Research on New Mode of Low-Carbon Travel for Related Employees in Internet Industry

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Abstract. This paper breaks the traditional thinking, re-examines the "supply and demand" relationship of transportation travel, and proposes to find a new path of low-carbon travel from the "demand side". The author innovatively proposed and demonstrated the "differentiated OAO office model", and put forward personalized suggestions for commuting needs.

Keywords: Internet industry; Differentiated OAO office model; Low-carbon travel

1 Introduction

In order to achieve the "dual carbon" goal, scholars have conducted numerous studies on the influencing factors of low-carbon travel for urban residents, but most of them have put forward some suggestions from the "supply side"[1-4].However, the author believes that in today's environment, Beijing's transportation system is already very well-established and there is not much room for carbon reduction. Endless expansion of infrastructure construction, development of battery or new energy technologies, improvement of car energy efficiency through technological research and development, and strengthening regulatory efforts have reached development bottlenecks. Therefore, a new technological revolution or reform is urgently needed to bring breakthrough progress to "low-carbon travel".

Therefore, the author hopes to start from the demand side and find new low-carbon travel paths.

2 Background of the Proposal of Differentiated OAO Office Mode

Some scholars believe that remote work will be an inevitable trend in the future, but security issues will be a critical concern. Shufang Cui, Li Chen, and Ming Ma believe that remote work has many advantages and typical values, so remote work in industrial parks has become an inevitable development trend. However, a major obstacle to remote work at present is security issues[5]. In the next 3-5 years, it is predicted that

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more than two-thirds of enterprises worldwide will adopt online office models[6]. Remote work is a concept that contrasts with traditional fixed workplaces and rigid full-time employment methods[7]. With the development of the market economy and the changes in traditional employment relationships, the "remote work" that breaks through time and geographical limitations has entered a new era of development. Compared with traditional centralized office forms, remote work helps enterprises reduce costs and increase efficiency, achieve flexible management, and adapt to market changes; It also provides more employment opportunities for workers and stimulates the vitality and creativity of the labor market[7].

3 Implementation and Data Validation of Online Office Survey Questionnaire

3.1 Data Source

This study used Questionnaire Star to conduct an online office survey on five workplaces including Beijing Everbright Bank Credit Card Center, Beijing Rootnet Technology Co., Ltd., Baidu, JD.com, and China People's Property Insurance Co., Ltd.

3.2 Implementation of Questionnaire Survey

The online office survey questionnaire was conducted from June 1, 2024 to June 20, 2024, including:(1) From June 1st to June 10th, we conducted an online office survey questionnaire test, with a total of 100 responses. After data cleaning, we found that there were a total of 91 valid questionnaires;(2) From June 12th to June 14th, we conducted a study on these 91 survey questionnaires and found three shortcomings: ① In the survey questionnaire, there was no question about "how many antennas do you want to work under every week", which was feedback from multiple respondents, indicating that the questionnaire was not set up reasonably. ② The order of setting the questions in the questionnaire is not reasonable, which does not achieve a good survey effect. ③ Some multiple choice and Single choice question questions are confused in setting the question types, and the questionnaire is set incorrectly. (3) From June 15th to June 20th, 100 survey questionnaires were re distributed. After data cleaning, a total of 93 valid questionnaires were obtained and their reliability and validity were tested. The inspection results are shown in section Reliability And Validity Testing.(4) The survey questionnaire will be officially conducted from June 21st to July 10th.

The survey method of "online office" adopts the method of online questionnaire, and the specific arrangement is as follows:(1) Arrange 5 friends from relevant units as investigators.(2) Conduct a questionnaire survey through friend push notifications and poster QR code scanning.(3) Paste the survey questionnaire poster at the company entrance and assign a dedicated person to provide consultation.(4) Provide economic rewards to employees who fill out the questionnaire by sending a 5 yuan red envelope. (Employees are required to provide their personal mobile phone numbers, and

the questionnaire can be distributed after the staff have completed it.).(5) You can answer by scanning the QR code on the poster, and this time we plan to interview 220 employees of the company.(The questionnaire star link is as follows: https://www.wjx.cn/vm/YBYmlOi.aspx#)

3.3 Data Preprocessing

Firstly, perform data cleaning and transformation on the collected questionnaires to ensure the quality of the data. According to statistics, 220 survey questionnaires were distributed. After data cleaning, data transformation, and data aggregation, 196 valid survey questionnaires were finally obtained. These survey data were then analyzed and studied.

3.4 Reliability and Validity Testing

During the survey and testing period, data cleaning and organization were carried out on 100 collected "online office" survey questionnaires, and it was ultimately found that 93 valid questionnaires were collected. Then conduct reliability and validity analysis on these 93 survey questionnaires.

SPSS software was used for reliability and validity testing. After running the data, it was found that the Cronbach's alpha coefficient of 93 valid survey questionnaires was 0.892, which was greater than 0.8, indicating good reliability; KMO=0.846, Greater than 0.7, sufficient sample size, sphericity test, P=0.000<0.05, consistent with sphericity test. Combining the two indicators, it can be concluded that its validity is good, and factor analysis is suitable for this case.

4 Data Organization and Analysis of Online Office Survey Questionnaire

According to the information collected, based on 196 valid survey questionnaires, we have organized and analyzed the data to obtain Table 1, Figure 1, Figure 2, and Figure 3.

The online office survey questionnaire has many questions related to "gender", "age", "salary level", "marital and child status", "travel distance" and "travel time", etc. For the convenience of statistics and research, Table 1 only lists some of the key attributes.

"Are you satisfied with the effectiveness of online work during the pandemic?" represented by A (Table 1). "How long do you think it will take to achieve large-scale online office?" represented by B (Table 1). "How many working hours would you like to have per week in the future?" represented by C (Table 1). "Do you think online office will become the main form of future office work for Internet related enterprises?" represented by D (Table 1). "Which approach do you think will be more attractive in the future?" represented by E (Table 1). "Which company do you belong to?" represented by F (Table 1). "Online office attitude" represented by G (Table 1). "Fully

online office" represented by H (Table 1). "Fully offline office" represented by I (Table 1). "Combining online and offline" represented by J (Table 1). "Internet enterprise Party A" represented by K (Table 1). "Office building owners" represented by L (Table 1). "Internet enterprise outsourcing" represented by M (Table 1)."number" represented by N (Table 1).

178 Internet enterprises were surveyed for outsourcing, accounting for 91%; The number of office building owners is 7, accounting for 4%; The number of Party A of Internet enterprises is 11, accounting for 5% (Table 1). The number of Internet enterprise outsourcing, office building owners and Internet enterprise Party A who are satisfied with online office work during the epidemic accounted for 93%, 30% and 64% respectively (Table 1). The number of Internet enterprise outsourcing, office building owners and Internet enterprise Party A who hold optimistic and wait-and-see attitude towards online office accounted for 95%, 57% and 82% respectively (Table 1).

The proportion of people who hold an optimistic attitude towards online work is the highest, reaching 85% (Figure 1); The proportion of people who wish to work offline for one day per week is the highest, reaching 63%, followed by those who wish to work offline for two days per week, reaching 24%. Therefore, it can be seen that the total proportion of people who wish to work offline for one or two days per week is 87% (Figure 2); The majority of people believe that the combination of offline and online is the most attractive way of working in the future, accounting for 87% (Figure 3).

From this, we can see that online office will become a very recognized form of office for Internet related enterprises in the future, and most people believe that the combination of online and offline is the most attractive.

5 Demonstration of Differentiated OAO Office Mode

5.1 Feasibility Analysis of Online Office Mode

5.1.1 The Feasibility of Online Office.

After three years of practice during the epidemic, online office will become a trend in the future, for the following reasons: Firstly, a change in mindset. After three years of the epidemic, most industries have experienced online office work, especially Internet related industries such as finance, insurance, funds, securities, banking, communications, and online shopping platforms. Our mindset has changed and we have gained an intuitive and firsthand experience of online work, which is a prerequisite for large-scale online work in the future. Secondly, the maturity of technology. During the three years of the epidemic, there were some good office software, such as Zoom, Tencent Meeting, Enterprise WeChat, DingTalk, and some instant messaging tools. With the increase of research and development by the country and related high-tech enterprises, in the next 3-5 years, related technologies and supporting software will become more mature and practical, and office efficiency will be greatly improved. So, large-scale online office work in the future is not an unattainable dream. Thirdly, the establishment of an online office ecosystem. As more and more Internet

related enterprises adopt the form of online office, the digital space corresponding to the physical space will become more and more mature, and then the online office ecosystem will become more and more perfect.

5.1.2 Pain Points of Online Office.

In the three years of the epidemic, online office has undergone practical operations and is relatively mature in technology, but there are still shortcomings in the following aspects: Firstly, data and related materials are important assets of the company. How can we ensure the security of online information? Secondly, how to establish a reasonable performance evaluation and promotion mechanism for online office personnel? Thirdly, how to determine responsibility for losses caused by online office data leakage? Fourthly, how should employee work-related injuries be defined? Fifth, how to ensure the efficiency of employees working online?

5.1.3 Solutions to Online Office.

Related Issues In order to achieve large-scale online work as soon as possible, some scholars have found solutions to the security of remote work. Some large companies have made breakthroughs in related technologies. Scholars suggest further improvement in legal systems and other aspects, as follows: Firstly, in response to the security issues of remote work, Shufang Cui, Li Chen, and Ming Ma proposed a VPN solution for remote work in industrial parks based on a zero trust network security framework, in order to ensure data security in multi business scenarios of remote work[5].Secondly, pay attention to the development of preface technology. With the rapid development and popularization of cloud computing, artificial intelligence, 5G networks, and virtual reality enhancement technology, online office will become more efficient and interactive[6].Thirdly, in terms of cutting-edge technology, artificial intelligence technology can distinguish between efficient and inefficient work modes through real-time monitoring and feedback, thereby helping managers to more accurately evaluate employees' work performance when working online and promptly identify areas for improvement[6].Fourthly, in response to potential issues or legal disputes arising from online work, it is recommended that national judicial authorities gradually improve relevant laws and regulations based on existing cases or potential possibilities. Fifth, establish and improve relevant laws and regulations for the recognition of work-related injuries caused by remote work[7].Sixth, enterprises should transform their thinking patterns. Enterprises have shifted from focusing on people to focusing on tasks, workload, and effectiveness. By examining the completion status of employees' tasks and work progress, performance evaluations are conducted to motivate them to improve work efficiency.

Table 1. Online Office Survey Data

Total	**N**	**F**	**N**	**A**	**N**	**G**	**B**	**N**	**C**	**D**	**E**
196	11	**K**	7	satisfied	4	optimistic	1-5 years	2	0	possible	**H**
								2	2	possible	**J**

					3	wait-and-see	6-9 years	3	2	possible	**J**
			4	dissatisfied	2	wait-and-see	6-9 years	2	2	possible	**J**
					2	pessimistic	10 years later	2	5	impossible	**I**
	7	**L**	2	satisfied	2	optimistic	1-5 years	1	0	possible	**H**
								1	1	possible	**J**
			5	dissatisfied	2	wait-and-see	6-9 years	2	2	possible	**J**
					3	pessimistic	10 years later	3	5	impossible	**I**
	178	**M**	165	satisfied	158	optimistic	1-5 years	9	0	possible	**H**
								121	1	possible	**J**
								28	2	possible	**J**
					7	wait-and-see	6-9 years	9	2	possible	**J**
			13	dissatisfied	2	optimistic	1-5 years	2	1	possible	**J**
					2	wait-and-see	6-9 years	2	2	possible	**J**
					9	pessimistic	10 years later	9	5	impossible	**I**

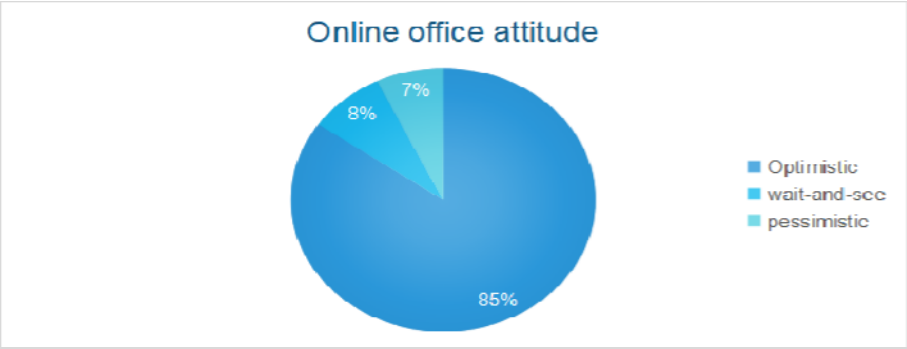

Fig. 1. Online office attitude

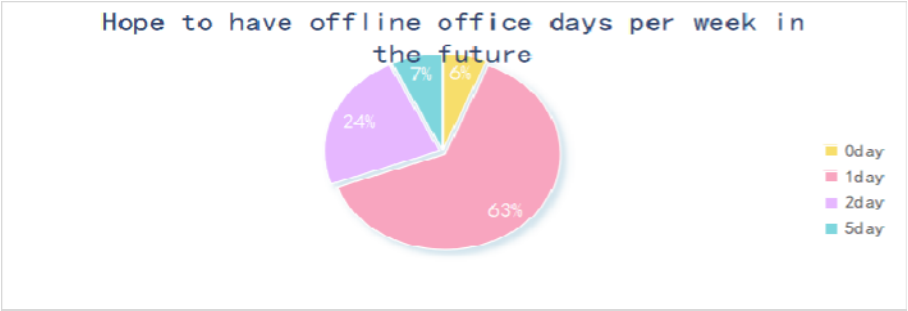

Fig. 2. Hope to have offline office days per week in the future.

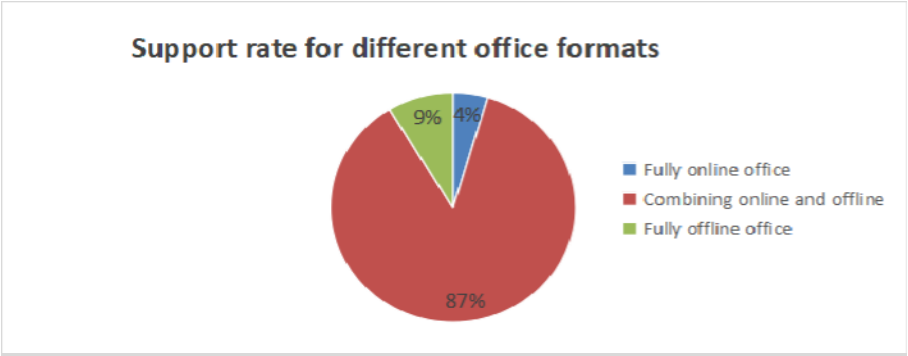

Fig. 3. Support rate for different office formats.

5.2 Differences on Online Office Modes

5.2.1 Differences in Online Office.

For Enterprises When it comes to finance, insurance, funds, securities, banking, communications, online shopping platforms and other Internet related industries, a certain proportion of employees can be selected for online office work. However, in the face of traditional industries such as construction, catering, manufacturing, and physical stores, the number of people participating in online office work is very small. So for companies that work online, we should treat them differently and not apply a one size fits all approach.

5.2.2 Differences in Online Work for Employees.

Through the investigation and analysis of Internet related enterprises and employees, we can know their attitude towards online office. 85% of people hold an optimistic attitude towards online office work (Figure 1); 87% of people hope to implement a combination of online and offline modes in the future, and they believe it is best to work offline 1-2 days a week (Figure 2); 87% of people believe that the combination of online and offline is the most attractive form of office in the future (Figure 3).

5.3 The Significance of Online Office

Compared to traditional office formats, online work has significant benefits in saving social costs, optimizing resource allocation, reducing traffic congestion, and reducing carbon emissions, as follows: Firstly, for companies, online work can reduce labor costs, save expensive housing rental expenses, widely attract the world's best talents, and increase employee loyalty, thereby reducing turnover rates. Secondly, for employees, online work can reduce daily transportation costs, increase more disposable time, improve work efficiency, and enhance their sense of happiness. Thirdly, for the country, online office can reduce more personnel mobility, thereby reducing unnecessary waste of manpower, material resources, and related supporting resources, improving resource allocation efficiency, ultimately solving the world problem of "economic growth and carbon reduction", and achieving a "win-win" situation. Fourthly, it is conducive to protecting the environment and achieving the "dual carbon" goal.

6 Proposal of Differentiated OAO Office Model

In summary, the author proposes the "Differentiated OAO Office Model" based on the feasibility and differentiation of online office.

Differentiated OAO mode: In the Internet and other relevant enterprises and institutions suitable for online office, the company will adopt a combination of online and offline models according to the actual situation and a certain proportion (OAO is the abbreviation of Online and Offline, and differentiation is reflected in different proportions). The company will give priority to selecting a group of employees who have long commuting distances, suitable job positions, meet the requirements for working from home, have strong self-discipline, and have data security guarantees to implement online work, and stipulate that they work offline 1-2 days a week; Offline work will still be implemented for employees who do not meet the requirements.

7 Conclusions

The author breaks the traditional thinking mode and explores new low-carbon travel paths from the perspective of "demand side", and has made the following findings: Firstly, in order to achieve the "dual carbon" goal, the country should shift its mindset from "supply side" reform to "demand side" reform. Secondly, the author innovatively proposes the "Differentiated OAO Office Model". Thirdly, for "commuting" travel, it is recommended to promote the use of differentiated OAO office mode.

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