Y Value

Table 11 Reliability of the Y Value

Case Handling Summary		N	%
Cases	Valid	409	100.0
	Excluded ^a	0	.0
	Total	409	100.0

A. Column deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach Alpha ^a	N of Items
.966	12

Y variable reliability > 0.7 with reliability.

Reliability of the X1, X2 and Y Values

Table 12 Reliability of the X1, X2 and Y Value

Case Handling Summary		N	%
Cases	Valid	409	100.0
	Excluded ^a	0	.0
	Total	409	100.0

A. Column deletion based on all variables in the procedure.

Reliability Statistics		N of Items
Cronbach Alpha ^a		
.954		30

X1, X2 and Y variable reliability > 0.7 with reliability.
Cronbach Alpha were both 0.7 with reliable data.

Effectiveness analysis

Table 13 Effectiveness analysis

The component matrix after the rotation ^a	ingredient		
	1	2	3
Digital platform reach			
5.1 I have had access to the information I need to do my job.	.878		
5.2 I have had access to the digital technology I need to do my job.	.873		
5.3 Digital technology (virtual meetings/collaborative platforms) has contributed to effective collaboration between me and my co-workers.	.886		
5.4 By means of digital technology (virtual meetings/collaborative platforms), I can easily contact my leader or a co-worker.	.888		
5.5 By means of digital technology (virtual meetings/collaborative platforms), we are able to communicate informally within my unit.	.883		

Table 13 (Continued)

The component matrix after the rotation ^a	ingredient		
	1	2	3
5.6 By means of digital technology (virtual meetings/collaborative platforms), I get sufficient access to essential information.	.891		
Digital communication quality			
6.1 In virtual meetings, it is easy to achieve a good discussion in smaller groups.	.860		
6.2 Virtual meetings is an efficient type of meetings.	.870		
6.3 It is easy to explain different issues in virtual meetings.	.880		
Digital platform use			
7.1 During the period in which you have been working from home since lockdown began in the middle of March 2020.		.869	
7.2 During the past three months before March 2020. Please indicate the percentage of your work week you spent on meetings, on average.		.907	
7.3 During the past three months before March 2020. Please indicate the average percentage of meetings that were conducted as video meetings.		.916	
1.Home-Based Telecommuting: If you compare the productivity of working in an office building (before the pandemic) and working from home (Work From Home), do you think these two different ways of working make your work tasks different?	.871		
2.Satellite Office: If the organization has a return-to-work policy in the building, do you think it will affect productivity if you switch offices between teams A and B?	.862		
3.Neighborhood work center: When you working in the neighborhood work center, do you think your supervisor values evaluating your productivity?	.858		

Table 13 (Continued)

The component matrix after the rotation ^a	ingredient		
	1	2	3
4.Mobile work: 1.To what extent do you perceive it would increase the productivity of your work?			.902
4.Mobile work: 2.To what extent do you perceive it would improve the performance of your work?			.892
4.Mobile work: 3.To what extent do you perceive it would be useful for your work?			.900
Quality			
1.1 While working from home, I am more efficient.	.836		
1.2 I performed better while worked from home.	.842		
1.3 I have self-motivated to keep productive when work from home.	.837		
1.4 Family task interferes with my ability to perform job-related duties.	.808		
Quantity			
2.1 Working from home allows me to do my tasks in my own schedule.	.851		
2.2 During WFH, I am not disturbed and I can concentrate much more on my tasks.	.846		
2.3 During WFH,my job quantity has decreased.	.833		
2.4 Work plans often change in mid-course while working from home.	.850		
Time			
3.1 I spend too much time in meetings, rather than at work when working from home.	.826		
3.2 I dedicate long hours, but I still accomplish very little, when working from home.	.797		

Table 13 (Continued)

The component matrix after the rotation ^a	ingredient		
	1	2	3
3.3 My colleagues and I spend a lot of time talking about personal matters when working from home.	.785		
3.4 During WFH, I have ever work outside working hours.	.816		

Extraction method: principal component analysis method.

Rotation method: Caesar normal chemical maximum variance method.

A. Rotation has converged after 4 iterations.

The factor loading coefficient is greater than 0.5 indicates that the validity test passes the validity test.

Analysis of the results

Descriptive statistical analysis

Description of the demographic factors

From the gender distribution, the number of male in the sample was slightly more, accounting for 52.81%, while female accounted for 47.19%. The overall gender distribution was relatively balanced.

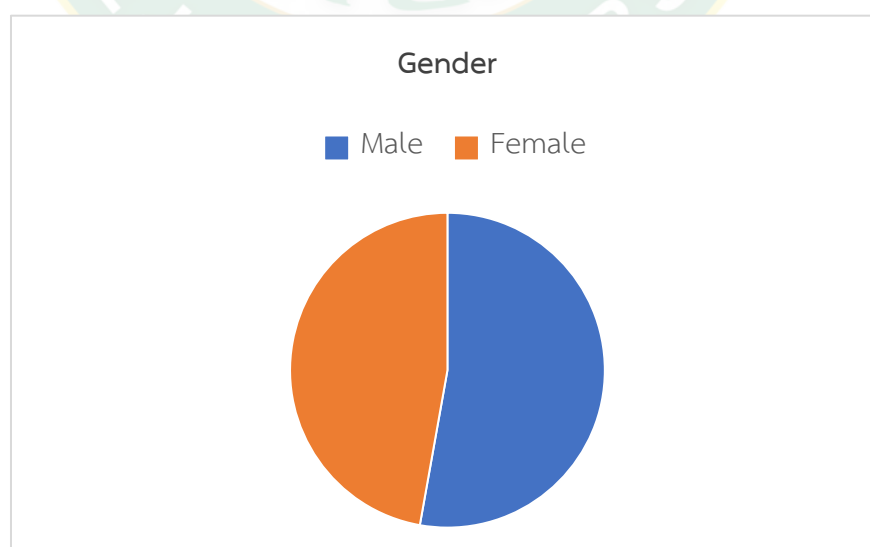


Figure 13 Gender

From the perspective of age, age was mainly concentrated in 21-30,31-40 and 0-21 years old, accounting for 30.81%, 28.12% and 16.87%, respectively.

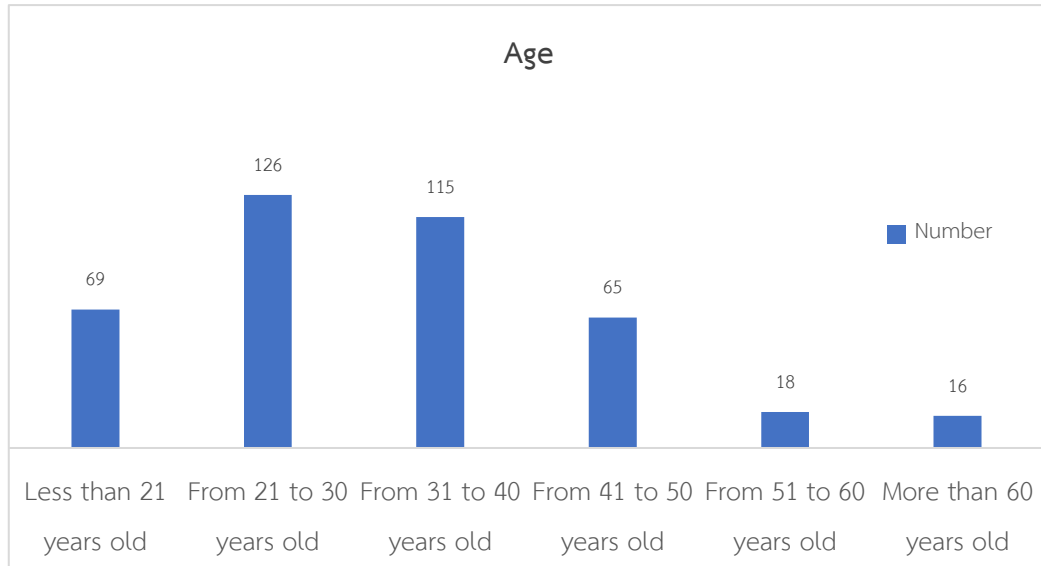


Figure 14 Age

From the perspective of monthly income, the highest proportion was 5,001 yuan to 10,000 yuan, accounting for 29.1%.



Figure 15 Income

From the perspective of the job position, the positions of the respondents were mainly concentrated in staff, managers and directors / senior managers, accounting for 37.41%, 22.49% and 22.25%, respectively.

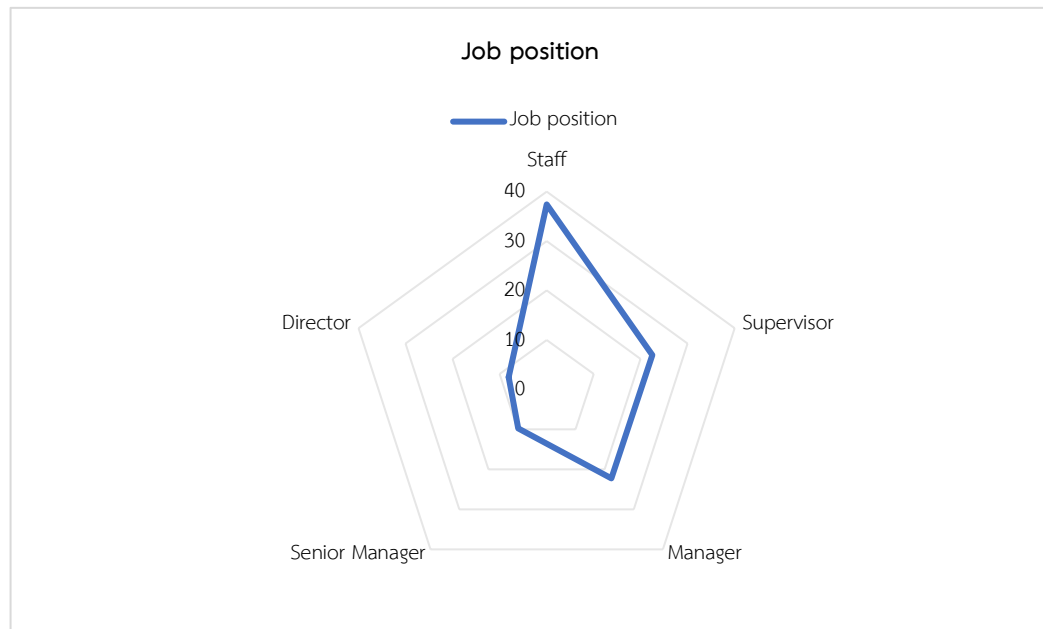


Figure 16 Job position

From the perspective of residence when working from home, most people in other second-tier cities accounted for 27.14% and 25.67%, respectively.

Table 14 Residence when working from home

Name	Choice	frequency	percentage (%)	accumulative perception (%)
Residence when working from home	Home in Beijing	22	5.38	5.38
	Renting in Beijing	39	9.54	14.92
	Homes in other first tier cities	80	19.56	34.48
	Rental housing in other first tier cities	52	12.71	47.19
	Home in second and third tier cities	111	27.14	74.33
	Renting in second and third tier cities	105	25.67	100

From the perspective of the distribution of population characteristics, we can see that the overall distribution is relatively balanced, which can be analyzed in the next step.

Description of the behavioral factors

Period of work from home during Covid19 pandemic: As can be seen from the data, the majority of respondents worked from home for 6 months. Among them, six months of service accounted for 28.4%, and one-year service accounted for 16.9%, indicating that there are more employees in these two home working periods. The proportion of respondents with longer home hours (one and a half and 2 years) was small, 12.7% and 12.5%, respectively, 15.9% worked from home for 2 and a half years, and 13.7% worked from home for 3 years.

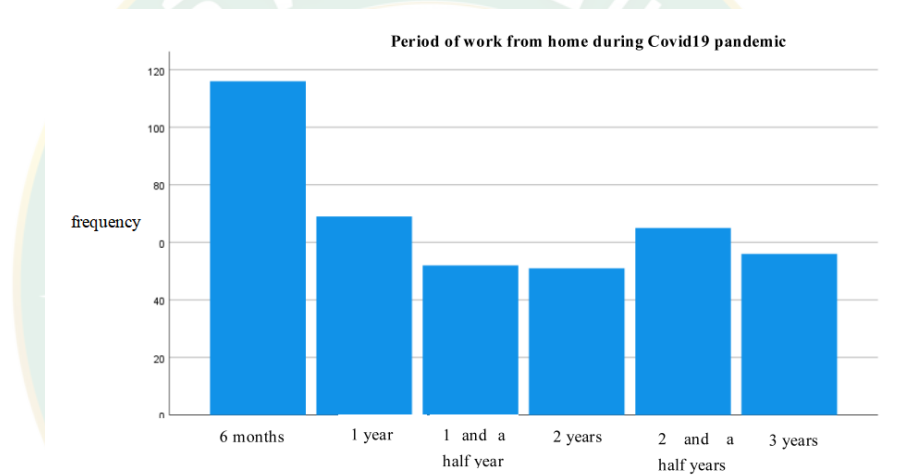


Figure 17 Period of work from home during Covid19 pandemic

Length of service: As shown in the table, the number of respondents with less than 1 year was 12%. The distribution of seniority was relatively concentrated in 1-5 years old, accounting for 24.7%. The distribution of working service was between 6 and 20 years old, accounting for 14.7%, 16.4% and 16.9% from low to high, and the proportion of respondents older than 20 years old accounted for 15.4%.

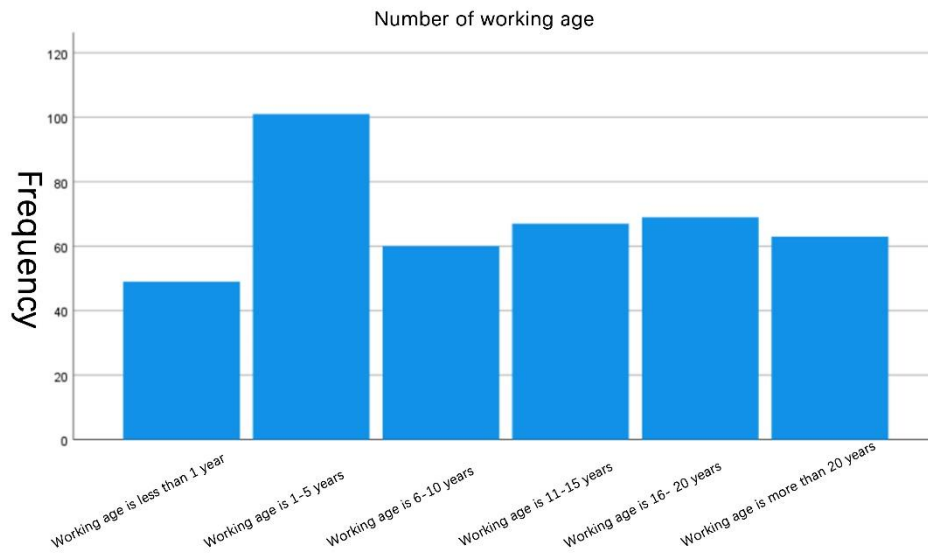


Figure 18 Number of working age

Work break time during working: Work break time during working varies between time periods. The work break time of less than 1 hour was 19.8%, and the majority of respondents had 1 hour and 2 hours, accounting for 30.3%. The time was 3 hours to more than 4 hours, and the proportion of respondents was 8.1%, 8.3% and 3.2%.

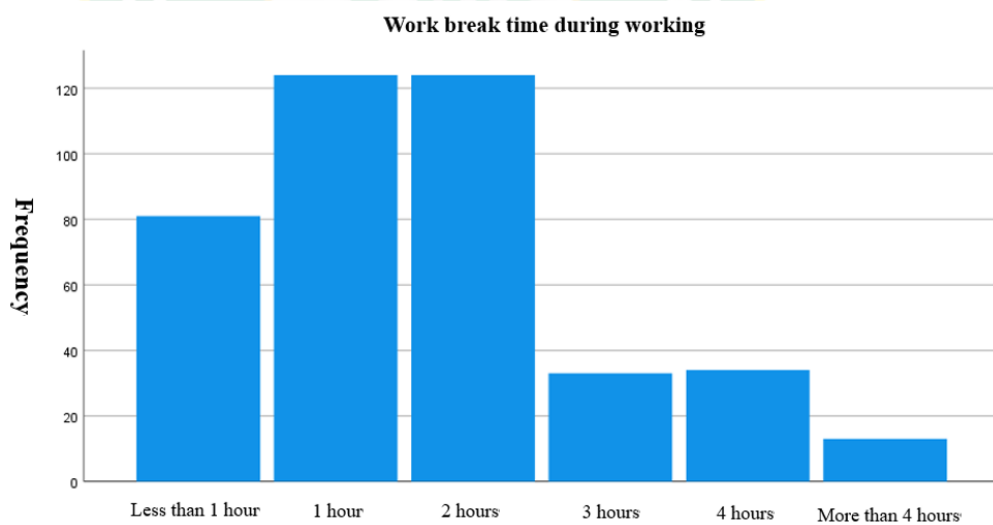


Figure 19 Work break time during working

Virtual meeting platform: The use of the virtual meeting platform varies among different positions. Tencent conference and Dingding are the main use of virtual conference platforms, accounting for 24%. This was followed by Teams (14.4%) and others (13%), which were also used by a significant number of respondents. The usage of virtual conference platforms for Zoom and Huawei Cloud conferences was 12% and 12.7%, respectively.

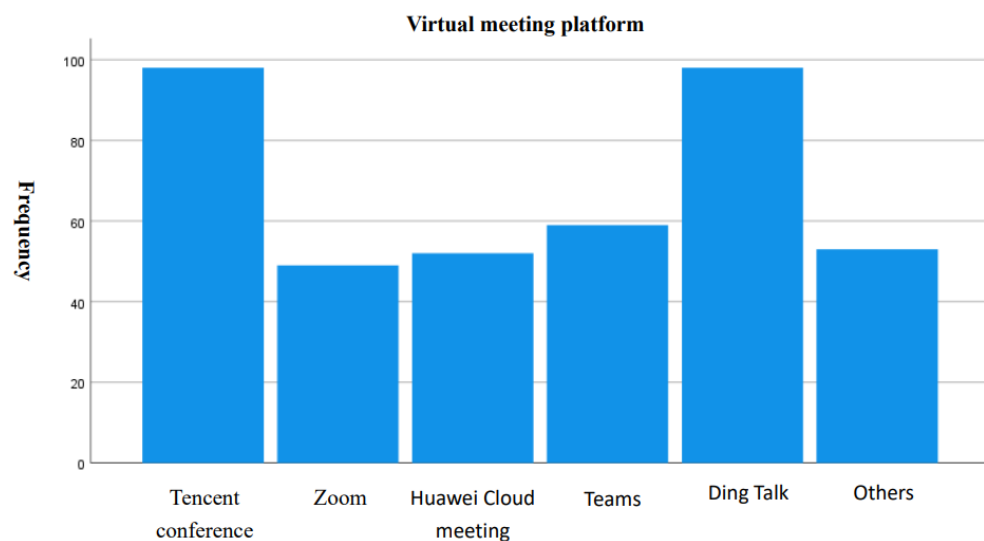


Figure 20 Virtual meeting platform

In conclusion, according to these data, we can see that the home working time of the epidemic is concentrated in 6 months, and the service is mainly distributed in 1-5 years old. The rest time during work is mainly 1-2 hours, while the virtual meeting platform using Tencent conference is relatively common in the interviews. These data provide the basis for a deeper analysis.

Multiple Regression analysis Model

Table 15 Multiple Regression analysis

		Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics
		B	Std. Error	Beta			Tolerance VIF
1	(Constant)	-.496	.139		-3.565	.000	
	X1	.907	.039	.756	23.279	.000	.606 1.651
	X2	.236	.050	.153	4.711	.000	.606 1.651

a. Dependent Variable: Y

Now write the multiple linear regression equation:

$$Y = 0.907 * X1 + 0.236 * X2 - 0.496$$

In this case, the regression coefficient of X1 is 0.907, which means that when the other factors remain unchanged, X1 increases by 1%, and Y will increase by 0.907%.

The regression coefficient of X2 is 0.236, which means that when the other factors remain unchanged, X2 increases by 1% and Y will increase by 0.236%.

Correlation Analysis

The link or association between the independent and dependent variables is investigated using correlation analysis. Pearson correlation used to analyse the relationship between work from home factors towards job satisfaction and work performance. Whether the variables are positively or negatively connected is determined by the sign of the results. The strength of the relationship, on the other hand, is determined by the value of the correlation. The table below displays the magnitude-based range and level of correlation of variables.

$0 < r < 0.3$	Weak correlation
$0.3 < r < 0.7$	Moderate correlation
$ r > 0.7$	Strong correlation

Figure 21 Interpreting the Size of a Correlation Coefficient

Source: Gerstman (2016)

Table 16 Correlation Analysis

Correlation		X1	X2	Y
X1	Pearson Correlation	1	.628**	.852**
	Sig. (1-tailed)		.000	.000
	N	409	409	409
X2	Pearson Correlation	.628**	1	.628**
	Sig. (1-tailed)	.000		.000
	N	409	409	409
Y	Pearson Correlation	.852**	.628**	1
	Sig. (1-tailed)	.000	.000	
	N	409	409	409

** . At level 0.01 (1-tailed), The correlation is significant.

The correlation coefficient between X1 and X2 is $0.628 < 0.7$ There is no strong correlation between X1 and X2, which initially indicates that the collinearity problem between the independent variables is moderate. The correlation coefficient between X1 and Y is 0.852, and the correlation coefficient between X2 and Y is 0.628, which has a relatively obvious linear relationship.

Collinearity

The collinearity problem is caused by the strong correlation between the independent variables, and its existence has an impact on regression, and now we need to observe the collinearity problem between the 7 independent variables, the most common basis is to focus on tolerance Tol and variance inflation factor VIF.

SPSS can output these two indicators in linear regression, let's look at the specific situation:

Table 17 Collinearity

		Coefficients ^a						
Model		Unstandardized		Standardized	t	Sig.	Collinearity	
		Coefficients		Coefficients			Statistics	
		B	Std.Error	Beta			Tolerance	VIF
1	(Constant)	-.496	.139		-3.565	.000		
	X1	.907	.039	.756	23.279	.000	.606	1.651
	X2	.236	.050	.153	4.711	.000	.606	1.651

a. Dependent Variable : Y

The results of this study show:

X1 ($b=0.907$, $\beta =0.756$, $P<0.001$), X2 ($b=0.236$, $\beta =0.153$, <0.001) all affect Y. X1 and X2 predict positively (because the regression coefficient is positive) Y.

VIF is the reciprocal of Tol, so the two of them are actually the same thing, we only need to interpret one of them. It is generally believed that if the tolerance Tol of an independent variable is < 0.1 , there may be a serious collinearity problem. Conversely, $VIF>10$ indicates a serious collinearity problem.

In this example, the Tol value of all independent variables is greater than 0.2, indicating that there is no particularly serious collinearity problem, and the performance of the correlation coefficient shows that the collinearity problem between the independent variables of this group of data is not serious and can be ignored.

Durbin-Watson statistic

Table 18 Multiple Regression analysis

Model Summary ^b						
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	.861 ^a	.740	.739		.62737	1.442

a. Predictors : (Constant), X2, X1

b. Dependent Variable : Y

The Durbin-Watson (D-W) statistic is 1.442, not less than 1, and the residue is considered relatively independent and meets the conditions. Model significance test, $P < 0.01$, the model has statistical significance.

Normal P-P Plot of Regression Standardized Residual

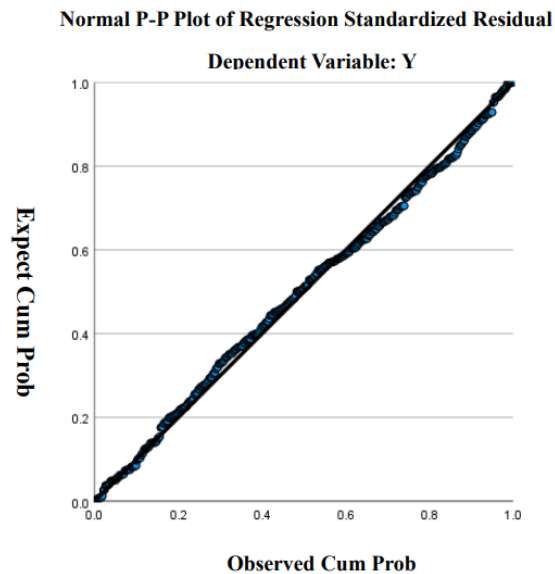


Figure 22 Normal P-P Plot of Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual, most of the points fall on diagonal lines, can be considered normal residuals, satisfying the conditions.

Scatterplot

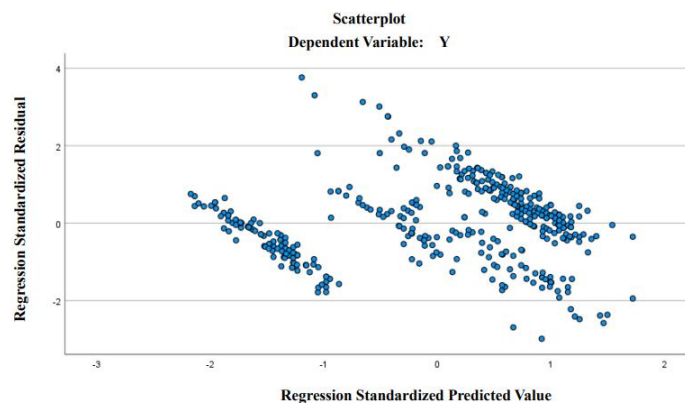


Figure 23 Scatterplot

Scatterplot, the distribution of each point is relatively uniform, and no regular changes are found. The residual variance can be considered homogeneous. Above we have diagnosed residual independence, residual normality, and residual variance homogeneity, and believe that the conditions are met.



CHAPTER V

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This chapter discusses and summarizes the results of the previous chapter. The discussion was held in support of these findings, including by reference to earlier research conclusions. In addition, the research objectives mentioned earlier in chapter I should be linked to all relevant recommendations or conclusions. Employers can gain insight into all aspects of the literature and latest findings that affect employees working from home by referencing all previous situations. The chapter concludes with a summary of the findings, conclusions, and recommendations for future research.

Summary of Research Findings

Demographic Profile of Respondents

The purpose of the study was to learn more about employee productivity in Beijing's Fengtai district who worked from home during the pandemic. The gender of the participants was explained in the responses, and equality between male and female employees was explained. Males accounted for about 52.81% of the sample (n=216), while females accounted for about 47.19% (n=193) of the sample.

Most of the participants in the study were between 21 and 30 years old, accounting for 30.81% of the sample (n = 126), followed by the sample aged between 31 and 40 years old, accounting for 29.1% of the sample (n = 115).

Most participants in the study had a monthly income between 5,001 yuan and 10,000-yuan, accounting for 29.1% of the sample (n=119), followed by the sample between 10,001 yuan and 20,000 yuan, accounting for 21.76% of the sample (n=89).

According to the respondent data, the majority of employees are 37.41% (n=153). 8.07% of employees (n=33) came from the highest levels of the company. In order to obtain comprehensive answers and eliminate bias, all levels of regional companies are guaranteed.

The main objective of this study was to determine the jobs of employees working from home. Therefore, the researchers divided the issue of where to work from home, between Beijing and other first- and second-tier cities, and between residential and rented housing. Based on this result, 27.14% of employees worked

from home in other second-tier cities, and 25.67% rented houses in other second-tier cities to work from home.

Research Question Answer

There are three research questions in this article, namely

1. To investigate the level of demographic factors, teleworking, behavioral and employee productivity
2. To assess the influence of teleworking factors on employee productivity

In response to the above research questions, this article sets up seven dimensions of behavior, four dimensions of teleworking and three dimensions of employee productivity and explores the relationship between the above dimensions and employee productivity. Data analysis shows that the seven dimensions of behavior, and four dimensions of teleworking are significantly positively correlated with employee productivity.

Discussion

Research has shown that the behavior of employees working from home and the improvement of teleworking will improve employee productivity. Demographic, behavioral and teleworking factors has an influence on productivity with the employee who work from home among in Fengtai City, Beijing, China.

Recommendation and Future Research

Implementation Recommendation

For employee:

1. Support work-life balance: Many employees see working from home as a great way to support work-life balance, allowing them to better take care of their family and personal needs.
2. More flexibility: Employees want more flexibility to work and be able to work and place their own hours and locations to be more productive.
3. Reduce commuting time and costs: Not having to commute every day can reduce time and costs, which is a big benefit for employees.
4. But may also feel lonely and socially distant: Some employees may feel that working from home causes loneliness and social distancing, and they may prefer to interact with colleagues in the office.

For company:

1. Reduce costs: Companies may need see working from home as a way to reduce operating costs, including reduced office space and equipment expenses.
2. Attract and retain talent: Companies may need to offer remote work options to attract and retain talented employees, especially those who need flexible working arrangements.
3. Increased productivity: Some companies believe that employees are more focused and productive when working from home.
4. Concerns about regulation and data security: Companies may be concerned about data security and regulatory issues, especially in sensitive industries.

For policymakers:

1. Economic incentives: Governments may be inclined to support working from home to boost economic growth and job creation.
2. Reducing traffic and pollution: Governments may welcome reducing the impact of commuter traffic on urban congestion and the environment.
3. Digital inclusion: Governments may support investment in internet and technology infrastructure to ensure that working from home is feasible for all.
4. Regulatory and Labor Rights: Governments need to consider how to protect the rights of employees and ensure that companies comply with labor regulations and data privacy regulations.

Future Research Recommendation

The purpose of this study was to analyze the impact of factors affecting remote working on employee productivity during the pandemic. This is a poorly researched topic, and in the future researchers should conduct similar studies in various industries to assess the impact of working from home adaptation on employees.

1. Influencing factor analysis: Research can continue to explore the impact of various factors on working from home, including employee productivity, job satisfaction, mental health, company performance, and more. This can help organizations better understand how to adjust policies and support systems.
2. Technology and infrastructure: Research can delve into digital technologies and infrastructure for working from home, including internet connectivity, security, digital tools, and more. This helps to develop better technical support and data security measures.

3. Management and leadership: Research can explore best practices for leaders and managers when supporting remote teams, including ways to maintain collaboration, improve team morale, and supervise employees.

4. Diversity and inclusion: Research can look at the work-from-home experience of different groups to ensure that the model is feasible for all employees, regardless of their background, needs, or disability.

5. Future of Work Trends: Research trends that can predict the future of work, such as hybrid work models, the evolution of digital work environments, etc. This is helpful for policymakers and organizations.

6. Legal and regulatory issues: Research legal and regulatory issues that can focus on working from home, including labor law, data privacy regulations, insurance, and compensation. This is very important for policymakers and companies.

7. Skills training and development: Research can look at the impact of remote work on skills demand in order to provide training and development opportunities for employees.

These recommendations represent some of the directions for research into the future of working from home to help better understand, implement and optimize remote work models. This will help adapt to the changing work environment and ensure that both employees and the organization benefit from it.

Limitations of the Study

First, the scope of this study is limited because the target population is only employees in Fengtai District, Beijing.

Second, we couldn't measure adaptation to the new situation in WFH, and our data measured work-from-home behavior months after the onset of the pandemic. More research should track this adaptation process in detail to better understand how businesses and employees are adopting the new environment and adapting to working from home. For example, How companies manage their work-from-home workforce, maintain collaboration and promote employee well-being to maximize the potential of remote work.

Finally, the data collected post-COVID only covers working days. The researchers didn't know how, thanks to the fact that the organization worked around the clock, employees' habits could have changed on weekends. The researchers didn't know that employees who had WFH on weekends might work more on weekends, or that employees would also do the same, working overnight or at any time they could. If this is the case, then we recommend sculpting the barriers

between work and personal life for pursuing the researchers' intention to investigate how WFH affects knowledge workers' future weekend work.

The World Health Organization (WHO) has reported 769,369,823 confirmed cases of COVID-19, resulting in 6,954,336 deaths. China, as a significant contributor to these numbers, has reported 99,300,923 cases. As we approach 2022, the continued prevalence of COVID-19 and its concomitant economic and social impacts present a persistent and severe threat to the world. The ongoing global economic recovery is uneven, exacerbated by disparities in vaccination opportunities, potentially deepening societal divisions and geopolitical tensions. Alarming, only 6% of the poorest 52 countries, which represent 20% of the global population, have achieved significant vaccination rates.



REFERENCES

- A .A. Attar, A.K. Gupta, & D. B. Desai. 2012. A Study of Various Factors Affecting Labour Productivity and Methods to Improve It. **IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)**, 11-14.
- Abioro, M., Adewole Oladejo, D., & Faderera, A. 2018. WORK LIFE BALANCE PRACTICES AND EMPLOYEES PRODUCTIVITY IN THE NIGERIAN UNIVERSITY SYSTEM. CRAWFORD. **JOURNAL of BUSINESS & SOCIAL SCIENCES (CJBASS)**, XIII(II). website:cjbasscru.org.
- Anakpo, G., Nqwayibana, Z., & Mishi, S. 2023. The Impact of Work-from-Home on Employee Performance and Productivity: A Systematic Review. **Sustainability**, 15(5), 4529. <https://doi.org/10.3390/su15054529>
- Bailey, D. E., & Kurland, N. B. 2002. A review of telework research: findings, new directions, and lessons for the study of modern work. **Journal of Organizational Behavior**, 23(4), 383–400. <https://doi.org/10.1002/job.144>
- Balková, M., Dvořáková, K., & Borovková, B. (2023). Evaluating the Experience with Work from Home. **Ad Alta: Journal of Interdisciplinary Research**, 13(1), 25–29. <https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=c0e3e6fe-9d08-4c69-bc50-656b450fc82e%40redis>.
- Bojovic, D., Benavides, J., & Soret, A. 2020. What we can learn from birdsong: Mainstreaming teleworking in a post-pandemic world. **Earth System Governance**, 5((2020) 100074), 100074. <https://doi.org/10.1016/j.esg.2020.100074>
- Borkovich, D. J., & Skovira, R. J. 2020. WORKING FROM HOME: CYBERSECURITY IN THE AGE OF COVID-19. **Issues in Information Systems**, 21(4). https://doi.org/10.48009/4_iis_2020_234-246
- Bugg, A. 2021. How to Keep Documents Safe While Working Remotely. [Online]. Available from <https://nira.com/keep-documents-safe-working-remotely/> (30 September 2021).
- Cahyono, Y., Fahlevi, M., Purwanto, A., Asbari, M., Mufid, A., Agistiawati, E., & Suryani, P. 2020. Impact of Work From Home (WFH) on Indonesian Teachers Performance During the Covid-19 Pandemic: An Exploratory Study Impact of Work From Home (WFH) on Indonesian Teachers Performance During the Covid-19 Pandemic : An Exploratory Study. **International Journal of Advanced Science and Technology**, 29(5), 6235–6244.
- Congressional Research Service. 2021. **Global Economic Effects of COVID-19**. [Online].

- Available from <https://crsreports.congress.gov> (2021, November 10).
- Contreras, F., Baykal, E., & Abid, G. 2020. E-Leadership and Teleworking in Times of COVID-19 and Beyond: What We Know and Where Do We Go. **Frontiers in Psychology**, 11(2). Frontiersin. <https://doi.org/10.3389/fpsyg.2020.590271>.
- Danilova, K. B., Ulfsten, A., Eikebrokk, T. R., Iden, J., Johannessen, T. V., & Johanson, D. 2022. Explaining individual job performance in work from home (WFH) arrangements. **Information Technology & People**, 36(5). <https://doi.org/10.1108/itp-01-2021-0039>
- Dean, S. 2013. Three elements of efficient operation. **Sales and Management**, 2013(8), 2. <http://www.qikan.com.cn/>
- Delprato, D. J., & Midgley, B. D. 1992. Some fundamentals of B. F. Skinner's behaviorism. **American Psychologist**, 47(11), 1507–1520. <https://doi.org/10.1037/0003-066x.47.11.1507>.
- Encyclopedia. 2020. **The 2020 Novel Coronavirus outbreak _360 Encyclopedia**. [Online]. Available from <https://baike.so.com/doc/29084162-30563544.html> (21 January 2020).
- Fengtai District People's Government of Beijing Municipality. 2019. **From January to October fengtai Park economic stability to “good” -Beijing Fengtai District People's Government website**. [Online]. Available from <http://www.bjft.gov.cn/ftq/fxbg/201912/6100f3d6b7f847858e319c52dc418206.shtml> (30 December 2019).
- Fengtai District People's Government of Beijing Municipality. 2022. **Notice of Fengtai District on improving control measures in some regions-Website of Fengtai District People's Government of Beijing**. [Online]. Available from <http://www.bjft.gov.cn/ftq/zwyw/202201/9262bacbf71c4a34b80c5ddc9b18fb6c.shtml> (2022, January 28).
- Fengtai District People's Government of Beijing Municipality. 2023. **Data download-Beijing Fengtai District People's Government website**. [Online]. Available from <http://www.bjft.gov.cn/ftq/2022jdsj/202303/8aa1831cc0764325b2568675d92242ab/files/7f34b7f160344707b323a8328c41d67d.xls> (2023, March 22).
- Fengtai District People's Government of Beijing Municipality. (n.d.). **Website of Fengtai People's District Government of Beijing Municipality**. [Online]. Available from <http://www.bjft.gov.cn/> (August 9, 2023).
- Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. 2013. **Embracing Digital Technology A New Strategic Imperative**.

- G. A. Tawney. 1915. **THE JOURNAL OF PHILOSOPHY PSYCHOLOGY AND SCIENTIFIC METHODS**. [Online]. Available from https://www.pdcnet.org//collection/fshow?id=jppsm_1915_0012_0002_0029_0032&pdfname=jppsm_1915_0012_002_0003_0006.pdf&file_type=pdf.
- Gamelon, M., & Froy, H. 2020. Biodemography: Unifying Concepts from Biology, Demography, and Mathematics. **Trends in Ecology & Evolution**, 35(6), 475–476. <https://doi.org/10.1016/j.tree.2020.03.008>
- Gibbs, M., Mengel, F., & Siemroth, C. 2021. Work from Home & Productivity: Evidence from Personnel & Analytics Data on it Professionals. **SSRN Electronic Journal**, D2, M5. <https://doi.org/10.2139/ssrn.3846680>.
- Golden, L. 2008. Limited Access: Disparities in Flexible Work Schedules and Work-at-home. **Journal of Family and Economic Issues**, 29(1), 86–109. <https://doi.org/10.1007/s10834-007-9090-7>
- Goldfarb, A., & Tucker, C. 2019. Digital Economics. **Journal of Economic Literature**, 57(1), 3–43. <https://doi.org/10.1257/jel.20171452>
- Guoxin Network.2020. **White Paper on China’s Actions against COVID-19**. [Online]. Available from http://www.scio.gov.cn/zfbps/ndhf/2020n/202207/t20220704_130649.html (2020, June 7).
- Hackney, A., Yung, M., Somasundram, K. G., Nowrouzi-Kia, B., Oakman, J., & Yazdani, A. 2022. Working in the digital economy: A systematic review of the impact of work from home arrangements on personal and organizational performance and productivity. **PLOS ONE**, 17(10), e0274728. <https://doi.org/10.1371/journal.pone.0274728>.
- Hayes, A. (2019, December 6). Operational Efficiency Definition. **Investopedia**. <https://www.investopedia.com/terms/o/operationalefficiency.asp>
- International Labour Office. 2020. **An employers’ guide on working from home in response to the outbreak of COVID-19**. International Labour Organization.
- Ipsen, C., van Veldhoven, M., Kirchner, K., & Hansen, J. P. 2021. Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19. **International Journal of Environmental Research and Public Health**, 18(4), 1–17.
- JOIN Solutions AG. 2023. **Work from Home: Definition, process, and examples**. [Online]. Available from <https://join.com/glossary/work-from-home>.
- Kailiang, Z., & Xia, W. 2021. The application dilemma and breakthrough of the labor law system under the home office mode. **Journal of Changchun University of Science and Technology (Social Sciences Edition)**, 34(3).
- Kazaz, A., Manisali, E., & Ulubeyli, S. 2008. EFFECT OF BASIC MOTIVATIONAL FACTORS

ON CONSTRUCTION WORKFORCE PRODUCTIVITY IN TURKEY/PAGRINDINI
 MOTYVACIJOS VEIKSNIŲ ĮTAKA STATYBOS PRODUKTYVUMUI TURKIJOJE.
JOURNAL of CIVIL ENGINEERING and MANAGEMENT, 14(2), 95–106.
<https://doi.org/10.3846/1392-3730.2008.14.4>

Kendra Cherry, MEd. 2022. **Why Behaviorism Is One of Psychology's Most Fascinating Branches**. [Online]. Available from

<http://verywellmind.com/behavioral-psychology-4157183?print> (2022, November 7).

Khalid Bhatti, K., & Masood Qureshi, T. (2007). Impact Of Employee Participation On Job Satisfaction, Employee Commitment And Employee Productivity.

International Review of Business Research Papers, Vol.3(No.2 June 2007, Pp. 54 - 68). <https://www.academia.edu/download/31222208/Bhatti.pdf>

Kolk, M. 2019. **Demographic Theory and Population Ethics -Relationships between Population Size and Population Growth**.

Krapfl, J. E. 2016. Behaviorism and Society. **The Behavior Analyst**, 39(1), 123–129.
<https://doi.org/10.1007/s40614-016-0063-8>

Kurkland, N. B., & Bailey, D. E. 1999. The advantages and challenges of working here, there anywhere, and anytime. **Organizational Dynamics**, 28(2), 53–68.

[https://doi.org/10.1016/s0090-2616\(00\)80016-9](https://doi.org/10.1016/s0090-2616(00)80016-9)

Lawler, R. R. 2011. Demographic concepts and research pertaining to the study of wild primate populations. **American Journal of Physical Anthropology**, 146(S53), 63–85. <https://doi.org/10.1002/ajpa.21611>

LONGMAN. 2019. **Efficiency | meaning of efficiency in Longman Dictionary of Contemporary English | LDOCE**. [Online]. Available from
<https://www.ldoceonline.com/dictionary/efficiency>.

Macaulay, T. 2017. **Operational Efficiency - an overview | ScienceDirect Topics**. [Online]. Available from <https://www.sciencedirect.com/topics/computer-science/operational-efficiency>.

Malone, J. 2017. (PDF) John B. Watson. ResearchGate.

https://www.researchgate.net/publication/319076898_John_B_Watson

MBA Skool Team. 2020. **Work From Home Definition | Human Resources (HR) Dictionary**. [Online]. Available from <https://www.mbaskool.com/business-concepts/human-resources-hr-terms/16870-work-from-home.html> (2020, December 15).

Mehmet, D., & Rezen, D. 1988. Hacettepe Vniversitesi Eđitim Fakóltesi

DergisizyxxwvutsrqponmlkjihgfedcbaZYXWVUTSRQPONMLKJIHGFEDCBA

BEHAVIORIST THEORY AND LANGUAGE LEARNING.

- Merriam-Webster. 2019. **Definition of DEMOGRAPHIC**. [Online]. Available from <https://www.merriam-webster.com/dictionary/demographic>.
- Messenger, J. C., & Gschwind, L. 2016. Three generations of Telework: New ICTs and the (R)evolution from Home Office to Virtual Office. **New Technology, Work and Employment**, 31(3), 195–208. <https://doi.org/10.1111/ntwe.12073>.
- Minkus, L., Groepler, N., & Drobnič, S. 2022. The significance of occupations, family responsibilities, and gender for working from home: Lessons from COVID-19. **PLOS ONE**, 17(6), e0266393. <https://doi.org/10.1371/journal.pone.0266393>.
- Mukherjee, S., & Narang, D. 2022. Digital Economy and Work-from-Home: The Rise of Home Offices Amidst the COVID-19 Outbreak in India. **Journal of the Knowledge Economy**, 14, 924(945). <https://doi.org/10.1007/s13132-022-00896-0>.
- Nakrošienė, A., Bučiūnienė, I., & Goštautaitė, B. 2019. Working from home: characteristics and outcomes of telework. **International Journal of Manpower**, 40(1), 87–101. <https://doi.org/10.1108/ijm-07-2017-0172>.
- Na-Nan, K., Chaiprasit, K., & Pukkeeree, P. Factor analysis-validated comprehensive employee job performance scale. [Online]. Available from <https://www.emerald.com/insight/content/doi/10.1108/IJORM-06-2017-0117/full/html> (2018, November 29).
- Narayanan, L., Menon, S., & Plaisent, M. 2017. Telecommuting: The Work Anywhere, Anyplace, Anytime Organization in the 21 st Century. **Journal of Marketing and Management**, 8(2), 47. <https://gsmi-ijgb.com/wp-content/uploads/JMM-V8-N2-P04-Lakshmi-Narayanan-Telecommuting.pdf>.
- O'donohue, W. T., & Kitchener, R. F. 1999. **Handbook of behaviorism**. Academic Press.
- Oliver, D. 2021. **How Remote Work is Shaking Up the U.S. Workforce: Research on How Remote Work is Shaking Up the U.S. Workforce: Research on the Recent Shift to Remote Work**. [Online]. Available from <https://doi.org/10.1136/bmj.n1066>.
- Pan, S., Chunmin, B., Shuai, Y., & Tianyu, Y. 2023. **Telecommuting Report 2020**. [Online]. Available from <http://www.iyiou.com/intelligence>
- Popovici, V., & Popovici, A.-L. 2020. **Remote Work Revolution: Current Opportunities and Challenges for Organizations**.
- Poston, D. L., & Micklin, M. 2019. **Handbook of population**. Springer.
- Prasetyaningtyas, S. W., Heryanto, C., Nurfauzi, N. F., & Tanjung, S. B. 2021. THE EFFECT OF WORK FROM HOME ON EMPLOYEE PRODUCTIVITY IN BANKING INDUSTRY.

- Jurnal Aplikasi Manajemen**, 19(3), 507–521.
<https://doi.org/10.21776/ub.jam.2021.019.03.05>
- Ruolin, X. 2022. **Ali, Tencent, byte home office “Three Kingdoms kill” online office software rolled up-China News network**. [Online]. Available from <https://www.chinanews.com.cn/cj/2022/04-18/9732046.shtml> (2022, April 18).
- Ruoxuan, G., & Siyan, X. 2020. **In the era of telecommuting, the three core changes after the paradigm shift**. [Online]. Available from <https://www.tisi.org/13036> (2020, February 20).
- Sam May-Varas, E. D., Margolis, J., & tmead. 2022. **Behaviorism**. [Online]. Available from <https://openoregon.pressbooks.pub/educationallearningtheories3rd/chapter/chapter-1-behaviorism/>.
- Schultz, D. P., & Schultz, S. E. 2015. **A history of modern psychology**. 11th ed.
- Shenk, C. E., & Vilardaga, R. 2007. **Applied extensions of behavior principles: Applied behavioral concepts and behavioral theories**. Researchgate, Chapter January 2007.
- Smite, D., Moe, N. B., Hildrum, J., Gonzalez-Huerta, J., & Mendez, D. 2023. Work-from-home is here to stay: Call for flexibility in post-pandemic work policies. **Journal of Systems and Software**, 195(0164-1212), 111552.
<https://doi.org/10.1016/j.jss.2022.111552>.
- Šmite, D., Moe, N. B., Klotins, E., & Gonzalez-Huerta, J. 2022. From forced Working-From-Home to voluntary working-from-anywhere: Two revolutions in telework. **Journal of Systems and Software**, 195(195(2023)), 111509.
<https://doi.org/10.1016/j.jss.2022.111509>.
- Staddon, J. 2014. **The New Behaviorism**. Psychology Press.
- StudySmarter. 2023. **Digital Technology: Definition, Examples & Impact**. [Online]. Available from <https://www.studysmarter.co.uk/explanations/business-studies/business-development/digital-technology/>.
- Tabutin, D. 2007. Whither demography? Strengths and Weaknesses of the Discipline over Fifty Years of Change. **Population** (English Edition), 62(1), 15.
<https://doi.org/10.3917/pope.701.0015>.
- Tan, L., Wu, X., Guo, J., & Santibanez-Gonzalez, E. D. R. 2021. Assessing the Impacts of COVID-19 on the Industrial Sectors and Economy of China. **Risk Analysis**, 42(1).
<https://doi.org/10.1111/risa.13805>.
- Tencent. 2020. **2020 Spring Festival enterprises resumption of work research report released_Fujian network_Tencent network**. [Online]. Available from <https://fj.qq.com/a/20200303/019092.htm> (2020, March 3).

- The people's government of beijing municipality. 2020. **Notice of Beijing Municipal People's Government on Flexible Arrangement of Enterprises in Beijing during the prevention and control of novel Coronavirus Pneumonia _ Policy document_Capital Window_Portal of Beijing Municipal People's Government.** [Online]. Available from https://www.beijing.gov.cn/zhengce/zhengcefagui/202001/t20200131_1622070.html (2020, January 31).
- The people's government of beijing municipality. 2021. **Press Conference on COVID-19 Prevention and Control in Beijing.** [Online]. Available from <https://www.beijing.gov.cn/shipin/Interviewlive/543.html> (2021, October 19).
- tutorialspoint. (n.d.). **Understanding Performance.** [Online]. Available from https://www.tutorialspoint.com/performance_management/performance_management_understanding.htm#.
- Ugwu, F. O., Enwereuzor, I. K., & Mazei, J. 2022. Is Working from Home a Blessing or a Burden? Home Demands as a Mediator of the Relationship Between Work Engagement and Work-Life Balance. **Applied Research in Quality of Life**, 18, 341-364. <https://doi.org/10.1007/s11482-022-10084-6>.
- United Nations Statistics Division. 2014. **Overview of Demographic Concepts and Methods United Nations Statistics Division.** [Online]. Available from <https://unstats.un.org/unsd/demographic/meetings/wshops/Myanmar/2014/docs/s05.pdf>.
- V. Deepa, Hasnan Baber, Balvinder Shukla, R. Sujatha, & Danish Khan. 2022. Does lack of social interaction act as a barrier to effectiveness in work from home? COVID-19 and gender. **Journal of Organizational**, 10(1), 94-111. <https://doi.org/10.1108/JOEPP-11-2021-0311>.
- Van Horn, C., & Heldrich, J. 2000. **Telework: Coming of Age? Evaluating the Potential Benefits of Telework.** [Online]. Available from http://zdalniej.pl/wp-content/uploads/2011/09/Telework_Coming_of_Age_Evaluating_the_Potential_Benefits_of_Telework.pdf.
- Varghese Thomas, P. **Demographic theories- Biological social and cultural.** [Online]. Available from <https://www.tutorialspoint.com/demographic-theories-biological-social-and-cultural> (2023, March 17).
- Vartiainen, M. 2021. **Telework and Remote Work.** [Online]. Available from <https://doi.org/10.1093/acrefore/9780190236557.013.850>
- World Health Organization. 2023. **WHO COVID-19 dashboard.** [Online]. Available from <https://covid19.who.int/>.
- World Health Organization. (n.d.). **Coronavirus.** [Online]. Available from

<https://www.who.int/health-topics/coronavirus#>

Wrike. (n.d.). **Remote Work vs. Telework - What's the Difference? | Remote Work Guide**. [Online]. Available from <https://www.wrike.com/remote-work-guide/faq/remote-work-vs-telework/>

Wyatt, W. J., Hawkins, R. P., & Davis, P. (1986). Behaviorism: Are Reports of Its Death Exaggerated? **The Behavior Analyst**, 9(1), 101–105.
<https://doi.org/10.1007/bf03391933>

Xiaoyan, W. 2020. What should China's economy do under the Novel Coronavirus (2019-nCoV) outbreak?. [Online]. Available from <https://xw.qianzhan.com/analyst/detail/220/200207-3c21eace.html>(2020, February 7).

Xinhua Finance. 2020. CIC consultant: Remote office data analysis-The rise and development of the remote office industry under the background of the epidemic in April 2020. [Online]. Available from <https://www.cnfin.com/news-xh08/a/20200430/1934160.shtml> (2020, April 30).

Yinxia, H., & Qingtang, Z. 2022. Telecommuting pros and cons. **Telecommuting Pros and Cons**, F272.92(2022, (09)).

Zhaopin recruitment, & National School of Development. 2022. Remote home working under the impact of the pandemic: reality and outlook. National School of Development.



APPENDICES



APPENDIX A

ENGLISH QUESTIONNAIRES

The effect of work from home factors on employee productivity

Part 1: Demographic factors

1. Gender

Male

Female

2. Age

Less than 21 years old

From 21 to 30 years old

From 31 to 40 years old

From 41 to 50 years old

From 51 to 60 years old

More than 60 years old (Please write down your age.....) _____ *

3. Income

Less than 5001 Yuan

From 5001 to 10000 Yuan

From 10001 to 20000 Yuan

From 20001 to 30000 Yuan

More than 30000 Yuan (Please write down your income.....) _____ *

4. Job position

Staff

Supervisor

Manager

Senior Manager

Director

5. Residence when working from home

Home in Beijing

Renting in Beijing

Homes in other first tier cities

Rental housing in other first tier cities

Home in second and third tier cities

Renting in second and third tier cities

Part 2: Behavioral factors

1.Period of work from home during Covid19 pandemic

6 months

1 year

1 and a half year

2 years

2 and a half years

3 years

2.Number of working age

Working age is less than 1 year

Working age is 1-5 years

Working age is 6-10 years

Working age is 11-15 years

Working age is 16- 20 years

Working age is more than 20 years(Please write down the number.....)

3.Work break time during working

Less than 1 hour

1 hour

2 hours

3 hours

4 hours

More than 4 hours(Please write down the number.....) _____ *

4.Virtual meeting platform

Tencent conference

Zoom

Huawei Cloud meeting

Teams

Ding Talk

Other(s) (Please write down the specify.....) _____ *

5.Digital platform reach(Please tick the extent to which you agree with the following statements (5-point scale“Strongly disagree” to “Strongly agree”):

5.1 I have had access to the information I need to do my job.

1.Strongly disagree

2.Disagree

3.Neutral

4.Agree

5.Strongly agree

5.2 I have had access to the digital technology I need to do my job.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

5.3 Digital technology (virtual meetings/collaborative platforms) has contributed to effective collaboration between me and my co-workers.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

5.4 By means of digital technology (virtual meetings/collaborative platforms), I can easily contact my leader or a co-worker.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

5.5 By means of digital technology (virtual meetings/collaborative platforms), we are able to communicate informally within my unit.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

5.6 By means of digital technology (virtual meetings/collaborative platforms), I get sufficient access to essential information.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

6. Digital communication quality (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

6.1 In virtual meetings, it is easy to achieve a good discussion in smaller groups.

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

6.2 Virtual meetings is an efficient type of meetings.

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

6.3 It is easy to explain different issues in virtual meetings.

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

7. Digital platform use

7.1 During the period in which you have been working from home since lockdown began in the middle of March 2020. Please indicate the percentage of your work week you spent on video meetings on average. Scale 0–100%.

- 1. Not at all (0%-20%)
- 2. Low (21%-40%)
- 3. Neutral (41%-60%)
- 4. High (61%-80%)
- 5. To a great exten (81%-100%)

7.2 During the past three months before March 2020. Please indicate the percentage of your work week you spent on meetings, on average. Scale 0–100%.

- 1. Not at all (0%-20%)
- 2. Low (21%-40%)
- 3. Neutral (41%-60%)
- 4. High (61%-80%)
- 5. To a great exten (81%-100%)

7.3 During the past three months before March 2020. Please indicate the average percentage of meetings that were conducted as video meetings. Scale 0–100%.

- 1. Not at all (0%-20%)
- 2. Low (21%-40%)
- 3. Neutral (41%-60%)
- 4. High (61%-80%)
- 5. To a great extent (81%-100%)

Part 3: Teleworking factors

1. Home-Based Telecommuting: If you compare the productivity of working in an office building (before the pandemic) and working from home (Work From Home), do you think these two different ways of working make your work tasks different? (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

2. Satellite Office: If the organization has a return-to-work policy in the building, do you think it will affect productivity if you switch offices between teams A and B? (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

3. Neighborhood work center: When you working in the neighborhood work center, do you think your supervisor values evaluating your productivity? (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

- 1. Strongly disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly agree

4.Mobile work: For each of the following mobile work support functionalities: mobile notification; location tracking; navigation; and real-time mobile job dispatching. (Please tick the extent to which you agree with the following statements (5-point scale “Not at all”–“To a great extent”): 1 Not at all 2 Low 3 Neutral 4 High 5 To a great extent

	1- Not at all	2- Low	3-Neutral	4-High	5-To a great exten
1.To what extent do you perceive it would increase the productivity of your work?			<input type="radio"/>		<input type="radio"/>
2.To what extent do you perceive it would improve the performance of your work?			<input type="radio"/>		<input type="radio"/>
3.To what extent do you perceive it would be useful for your work?			<input type="radio"/>		<input type="radio"/>

Part 4: Employee productivity

1.Quality (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree” –“Strongly agree”):

1.1 While working from home, I am more efficient.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

1.2 I performed better while worked from home.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

1.3 I have self-motivated to keep productive when work from home.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

1.4 Family task interferes with my ability to perform job-related duties.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

2.Quantity: (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

2.1 Working from home allows me to do my tasks in my own schedule.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

2.2 During WFH, I am not disturbed and I can concentrate much more on my tasks.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

2.3 During WFH,my job quantity has decreased.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

2.4 Work plans often change in mid-course while working from home.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree
- 5.Strongly agree

3.Time: (Please tick the extent to which you agree with the following statements (5-point scale “Strongly disagree”–“Strongly agree”):

3.1 I spend too much time in meetings, rather than at work when working from home.

- 1.Strongly disagree
- 2.Disagree
- 3.Neutral
- 4.Agree

5. Strongly agree

3.2 I dedicate long hours, but I still accomplish very little, when working from home.

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree

3.3 My colleagues and I spend a lot of time talking about personal matters when working from home.

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree

3.4 During WFH, I have ever work outside working hours.

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree





APPENDIX B

CHINESE QUESTIONNAIRES

居家办公因素对员工生产力的影响[复制]

第 1 部分：人口因素

1. 性别 [单选题] *

男

女

2. 年龄 [单选题] *

小于 21 岁

21 岁至 30 岁

31 岁至 40 岁

41 岁至 50 岁

51 岁至 60 岁

大于 60 岁 (请写下您的年龄) _____ *

3. 收入/月 [单选题] *

低于 5001 元

5001 元至 10000 元

10001 元至 20000 元

20001 元至 30000 元

大于 30000 元 (请写下您的收入) _____ *

4. 工作岗位 [单选题] *

职员

经理

主任/高级经理

部门负责人

总经理/董事长

5. 居家办公地点 [单选题] *

北京住宅

北京租房

其他一线城市的住宅

其他一线城市租房

其他二线城市的住宅

其他二线城市租房

第2部分：行为因

1. 疫情期间居家办公的时间 [单选题] *

- 1 个月
- 2 年
- 3 年半
- 4 年
- 5 年半
- 6 年

2. 工龄 [单选题] *

- 工作年龄小于 1 岁
- 工作年龄为 1-5 岁
- 工作年龄为 6-10 岁
- 工作年龄为 11-15 岁
- 工作年龄为 16-20 岁
- 工作年龄超过 20 岁(请写下您的工龄) _____ *

3. 工作期间的休息时间 [单选题] *

- 少于 1 小时
- 1 小时
- 2 小时
- 3 小时
- 4 小时
- 超过 4 小时(请写下您的休息时间) _____ *

4. 虚拟会议平台 [单选题] *

- 腾讯会议
- Zoom
- 华为云会议
- Teams
- 钉钉
- 其他 (请写下您使用的会议平台) _____ *

5. 数字平台覆盖范围 (请勾选您同意以下陈述的程度 (从“完全不同意”到“完全同意”分为 5 分)):

5.1 我已经获得了完成工作所需的信息。 [单选题] *

- 1. 完全不同意
- 2. 不同意
- 3. 中立
- 4. 同意
- 5. 完全同意

- 5.2 我已经获得了完成工作所需的数字技术。 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立
 - 4. 同意
 - 5. 完全同意
- 5.3 数字技术（虚拟会议/协作平台）有助于我和同事之间的有效协作。 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立
 - 4. 同意
 - 5. 完全同意
- 5.4 通过数字技术（虚拟会议/协作平台），我可以轻松联系我的领导或同事。 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立
 - 4. 同意
 - 5. 完全同意
- 5.5 通过数字技术（虚拟会议/协作平台），我能够在我的单位内进行非正式交流。 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立
 - 4. 同意
 - 5. 完全同意
- 5.6 通过数字技术（虚拟会议/协作平台），我可以充分获取基本信息 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立
 - 4. 同意
 - 5. 完全同意
6. 数字通信质量（请勾选您同意以下陈述的程度（从“完全不同意”到“完全同意”分为5分））：
- 6.1 在虚拟会议中，很容易在规模小的小组中进行良好的讨论。 [单选题] *
- 1. 完全不同意
 - 2. 不同意
 - 3. 中立

- 4. 同意
- 5. 完全同意

6.2 虚拟会议是一种高效的会议类型。 [单选题] *

- 1. 完全不同意
- 2. 不同意
- 3. 中立
- 4. 同意
- 5. 完全同意

6.3 在虚拟会议中很容易解释不同的问题。 [单选题] *

- 1. 完全不同意
- 2. 不同意
- 3. 中立
- 4. 同意
- 5. 完全同意

7. 数字平台使用

7.1 自 2020 年 3 月中旬开始疫情封锁以来您居家办公期间，您每周平均花在视频会议上的百分比。比例 0 - 100%。 [单选题] *

- 1. 0%-20%
- 2. 21%-40%
- 3. 41%-60%
- 4. 61%-80%
- 5. 81%-100%

7.2 在 2020 年 3 月之前的过去三个月内，您每周平均花在会议上的百分比。比例 0 - 100%。 [单选题] *

- 1. 0%-20%
- 2. 21%-40%
- 3. 41%-60%
- 4. 61%-80%
- 5. 81%-100%

7.3 在 2020 年 3 月之前的过去三个月内，您以视频会议形式举行的会议的平均百分比比例 0 - 100%。 [单选题] *

- 1. 0%-20%
- 2. 21%-40%
- 3. 41%-60%
- 4. 61%-80%
- 5. 81%-100%

第3部分：远程办公因素

1. 基于家庭的远程办公：如果您比较在办公楼工作（疫情前）和居家办公的生产力，您认为这两种不同的工作模式会让您的工作任务有所不同吗？（请勾选您同意以下陈述的程度（从“完全不同意”到“完全同意”分为5分）： [单选题] *

1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意

2. 卫星办公室：如果公司颁布返厂复工政策，您认为您在团队 A 和团队 B 之间切换办公室会影响生产力吗？（请勾选您同意以下陈述的程度（从“完全不同意”至“完全同意”分为5分）： [单选题] *

1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意

3. 社区工作中心：当您在社区工作中心工作时，您认为您的主管重视考察您的生产力吗？（请勾选您同意以下陈述的程度（从“完全不同意”至“完全同意”分为5分）： [单选题] *

1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意

4. 移动工作：对于以下每个移动工作支持的功能：移动通知；位置跟踪；航行以及实时移动作业调度（请勾选您同意以下陈述的程度（从“一点也不”至“在很大程度上”分为5分）
1 极低 2 低 3 中 4 高 5 极高 [矩阵量表题] *

	1-极低	2.低	3-中	4-高	5-极高
1. 你认为这会在多大程度上提高你的工作效率？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. 你认为这会在多大程度上提高你的工作表现？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. 你认为它在多大程度上对你的工作有用？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

第4部分：员工生产力

1. 质量：（请勾选您同意以下陈述的程度（从“完全不同意”至“完全同意”分为5分）

1.1 在居家办公期间，我的工作效率更高。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意
- 05. 完全同意

1.2 在居家办公期间，我的工作表现更好。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意
- 05. 完全同意

1.3 在居家办公期间，我有保持工作效率的自我激励能力。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意
- 05. 完全同意

1.4 家庭任务阻碍了我履行工作职责的能力。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意
- 05. 完全同意

2. 数量：（请勾选您同意以下陈述的程度（从“完全不同意”至“完全同意”分为5分）

2.1 居家办公可以让我按照自己的时间表完成任务。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意
- 05. 完全同意

2.2 在居家办公期间，我没有受到干扰，可以更加专注于我的任务。 [单选题] *

- 01. 完全不同意
- 02. 不同意
- 03. 中立
- 04. 同意

5. 完全同意
- 2.3 在居家办公期间，我的工作数量减少了。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意
- 2.4 在居家办公期间，工作计划经常在中途发生变化。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意
3. 时间：（请勾选您同意以下陈述的程度（从“完全不同意”至“完全同意”分为5分）
- 3.1 在居家办公期间，我把太多时间花在会议而不是工作上。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意
- 3.2 在居家办公期间，我花了很长时间，但我仍然收效甚微。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意
- 3.3 在居家办公期间，我和同事们花了很多时间谈论个人事务。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意
- 3.4 在居家办公期间，我曾经在工作时间之外工作。 [单选题] *
1. 完全不同意
2. 不同意
3. 中立
4. 同意
5. 完全同意

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