

Section 3

LABOR SHORTAGES CONFRONTED BY KANSAI

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Since the latter part of 2022, economic and social activities have systematically returned to a state of normalcy following the repercussions of the COVID-19 pandemic. Nonetheless, the economic ramifications stemming from the pandemic have been profound, with the labor market recovery experiencing considerable delays, notably within the non-manufacturing sector. Furthermore, over the medium to long term, Japan faces a demographic decline, contributing to a persistent labor scarcity due to diminishing working-age demographics. Specifically, the anticipated future contraction of the population in the Kansai region surpassing the national average accentuates the urgency in addressing the imminent labor shortage.

In Section 3, we ascertain the prevailing condition of the labor market in Kansai, pinpoint associated challenges, and contemplate strategic responses to potential disruptions in the labor supply. Subsection 3.1 employs statistical data to scrutinize the existing state and obstacles of the labor market in Kansai. Subsection 3.2 provides illustrations of private enterprises that are proactively addressing impending labor shortages, and Subsection 3.3 consolidates the outcomes derived from the analysis presented in Section 3.

1. Current situation and issues in the Kansai labor market

(1) Current situation

Assessing the trajectory of key labor statistical indicators in the Kansai region from 2019 onward, it is evident that the labor market has substantially rebounded from the adverse effects induced by the COVID-19 pandemic. Examining aggregate figures (Table 3-3-1), the employment landscape experienced a downturn in 2020, marked by a decline in the employment rate and an increase in the unemployment rate compared to 2019 – the year preceding the pandemic. However, a recovery ensued in 2021 and 2022. On average, the employment rate in 2022 surpassed the 2019 level, and while the unemployment rate remained elevated compared to 2019, it decreased from the prior year. Notably, in the first quarter of 2023, the employment rate exhibited a decline from the previous year, and the unemployment rate persisted at a level above that of 2019, hinting at a potential interruption in the ongoing recovery. Despite the setbacks induced

Table 3-3-1 Trends in Major Labor Market Indicators in Kansai

total				
	labor force participation rate	employment rate	unemployment rate	average monthly working hours
2019	59.8	58.3	2.6	37.3
2020	60.0	58.2	3.0	36.1
2021	60.4	58.5	3.1	36.0
2022	60.9	59.1	2.9	36.0
2023Q1	60.5	58.8	2.9	35.7
male				
	labor force participation rate	employment rate	unemployment rate	average monthly working hours
2019	69.2	67.3	2.8	42.4
2020	69.7	67.5	3.2	40.7
2021	70.0	67.8	3.2	40.6
2022	70.3	68.2	3.1	40.7
2023Q1	70.0	67.8	3.1	40.2
female				
	labor force participation rate	employment rate	unemployment rate	average monthly working hours
2019	51.5	50.2	2.3	30.9
2020	51.2	49.8	2.8	30.1
2021	51.7	50.2	2.9	30.2
2022	52.4	51.0	2.6	30.4
2023Q1	52.0	50.6	2.6	30.1

Note: Figures for 2019-2022 are annual averages of quarterly data. Average monthly working hours is in hours; all other units are in percent.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

by the COVID-19 pandemic, the number of labor force participation rates has consistently exhibited an upward trajectory from 2019 through the most recent 2023Q1.

When disaggregated by gender, during the peak impact of the COVID-19 pandemic on economic activity in 2020, both the labor force participation rate and employment rate experienced a decline among women, constituting the majority of non-regular workers in the service industry—predominantly engaged in face-to-face interactions with clients. This downturn was notably pronounced within the 15-24 age cohort, where temporary part-time employment (*arubaito*) predominates. While not explicitly detailed in the table, it is noteworthy that the labor force participation rate and employment rate for this demographic decreased by 1.8 and 2.1 percentage points, respectively, from their 2019 levels. Conversely, for men, both the labor force participation rate and the employment rate exhibited an increase, underscoring that the detrimental

impacts of the COVID-19 pandemic on the labor market were comparatively less severe for men than for women.

Nevertheless, the unemployment rate witnessed an increment of 0.4 to 0.5 percentage points above the 2019 baseline for both men and women, signifying a deteriorating employment landscape for both genders. Among men, the most substantial surge in the unemployment rate occurred within the 35-44 age cohort, manifesting an increase of 0.8 percentage points from the 2019 level. Conversely, for women, the steepest rise in the unemployment rate occurred within the 25-34 age cohort, constituting the majority of regular workers (29.2%), with a noteworthy uptick of 1.4 percentage points. Subsequently, the 15-24 age cohort and the 55-64 cohort group experienced respective increases of 0.7 percentage points (Table 3-3-2).

In both 2021 and 2022, the labor force participation rates and employment rates demonstrated an upward trajectory for both men and women, rebounding to levels surpassing those of 2019 (excluding women aged 15-24).¹⁾ However, despite a decline in the unemployment rate for both genders in 2022 compared to the previous year, it persisted above the 2019 benchmarks. Among men, the most significant deviation from the 2019 benchmark in the unemployment rate is observed in the 45 to 54 age cohort, registering a +0.5 percentage point

Table 3-3-2

Changes in Unemployment Rates Relative to 2019 levels Across Gender and Age Categories (Kansai)

male						
	15~24	25~34	35~44	45~54	55~64	65 and over
2020	+0.5	-0.1	+0.8	+0.4	+0.7	+0.0
2021	+0.4	+0.2	+0.3	+0.7	+0.9	+0.2
2022	+0.3	+0.3	+0.4	+0.5	+0.2	+0.0
2023Q1	-1.2	+2.0	+0.5	+0.5	+0.1	-0.8
female						
	15~24	25~34	35~44	45~54	55~64	65 and over
2020	+0.7	+1.4	+0.0	+0.3	+0.7	-0.2
2021	+1.4	+1.0	-0.3	+0.4	+1.1	+0.3
2022	+1.2	+0.5	+0.2	+0.0	+0.6	-0.2
2023Q1	+0.3	+0.8	-0.1	+0.1	+0.5	-0.1

Note: The figures are derived from the annual average of quarterly data on the unemployment rate, with units expressed in percentage points.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

1) In 2022, both the labor force participation rate and employment rate for women aged 15-24 continue to trail the 2019 levels, registering -0.1 percentage points and -0.6 percentage points below, respectively.

difference. Conversely, for women, the divergence from the 2019 benchmark in the unemployment rate was particularly pronounced, recording +1.2 percentage points for those aged 15-24, and +0.5 percentage points and +0.6 percentage points for those aged 25-34 and 55-64, respectively.

In the first quarter of 2023, both the labor force participation rate and the employment rate exhibit a decline from the previous year for both men and women, while the unemployment rate remains unchanged from the previous year's average, persisting at a level surpassing that of 2019. This pattern suggests a halt in the ongoing recovery of the employment situation. Notably, for men, this trend is particularly pronounced within the prime working age cohorts (25-34, 35-44, and 45-54), whereas recovery continues in the older age cohorts (55-64 and 65 and over). In contrast, for women, noticeable declines in both the labor force participation rates and employment rates are apparent in the 15-24 age cohort and the 65 and over age group.

The average monthly working hours for both men and women experienced a notable decline in 2020 compared to 2019. Men's average working hours hovered around 40.7 hours since 2020, further decreasing to 40.2 hours in the first quarter of 2023. Conversely, the average monthly hours worked for women exhibited recovery in 2021 and 2022 but saw a decline again in the first quarter of 2023. This reduction in working hours, despite improvements in the employment situation, can be attributed to two primary factors. First, there was a substantial increase in the number of workers forced to take temporary leave in 2020, coinciding with the onset of the COVID-19 pandemic. Although this number declined post-2020, it remained significantly higher than the 2019 level (refer to Table 3-3-3). Second, as part of the workstyle reform, the overtime work limit was imposed on small and medium-sized enterprises (SMEs) starting from April 2020. The upper limit for overtime work was set at 45 hours per

Table 3-3-3

The number of workers forced to take temporary leave and its proportion relative to the employed workforce (Kansai)

	total		male		female	
	number of workers	proportion	number of workers	proportion	number of workers	proportion
2019	27.8	2.6	10.5	1.8	17.3	3.6
2020	42.3	4.0	15.8	2.7	26.3	5.6
2021	33.8	3.2	13.0	2.3	20.5	4.3
2022	33.5	3.2	13.8	2.4	19.5	4.0
2023Q1	36.0	3.4	13.0	2.3	22.0	4.6

Note: Figures for 2019 to 2022 are annual averages of quarterly data. The number and rate of absences are expressed in thousands and percentages, respectively.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

month and 360 hours per year, as a general rule.

(2) Issues

While employment has rebounded from the impact of the COVID-19 pandemic, novel challenges have surfaced. One such challenge is the escalating labor shortage within the non-manufacturing sector. The second challenge is anticipated constraints on labor supply stemming from the continual decline in the working-age population.

1) Increased labor shortage within the non-manufacturing sector

Figure 3-3-1 illustrates the employment conditions D.I., an index quantifying the disparity between “Excessive employment” and “insufficient employment,” thereby reflecting the evaluative perspective on employment conditions in the Kansai region across various industries. A positive D.I. signifies that a higher percentage of firms perceive their workforce to be in surplus, whereas a negative D.I. suggests that a higher percentage of firms perceive their workforce to be in shortage. As illustrated, both the manufacturing and non-manufacturing industries are exhibiting a declining trend, with the exception of the year 2020, when the COVID-19 pandemic exerted its impact. Particularly noteworthy is the non-manufacturing sector, where the perception of a labor shortage

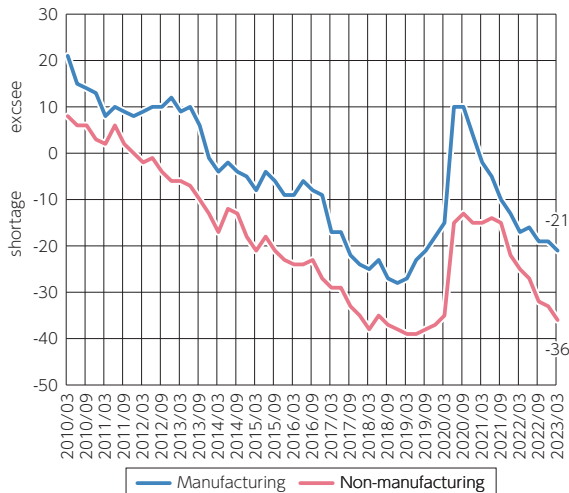


Figure 3-3-1

Employment conditions D.I. by Sector (Mar. 2010-Mar. 2023, Kansai)

Source: “Short-term Economic Survey of Enterprises in the Kinki Region,” Osaka Branch, Bank of Japan

has heightened since 2012, and the disparity with the manufacturing sector has expanded. In the March 2023 survey, the D.I. for the non-manufacturing sector stood at -36, significantly lower than the -21 recorded for the manufacturing sector.

To pinpoint industries in the non-manufacturing sector experiencing a substantial increase in labor demand, we analyzed trends in the number of new job openings by industry. Recognizing the influence of the labor market's size within each industry on the number of new job openings, we calculated the ratio of new job openings by industry to the number of workers in that industry. The trends based on these ratios are visually depicted in Figure 3-3-2.

From 2016 to 2019, prior to the COVID-19 pandemic, the top six industries based on the ratio of new job openings to the number of workers were medical care and welfare, other services, accommodations, eating and drinking services, information and communications, transportation and postal services, and living-related services and entertainment. Notably, only the medical and welfare and construction industries exhibited a sustained upward trend during this period.

In 2020, the impact of the COVID-19 pandemic prompted companies to curtail or suspend their hiring activities, leading to a substantial decline in the ratio of new job openings to the number of workers throughout nearly all industries

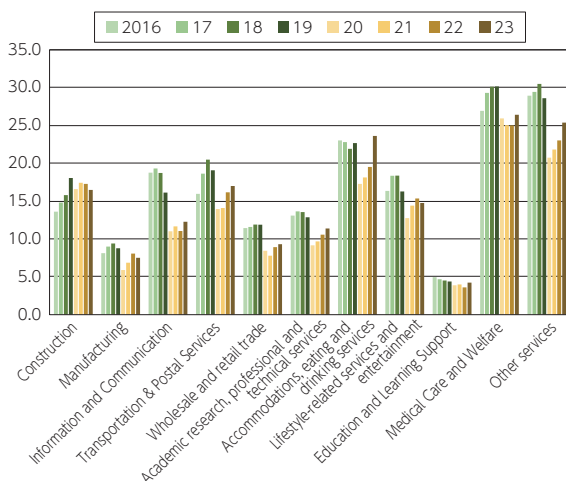


Figure 3-3-2

Ratio of new job openings by industry to the number of workers in that industry (Kansai)

Note: The number of new job openings by industry is the annual average of monthly data (January 2016-April 2023), and the number of workers by industry is the annual average of quarterly data.

Source: "Employment Security Service Statistics," Ministry of Internal Affairs and Communications; "Labour Force Survey," Statistics Bureau, Ministry of Internal Affairs and Communications

(year on year: -11% to -33%). The sole exception was observed in the construction industry, where the year-on-year decline was comparatively modest at -8%.

Following 2020, numerous industries witnessed a gradual recovery in the number of job openings. Notably, the accommodations, eating and drinking services industry experienced a substantial increase in the ratio of new job openings to the number of workers in 2023 (+21.0% year on year). This resurgence can be attributed, in part, to the swift rise in the number of foreign visitors to Japan following the easing of border control measures in October 2022. Consequently, the accommodations, eating and drinking services industry stands as the only sector to have fully recuperated to the 2019 level by 2023.

As of the first quarter of 2023, the six leading industries, based on the ratio of new job openings to the number of workers, comprise medical care and welfare; other services; accommodations, eating and drinking services; construction; transportation and postal services; and lifestyle-related services and entertainment.

In summary, robust labor demand characterized medical care and welfare, service industries involved in face-to-face interactions with clients, and transportation and postal services even before the advent of the COVID-19 pandemic. Notably, the accommodations, eating and drinking services sector exhibited notably robust growth in job openings in the most recent period. Additionally, the construction industry has displayed a consistent and resilient increase in labor demand, maintaining its upward trajectory and avoiding significant decline even during the COVID-19 pandemic.

2) Current and anticipated future conditions regarding constraints in labor supply

Although the population aged 15 and over in the Kansai region reached its zenith in 2012 and has since been on a downward trajectory, the count of the labor force has demonstrated a converse trend, experiencing growth since 2023 (refer to [Figure 3-3-3](#)). This shift can be primarily attributed to the heightened participation of women and the elderly in the labor market.

[Table 3-3-4](#) illustrates the disparity in the number of labor force participants at each specific point in time (by sex and age cohort) relative to the count five years prior.

The labor force participation rates within the age cohort of 25 to 64 have consistently displayed an upward trajectory over the past two decades. Notably, the engagement of women aged 25-34 in the labor market has exhibited a notable surge since the early 2000s, with their participation rate in 2005 being 7.3 percentage points higher than that of five years earlier. This surge is attributed

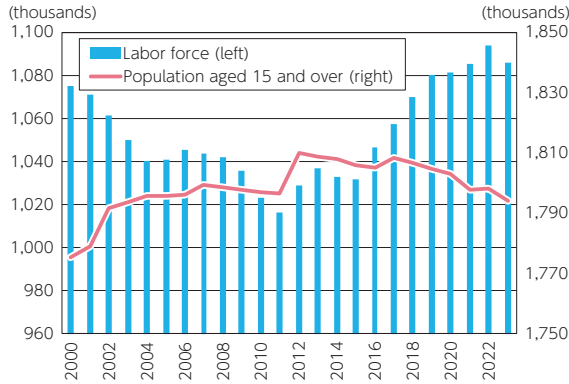


Figure 3-3-3 Population aged 15 and over and labor force (Kansai)

Note: Figures spanning from 2019 to 2022 represent annual averages derived from quarterly data, whereas figures for 2023 specifically pertain to the first quarter of that year.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

Table 3-3-4

Comparison of Labor Force Participation Rates at each specific point in time relative to the count five years prior (by sex and age cohort) (Kansai)

male						
	15~24	25~34	35~44	45~54	55~64	65 and over
2005	-10.1	-2.9	-0.7	-0.4	-2.1	-16.5
2010	-1.2	+1.2	-0.4	-0.4	+0.1	+0.2
2015	+1.8	-1.9	-1.1	-0.7	+3.1	+8.5
2020	+17.1	+1.1	-0.6	-0.6	+6.8	+13.1
female						
	15~24	25~34	35~44	45~54	55~64	65 and over
2005	-5.8	+7.3	+2.5	+1.5	+0.8	-8.3
2010	-4.3	+6.9	+5.2	+6.7	+5.9	+4.4
2015	+0.5	+4.6	+7.1	+6.7	+14.2	+21.3
2020	+16.8	+9.9	+8.8	+4.9	+19.5	+15.0

Note: Figures used in the calculations are annual averages of quarterly data. All figures are in percentages.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

to the implementation and amendment of the Child Care and Family Care Leave Law commencing in the 1990s, coupled with the establishment of daycare centers (Higuchi et al., 2016; Yamaguchi, Asai, and Kambayashi, 2018). The concerted efforts to encourage women to remain in the workforce post-child-birth, aided by developments such as the revision of the Child Care and Family Care Leave Law, the enforcement of the Women's Advancement Promotion Law, and a growing understanding of women's roles by companies, have contributed to a substantial increase in the labor force participation rates for women aged

35-44 and 45-54 since the late 2000s. Consequently, the upward trend in labor force participation rates persists for women aged 25-54, driven in part by further amendments to the Child Care and Family Care Leave Law, the enforcement of the Women's Advancement Promotion Law, and improved corporate understanding of women's roles and contributions.

Females aged 55-64 and 65 and above exhibited a discernible upward trajectory in their engagement in the labor market during the latter part of the 2000s, marking a notably steep ascent in the 2010s. This pattern was likewise discerned among males aged 55-64 and 65 and over. The impetus behind this trend appears rooted in the overhauls of the pension system in 1994 and 2000, coupled with the amendment of the Act on Stabilization of Employment of Elderly Persons in 2012 (Yamada, 2017; Kondo and Shigeoka, 2017). Following the pension system revision, the initiation age for the fixed-rate segment of Old-age Employees' Pension special benefits underwent incremental elevation from 60 to 65 between 2001 and 2013, with a subsequent increase for the remuneration-proportional segment spanning from 2013 to 2025. The rise in the commencement age for benefit receipt is anticipated to stimulate employment, given the diminishing pension income until that age. Moreover, the 2012 amendment to the Act on Stabilization of Employment of Elderly Persons mandated companies to retain employees up to the age of 65, affording workers the option to continue working until that age.

However, as depicted in [Figure 3-3-3](#), the pace of the increment in the labor force has decelerated since 2020. In the most recent first quarter of 2023, the female labor force participation rate rebounded to surpass the 2019 level, but only by a marginal +1.1%. The resurgence of women's labor force participation following the impact of the COVID-19 pandemic has been sluggish. Similarly, the growth in the rates of labor force participation for the 55-64 and the 65 and over age cohorts has attenuated, signaling a plateau in the engagement of the elderly in the labor market ([Figure 3-3-4](#)).

Beyond the stagnation in the labor participation of women and the elderly, the anticipated acceleration in the future decline of the working-age population is attributed to both a low birthrate and an aging society. Consequently, it is highly probable that labor shortages will exert an impact on supply regulations in the future. To discern the industries susceptible to such effects, we analyzed the age structure within each sector.

[Table 3-3-5](#) shows the demographic composition of the workforce in each industry for the first quarter of 2023. The industries with the lowest share of individuals aged 15-34 were other services, construction, and transportation and postal services, all registering below 20%. Conversely, the top three industries in terms of the proportion of workers aged 65 and over are other services,

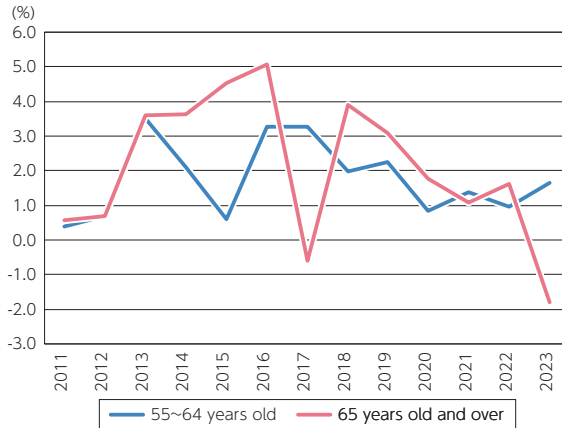


Figure 3-3-4 Year-on-year change in the labor force (Kansai)

Note: Figures for 2011 through 2022 represent annual averages derived from quarterly data, while figures for 2023 pertain specifically to the first quarter of the year.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

Table 3-3-5 Demographic composition of the workforce in each industry (Q1 2023, Kansai)

	15-34 years old	35-64 years old	65 years old and over
Construction	15.9	66.7	17.4
Manufacturing	27.3	64.2	8.6
Information and Communication	35.7	60.7	3.6
Transportation & Postal Services	17.2	72.4	10.3
Wholesale and retail trade	26.2	62.2	11.6
Academic research, professional and technical services	22.9	62.9	14.3
Accommodations, eating and drinking services	43.1	44.8	12.1
Lifestyle-related services and entertainment	30.3	48.5	21.2
Education and Learning Support	31.0	58.6	10.3
Medical Care and Welfare	23.1	65.3	11.6
Other services	13.7	63.0	23.3

Note: Units are expressed in percentages.

Source: Labour Force Survey, Statistics Bureau, Ministry of Internal Affairs and Communications

lifestyle-related services and entertainment, and construction.²⁾ The percentage of elderly workers in the other services and lifestyle-related services industry, it exceeds 20%, while in the construction industry, it is at 17.4%.

The social infrastructure established during the high-growth period is rapidly aging, and the construction industry anticipates a swift surge in the demand for labor to construct and uphold this infrastructure (Ministry of Land, Infrastructure, Transport and Tourism 2021a). With an aging workforce in the industry and a deficit of younger individuals to inherit and sustain these skills, there exists a shortage of human resources poised to carry the industry forward. This scenario implies imminent supply constraints for services and public investments crucial to maintaining the essential functions of daily life.

Currently, the transportation and postal service industries exhibit a high proportion of middle-aged workers. Consequently, the retirement of older workers is anticipated to have a minimal impact. However, the scarcity of young workers is projected to result in a substantial reduction in the workforce two decades from now.

2. Addressing the anticipated labor shortage problem in the future

As mentioned above, the sectors of medical care and welfare, accommodations, eating and drinking services, construction, as well as transportation and postal services presently confront labor shortages attributable to heightened demand, with certain industries inevitably encountering labor supply constraints due to a decline in the working-age population. To surmount these challenges, it is imperative to augment the labor force by enhancing the working environment, encompassing work styles. Equally crucial is the adoption of novel technologies to enhance labor productivity.

2) To discern the industries witnessing a progression in population aging, data from the 2020 National Census on the number of workers by industry (industry group, 4-digit) is employed, specifically focusing on the other services and lifestyle-related services and entertainment sectors. Within the other services industry, specifically in building maintenance services and guard services, employing 35.5% of the workforce, the percentages of workers aged 65 and over are notably high at 42.8% and 38.3%, respectively. Likewise, in the laundry, beauty, and bath services, encompassing approximately 50% of the workforce, 20.7% of the workers fall into the 65 and over age category.

(1) Enhancing the accession rate and attachment through the improvement of the work environment.

Figure 3-3-5 illustrates the accession and separation rates by industry for the first half of 2022 at the national level. Despite a considerable number of new job openings, the construction and transportation and postal services exhibit the lowest accession rates. Conversely, service industries involving face-to-face interactions with clients, such as accommodations, eating and drinking services (20.3%), lifestyle-related services and entertainment (14.2%), and other services (11.3%), continue to recover from the COVID-19 pandemic, securing the top three positions in employment rates. Nevertheless, these industries also demonstrate high separation rates (15.0%, 10.0%, and 11.1%, respectively), indicating a low level of worker attachment. Additionally, medical care and welfare rank among the top five in terms of separation rate, suggesting similarly low attachment levels.

The primary factor contributing to the diminished accession and separation rates in these sectors is the challenging working environment. Firstly, suboptimal working conditions are highlighted. As depicted in Figure 3-3-6, which illustrates the average number of paid vacations taken per worker and the average weekly working hours in each industry, construction, transportation and postal services, medical care and welfare, and service-oriented industries involving

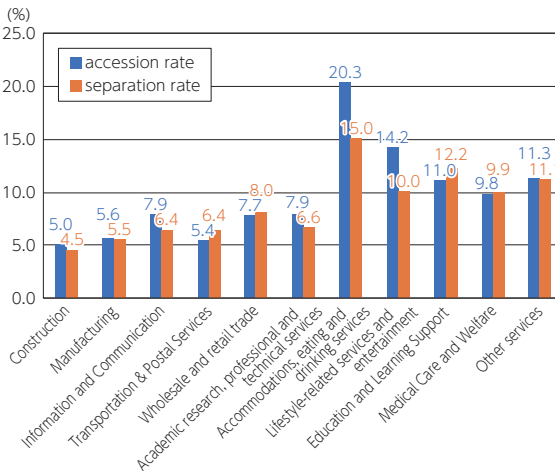


Figure 3-3-5

Accession and separation rates by industry (first half of 2022, Japan)

Note: Figures for 2023 through 2022 are annual averages of quarterly data; figures for 2023 are for the first quarter of 2023.

Source: "Survey on Employment Trends in the First Half of 2022," Ministry of Health, Labor and Welfare

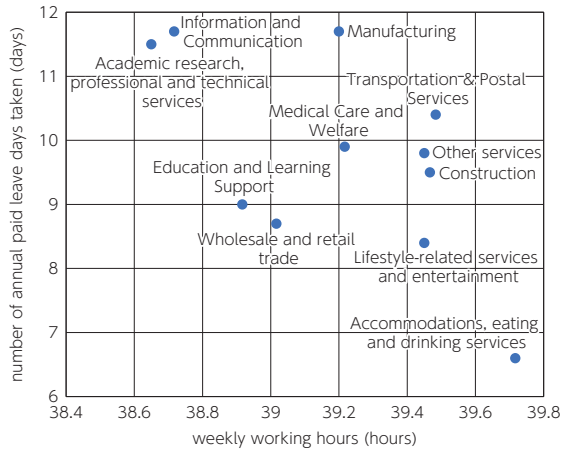


Figure 3-3-6

Average number of annual paid leave days taken and weekly working hours per worker (2021, Japan)

Source: Ministry of Health, Labour and Welfare, 2022 Comprehensive Survey of Working Conditions

face-to-face interactions with clients such as accommodations, eating and drinking services tend to exhibit extended working hours coupled with fewer days of paid leave taken compared to other sectors. This phenomenon is attributed to the prevalent practice of “nakanuke” in the medical, accommodations, eating and drinking services, and transportation industries, where workers experience prolonged work periods with extended breaks during periods of low activity in the middle of the day. Although workers are granted lengthy breaks during these low-demand periods, they are often tethered to work for an extended duration on the same day, making it challenging for them to avail themselves of leave. Furthermore, the construction industry has adopted a norm of working on holidays and maintaining prolonged working hours to meet construction deadlines.³⁾

Low wages constitute another contributing factor. Illustrated in Figure 3-3-7 are the earnings of ordinary employees, predominantly regular workers, and part-time employees, primarily non-regular workers. Throughout accommodation, eating and drinking services, lifestyle-related services and entertainment, other services, as well as transportation and postal services, wages fall below

3) As per the Ministry of Land, Infrastructure, Transport, and Tourism (2021b), the aggregate annual working hours for construction workers in FY 2020 exceeded those of all industries by 364 hours, constituting an approximately 20% increase. Furthermore, around 40% of engineers engaged in construction activities operate on a schedule that allows for only four or fewer days off within a four-week period.

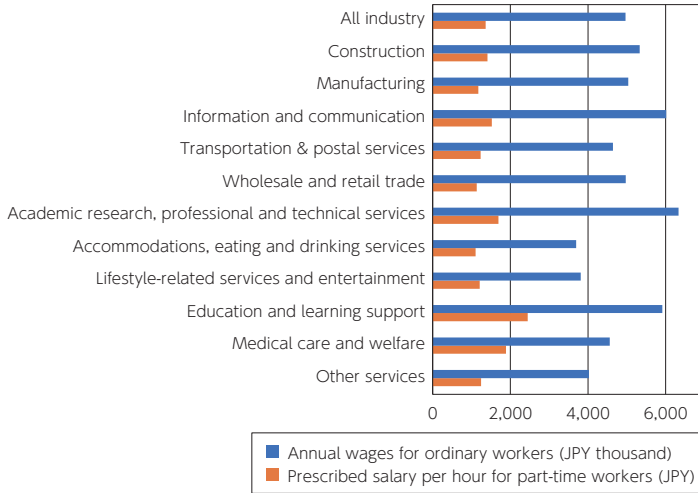


Figure 3-3-7 Wages by Employment Type by Industry (2022, Japan)

Note: "Part-time workers" are workers who have shorter prescribed working hours per day or the same prescribed working hours per day but fewer prescribed working days per week than ordinary workers at the same establishment. The annual wage of an ordinary worker is calculated as "cash paid on time" x 12 + "annual bonus and other special salary."

Source: "Basic Survey on Wage Structure," Ministry of Health, Labour and Welfare

the industry-wide average for both types of employment. Notably, wages in the accommodations and eating and drinking services industry rank as the lowest among both regular and part-time employment. Although wages in service industries with face-to-face interactions experienced a significant increase in 2022 due to a heightened labor shortage following the post-COVID-19 economic normalization (Nishioka, 2022), they remain relatively low compared to other sectors.

In summary, improvements in the working environment, including work-styles and wages, are essential to improve the job accession rate and attachment in these industries.

(2) Improving productivity by introducing new technologies

The incorporation of new technologies holds the potential to enhance productivity and mitigate labor shortages by elevating work efficiency and diminishing the need for manpower. Historically, the advent of microelectronics (ME) technology in the 1980s catalyzed the widespread adoption of industrial robots and machine tools in manufacturing settings. Concurrently, the introduction of office computers, word processors, and other office automation (OA) machines

revolutionized office work. This technological advancement led to significant labor savings, particularly in the manufacturing sector, where numerous production processes witnessed a reduction in personnel, accompanied by advancements in unmanned operations (Nakayama, 1987). Consequently, this transition resulted in heightened production volume and efficiency, all achieved without a corresponding increase in the workforce (New Energy and Industrial Technology Development Organization 2014).

In recent years, the advancement of Information and Communication Technology (ICT) has broadened the application of information devices, Local Area Networks (LANs), and the Internet. This evolution is exemplified by the systemization of diverse tasks, the automation of office work through Robotic Process Automation (RPA), and the emergence of smart factories leveraging Artificial Intelligence (AI) and the Internet of Things (IoT). A noteworthy trend involves the pursuit of new business models and enhanced customer value by optimizing business processes through the effective management and analysis of data stored in information devices.

The adoption of these innovative technologies not only enhances productivity by optimizing the efficient utilization of limited human resources, but also facilitates skill transfer and enhances the working environment, including workstyles.

(3) Examples

This subsection outlines instances of addressing labor shortages in the medical care and welfare, accommodations, eating and drinking services, transportation and postal services, and construction industries through the enhancement of the working environment and the adoption of new technologies (Table 3-3-6).

1) Medical care and welfare - Sompo Care Inc.

SOMPO Care initiated a demonstration experiment in July 2022 to assess the impact of introducing nursing care robots and information devices on staff workload and the quality of services at multiple nursing care facilities.⁴⁾ The results of the verification demonstrated that the implementation of nursing care robots not only reduced the work hours of staff members but also concurrently increased the time available for them to undertake actions aimed at enhancing

4) "DX in nursing care is a dream or an experiment," [in Japanese] Nikkei, November 22, 2022. (<https://www.nikkei.com/article/DGXZQOUA1102L0R11C22A1000000/> last viewed June 23, 2023)

Table 3-3-6

Examples of Working Environment Improvement and New Technology Introduction

Name	Initiative
Sompo Care Inc.	Demonstration experiments were conducted to alleviate staff workload through the utilization of nursing care robots, including a "sleep sensor" for remote monitoring of residents' sleep status and an "automatic position changer" designed to prevent bedsores. Furthermore, an "independence support application" was developed to predict patients' conditions by analyzing data such as patient care records in comparison with information accumulated from over 30,000 patients over the preceding years. This initiative represents an effort to transform the observation and prediction of users' conditions, traditionally reliant on the tacit knowledge of skilled staff, by harnessing the insights derived from nursing care data.
Jinya Co., Ltd.	A cloud-based system was implemented to centralize the management of information, encompassing customer relations, time and attendance tracking, and business analysis, with the aim of enhancing operational efficiency and fostering information sharing among employees. Additionally, service quality was elevated through the integration of sensors, devices, and IoT technology. The company underwent a shift in work allocation from a strict division of labor to a multitasking approach, minimizing unnecessary waiting times and reducing the duration during which employees were engaged in tasks. Moreover, the adoption of a three-day workweek not only heightened employee satisfaction but also led to a substantial reduction in employee turnover.
Sekisui House, Ltd.	The integration and restructuring of disparate systems and databases across departments enabled the efficient utilization of information, resulting in substantial cost reductions and productivity enhancements. Furthermore, the widespread adoption of iPads throughout the company allowed field employees to access the system and conduct work directly through these devices. This approach facilitated direct transitions between the field and home, leading to a significant reduction in overtime hours. To further enhance the working environment at construction sites, the company is actively engaged in the development and implementation of construction robots.
Yamato Transport Co., Ltd.	Since 2020, the company has been executing a "data-based management" strategy, enhancing on-site operational efficiency through data analysis and the integration of AI. A notable instance involves the application of machine learning technology to forecast cargo volumes at distribution centers three to four months in advance, allowing for the optimization of employee shifts and vehicle assignments based on these predictions. Additional initiatives comprise the deployment of logistics support robots to streamline sorting and loading operations, resulting in reduced manpower and heightened efficiency.

the quality of care.⁵⁾

This initiative stems from a pronounced labor shortage in the nursing care industry. In light of the outcomes of this demonstration project, the Ministry of Health, Labour, and Welfare is contemplating the possibility of revising the existing standard, currently set at one staff member per three patients.

SOMPO care has incorporated machines equipped with sensors, aiming to comprehensively understand users' conditions without imposing an additional

5) Report on the Project for Measuring the Effectiveness of Efforts to Improve Productivity through the Use of Nursing-care Robots," [in Japanese] Document from the 216th Subcommittee on Nursing-care Benefits, Council on Social Security, April 27, 2023 (<https://www.mhlw.go.jp/content/12300000/001091715.pdf> last viewed June 23, 2023)

burden on staff. Additionally, the company has developed an application that forecasts a patient's condition several months in advance by analyzing the patient's nursing care data in comparison with information from over 30,000 patients accumulated in the past. This initiative seeks to actualize the observation and prediction of a user's condition, traditionally reliant on the tacit knowledge of skilled staff, through the utilization of nursing care data. The anticipation is that preventing the deterioration of a patient's condition will alleviate the workload on staff and ultimately contribute to the mitigation of staff turnover.⁶⁾

2) Accommodation service - Jinya Co., Ltd.

In 2009, Jinya Corporation, a small ryokan (inn) situated in Tsurumaki Onsen, Kanagawa Prefecture, implemented a cloud-based system to efficiently centralize information, spanning from customer management to attendance and business analysis. This initiative aimed to enhance operational efficiency and facilitate the seamless sharing of essential information among employees. Additionally, the integration of IoT technology and equipment, including sensors and cameras, played a pivotal role in elevating service quality. Noteworthy applications included the automatic reading of license plate numbers for arriving cars and the monitoring of user numbers, water temperature, and the availability of towels in the public baths.

Simultaneously, there was a shift in the distribution of work at Jinya, transitioning from a strict division of labor, where each task had a dedicated employee, to a multitasking system. This approach involves one employee performing various tasks, ranging from front desk responsibilities to room cleaning. The adjustment aimed to minimize unnecessary waiting times and reduce the overall time spent by employees. Additionally, a three-day workweek was instituted, incorporating a variable schedule of 10 hours per day starting in 2020. This change led to a notable increase in employee satisfaction and a significant decrease in turnover.^{7), 8)}

6) "Supporting Unchanged Lifestyles with Digital x Expertise - Transformation into 'Predictive Care'," [in Japanese] SOMPO Holdings News Release, April 18, 2022 (https://www.sompo-hd.com/-/media/hd/files/news/2022/20220418_1.pdf?la=ja-JP last viewed June 23, 2023)

7) "Working with a 'Three-day Weekend' - How Will Working Standards Change? -," [in Japanese] Recruit Works Research Institute, April 3, 2023 (https://www.works-i.com/research/works-report/item/4dayww_2023.pdf last viewed June 23, 2023)

8) Survey on the Management Status of Small and Medium Inns," [in Japanese] Organization for Small & Medium Enterprises and Regional Innovation, March 2017 (https://www.smrj.go.jp/doc/research_case/h28_ryokan_full.pdf last viewed June 23, 2023)

3) Construction - Sekisui House, Ltd.

Commencing in 2010, Sekisui House initiated the “Mansion Information Project” aimed at integrating and restructuring independent systems and databases within each department to achieve company-wide optimization. By centralizing the management of scattered information, the company successfully utilized data and streamlined business processes, resulting in substantial cost reductions and improvements in productivity (Shishikura, 2019). Additionally, from 2013 onwards, the company actively promoted the use of iPads throughout its operations. Field employees leveraged iPads to enter and engage with the system, facilitating a direct transition from the field to home and significantly reducing overtime hours.⁹⁾

In 2018, the company unveiled a robot designed to assist in the installation of plasterboard on ceilings—a physically demanding task. Currently under development for future practical use, the introduction of this robot is anticipated to alleviate the workload of construction workers, potentially reducing it by up to 70%.¹⁰⁾

4) Transportation - Yamato Transport Co., Ltd.

Since 2020, Yamato Transport has actively pursued a “shift to data-based management” strategy, focusing on enhancing on-site operations through data analysis and the integration of AI. A notable application involves the implementation of machine learning technology to establish a system predicting package volume at distribution centers three to four months in advance. This predictive system enables the optimization of employee shifts and vehicle assignments based on the anticipated workload.¹¹⁾ Furthermore, to enhance safety and efficiency in sorting and loading operations, a logistics support robot was introduced at sorting sites to prevent accidents and reduce manpower. In November 2022, the company conducted a demonstration test of a personal delivery service using unmanned automatic delivery robots in Ishikari City, Hokkaido.

9) “17,000 iPads Utilized by All Employees, In-house Apps, 15 Hours Less Overtime per Month,” [in Japanese] Nikkei Computer, January 10, 2019.

10) “Robot Technology to be Introduced to Housing Construction Sites to Reduce Workload by up to 70% and Improve Construction Site Environment,” [in Japanese] Sekisui House, Ltd. press release, May 16, 2018 (https://www.sekisuihouse.co.jp/library/company/topics/detail/_icsFiles/afildfile/2018/05/16/20180516_2.pdf last viewed June 23, 2023)

11) “Yamato Transport Achieves Optimal Allocation of Management Resources with MLOps,” [in Japanese] ExaWizards Corporation, Case Study, August 3, 2022 (<https://exawizards.com/works/20297> last viewed June 23, 2023)

3. Summary

While the labor market in the Kansai region is gradually rebounding from the impact of the COVID-19 pandemic, the extent of recovery exhibits variations based on gender and age group. Women, predominantly constituting informal workers in service industries with face-to-face interactions, experienced more pronounced setbacks during the pandemic; however, they have largely recuperated. Conversely, for men, the pandemic's impact was comparatively milder than for women, but the recovery of the employment situation has decelerated, particularly within the prime working age cohort.

The current pressing concern revolves around the escalating labor shortage in the non-manufacturing sector. Industries such as medical care and welfare, services involving face-to-face interactions with clients, and transportation and postal services have witnessed substantial job openings, even predating the COVID-19 pandemic. Simultaneously, the construction industry, which remained relatively unaffected during the pandemic, has been experiencing a consistent and growing demand for labor. Concerns are emerging regarding potential labor supply constraints in certain services, including transportation and postal service, and construction in the future due to persistent labor shortages.

To address these challenges, it is crucial to prioritize the enhancement of the working environment, aiming to elevate the accession rate and attachment within the mentioned industries. An integral component of this improvement involves the introduction of new technologies. Technological innovation serves not only to boost labor productivity, but also to enhance working conditions and workstyles, as evidenced by several successful cases. Anticipated to gain further momentum in the future, this trend holds the potential to foster positive changes across various sectors.

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