How Human Coexistence with ICT in the Era of Telework Enabled Should Be: From the Viewpoint of Now and the Future of Telework in Japan

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Telework is sufficiently possible in terms of the technical environment. However, neither the organizational culture nor the legal system that supports it is adequately aligned with use of telework in the sense of "flexibility in choosing location of work." How should human beings view their work location within a society of developing technology? In this paper, I consider telework from the perspective of information systems and human values by attempting to address two questions. First, how should telework be positioned in a society where AI and robots equipped with it will replace human labor? Second, what value does telework have in terms of flexibility of work location and working hours for it? To begin, I review changes in the definition and classification of "telework" and show that the single word "telework" covers a wide range of telework patterns. I then confirm that the location choices for telework include "home," "satellite office," and "mobile" settings. Next, I argue that the present dissemination of telework is somewhat limited, even when it is used outside of existing systems. Based on this, I consider the future of human beings and positioning of AI and robots from the standpoint of labor in future society, examine the significance and value of humans' teleworking to obtain discretion in their location of work from the standpoint of modern society in which technology and humans are entangled, and point out that humans must acquire "locational flexibility for the purpose of being particular about place."

I. Introduction

Many years have already passed since telework first received attention in Japan as an "option for a new style of working using ICT" in the 1980s. In the 1990s, when studies on telework were undertaken individually in a diverse range of fields, such as management, law, and engineering, and recognition of "telework" in itself was low, recognition and discussion of it within the contexts of existing research fields did not gain much steam. It was in June 1999 when researchers from various fields gathered to establish the Japan Telework Society. For more than twenty years that continued up through 2019, telework has been studied as an "option for a *new* style of working." Technology has made great strides forward during these two decades,

and information technology (IT) has become indispensable to modern society as information technology that facilitates communication as well (ICT). A new era has come in Japan with the enthronement of new Emperor in 2019, and with 2020, a year in which COVID-19 changed the world's values and behavior substantially.

As a result of technical progress, 21st-century human beings have obtained new "magical devices" in the forms of not only laptop computers but also smartphones. Twenty years ago, what would we have thought if we had seen everyone on the street freely obtaining various kinds of content with such "magical devices" in their hands, people with open laptops lining the windows of coffee shops, and other commonplace scenes of today's society? These may represent aspects of the "society in which people can work anywhere at their convenience" and "society in which working people can freely choose their work location" that many telework researchers have desired. However, in reality, we have not yet achieved the society that was originally envisioned, one which involves sufficient locational flexibility and the associated flexibility of working hours.

Telework is already practicable from the standpoint of technical development, and its technologies are sufficiently spread throughout society (Yanagihara 2014; 2017; 2019). However, awareness of "discretion in their location of work" has not sufficiently penetrated the values of the people who comprise society, and neither the organizational culture nor the legal system that supports it is adequately aligned with the sense of telework as working people's "flexibility of work style." Today, with the technical environment already in place, what are the obstacles preventing value changes in thinking on work location? And how should human beings view work styles within a society of continually developing technology?

In this paper, I will consider the issue of positioning people who do telework in a society in which artificial intelligence (AI) and robots will replace human labor, paying attention to the choice of work location and the associated choice of working hours. Stated another way, this paper will consider the value that telework has in human labor and the value that human labor has in a highly sophisticated information society. I begin by reviewing changes in the definition and classification of "telework" and examine the direction that telework has taken thus far. Next, I will study the state of and issues associated with telework today. Based on the above, I will consider the future of human beings and positioning of AI and robots in labor within modern society and also study the value of teleworking to obtain "discretion in their location of work" in future society from the perspective of a modern social structure in which technology, organizations, and people are integrated.

II. Definition and classifications of telework and its changes in Japan

1. The history of telework and changes in its purpose

The history of telework in Japan began together with the popularization of personal computers (PC) that arrived with computer miniaturization technologies. With greater efficiency in white-collar work brought by PCs (called "office automation, OA"), people began thinking that the preparation of documents and work ancillary to it could be done outside of fixed offices. One factor behind this was commuter rush hours. Compared to today, when operations are managed by computer and trains run on congested schedules, railway transport capacity in those days allowed for fewer trains and therefore crowding was high. Trains in the Tokyo metropolitan area were running at over 200% capacity, and thus commuting on jam-packed trains came to be seen as a problem (MLIT 2007). In light of this, experiments involving suburban "satellite offices" and "resort offices" in summer resort areas (Matsuoka, Sato, and Miyazaki 2016) were conducted primarily to alleviate the burden of commuting. These developments were called the "first telework boom." However, they lost momentum with the collapse of Japan's "bubble economy" in the early 1990s. Later, work styles involving the use of mobile PCs out of the office and a business venture using IT called "small office/home office" (SOHO) arrived in the late 1990s as companies looked to improve productivity and telecommunications environments became more developed (the "second telework boom"). However, limited communications speed and other technical problems restricted their application. Nonetheless, telework, which had progressed through the first and second booms and under the leadership of private companies, became positioned as national policy with a

Table 1. Advantages of telework

Advantages for companies	Advantages for employees
·Personnel recruitment and training ·Innovation of work processes ·Lower business operation costs ·Maintenance of business continuity in emergencies (BCP) ·Better business competitiveness through stronger internal/external collaboration ·Personnel recruitment and training, controlling job separations and support in employment continuation ·Stronger corporate brand and corporate image	·Better work-life balance ·Better productivity ·Autonomous/self-managed work styles ·Stronger collaboration with the workplace ·Better overall job satisfaction and work motivation

Source: MIC (2018a), translated by the author.

national strategy[1] that began in 2001 to drive the aforementioned developments and the diffusion of broadband service. This was the "third telework boom" (Kinezaki 2007). During this time, telework came to be studied from a variety of angles. They included not only cost reduction and better productivity, which are benefits for company managers, but also better balance with home life and compatibility with diverse lifestyles, which are benefits for workers. Telework was also studied as a way of revitalizing local communities and addressing issues associated with women, the elderly, and the disabled, which were government concerns.

However, the third telework boom, which had been promoted as a part of the nation's policy for using ICT, died out with the 2008 financial crisis. What sparked the current upswell that is considered to be the "fourth telework boom" is the so-called "work-style reform" that began in 2017 (Shimozaki 2018). Unlike the past booms that ended on an empty note, the current telework boom is not only taking place based on sufficient ICT technologies but is also coupled with the need to improve work-life balance (WLB) to cope with child-rearing and nursing care demands associated with the low birthrate and aging population (a problem that became conspicuous at the beginning of the 21st century, when the third telework boom was taking place) and thus linked to the introduction of work-from-home schemes by major companies. It can be said that telework has finally gained widespread recognition as a result.

The purpose of telework has also wavered together with the historical backdrop that supported this boom. In the first boom, the purpose was declared to be to alleviate the burden on workers by eliminating their difficult commutes. However, later, when the bubble economy collapsed, it was shifted to productivity improvement and organizational reform as an extension of it as seen from the perspective of business managers. Incorporation of telework into business continuity plans (BCP) as a way of coping with disasters and crises following the emergence of a new strain of influenza in 2009 (Yoshizawa 2010) and the Great East Japan Earthquake of 2011 also received attention (Sahori et al. 2013; Yanagihara and Yoshizawa 2013; Yanagihara 2018). As for the purpose of the current introduction of telework, discussion has come to be based on numerous advantages for both management and workers. This is occurring amid calls for a "society that promotes women's active participation" and renewed attention on child-rearing and nursing-care assistance with the intent of "regional revitalization" and expanding the working population to cope with a society marked by population decline in which falling birthrates and aging continue (see Table 1).

2. Current definition and classifications of telework

(1) Changes in the initial definition and classifications

The government defines telework as a "flexible work style using ICT that is not restricted by place" (MIC 2017) and a "flexible work style that uses ICT and effectively uses time and place" (MIC 2019; METI 2018); MHLW 2018; MLIT 2018a). However, today, when ICT has developed to an advanced level and has become

indispensable as social infrastructure, there are few operations that are not "operations that use ICT." Our society is one in which various ICT tools are used. Indeed, this phenomenon has developed to the extent that even email, which is known as a general means for work communication, is seen by young people as a "legacy tool" for non-synchronous communication with text only. In other words, the focus of telework is not on the first half of the definition ("work style that uses ICT") but rather the second half ("flexible work style that effectively uses time and place"). Put another way, the time is coming when we must reconsider not "what to use when working" but rather "where to work," "when to work," "how much to work," and "how to work" when looking at telework.

Telework has been categorized in various ways, and the core nature of that categorization has come under discussion. W.A. Spinks, who is a pioneer in Japan's telework research, classified telework from five perspectives: "employment relationship," "location," "frequency," "telecommunication technology," and "facility" (Spinks 1998). However, in the 21st century, a society has taken shape in which ICT has been incorporated into work and social living and become one with them.[2] Consequently, the classification of "telecommunications technology" has become irrelevant. Furthermore, the use of "facility" was integrated into the perspective of "location" because it is the same as changing location. Under Spinks' pattern, "urban/suburban/rural" are included in the "facility" classification. However, as is shown by the example of "Furusato Telework" that the government supported under the name of regional revitalization (Tazawa 2015; 2018; Tokozakura 2017; 2018) and the example of "Resort Office," which has been implemented at Karuizawa and other resort areas (Matsuoka 2018), this concept of "urban or regional" continues as a reason for selecting location. The above telework classifications shows strong influence of the working side's perspective. In addition to them are classifications that concern the introduction of telework—in other words, classifications seen from the business managers' perspective. Regional revitalization is often mentioned as a benefit of telework. It can be classified into (1) attraction of large enterprises, (2) localization, and (3) virtual revitalization (Kano et al. 2017). This is not "urban or regional," but rather a classification of the method for introducing telework when seen from the regional level, and it is a necessary classification axis for considering which introduction method is best for a particular region.

(2) Current general classifications: Form of employment and workspace

As a result of the changes mentioned above, a method that takes Sato's "form of employment" and "workspace (location)" (Sato 2012) as classification axes has recently become the basic method. It is even used in the government's classifications. In the most recent "2018 White Paper on Information and Communications in Japan" (MIC 2018c), telework was first classified into "self-employed type"[3] and "employment-type" based on form of employment, and then classified just employment-type telework with two stages using two classification axes into "work from home," "mobile work," and "satellite office work" depending on the work location. There are also instances, like Sato (2012), when self-employed type telework is further classified based on the main location. Even the Ministry of Land, Infrastructure, Transport and Tourism (hereinafter MLIT) first classified telework into "at-home-type," "satellite-type," and "mobile-type" when defining teleworkers for the "2017 Population Survey on Teleworkers" (MLIT 2018b) and then further classified those categories into employment-type and self-employed type. In other words, it can be said that using the two characteristics of "form of employment" and "workspace (location)" as axes for classification is the standard classification method at the present time. In this paper, I will classify employment-type and self-employed-type into three patterns each by adding the government's location classification method to the classifications presented by Sato (2012) (see Table 2). Generally speaking, only employment-type telework is classified by "location" and work from home and satellite office work, in particular, are often presented as telework.

Self-employed type telework contains the extremely diverse items classified within it precisely because it is self-employed. Only one point determines whether telework is self-employed or employment, and that

Table 2. Patterns derived by the two telework axes

		Workspace (location)		
		Home	Nearby office	Moving
Form of employment	Employment-type	Work from home	Satellite office work	Mobile work
	Self-employed type	At-home working	Shared office work	Self-employed mobile work

Source: Sato (2012), modified and translated by the author.

is whether an employment contract has been concluded or whether work orders are received based on a service contract. As mentioned before, in today's society, doing work without using any ICT whatever is close to impossible. Furthermore, when starting a business, using email and simple teleconferencing tools are essential to business execution, and location is up to the individual. In this modern society, engaging in discussion of self-employed type telework, which has a high degree of flexibility in terms of work execution, using the workspace axis in the same manner as employment-type telework has little meaning within research on telework. I will therefore proceed with my study in this paper by focusing on employment-type telework.

(3) Patterns based on other classification axes: Frequency and system

While location is an important factor in employment-type telework, other classifications cannot be ignored. In much telework research conducted thus far, discussion has proceeded based on definitions that are extremely vague and open to broad interpretation, qualities that can be seen in the government's definition, as the true nature of telework has not been discussed sufficiently (Sato 2012). In research, there must be discussion on the true nature of telework as something unlike traditional "ordinary ways of working", and the ways of working that should be recognized as telework must be clarified. For this reason, there is a need to add necessary classification axes while also using the two axes of form of employment and workspace (location) as a basic foundation.

First, frequency should be studied. Under this axis, it is possible to separate telework into "complete telework" in which all work is done by telework without commuting and "partial telework" in which commuting to an office is premised but some working hours are done via telework. For example, working that mainly takes place at the home or a nearby satellite office when a person has difficulty going to an office as usual (e.g., because of pregnancy, injury, or physical disability) but can still work indicates complete telework. On the other hand, cases in which a person works from home or at a satellite office during part of a day or just one or two days a week, cases in which a person commutes to an office but does work on a mobile device while outside the office during the day, and cases when a person does work locally during a business trip also involve traditional office work and are therefore called partial telework. In particular, partial telework performed as mobile work is presently done by many employees without regard for telework systems. That the place where this mobile work-based partial telework is done has become the home is likely the mental image of "work from home" held when telework is recognized as part of the recent "work-style reform" movement.

The classification of "partial/complete" is important in the employment of persons with disabilities, a topic that has been receiving attention in recent years. In complete telework by persons with severe physical disabilities, because the person does not have a desk in an office, there are instances when ways of providing work management are tried using information systems (Y's Staff 2017) and when operations are executed as a separate company in order to alleviate problems caused by differences in treatment and work environment among employees (Takeuchi et al. 2007). Partial telework is not thought to be greatly different from business travel or work outside the office in terms of its operation. However, in the case of complete telework, it is difficult to make physical places equal, and thus there are significant differences with partial telework in terms

Table 3. Telework classifications by Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

At-home-type teleworker	Person who does telework at home
Satellite-type teleworker	Person who does telework at another office of his/her company or at a shared-use office used by multiple companies or individuals
Mobile-type teleworker	Person who does telework at a customer premises or other remote place visited during work, coffee shop/library/hotel on business trip, etc. or while moving
Employed-type teleworker	Employed person who does telework
System-based teleworker	Employed-type teleworker who does telework with the introduction of a telework system by his/her employer (including cases where no system exists but telework is approved by the company, supervisor, etc.)
System-less teleworker	Employment-type teleworker who does telework without the introduction of a telework system by his/her employer or without knowing whether or not a system has been introduced by his/her employer
Self-employed type teleworker	Self-employed person who does telework

Source: MLIT (2019), translated by the author.

of concept and methods of operation. Although discussion of differences in frequency is therefore necessary, in this paper, I will stop at simply mentioning that classification based on "frequency" is required.

There is also classification with respect to whether or not systems exist. Although the government's definitions and classifications of telework appear to be roughly uniform in terms of interpretation, the MLIT made a major change beginning with a 2016 survey (MLIT 2017) by establishing the classification "whether or not telework is based on a system (including 'do not know')" in employment-type telework (see Table 3). In the absence of a telework system, it is generally most likely that telework will not be recognized as working hours (except for temporary time outside the office) without the application of an off-site work system or highly professional work system.[4] That MLIT went so far as to present this as an item indicates that a good number of workers are teleworking voluntarily outside the scheduled working hours even without a telework system. The fact that people do telework without compensation has traditionally been called "*mochikaeri zangyo*" (take-home overtime). It is also suggested in recent surveys (Nakai et al. 2019). The Ministry of Health, Labour and Welfare is demanding the strict ascertainment of working hours with a revision of the Industrial Safety and Health Act in 2019, and makes no mention of this point because working hours must be managed similarly even if they are done as telework. In other words, unsystematized telework is important as a classification for research, particularly in the study of business administration; for example, in human resources management and organizational behavior theory. However, it is inherently impermissible and does not appear in public awareness activities.

(4) Classifications adding working time management as a new axis

I would also like to give attention in this paper to the perspective of managing working hours that influences "discretion in working in terms of how and how much" based on the above-described changes in classifications and current practice of strictly managing working hours.[5] One factor that hinders the introduction of employment-type telework is concern arising from the fact that, because people cannot see each other, it is unknown whether they are actually working. In such cases, the establishment of performance-based evaluation systems and the application of discretionary labor systems arise in discussions of telework. However, a discretionary labor system has conditions with respect to "time zones," time management is conducted with discretion in "number of hours" assessed in terms of "deemed working hours," and the management of working hours is currently becoming even stricter. Complete discretion of time is feasible only with a way of working that does not have restriction on working hours. This is another way of working

Table 4. Telework classified by the axes of form of employment, time, location, and management

Classification by existence/non-existence of an employment contract with a company	
Employment-type telework	Self-employed type telework
18 types from the following combinations	
Classifications based on the time that telework is done	
Complete telework	
Partial telework	
Classifications based on work location	
Work from home	
Mobile work	
Satellite office work	
Classifications based on working time management	
Work managed based on a number of hours established in employment regulations	
Work managed based on "deemed time"	
Work without working hours regulations and not managed for time	

Source: Prepared by the author (Translation of Table 4 in Yanagihara (2019c)).

that approaches the self-employed type and has different working time management conditions, and therefore it requires different classification (Yanagihara 2019a).

Here I will examine telework classifications that take frequency and working time management into account after adding this new classification axis as a research axis. Classifying telework by four axes—form of employment, time (frequency), location (workspace), and method of time management—shows that combining them produces eighteen different work styles for the employment-type (See Table 4). Of course, location is the most important element of telework, and therefore various information systems have been developed for it. In other words, although employment-type telework appears to be a work style that actively uses ICT in remote locations, in the current situation where few people can employ work styles that do not have regulations on working hours, it is a work style in which people are managed and supported by ICT (information systems) in remote locations. Nevertheless, employment-type telework is a work style with a certain degree of flexibility if compared with conventional work styles that come with a completely standardized commute.

III. Current state and issues of employment-type telework

1. The situation before COVID-19

So then, how far has employment-type telework penetrated into society? There is a great difference between the time up to 2019 and 2020, when the threat of COVID-19 arose and people around the world were called on to stay home. I will first look at the situation before COVID-19.

According to the Population Survey on Teleworkers (MLIT 2019), a continuing survey conducted by the MLIT targeting 40,000 workers, the percentage of teleworkers in 2018 was 17.4%. The number of teleworkers as a whole had been growing by about 3% since 2016 and could be described as being in an upward trend

these three years.[6] Looking at the breakdown by type, Self-employed type teleworkers accounted for 24.0% of 4,377 self-employed persons, and employment-type teleworkers accounted for 16.6% of 31,249 employed persons. This shows that there has been less employment-type teleworkers than self-employment-type although in many surveys no distinction is made between the two types. Considering that, in this survey, people who do work remotely from their ordinary business location or workplace using ICT, even if only a little, are considered to be engaged in telework, the figure of 16.6% for employment-type teleworkers is by no means high in modern society in which outside work by salespeople and mobile work during business trips take place routinely.

In the Ministry of Internal Affairs and Communication's "Communications Usage Trend Survey" (MIC 2018b), the percentage of people who had experience teleworking within the past year stood at 6.4% (N=2,040). Among individuals of the 20.4% who desired to do telework but had no experience doing so, 74.8% gave the lack of a system in their workplaces as the reason for it. This shows how the presence or absence of such a system influences the practice of telework. As was stated above, the MLIT ascertains teleworkers regardless of the presence (or absence) of such a system and states that there is a certain number of people who do telework even without a system. Thus, when "low-frequency teleworkers" (MLIT 2017) who do telework for short hours primarily in the form of mobile work and people who work outside the office during routine operations and are not aware that they are teleworkers are included, it is unmistakable that there are people who do telework even without a system. Additionally, there is also the figure of 20.8% in a small-scale preliminary study from the private sector that did not ask about business categories or age. From this, it is thought that around 20% are aware that they are teleworkers (Nakai et al. 2019).

Bias exists when looking at a breakdown of results from the MLIT (2019). Although bias in age groups is unavoidable, a tendency of bias in gender is conspicuous. In employment-type telework, the number of men roughly doubles that of women, but in self-employed type telework, there are many men in their teens and twenties while many women in their thirties. This demonstrates the fact of women's "shift to self-employed type telework out of necessity in order to continue work" that is due primarily to child-rearing or relocation associated with their spouses' job transfer. The fact that there are no major differences in gender or age group for self-employed type telework for age groups at and above 40 years and that the number of men in employment-type telework is consistently more than twice that of women may not be only because employment-type telework is not used as a work style that fits with women's lifestyles but also because men do "telework on their own" even without a system. Moreover, while it cannot be said that teleworkers with a system invite long working hours, it is known that the percentage of long working hours of people who are not covered by a system is high (Hagiwara and Kume 2017). In other words, this MLIT survey (2019) indicates the possibility that telework is still being practiced as part of take-home overtime without a system. Aside from the problem of time management, the lack of "locational flexibility" is a cause behind increasing employment-type telework that is outside of a system. In the present age, when managing working hours in an information system has become easy, guaranteeing discretion whereby people can work by choosing their location in line with their individual circumstances and attitude, so long as time management is possible, is telework as it should be; i.e., a way of working that can help solve diverse problems. However, it is difficult to claim that this is being realized.

It has been pointed out that there are three factor groups that impede telework: means-related factors (underdeveloped IT environment, differences in office environments, and delays in computerization), organizational factors (work processes, communication, bothering of others, and methods for personnel evaluations), and subject-related factors (psychological stress and information literacy) (Shinada 2020). As a way with dealing with those, a specific measure was presented as follows: "It is necessary to establish circumstances that permit the application of telework through, for example, an attitude of tackling true issues—namely, 'management,' 'evaluation,' 'communication,' 'type of occupation,' 'IT infrastructure,' 'IT security,' 'legislation,' 'facilities,' and 'Japanese corporate customs'—that are impediments creating

conditions that impede telework" (Spinks 1998). However, these issues and measures, which have been talked about for twenty years, have not changed much except for those concerning ICT environments. Even now, "working time management," "progress management," "communication," and "information security" are mentioned as main challenges, and, in companies that do not use telework, the problems of "no suitable jobs" and "difficulty making evaluations" are also mentioned (Ikezoe 2019). Thus, it is a fact that Japanese people's awareness covering "office perspectives" and "work perspectives" (Koga and Yanagihara 1999) still cannot keep up with the telework enabled social environment.

2. The impacts of COVID-19

Since March 2020, work from home has been practiced for emergency evacuation and as a mandatory measure due to the impacts of COVID-19. Particularly in April, telework was implemented in many companies regardless of whether or not they were prepared for it, as workers were forced to refrain from commuting due to a state of emergency declaration. Among companies that were not ready, there were instances in which not only was the work environment not fully developed but employees had trouble keeping up with work from home in terms of their awareness or skills. Consequently, ordinary commuting returned when the restriction on going outside was lifted.

Some companies were continuing work from home when another spread of infections thought to be the "second wave" came in July; however, the government needed to strongly urge many other companies to use telework again. But even with such urging, most companies did not continue work from home as much as they did in April in response to the first state of emergency declaration. (It was in such a situation that a third, even larger wave arrived in December 2020.)

The trend toward more work from home that was sparked by COVID-19 will likely continue for the time being. However, even if workers become aware of the effects of telework and desire to continue it, companies will likely remain timid about telework and return to their original practices as soon as compelling force is relaxed. Most Japanese companies cannot proactively advance telework without a strong request—or, put differently, pressure—from the government, as they are still typical "work first" organizations and unwilling to adopt a new measure or working style that (they think) may prevent their employees from doing their best in their work.

A fundamental reason for this is the fact that the above-mentioned obstacles to telework that presupposes work in a real office have not yet been resolved. One reason for the emphasis on real offices, i.e. "face-to-face environments" and "collective environments," exists in Japan's organizational culture. In Japanese organizations, there is a sense of values that assumes that the organizational context, which is "something like a common frame of reference that is shared by parties engaged in communication," is in a high state (Ueda 2018), and it is known that organizational citizenship behavior (OCB) is what makes this high context (Ueda 2019b). OCB is behavior that contributes voluntarily to the organization without seeking a direct reward. It plays an important role in mutual evaluation within a high-context organization.[7] In work from home caused by COVID-19, in which long-term complete telework was necessitated urgently, the only work results that are confirmable by others are those of tasks for which the person responsible is clear. In Japanese society, where a certain element exists whereby work performance is evaluated with the assumption that OCB will be visible in a real office, anxiety is felt on both the evaluating side and evaluated side because the effects that a person's existence itself has on the organization cannot be confirmed.

IV. The future of employment-type telework that coexists with ICT

1. The positioning of AI and robots in work

As I mentioned above, the issue of telework remains unresolved and its spread is being impeded by problems associated with the culture and constitution of Japanese companies (Ikezoe 2019). However, ICT's

development continues to gradually change how people work. Today, AI and robots equipped with it are used in a variety of operations. Similar to the Electronic Data Processing Systems (EDPS) at the dawn of the age of information systems in the 1960s, with which standardized operations (typified by salary calculations) were replaced with computers, people are being replaced with computers as a result of labor shortages brought by the low birthrate and aging society. Many factory operations are already being entrusted to industrial robots that continue to make high-quality products surely and without breaks. The number of industrial robots installed in Japan peaked in the year 2000 and their installation in manufacturing settings has settled down substantially since then. In the years ahead, society will become one in which operational tasks that were typically done by humans, such as those involving communication and memory, will be taken over by technology one after another (Ema 2019). Recent advancements in Robot Process Automation (RPA; a process of automating tasks that humans had typically performed using application software with AI or digital labor) have been remarkable. Forty-seven percent of jobs will be lost with automation of 70% or higher in the next decade or two (Frey and Osborne 2017), and RPA will replace white-collar work (van der Aalst, Bichler, and Heinzl 2018). It has also been specifically stated that the occupations of 49% of all employed persons in Japan will become technologically automated within the next few decades (Nomura Research Institute 2015).

This means that half of all work that can be done through telework will be lost as jobs as a result of advancements in RPA. In fact, personnel reductions are progressing from RPA's introduction. However, unlike a sentiment resisting IT called the "neo-Luddite movement" that occurred in the late 1990s amid progressing EDPS, replacement by RPA is viewed positively. In other words, modern society has already become a world in which human beings and information systems are completely mixed, and humans recognize its existence. "Human labor" has come to encompass "labor entrusted to ICT." As this progresses, telework will move toward new concepts that take into account the characteristics and relationships of humans and ICT.

2. The relationship between technology and humans from the standpoint of the location of work

COVID-19 has demonstrated that the use of telework presents no problems in terms of technology. Almost all security concerns can be eliminated by using solutions for telework and preparing operational guidelines. Information leaks caused by phishing websites and poor document management are often mentioned. While preventing them completely is difficult, many leaks occur from problems in human operation. Presently, incidents involving improper access using systems themselves without human intervention or that invite such access account for less than 20% of leaks (Japan Network Security Association 2018). In other words, people cause security problems in telework, not machines. The robots that will replace humans (where the danger exists) and the AI that controls them do not choose work location. They can be installed wherever is best for business managers and be made to work as instructed by remote control, anytime and anywhere. And, of course, there is no danger that they will be infected with COVID-19.

The government has been pursuing a "society in which anyone can connect to the internet anytime and anywhere." As this has become a reality, a "society in which anyone can work using ICT anytime and anywhere" is being realized. With "anytime," degree of flexibility increases as discretion with upper limits on hours set with consideration for humane ways of working becomes accepted (flextime and discretionary work), and "anyone" is seeing progress with the advancement of extended mandatory retirement ages and elderly employment as Japan's society ages. However, regarding "anywhere," the only choice available for people who have entered into an employment contract and work in an organization is telework. If humans cannot cope when machines become able to work "anywhere," humans in a society that is built on advanced ICT will lose their significance. That may be the future if "awareness of telework" does not spread even as telework itself does.

3. Significance of telework and positioning of human beings in the AI age

So then, will humans (who cannot work "anywhere") be incapable of keeping pace with the coming age of AI? Traditionally, candidates for executive positions in major companies were required to accept job transfers that involved relocation, and thus companies assigned personnel capable of working anywhere to important posts. It was a matter of course that companies did not consider families' convenience, but rather that families changed themselves to fit the company's convenience. This is not an exceptional practice even now. It is still commonplace to see many university-graduated career-track workers be presented with a career plan that presumes job relocations and thus end up choosing between a job transfer without their family due to their spouse's work or child's schooling or, when putting priority on moving as a family, a job transfer or occupational change that forces the worker's spouse to abandon his or her career or compels the worker to take a local job with lower pay and benefits. Against this backdrop, there are cases of telework emerging even among the employment-type that come from "being particular about location of work" from the standpoint of workers who want to continue their careers at their new locations or who "want to continue working *here*" (Yanagihara 2017). There is also a job-transfer undertaking called a "regional bank human resources bank" that makes use of careers in association with spouses' job transfers (Nihon Keizai Shimbun 2018), through which a mechanism for promoting spouses' career continuation in a manner compatible with Japan's employment custom of the job transfer is being tried. In other words, for companies to maintain their human resources, it will be important to have a mechanism that not only has people work "without being particular about place" and "without being limited to place" but also work "at a specific place when circumstances make them particular about that place." In fact, work styles in our highly diverse society continue to change into working "with particular focus on time and place" as "people are liberated from the constraints of time and place" by ICT (Koga 2018).[8] Human movement has become difficult with COVID-19, and awareness of this is rising even in Japan. Some companies are even changing course toward applying methods for dealing with unaccompanied job relocations and job transfers with telework. I would like to point out that, in such an age, the traditional way of working—in which the "employer" controls time and place by strictly managing working hours with uniform standards and not using telework—may lead to lower productivity and morale within environmental changes that include society's rapid aging with low fertility.

As for time, in order to eliminate inconvenience for employed-type teleworkers who lack discretion in their working hours, there is the view that people who do highly specialized work should enter into service contracts as self-employed type teleworkers (Ouchi 2019). Self-employed type has high discretion in locational flexibility. However, there is meaning in continuously doing work based on organizational culture as a member of that organization, and there are times when great results are achieved precisely because they came from an organization. Above all, economic stability is an important factor for cultural living, and it is natural to desire stable employment rather than self-employment, which tends to have ups and downs in terms of income. In a modern society that is more strongly influenced by economic conditions than ever before, it is natural for people to be highly desirous of economic stability to lead an ordinary life—occasionally facing life's turning points through child-rearing or nursing care, with the family living life, and getting through life, together—in the hope of leading a "healthy and culturally rich life" tied to family and the community. Additionally, people in self-employment do not just engage in the specialized work for which they have skills. They must possess the sales skills needed to get jobs, and they must deal with a broad range of tasks. Sometimes they must decide to hire employees and manage them. Considering this, it may be difficult to conclude that, with self-employed type telework, highly specialized people gain great satisfaction by freely doing the work they want to do.

If we take it that having emotions is proof of being human, then machines literally operate "mechanically" by making correct judgments without human involvement or emotion and do highly reliable work regardless of time or place. However, humans can engage in tasks involving decision-making with emotions that only humans do by purposely "choosing location," or, put another way, based on "bounded rationality" (Simon

1997). It is precisely because of those emotions that organizational citizenship behavior is generated and "sharing the same place" becomes necessary at times. In the age of emerging AI, human potential exists in areas related to human sociality—in other words, at the intersection of "finding the next problem to solve" and "persuading many people to address those problems and cooperate with solutions obtained" (Brynjolfsson and McAfee 2017). If the work left for humans in the future aggregates in areas related to human sociality, then the availability of telework, which recognizes the "flexibility to be particular about where one works" for living a highly satisfying life capable of enriching the "emotion" that nurtures human sociality, will become a model for work styles in a society where people coexist with AI. This is not a denial of human work done with face-to-face communication. Instead, with the sharing of places as necessary, it becomes an opportunity to re-acknowledge human value in the sense that it can lead to work execution and new ideas with behaviors and emotions that differ from AI.

V. Conclusion

Awareness of telework has risen as a result of work-style reform. On the other hand, the management of working hours has come to receive thorough attention from society shifting toward one in which people truly want to live their lives while working comfortably and humanely. Aside from clearly long working hours, if people are in a position that permits them to determine how they will work and the content of their work to a certain extent, then discretion in terms of location and time should raise their motivation and have a good impact on the organization.[9] However, under the currently applied strict working time management methods, there is no flexibility in time regarding "when and how much to work"—for example, there is no flexibility of how to work such as "putting a child to bed early at night and then preparing documents at home" or "first getting sleep after returning home and then doing work at home early in the morning"—and the benefit obtained from telework goes no further than limited flexibility of location.[10]

Being able to select "comfortable working hours" that match individual lifestyles is intrinsically important in telework. Returning home early is important for people who live with someone having child-rearing or nursing care needs, and particularly when living with someone whose age or circumstances require transportation or being with him or her at night. For such people, there are times when doing remaining work at home, even if after 10:00 p.m., can be helpful and lead to career continuation. While in some cases temporary problems can be resolved by taking paid time off, responding to constant problems (such as involving child-rearing, nursing care, or reduced commuting) may require conditionally removing restrictions on late-night work and systematizing telework. However, this is not to affirm the ridiculed "unlimited work with flat-rate pay" style of working that seeks to reduce costs from a business manager's standpoint. Rather, it is to stress that workers should be particular about working time and place if an environment for working autonomously and humanely exists.

As is shown by the various study results and actual circumstances I presented above, some workers do telework at their individual discretion. Some activities do not appear in the studies' results, such as voluntary training outside of working hours. In a society of emerging technology that permits work without having to choose time and place, simply clamoring for "flexibility in choosing work location and time" will likely lead toward more entrusting of work to AI and robots, and some people will lose their working skills as a result. Human beings, who make up society by having emotions and relationships with others, are different from AI and robots. Choosing to "work here" and to "work at this time" based on our own volition and then doing it is a way of working that allows us to not only perform the tasks assigned to us but also fulfill our roles as members of whole society, including our relationships with others. Carrying out work with awareness of relationships with others will be the role of human beings in an ICT-based society built on coexistence with AI and robots, and it will lead to a society in which telework is accepted and the value of humane work permeates throughout.

While this paper was being proofread, a 31-day state of emergency was declared in four prefectures of the Tokyo metropolitan area on January 7, 2021, and then it extended one more month in ten prefectures including Tokyo and Osaka on February 2. Accordingly, companies were again asked to use telework as a means of achieving a "70% reduction in the number of people commuting to work." However, unlike the first declaration in April 2020, we are seeing few news reports of companies being forced to employ telework. A probable reason for this is that telework has become established in the companies that continued to use it up to the recent declaration. On the other hand, it is likely that some companies that felt inconvenienced by the previous mandatory and urgent demand to employ telework are having second thoughts about using it this time around. Additionally, the current declaration is not generating the same sense of "abnormality" in daily life that was felt last time, in part because schools are not being closed. As a result, companies have a weaker sense of crisis this time. It may well be that many companies have not yet found any real advantages to implementing telework in the face of an uncertain future. Thus, the recent demand for telework again asks us: In a society defined by coexistence with ICT including AI, how should workers live sound and healthy lives, and what kinds of business activity should companies aim for?

This paper has been revised from the original one (Yanagihara 2019c), which was commissioned by the editorial committee of *The Japanese Journal of Labour Studies* for inclusion in the special feature "Changing Workplaces, Changing Work Styles" in its August 2019 issue (vol.61, no.709), considering the situation under COVID-19 crisis and other aspects in line with the gist of *Japan Labor Issues*.

Notes

1. For details on the e-Japan Strategy, u-Japan Policy, and the various government IT policies that encompass them, see the website of the Cabinet Office's IT Strategic Headquarters (http://japan.kantei.go.jp/policy/it/index_e.html).
2. The concept that such technologies and human society have become one and are indivisible is based on an analytical perspective for information systems called "sociomateriality." For details on sociomateriality, see Orlikowski and Scott (2008) and Koga (2017), and for details on its relationship with telework, see Koga and Yanagihara (2014).
3. In this paper, self-employed workers working with ICTs are classified as "self-employed type" teleworkers, distinguished from employment-type teleworkers. In most of other countries self-employed persons who perform their work with ICTs are not considered as teleworkers but typically a part of the so-called 'gig economy.' In Japan, many women with family responsibilities tend to choose working self-employed utilizing ICTs under service contracts. Also, there is a unique background regarding the origins of teleworker. Sato (2019) explains that "home-based self-employed workers working with ICT equipment were considered to be the first 'teleworkers' in the Japanese workforce. They have since made up the majority of formal Japanese teleworkers, as most Japanese companies' labour practices and evaluation systems forbid their employees from teleworking." See Sato (2019) for more details of Japanese telework.
4. Because consideration of legal problems and issues in systems for managing working time is outside of my specialty, I simply present the problem that "hours done in telework may not be considered working hours if telework is not systematized" in this paper.
5. See also Yanagihara (2019a) for more on telework as seen from the aspect of working time management.
6. It is difficult to state that sufficient consistency has been maintained in the results of the MLIT survey (which has been conducted continuously since 2002), as the definition of "telework" was changed slightly beginning with the 2016 survey (MLIT 2017). For this reason, I only considered the results of the 2018 survey, which are the latest results available, for this paper.
7. Although this paper does not go into OCB in detail, OCB refers to engaging in behavior as an organization member in the same office that brings good effects to the organization as well as its members voluntarily and without seeking reward. Examples include "helping a nearby colleague who is having difficulty with a task even though the task is outside one's own job" and "voluntarily picking up trash in the office and discarding it without being told to do so." The definition of and thinking behind OCB are discussed in various literature, including writing by Organ (1988), who is an advocate of the OCB concept, and Organ et al. (2006). See Ueda (2019a) for the latest trends in OCB studies.
8. Being particular about location of work actually has a deeper relevance with work-life balance (WLB) than regional revitalization. There is also a proposal for "telework leave" that seeks to improve WLB by allowing "leave" based on the assumption that only minimal communication-related tasks will be conducted by telework for temporary focus on work location (Yanagihara 2005). However, Japan's current direction, which presupposes working time management, remains unchanged from thinking on ways of working in the factory labor era, and it stresses only working and resting in hourly units. As is shown with "telework leave," working and resting can actually be done at the same time. This is the recent trend of "workation" (work + vacation).
9. Generally speaking, this is often mentioned as the principle behind discretionary labor and advanced highly professional work systems. However, there are also examples in which it is deemed effective even in terms of the methods and content of jobs that lack discretion, such as factory work. See Muto (2017) for a detailed discussion.
10. There is an example of improving WLB through work in combination with telework that makes use of finely segmented time by pursuing strict working time management. See Yanagihara (2017) for a detailed discussion.

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