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# The Relation between Telework and Social Capital in the Workplace: Evidence from Japan

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## 1. Introduction

The purpose of this paper is to examine the impact of telework on social capital in the workplace in Japan. Telework<sup>1</sup> has gained popularity due to the COVID-19 pandemic. According to a survey<sup>2</sup> conducted by the research firm Persol, the teleworking rate was 25.6% as of July 13 to 18, 2022. Thus, roughly one in four workers in Japan is teleworking. In addition, the government is promoting the use of telework as a flexible work style. While telework is encouraged as a flexible way of working, the rate of telework implementation has not increased with the onset of the COVID-19 pandemic. One reason for this may be reflected in the results of a survey of attitudes toward telework, where both advantages and disadvantages were mentioned, with lack of communication cited as a top concern by both workers and management. According to a survey<sup>3</sup> conducted by the Japanese Trade Union Confederation (JTUC) from June 5 to 9, 2020, 37.6% of teleworkers cited "lack of communication with superiors and colleagues" as a disadvantage<sup>4</sup>. In addition, according to the "Questionnaire on the Merits and Demerits Felt by Companies in Telework<sup>5</sup>" conducted by Teikoku Databank, Ltd., from February 4 to 8, 2022, 26.6% of companies cited "reduced internal communication and difficulty in communication" as a demerit of telework. The most frequently cited disadvantages

of telework are those related to communication. Communication concerns in telework arise because the amount of information available is less than that available in person and because a method of communication must be adapted. Given that communication is the foundation of trust, this study questions whether such decreased information during the communication process fundamentally affects the social capital of coworkers in the workplace. In this paper, we hypothesize that a lack of communication undermines social capital in the workplace.

To examine the above hypothesis, this study compares the social capital of teleworkers and nonteleworkers. Specifically, an internet survey ("Telework and Corporate Social Capital Survey") is conducted to ask teleworkers and nonteleworkers about their respective internal trust relationships. Based on the responses, a social capital variable is then created and compared to determine whether teleworkers' social capital is lower than that of nonteleworkers. The next section summarizes previous research on the relationship between telework and social capital.

## 2. Previous Research

Starting with Putnam (1993), research on social capital has been conducted in various fields, and it has been noted that social capital has diverse effects on corporate activities. For example,

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<sup>1</sup> Although there are previous studies and surveys that use remote work (remote worker) synonymously with telework (teleworker), in this paper we use the term telework (teleworker) to unify the expressions.

<sup>2</sup> The study was conducted nationwide among people

aged 20 to 59 years, with a sample size of 25,360.

<sup>3</sup> The study was conducted nationwide among people aged 18 to 65 years, with a sample size of 1,000.

<sup>4</sup> Surveys were provided in Japanese. The English translation is provided by the author.

<sup>5</sup> The survey was conducted on firms, with a sample size of 1,837.

increased social capital enhances corporate governance and organizational productivity, and social capital has become an important factor in corporate activities <sup>6</sup>.

The potential of telework to influence social capital is also mentioned with regard to the spread of ICTs. For example, Cohen & Prusak (2001) noted that actually working in the same workplace is important for social capital, as online communication is less informative due to the loss of physical information and informal conversations and educational opportunities. Haldane (2020) hypothesized that the spread of telework due to the COVID-19 pandemic would weaken social capital in the workplace, reducing chance encounters and idea generation.

However, these studies have not been quantitatively verified. Similarly, although with no focus on social capital, Morganson (2010) conducted a study on the effects of telework on social isolation. The author analyzed teleworkers from multiple perspectives and received 578 valid responses from an emailed survey sent to 1,426 people belonging to a nonprofit engineering organization in the USA. Morganson (2010) found that teleworking increases social isolation among engineers. In addition, Saraniemi et al. (2022) collected 33 diaries of essential workers during the coronavirus pandemic in Finland and analyzed the diary content. They found that the early stage of telework, in particular, reduced social capital in the workplace. Although these studies have highlighted the negative effects of teleworking on social capital and social isolation, there has not been enough quantitative analysis conducted on this topic. Thus, we conducted an internet survey to compare the social capital of teleworkers and nonteleworkers.

### 3. Positive Analysis

To investigate the relationship between

telework practices and social capital, we conducted the Telework and Corporate Social Capital Survey in Japan (hereafter referred to as the "SC Survey"). This nationwide survey collected data from 18- to 69-year-old individuals. The survey was conducted from August 19 to 23, 2022. The sample size consisted of 3,000 teleworkers and 3,000 nonteleworkers, for a total sample size of 6,000. Teleworkers were defined as those who responded that they teleworked at least one day a week at the time the survey was conducted. On the other hand, respondents who reported that they had not teleworked for a day at the time of the survey were defined as nonteleworkers. As the rate of teleworking varies by region, the allocation of teleworkers and nonteleworkers was adjusted to match the actual demographics of each region to minimize the influence of regional differences <sup>7</sup>. Specifically, the areas were divided into Hokkaido, Tohoku, South Kanto, North Kanto/Koshin, Hokuriku, Tokai, Kinki, Chugoku, Shikoku, and Kyushu according to the regional classification of the Statistics Bureau, the Ministry of Internal Affairs and Communications.

Table 1. Survey Summary

	survey overview
survey period	19 August 2022 - 23 August 2022
method	online survey
online panel	Rakuten Insight
targets of survey	Men and women aged 18-69 nationwide
sample size	6,000
survey layout	Teleworkers and non-teleworkers were allocated to ensure that each had a sample size of 3,000. For each sample, the sample was also allocated by region to match the demographics.
screening	Excludes part-timers, housewives, househusband, self-employed, students and unemployed from occupations. Excluded from the occupational category technical and work-site operations. Excluded 1-4 persons from the size of the company where they work.

Next, we explain the screening process undertaken. To compare the differences in social capital between teleworkers and nonteleworkers, we excluded housewives, househusbands, students, and unemployed people who are not expected to work in the workplace in the first place. Some

employees in the Tokyo metropolitan area were teleworking, while only 19.1% of employees in regional urban areas were doing so.

<sup>6</sup> See, e.g., Miyagawa (2019).

<sup>7</sup> e.g., according to the Ministry of Land, Infrastructure, Transport and Tourism's "FY2021 Telework Demographic Survey," as of October 2021, 38.9% of

occupations were also deemed unsuitable for telework. In general, the food and beverage industry, which involves direct customer service, and jobs that require going out into the field were found to be unsuitable for telework. Part-time jobs were also excluded, as they often involve direct customer service and are assumed to be less suited to telework. For the same reason, manual workers were also excluded because the nature of their work basically requires them to come to work, which means that their jobs are not suited to telework. In addition, since social capital in the workplace refers to trust and networks within the company, a certain number of people need to be present in the workplace to verify social capital. Therefore, we also excluded respondents who answered "1-4 people" in response to the query about the size of the company for which they worked.

Under the above assumptions, we collected data for teleworkers and nonteleworkers.

### 3.1 Creating Variables

Next, to measure the social capital of workers, we created variables related to social capital. In this study, given that the teleworking conditions vary among individuals even within the same workplace, we adopt the perspective that individuals possess social capital, as represented by Burt (1992). Furthermore, considering the increased difficulty in understanding each other's situations due to telework and the rising anxiety related to communication, we focus on Nishimura (2018) in designing our questions from the viewpoints of workplace trust, information sharing, and the availability of voluntary assistance. Nishimura (2018) analyzed the impact of individual social capital on productivity. This study developed questions in terms of "a state in which the workplace has a good grasp of each other, creating norms of trust and reciprocity" and "a state in which one is able to exercise one's own power to mobilize resources against others." Then, exploratory factor analysis was conducted on these

questions, and "trust and reciprocity" and "resource mobilization" were analyzed as synthetic variables of social capital. Since the problem of interest in this study is also concerned with the social capital of individual workers, the evaluation indices of "trust and reciprocity" and "resource mobilization" of Nishimura (2018) were used in the analysis. Similar to Nishimura (2018), Table 2 shows that the factor analysis resulted in two factors of the SC survey<sup>8</sup>. Note that the method of rotation of the factor axes is oblimin.

Table 2. Results of Factor Analysis

	trust and reciprocity	resource mobilization
The atmosphere is one of helping each other when there is a problem at work	0.907	-0.076
People at work are trustworthy	0.846	-0.129
When I propose something new, people around me make arrangements and help me to get the proposal approved	0.733	0.168
When I make a mistake at work, my supervisor one level above me takes action with me in mind	0.710	-0.054
People in the workplace understand the characteristics of your work style and habits	0.595	0.226
People at work understand how busy I am	0.588	0.240
When I do not understand a company procedure or a job, the people around me often teach me spontaneously	0.535	0.146
I have relatively easy access to the information I need to perform my duties	0.491	0.267
I can accelerate deadlines for work I have asked others to do	0.123	0.633
I often find out about internal gossip before others do	-0.108	0.528
If I ask for it, I can make decisions, approvals, etc. faster than usual	0.315	0.482
variance explained	3.932	1.167
contribution ratio	0.357	0.106
Cronbach's alpha	0.901	0.688
	0.911	

First, for "trust and reciprocity," eight statements, namely, "People at work are trustworthy," "People in the workplace understand the characteristics of your work style and habits," "The atmosphere is one of helping each other when there is a problem at work," "When I do not understand a company procedure or a job, the people around me often teach me spontaneously," "People at work understand how busy I am,"

<sup>8</sup> Surveys were provided in Japanese. The English

translation is provided by the author.

"When I propose something new, people around me make arrangements and help me to get the proposal approved," "When I make a mistake at work, my supervisor one level above me takes action with me in mind," and "I have relatively easy access to the information I need to perform my duties", were combined and scored. All questions consisted of a 5-point scale<sup>9</sup> that included "agree", "somewhat agree", "do not know", "somewhat disagree", and "disagree". A score of 1 was given for "disagree," with 1 point increments in between, and a score of 5 was given for "agree." The scores for "resource mobilization" were summed for the following three items: "I can accelerate deadlines for work I have asked others to do," "I often find out about internal gossip before others do," and "If I ask for it, I can make decisions, approvals, etc., faster than usual." Descriptive statistics for these variables are presented below.

Table 3. Descriptive Statistics

	Min.	Max.	Ave.	SD
trust and reciprocity (teleworkers)	8.0	40.0	27.0	36.9
trust and reciprocity (nonteleworkers)	8.0	40.0	25.9	39.9
resource mobilization (teleworkers)	3.0	15.0	9.0	5.5
resource mobilization (nonteleworkers)	3.0	15.0	8.7	5.4

The composite variables of "trust and reciprocity" and "resource mobilization," which represent social capital, suggest that higher scores indicate greater social capital. If teleworking decreases social capital, then we expect teleworkers' scores to be lower than those of nonteleworkers. In fact, however, teleworkers scored higher on the "trust and reciprocity" scale, with teleworkers scoring an average of 27.0 compared to 25.9 for nonteleworkers. The scores for "resource mobilization" were 9.0 for teleworkers and 8.7 for nonteleworkers, indicating that teleworkers scored higher than nonteleworkers. However, as we will discuss in the next section, there was some bias in the data for attribute items other than the screening items. Therefore, in the next section, we will examine the relationship

between telework and social capital after controlling for these biases.

### 3.2 Hypothesis and Variables

As mentioned above, some of the data were biased with respect to the attribute items. After controlling for these variables via propensity score matching, we examined the relationship between telework and social capital. Before discussing the controlled variables, we would like to explain the telework variables. For telework, we created a dummy variable in which the teleworker variable is given a value of 1 and the nonteleworker variable is given a value of 0. Next, we will explain the control variables. Table 4 shows the characteristics of the industry, job category, number of employees, and tenure of the company where the teleworkers work. For industry, differences are noticeable in the aggregates for manufacturing, information and communications, and medical/care/welfare. For occupation, differences are noticeable in sales and in professional/technical/research. In terms of the number of employees, the larger the size of the company is, the greater the number of teleworkers is, and there is a difference in the length of tenure (30 years or more). Thus, these four items were introduced as control variables. Specifically, dummy variables of 0 and 1 were created for each option based on "other" for industry and occupation, respectively. Variables for the number of employees and tenure were created by converting them to class values.

<sup>9</sup> The same applies to the question on "resource

mobilization" discussed below.

Table 4. Aggregation

type of industry	teleworkers	non-teleworkers
Agriculture, Forestry, Fisheries and Mining	0.4%	0.3%
Construction	4.3%	6.6%
Manufacturing	33.5%	13.9%
Electricity, gas and water supply	2.0%	1.7%
Transportation and postal services	2.4%	6.0%
Information and communications	18.3%	3.8%
Wholesale and retail	7.2%	10.7%
Restaurant and Lodging	1.2%	2.1%
Finance and insurance	6.3%	6.2%
Real estate business	2.1%	2.3%
Education (industry)	2.6%	7.4%
Medical/Care/Welfare	2.2%	15.5%
Public business	4.2%	9.7%
Others	13.3%	13.7%

type of occupation	teleworkers	non-teleworkers
Sales(eigyo)※	21.5%	15.3%
Sales(hambai)※	1.1%	4.3%
Service	4.4%	10.0%
Professional/Technical/Research	33.7%	22.0%
Administrative (including administration)	31.5%	30.9%
Education (occupation)	1.9%	6.3%
Others	5.9%	11.2%

※Eigyo is person who actively tries to sell products to people who have little interest in the product.

※Hambai is a person who sells products to people with a high interest in the product.

Based on the above, we verified whether the presence or absence of telework has an impact on the explanatory variables and the social capital evaluation indicators “trust and reciprocity” and “resource mobilization”.

### 3.3 Estimation results and interpretation

The study tested the hypotheses using propensity score matching. First, a logistic regression analysis was conducted using the presence or absence of teleworking as the explanatory variable and industry, job category, number of employees and tenure as control variables. Matching was performed using the estimated propensity scores, and t tests were conducted for “trust and reciprocity” and “resource mobilization” for the presence or absence of telework. The nearest neighbor matching method was used in this study. The estimation results of the logistic regression analysis are shown in Table 5,

Tenure	teleworkers	non-teleworkers
Less than half year	2.3%	4.0%
6 months to less than 1 year	2.5%	2.8%
1 to less than 1.5 years	2.4%	3.6%
1.5 to less than 2 years	2.3%	2.5%
2 to less than 2.5 years	2.2%	2.0%
2.5 to less than 3 years	2.3%	2.5%
3 to less than 5 years	9.1%	10.3%
5 to less than 10 years	14.3%	16.1%
10 to less than 20 years	23.1%	23.8%
20 to less than 30 years	17.3%	17.2%
More than 30 years	22.1%	15.2%

The number of employees	teleworkers	non-teleworkers
5-9 persons	3.0%	4.7%
10-29 persons	5.5%	9.9%
30-99 persons	8.2%	16.0%
100-299 persons	11.2%	17.0%
300-999 persons	15.6%	16.2%
1,000-4,999 persons	22.2%	17.6%
More than 5,000 persons	34.4%	18.7%

the results of the t test are shown in Table 6, and the covariate balance is shown in the figure. For the tests, R was used.

Table 5. Estimation Results of Logistic Regression Analysis

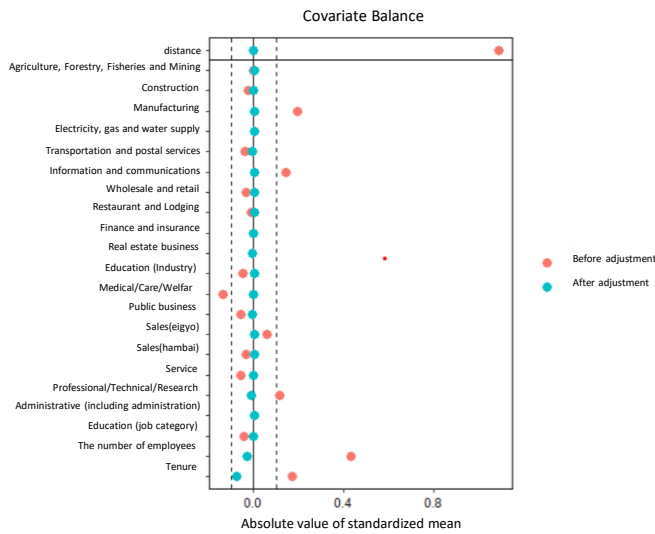
	odds ratio	p-value
Agriculture, Forestry, Fisheries and Mining	1.087	0.853
Construction	0.528	0.000 ***
Manufacturing	1.528	0.000 ***
Electricity, gas and water supply	0.920	0.694
Transportation and postal services	0.335	0.000 ***
Information and communications	3.804	0.000 ***
Wholesale and retail	0.736	0.014 *
Restaurant and Lodging	0.697	0.122
Finance and insurance	0.688	0.005 **
Real estate business	0.805	0.266
Education (industry)	0.439	0.000 ***
Medical/Care/Welfare	0.124	0.000 ***
Public business	0.297	0.000 ***
Sales(eigyo)※	1.906	0.000 ***
Sales(hambai)※	0.322	0.000 ***
Service	0.701	0.022 *
Professional/Technical/Research	2.120	0.000 ***
Administrative (including administration)	1.709	0.000 ***
Education (occupation)	0.946	0.819
The number of employees	1.000	0.000 ***
Tenure	0.997	0.383
Pseudo R-squared	0.175	
Likelihood ratio	1456.997***	
AIC	6904.8	

\*\*\* indicates a two-sided 0.1% significance level, \*\* indicates a two-sided 1% significance level, and \* indicates a two-sided 5% significance level.

※Eigyo is person who actively tries to sell products to people who have little interest in the product.  
 ※Hambai is a person who sells products to people with a high interest in the product.

Table 6. Estimation Results of the t test

Figure. Covariate Balance



The results of the postmatching t test in Table 6 are significant, with a positive sign for “trust and reciprocity” and “resource mobilization”. In other words, a statistically significant difference is confirmed, indicating that teleworkers have greater social capital than nonteleworkers. This result contradicts our hypothesis. Although we assumed the presence of a causal relationship in which teleworking reduces communication and affects social capital, it can be inferred that a workplace with a high level of social capital is more likely to implement teleworking based on that social capital. The results suggest that because social capital in the workplace is high, teleworkers are able to carry out their work without any problems even if they do not meet face-to-face, while in workplaces with low social capital, workers may not be able to fully carry out their work unless they meet face-to-face in the workplace.

#### 4. Conclusion

This study tested the hypothesis that telework reduces social capital in the workplace. To test this hypothesis, the social capital of

teleworkers and nonteleworkers was compared;

	trust and reciprocity	resource mobilization
t-value	5.779	4.911
degrees of freedom	1774.7	1915.1
p-value	0.000	0.000
	***	***

\*\*\* indicates a two-sided 0.1% significance level, \*\* indicates a two-sided 1% significance level, and \* indicates a two-sided 5% significance level.

however, teleworkers were found to have higher levels of social capital than did nonteleworkers, in contrast to the hypothesis. Interpreting these results, it may be possible that in workplaces where social capital is high to begin with, teleworking can be implemented with the support of that social capital. In the future, the perspective of social capital in the workplace may become important in the diffusion of flexible working methods such as teleworking. As introduced at the beginning of this paper, there are expectations about telework that stem from the policy aspect of working styles; however, it may also be possible to consider telework from the perspective of social capital in the future. This new hypothesis needs to be tested in the future.

Finally, three major issues related to this study remain to be addressed. First is the implementation of randomized controlled trials. To rigorously examine causality, it is necessary to compare the social capital of both teleworkers and nonteleworkers after randomly allocating them to telework or nontelework. While there would likely be difficulties related to actually conducting this experiment, Atkin et al. (2023) conducted an experiment in India in which teleworkers and nonteleworkers were randomly assigned to telework in a rigorous validation, and randomized controlled trials were desirable<sup>10</sup>. The second point is related to conducting a longitudinal survey. In the present study, we were not able to test the possibility that teleworkers reduced their social capital, which was greater than that of nonteleworkers, as a result of teleworking. To verify this point, it is desirable to conduct continuous surveys in the future. The third point is related to the refinement of the evaluation

<sup>10</sup> Atkin et al. (2023) analyzed the relationship between telework and productivity on the basis of an RCT.

Social capital was not mentioned in this study.

indicators of social capital. Herein, an evaluation index for social capital in the workplace was developed based on previous research; however, it is necessary to reconsider a more appropriate evaluation index from the perspective of the impact of telework. We would like to perform these tasks in the future.

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