

Nakamura, Akihiro; Takao, Misuzu; Nakamura, Tomoaki; Goto, Takao

Conference Paper

The impact of teleworking on working time constraints and the planning of sightseeing trips

32nd European Conference of the International Telecommunications Society (ITS):
"Realising the digital decade in the European Union – Easier said than done?", Madrid,
Spain, 19th - 20th June 2023

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Nakamura, Akihiro; Takao, Misuzu; Nakamura, Tomoaki; Goto, Takao (2023) : The impact of teleworking on working time constraints and the planning of sightseeing trips, 32nd European Conference of the International Telecommunications Society (ITS): "Realising the digital decade in the European Union – Easier said than done?", Madrid, Spain, 19th - 20th June 2023, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/278004>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

The impact of teleworking on working time constraints and the planning of sightseeing trips

Akihiro Nakamura, Misuzu Takao, Tomoaki Nakamura, Takao Goto

Keywords: Telework, Peak shift, Tourism

1. Research background and research questions

New information technologies, including big data and AI, are emerging daily, requiring a transformation of how we conduct business and live. Amidst this growing momentum for social change, the COVID-19 pandemic has triggered rapid developments in telework, online education and other services. A benefit of telework, one of the representatives of newly developed online services, is the ‘realisation of flexible working’, which has the effect of easing restrictions on working hours and easing physical fatigue due to the elimination of commuting time.

This increased rate of telework adoption is expected to ease time and location constraints related to tourism behaviour: according to the Japan Transport Corporation (2019), which surveyed travel disincentives before the COVID-19 pandemic, the number one travel disincentive was ‘not being able to take holidays due to work, etc. (33.7%)’, The second most common factor was that holidays do not overlap with family, friends, etc. (31.4%). While it used to be difficult to take many holidays in the past, the implementation of telework is expected to enable flexible working styles that effectively use time and place, allowing for flexible changes in tourism behaviour. Indeed, in Giménez et al. (2018), a higher proportion of teleworkers were reported to engage in leisure and non-market type work during typical business hours compared to commuters.

As tourism resources cannot be stocked, congestion occurs, and prices increase during peak seasons. If working time constraints are eased by telework progress such that people can take holidays more flexibly, tourism demand peaks may be less pronounced than before.¹ Although many studies in Japan and abroad have analysed the interdependence between travel and information and communication, including such tourism behaviour (e.g. Nakamura, 2002), as information and communication technology developed, the OD (origin and destination) on the information and communication side became more difficult to ascertain. Moreover, quantitative studies conducted in Japan began to decrease before the COVID-19 pandemic. On the other hand, several studies examining the outcomes of telework implementation were

¹ The potential of online tours has also been noted. Online tours are not just an alternative to travel, but are expected to serve as a link between travellers and the local area, indicating that tourists are still willing to visit tourist destinations (Miyazaki, 2021).

conducted before the pandemic. According to Hattori et al. (2022), these studies can be categorised into (i) those that found that teleworking produces positive outcomes and (ii) those that focus on the negative consequences of teleworking², with both positive and negative study results reported.

While these studies focused on the relationship between business behaviour and telework³, this study analyses the relationship between tourism behaviour and telework⁴. The study first examines the possibility that the development of telework will lead to a levelling off of tourism demand peaks compared to the past, based on data from a web-based survey conducted by the authors in August 2022.

In addition, the study also analysed which attributes of tourism trips contribute to the levelling of demand peaks due to telework implementation. For the latter part of the analysis, the study focused on why teleworking can level out tourism demand: easing time and location constraints.

Concerning the former ‘easing of time constraints’, one of the positive outcomes of the implementation of teleworking mentioned above was that teleworking provides workers themselves with greater discretion regarding the allocation of their living time. This is because the implementation of telework is expected to eliminate the need for travel time spent commuting to and from work and school, allowing workers to go sightseeing at⁵ times that they had previously given up on. In this way, the seasonal variability of tourism and the crowding phenomenon during major holidays, as estimated by Nakahira and Yabuta (2017), would also make it possible to avoid travelling on crowded dates, enabling a certain degree of levelling out of tourism behaviour.

Regarding the ‘easing of location restrictions’, this means that, whereas originally, one would always have to go to a fixed location such as a workplace or school to work or take courses that could not be controlled at a time and date for personal reasons, the

² Negative research findings from telework suggest that telework may lead to a hotbed of longer working hours compared to face-to-face work, as workers perceive a greater workload and a greater tendency to become more immersed in their work. For more information, see Felstead and Henseke (2017) and Hattori et al (2022).

³ Other studies focusing on the relationship between corporate behaviour and telework include Adachi (2022) and Yamaguchi and Saito (2022), who analysed the relationship between business travel and online conferencing services, but these are only a few. Another quantitative study that looked at the relationship between frequency of telework and choice of residence is Takagi et al. (2022).

⁴ The few relationships between tourism behaviour and teleworking are mostly limited to qualitative analysis of primary data for workcations and blazers. See, for example, Tsujimoto (2021) or Moriya and Ikechi (2021).

⁵ For example, if telework was possible on the day following a consecutive holiday (weekday), this study assumes that changes in tourism behaviour may occur as a result of the relaxation of time constraints, which would allow the entire consecutive holiday to be spent on tourism, whereas before telework was implemented, people often went home on the morning of the last day of the consecutive holiday or the day before.

implementation of telework allows greater flexibility in the location of work and study. More specifically, if telework allows people to do their work in remote locations (e.g. at home or in tourist areas) without going to the workplace, they can engage in more flexible tourism activities, such as weekday or long-duration tourism. Given that, as mentioned above, the primary disincentive for travelling among Japanese people was related to holiday time from work, it would be useful to test whether telework implementation would ease location constraints.

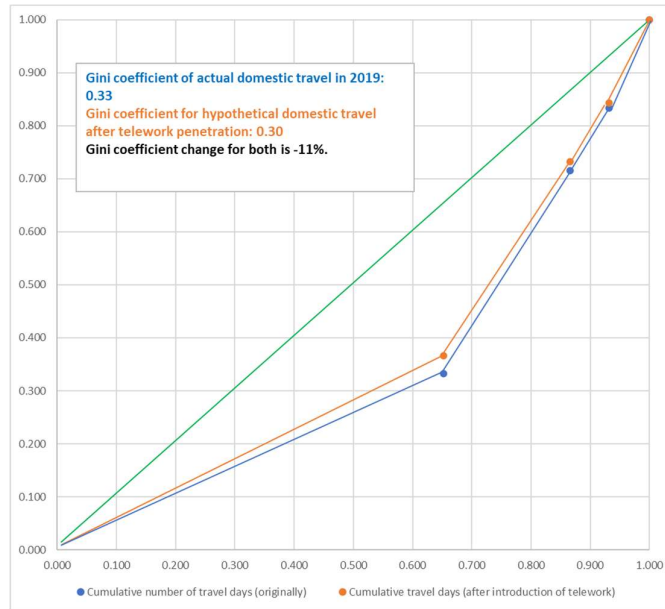
Nakamura et al. (2022) considered the above two perspectives but did not analyse the interdependence between the introduction of telework and the levelling of tourism demand quantitatively, as this study did. In addition, Takao et al. (2023) analysed the interdependence between the two, but this study conducted a new web-based questionnaire survey to test the hypothesis with more detailed data to address the points that Takao et al. (2023) were unable to analyse in detail due to the number of samples and other issues. The analysis results in this study revealed that domestic overnight sightseeing trips, which used to be made during relatively crowded periods, could be shifted to relatively uncrowded periods with the introduction of telework, potentially easing congestion.

2. Data used for validation and hypothesis testing

The data used in this study were gathered from web-based questionnaire surveys conducted in Japan by the authors in August 2022. The survey was conducted among workers throughout Japan, with a valid sample size of 3,200; it targeted monitors of a web-based survey company and attempted to collect the data in a manner consistent with the age and gender distribution of workers in Japan. The survey asked about the timing, purpose and accompanying persons of actual domestic overnight trips made by respondents in the year prior to the COVID-19 epidemic in Japan. Respondents were then asked whether they would have made the trip at a different time if they had been able to telework during the period in question.

2.1 Will the development of teleworking level out tourism demand?

The questionnaire survey revealed that 810 respondents had made at least one domestic overnight trip in the year prior to the pandemic. Respondents answered for all domestic overnight trips they had made during the year in question, with a total of 3,969 trips; of these trips, around 11% originally made on weekends were moved to weekdays, 15% originally made on three consecutive weekends were moved to weekdays, and 24% were found to move to regular weekends. A certain number of trips made on major holidays were also shown to move to other less crowded times of the year.



	Weekdays only	Saturday and Sunday only	Saturday, Sunday + paid holiday	3 consecutive holidays as per calendar	3 consecutive holidays as per calendar + paid holiday	Large consecutive holidays	Total travel days	Percentage of travel days	Number of days	Percentage of days
weekdays	1119		405		31.75		1556	0.40	238	0.65
(normal) weekends		929	810				1739	0.45	78	0.21
three consecutive holidays				202	95.25		297	0.08	24	0.07
major holidays						288	288	0.07	25	0.07
							3880	1.00	365	1.00

Figure 1: Leveling off of travel demand

These results indicate that introducing telework may shift the peak demand for tourism. In this study, the Gini coefficient was calculated as an indicator to capture the levelling-off effect⁶. Specifically, we first investigated how many days out of the 365 days in a year are ‘1. weekdays’, ‘2. (normal) weekends’, ‘3. three consecutive holidays’ and ‘4. major holidays’. As a corollary, in 2019, the year covered by this web-based survey of 'domestic overnight trips', there were 25 days for '4. major consecutive holidays', 24 days for '3. consecutive holidays', 78 days for '2. (normal) weekends' and the remaining 238 days for '1. weekdays'⁷. If the number of days

⁶ Studies that have attempted to capture seasonal variations in tourism demand using the Gini coefficient include Oi (2022).

⁷ Specifically, as "4. Large consecutive holidays", it was assumed that "GW is 10 consecutive holidays (27 Apr-6 May)", "Obon holidays are up to 9 consecutive holidays (10-16 Aug) (but including 3 consecutive holidays 8/10-12, in which case the bottom 3 consecutive holidays are 7)", "Silver Week is 2 3 consecutive holidays without substance (14,15,16 Sep and 21,22 Sep, 23)) and 'up to nine consecutive holidays during the year-end and New Year holidays (28 December-28 January-5)'. The number of days for major holidays was assumed to be 10+6+9=25 days, including GW, Obon and New Year holidays. The number of "3. 3 consecutive holidays" was 8 (12-14 Jan, 9-11 Feb, 13-15 Jul, 10-12 Aug, 14-16 Sep, 21-23 Sep, 12-14 Oct, 2-4 Nov) including Silver Week, for a total of 8 x 3 = 24 days. 2.(Normal) Saturdays and Sundays" were originally 365/7 = 52.1... 52 times, of which 8 were 3 consecutive holidays, resulting in 44 Saturdays and Sundays that were not 3 consecutive holidays, and GW (2), Obon (1) and

elapsed in a year (365 days) is taken on the horizontal axis and the cumulative number of travel days on the vertical axis, the graph would be a 45-degree line if travel had been levelled on all 365 days of the year. Using the 45-degree line as a reference, the cumulative number of days of domestic overnight trips was accumulated in the order of '1. weekdays', '2. (normal) weekends', '3. three consecutive holidays' and '4. major holidays'. A graph was created to calculate the Gini coefficient.

The Gini coefficient of the graph created from the survey results with the actual domestic overnight trips made in 2019 was 0.29. Similarly, the Gini coefficient of the graph created from the results of the questionnaire survey with the cumulative number of days of hypothetical domestic overnight trips after the penetration of telework was achieved was 0.22. The change in the Gini coefficient for both was -23%, indicating that the penetration of telework contributes to a levelling off of demand for tourism trips.

2.2 Will the development of teleworking level out tourism demand?

First, visiting a tourist destination requires being absent from work. However, teleworking creates the potential to work online from a tourist destination. If meetings with fixed dates that cannot be missed can be accessed remotely from a tourist destination, taking a tourist trip with a flexible schedule becomes easier. As a result, sightseeing trips that were previously made on weekends can be changed to times when travel costs are relatively low (off-peak times), e.g. weekdays. This point will be called the 'opportunity cost of one tourism trip'. Two perspectives on this point were set out in this study. In the questionnaire used for this study, respondents were asked how much of their work could be done remotely. Similarly, they were asked how many of their work tasks could be scheduled and timed at their own convenience and not by others. For the former, the hypothesis was that the more jobs that allow remote work, the easier it would be for the introduction of telework to shift the tourist travel period from its peak, while for the latter, the hypothesis was that the more jobs that are determined by the convenience of others, the easier it would be for the introduction of telework to shift the tourist travel period from its peak. The latter hypothesis is that people with jobs whose dates and times are determined by other people's availability will be more likely to shift their tourism trips away from the peak.

New Year (2) holidays were included in the consecutive holidays, which were 39 times after subtracting them, resulting in 39 times \times 2 days = 78 days. The number of other "1. weekdays" was 365 days - (25 days + 24 days + 78 days) = 238 days. Note that "Saturday and Sunday + paid" and "3 consecutive holidays + paid" in the survey responses were calculated by assuming that one weekday was paid, and allocating an additional day to a weekday.

In addition, this study focuses on the physical fitness preserved by eliminating commuting time due to teleworking. Commuting to work the day after returning from a trip is often physically demanding. Therefore, in many cases, the day after returning is taken as a day of rest in the true sense of the word, and a holiday is taken. In Japan, where it is difficult to take long holidays, tourism demand is consequently concentrated on consecutive holidays, including national holidays and other major holidays. If commuting is no longer mandatory due to telework, starting work via telework the next day after returning home from a sightseeing trip is easier. As a result, the likelihood of being able to go on a trip at a time when only relatively short holidays are available increases. Since the physical benefits of the elimination of commuting benefit those who have longer commuting times, we hypothesised that people with longer commuting times are more likely to experience a peak shift in tourism with the introduction of telework. With the above hypotheses set, the following estimating equations were estimated with other personal attributes and factors added to the explanatory variables as control variables.

$$Y_{it} = a + br*remjob_i + bu*unconjob_i + bc*comtime_i + bw*wftacpt_i + be*emhit_i + bo*ocomit_i + bn*ninit_i + bpn*natureit_i + bph*historyit_i + bpo*onsenit_i + bps*sportit_i + bpc*concertit_i + bs*sexi_i + ba*agei_i + bhi*hincomei_i + \epsilon_{it}$$

Here, Y is a dummy variable that takes the value 1 when a peak trip is changed to a relatively less crowded date and 0 otherwise. The subscript i indicates the individual respondent, and t is a subscript indicating the individual trip. The above equation was estimated in a logit model using the sample split data (ϵ_{it} is the error term with iid extreme value distribution). The definitions of each variable are shown in Figure 2.

remjob	Percentage of total jobs that can be done remotely
unconjob	Percentage of total jobs for which dates and times are determined by other people's availability
comtime	One-way commuting time (minutes)
wftacpt	1 if you feel you can work online while on a sightseeing trip, 0 otherwise
emh	1 if accompanied by an elementary, junior high, or high school student on the trip, 0 otherwise
ocom	1 if the traveler is accompanied by someone other than an elementary, junior high, or high school student, 0 otherwise
nin	Number of accompanying persons for the trip
nature	Purpose of the trip is nature
history	Purpose of trip is historical exploration
onsen	Purpose of trip is hot springs
sport	Purpose of trip is sports
concert	Purpose of trip is to attend a concert or other art event
sex	1 for men, 2 for women
age	Age
hincome	Household income

Figure 2: Variables in the estimation model

3. Estimation results and summary

The results of the estimation equations presented in the previous section for each of the split samples are presented in Table 3. The estimates in the leftmost column of Table 3 are based on tourist trips conducted on Saturdays and Sundays, which had the largest sample size. The results are based on an analysis of which individuals and which sightseeing trips, originally conducted on Saturdays and Sundays, would be changed to weekdays by the introduction of virtual teleworking. The estimates in the middle of Table 3 similarly analyse whether trips originally made on three-day weekends would be changed to either a regular weekend or a weekday, while the rightmost column of Figure 3 similarly analyses whether trips originally made on major holidays would be changed.

	Week end		3 days Week end		Large Seasonal Vacations	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
remjob	-0.163	(0.413)	0.424	(0.273)	0.522	(0.214)
unconjob	0.491	(0.003)	-0.568	(0.094)	-0.073	(0.838)
comtime	0.004	(0.127)	0.009	(0.096)	0.003	(0.578)
wftacpt	0.546	(0.001)	0.714	(0.030)	0.878	(0.015)
emh	-0.317	(0.090)	-0.443	(0.186)	-0.755	(0.028)
ocom	-0.105	(0.514)	-0.239	(0.510)	0.363	(0.361)
nin	-0.017	(0.503)	-0.003	(0.966)	0.013	(0.890)
nature	-0.161	(0.274)	-0.018	(0.947)	0.685	(0.015)
history	0.173	(0.268)	-0.277	(0.350)	0.132	(0.664)
onsen	0.276	(0.046)	0.233	(0.368)	-0.502	(0.072)
sport	0.292	(0.107)	-0.845	(0.032)	-0.388	(0.363)
concert	-0.396	(0.110)	-0.438	(0.376)	-0.996	(0.147)
sex	0.691	(0.000)	0.913	(0.001)	1.081	(0.000)
age	-0.006	(0.299)	-0.020	(0.139)	0.000	(0.990)
hincome	0.000	(0.870)	0.000	(0.678)	0.000	(0.236)
constant	-3.104	(0.000)	-0.824	(0.325)	-2.742	(0.002)
# of samples	2409		309		340	
McFadden Index	0.038		0.1026		0.1259	

Figure 3: Estimation results:

Data on trips taken on Saturdays and Sundays (whether shifted to weekdays or not), trips taken on three consecutive holidays (whether shifted to Saturdays, Sundays or weekdays or not) and trips taken on major holidays (whether split to three consecutive holidays, Saturdays, Sundays or weekdays), respectively.

For reasons of space, we do not wish to report the details of the estimation results in writing, but it appears that whether or not a job is easy to work remotely has no impact on the ease of tourism peak-shifting. On the other hand, the extent to which the availability of others

determines work, individual respondents' willingness to work at the destination, differences in companionship, and differences in the purpose of the trip, affect the ease of peak-shifting tourism.

The results of the study's analysis indicate that the introduction of telework may level out tourism demand and that there are certain trends in the attributes of peak-shifting travellers and tourism trips.

Thanks

This paper is part of the results of the 2021 Chuo University joint research project 'Interdisciplinary research on the interdependence of transport and communication with a view to the after-corona'.

We would like to thank Editage (www.editage.com) for English language editing.

References.

Adachi, H. (2022) "The impact of the new coronavirus on business travel and business travel after its end," *Transport and Economics*, 82(6), pp. 42-47.

Felstead, A. and Henseke, G. (2017) "Assessing the growth of remote working and its consequences for effort, well-being and work-life balance," *New Technology. Work and Employment*, 32, pp. 195-212.

Foundation (2019) Annual Travel Report 2019.

Gimenez-Nadal J. I., Molina, J.A., Velilla, J. (2018) "Telework, the Timing of Work, and Instantaneous Well-Being: Evidence from Time Use Data" *IZA Discussion Papers*, No. 11271. (<https://www.econstor.eu/bitstream/10419/177075/1/dp11271.pdf>)

Hattori, Y., Enatsu, K. and Furu, H. (2022) "Determinants of Remote Work Shift and its Shakeout," in Kiyoshi Takahashi and Toshihiko Kato (eds.), *The Science of Remote Work I: Survey Analysis*, pp. 200-223.

Miyazaki, Saya (2021) "How to interact with local communities through online tours with a view to resuming travel after the Corona disaster," JTB Research Institute. (<https://www.tourism.jp/tourismdatabase/column/2021/04/covid19-online-tour/> (last accessed 6 November 2022))

Moriya, K. and Ikechi, T. (2021) "A Study on the Characteristics of Japanese Braisure Travellers and Efforts in the Region," *Journal of Tourism Research*, 33 (3), pp. 37-45.

- Nakahira, K. and Yabuta, M. (2017). "An Empirical Investigation of Tourism Demand Variability: the Gini Index and Entropy Measure Approach," *IERCU Discussion Paper*, 295.
- Nakamura, A. (2002), "Traffic and call substitution and supplementation," *Journal of Transport Studies* (45), pp. 137-146.
- Nakamura, Akihiro, Misuzu Takao, Tomonari Nakamura and Takao Goto (2022), "Social Transformation through the Development of On-Lineization," *Sustainable Urban Development and Public Goods: a Comparative Study of Cities in Tokyo and Shanghai*, pp. 67-90, Hiiraikafusha.
- Oi, Tatsuo (2022), "Analysis of seasonal variation in accommodation demand using the factor decomposition method of the difference in Gini coefficients," *Data Science Research*, 1, pp. 19-35.
- Rintaro Takagi, Takatoshi Arai and Koutaro Imai (2022), "Consideration of residential area distribution considering telework frequency using a logit model," *Journal of Urban Planning*, 57 (3), pp. 1079-1085.
- TSUJIMOTO, Chiharu (2021), "A Study on 'Workcation' in Hot Spring Areas: From the Perspective of Relationship Population Construction and Travel Products," in *Proceedings of the National Conference of the Japan Society for Tourism Research*, 36, pp. 83-87.
- Yamaguchi, Ryo and Chisa Saito (2022) "Post-corona ways of working and changes railway operators should focus on," *Transport and Economy*, 82(6), pp. 28-36.