Changes in Industrial Structure and Work Styles in Japan

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The purpose of this paper is to review the relationship between industry and the labor force by looking back historically at industries in Japan. In considering the relationship between industry and labor, the important factors are the homogeneity within each industry, the heterogeneity between industries, and the impact that the rise and decline of industries has on the labor force. In this paper, we examine the relationship between the transformation of the industrial structure and the labor force from the 1940s onward, distinguishing three periods: the 1940s–1960s, the 1970s–1980s, and the 1990s–2010s. Regarding the period of the 1940–1960s, we explore how the industrial structure transformation was brought about by the historical events: the wartime regime, postwar reconstruction, and high economic growth. After the rapid heavy industrialization under the wartime regime, there was a shift in the industrial structure centered around the emergence of the machinery industry during a time of high economic growth. After World War II, dealing with declining industries became an important issue for both the government and labor unions. During the period of high economic growth, as automation was introduced mainly in the process industry and its use became common in operations, the labor skills required changed over time. In the following 1970s and 1980s, post-industrialization progressed. With the introduction of microelectronics and office automation, technological innovation affected a wider range of industries and work styles. In addition, non-regular employment expanded after the 1970s, primarily in wholesale and retail trade, and restaurants. The 1990s–2010s were marked by the development of information technology and the expansion of the care service industry. As the service sector expanded, the share of non-regular employment continued to increase, but this growth has slowed down in recent years.

I. Introduction

The purpose of this paper is to review the relationship between industry[1] and the labor force by looking back historically at industries in Japan. There are various factors that define labor, including occupation, size of company, gender, age, educational attainment, forms of employment, ethnicity, and companies' home and location countries, as well as industry. This paper considers the impacts of industrial structure changes on labor.

The first important factor in considering the relationship between industry and labor is the homogeneity within each industry. In many countries that have been industrialized through manufacturers' shift to the core of industry, companies and workers have formed organizations within each industry. This assumes that the business environment and the technology used are homogeneous and that there is commonality in the way of working.

The second important factor is the heterogeneity between industries. In developed countries, modernization has been accompanied by the transition from the primary industry to the secondary and tertiary industries and the further differentiation and development in the tertiary industry. The labor skills required in the services industry, including face-to-face services, differ far from those required in the manufacturing industry. Amidst progress in informatization, further new skills and work styles are required.

The third important factor is the impact that the rise and decline of industries has on the labor force. The rise and decline of industries are divided into an industry's replacement of another industry and deindustrialization in which an industry in one country replaces its rival in another country. As the rise and decline of industries are natural in a capitalist economy, addressing declining domestic industries has been one of the key industrial policies since World War II.

The following analyzes labor in major Japanese industries in each period.

II. 1940s–1960s: Wartime regime and postwar reconstruction, high economic growth, and industrial structure transformation

We here review the characteristics of industries and work styles that symbolize the 1940s–1960s period from the perspectives of 1) the wartime regime and postwar reconstruction, 2) high economic growth, and 3) the routinization of industrial structure transformation. Specifically, we analyze 1) rapid wartime machinery industry expansion and industrial structure changes during postwar reconstruction; 2) transition from the light industry to heavy chemical industries and declining agricultural population; and 3) great progress in technological innovation in the manufacturing industry that produced structural changes in relations between industries, within each industry, and within individual companies, distinguishing employment as a major issue.

1. Wartime regime and postwar reconstruction

Let us examine changes in share of wartime manufacturing production by sector (Table 1). "Wartime" here refers to the period between the Second Sino-Japanese War (1937–1945) and World War II (1941-1945). The first important characteristic is a substantial shrinkage of the daily necessities sector as compared to the prewar average (1934–1936). Under the wartime regime, the shares of food and textile sectors, which are related to daily necessities, declined dramatically. Particularly, the share of the textile, which represented the largest industrial sector, decreased substantially from 31.3% before the war to 5.9% in 1945.

In the cotton-spinning industry, which experienced a particularly substantial decline, more than 60 companies before the war were integrated into the "big ten" spinners by 1943 due to the government's wartime industry realignment. In the final days of the war, cotton spinners' machines became subject to the metal provision order for weapon production. Their buildings that lost spinners were used for producing aircrafts and ships (Abe 2021, 50).

Table 1. Production share of manufacturing by sector (Before WWII to 1955)

(Unit: %)

	Before WWII	1940	1942	1945	1947	1950	1955
Food	10.7	9.1	7.7	5.3	10.1	12.6	18.2
Spinning and weaving	31.3	18.4	12.6	5.9	12.3	22.0	16.1
Sawing, plaining and wood products	2.3	3.8	3.6	5.0	9.8	4.4	4.8
Printing and bookbinding	2.0	1.3	1.3	1.0	2.1	2.6	2.8
Chemical	16.6	17.1	15.2	9.2	18.8	22.8	20.2
Ceramics	2.7	2.9	2.6	2.4	4.6	3.6	3.6
Metal	17.2	21.8	22.7	18.8	14.8	16.8	17.3
Machinery and apparatus	13.4	23.8	32.2	51.3	27.3	13.7	15.1
Others	3.8	2.0	1.9	1.0	0.3	1.5	2.0
Total (million yen)	10,828	27,092	32,039	43,966	281,108	2,167,579	6,217,760
Heavy industry	30.6	45.6	54.9	70.1	42.1	30.5	32.4
Heavy and chemical industry	47.2	62.7	70.1	79.3	60.9	53.3	52.6
Food and textile products	42.0	27.5	20.3	11.2	22.4	34.6	34.3

Source: Takeda 2007, Table 1-7 (pp. 42–43). Figures before 1947 are based on Bank of Japan n.d., "Honpo keizai tokei" [Economic statistic of Japan], and figures after 1950 are on Ministry of International Trade and Industry, 1961, "Kogyo tokei goju nen shi" [History of the census of manufactures].
Note: Data "before WWII" represent 1934–36 averages.

The second important characteristic is the expansion of heavy chemical and machinery industries. The production share for the machinery industry at the center of weapons production expanded from 13.4% before the war to more than 50% in 1945, representing the largest industrial sector. Metal and machinery production combined account for 70.1% of manufacturing production in 1945. This share failed to be topped even in 1960, indicating how rapid wartime industrial structure changes were (Takeda 2007, 42–43).

The rapid wartime changes in the industrial structure brought about considerable changes in structure of the labor force. After rising by 210,000 during the 1914–1920 World War I period and by 300,000 during the 1932–1936 period during the expansion of heavy chemical industries, the number of machinery industry workers largely increased by 1.3 million between 1936 and 1940, around the Second Sino-Japanese War, and by 2.22 million between 1940 and 1944, around the Pacific War (Sawai and Tanimoto 2016, 319).

Labor might have apparently moved from agriculture as the largest prewar industry, as well as textile and commerce industries. The labor mobility was accompanied by growth in women's labor in agriculture. From 1936 to 1944, the number of men in the agriculture and forestry industries decreased by 2.04 million, while the number of women in the industry increased again by 1.07 million. In the postwar era, the sector's share increased again by 2.64 million of men and 890,000 of women (Sawai and Tanimoto 2016, 361).

2. High economic growth

Japan's high economic growth generally refers to the 1955–1973 economic expansion period when high economic growth rates were realized. Regarding the analysis of the industry-labor relationship, the first attention-attracting point of the period is industrial structure transformation, including heavy chemical industries' development into Japan's industry leader in tandem with the decline of the textile industry, known as the prewar industry leader. From 1965, production goods producers, such as giant steelworks and large-capacity thermal power stations, as well as automobile and electrical appliance industries as consumer goods producers, became internationally competitive (Hazama 1994, 9). Second, the industrial structure transformation was accompanied by labor force growth amidst the sharp population expansion (from some 72 million in 1945 to about 104 million in 1970) and by qualitative labor force change through educational reforms to continuously improve educational

attainment. The qualitative labor force change and technological innovation as the most important factor behind high economic growth were peculiar to economic growth.

In the 1955–1970 high economic growth period, employment decreased by approximately 6 million in the primary industry while increasing by 8.5 million in the secondary industry and by 10.4 million in the tertiary one (Table 2). The 1955–1970 period featured a decline in the number of self-employed and family workers, indicating an increase in employees (Table 3). However, these changes were attributable primarily to drops in self-employed and family workers in the agriculture and forestry industry. Manufacturing and services industries in a wide sense showed a slightly different trend. While self-employed and family workers decreased sharply in the agriculture and forestry industry, self-employed workers increased in manufacturing, wholesale and retail trade, eating and drinking services, finance and insurance, and real estate industries. In the services industry, both self-employed and family workers increased (Sawai and Tanimoto 2016, 424–425).

Among manufacturers, the textile industry posted a decrease in its share of employment since 1965 as shown by Table 2, while the machinery industry raised its employment share sharply from 3.1% in 1955 to 7.4% in 1970, winning the highest share among the industrial divisions (Okazaki 1996). Its employment increased by 2.64 million during the 1955–1970 period. In the machinery industry, small, medium, and micro enterprises were then increasing amidst the repetition of launches and bankruptcies and organized into multilayered supplier systems, contributing to high economic growth (Hazama 1994; Ueda 2011).

Table 2. Employment structure by industry (1940–1975)

(Unit: % or 1,000 persons)

	Employment share							Change					
	1940	1950	1955	1960	1965	1970	1975	1940-50	1950-55	1955-60	1960-65	1965-70	1970-75
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3,143	3,635	4,458	3,914	4,477	905
Primary industry	44.3	48.3	41.0	32.6	24.6	19.4	13.9	2,816	-1,097	-1,872	-2,501	-1,651	-2,718
Secondary industry	26.0	21.9	23.5	29.2	32.0	34.0	34.0	-631	1,408	3,542	2,481	2,464	341
Mining	1.8	1.7	1.4	1.2	0.7	0.4	0.3	-7	-56	3	-206	-110	-84
Construction	3.0	4.3	4.5	6.1	7.1	7.6	9.0	550	251	897	724	540	808
Manufacturing	21.1	16.0	17.6	21.8	24.2	26.0	24.8	-1,174	1,213	2,643	1,962	2,034	-383
Food	1.4	2.2	2.1	2.1	2.3	2.1	2.1	325	37	94	200	-20	40
Textile	3.9	3.1	3.2	3.2	3.0	2.7	2.2	-158	153	134	51	-17	-287
Metal	1.4	0.9	0.9	1.4	1.5	1.5	1.4	-129	33	241	86	108	-37
Metal products	0.7	0.7	1.0	1.5	2.0	2.5	2.4	24	139	279	270	354	-2
Machinery	6.4	2.7	3.1	4.9	5.9	7.4	7.1	-1,098	237	944	651	1,042	-101
Others	7.3	6.3	7.3	8.7	9.5	9.8	9.6	-139	613	951	704	567	4
Tertiary industry	29.7	29.8	35.5	38.2	43.4	46.7	52.1	958	3,324	2,788	3,935	3,66	3,282
Wholesale and retail trade	12.6	11.1	13.9	15.8	18.0	19.3	21.4	-135	1,510	1,437	1,654	1,497	1,305
Finance and Insurance	0.8	1.0	1.5	1.6	2.0	2.1	2.6	74	231	124	256	146	295
Transport and communications	4.2	4.4	4.6	5.0	6.0	6.2	6.4	205	223	396	647	371	158
Services	8.9	6.5	8.4	10.2	11.0	12.1	14.4	-577	962	1,160	809	1,056	1,332
Others	3.1	6.7	7.1	5.6	6.4	7.0	7.2	1,390	399	-329	569	596	193

Source: Okazaki 1996, Table 4 (p. 73). Figures are based on Toyo Keizai Shinpo-sha, ed., 1991, "Kanketsu showa kokusei soran" [The comprehensive census of Japan in the Showa era], vol. 1.

Table 3. Number of employed persons by industry and employment status

(Unit: 10,000 persons)

	Self-employed worker	Family worker	Employee	Total	Self-employed worker	Family worker	Employee	Total	Self-employed worker	Family worker	Employee	Total
	All industries				Agriculture and forestry				Non-agriculture and forestry			
1955	1,040	1,385	1,690	4,115	533	1,027	44	1,604	508	358	1,646	2,512
60	1,033	1,151	2,273	4,457	508	820	65	1,393	524	331	2,208	3,063
65	968	992	2,783	4,743	441	673	41	1,155	528	320	2,742	3,590
70	977	805	3,306	5,088	363	451	29	843	614	354	3,277	4,245
75	939	628	3,646	5,213	303	286	29	618	637	343	3,617	4,597
80	951	603	3,971	5,525	253	249	30	532	698	354	3,941	4,993
	Manufacturing				Wholesale and retail trade, eating and drinking places, Finance and insurance, and Real estate				Services			
1955	109	92	555	756	212	191	312	715	130	46	274	450
60	94	64	793	951	230	191	427	848	133	46	373	552
65	103	67	987	1,157	213	177	566	956	133	44	450	627
70	149	85	1,144	1,378	226	186	731	1,143	143	49	558	750
75	135	72	1,138	1,345	243	185	868	1,296	146	50	659	855
80	161	71	1,135	1,367	252	184	1,003	1,439	159	54	788	1,001

Source: Sawai and Tanimoto 2016, Table 6-23 (p. 424). Figures are based on Toyo Keizai Shinpo-sha, ed., 1991, "Kanketsu showa kokusei soran" [The comprehensive census of Japan in the Showa era], vol. 1 (pp. 74–78), which was originally from the Statistics Bureau of the Ministry of Internal Affairs and Communications, 2013, *Labour Force Survey*.

3. Industrial structure transformation

The high economic growth period featured industrial structure transformation in which some industries' expansion was combined with the decline of the textile industry, including spinning as the biggest modern industrial sector before the war, and with a sharp reduction of coalmines through an energy policy turnaround. Regarding the impact of industrial structure transformation on labor, the coal industry's decline in the late 1950s led to harsh labor-management conflicts, such as the 1960 Mitsui-Miike Struggle, largely affecting rural economies. The impact of cotton spinning's decline differed far from that of the coal industry's setback. This was because the cotton-spinning and coal industries had different employment share and cotton-spinning factories were located more evenly nationwide than coalmines (Abe 2021, 63).

Technological innovation in the 1960s featured automation at electricity, chemical and other production sites. From an earlier stage, workers in process industries engaged in monitoring meters for equipment to quickly find problems and anomalies. As automation helped to increase production process scales as well as production, in-house education made progress to enable workers to gain knowledge for controlling production equipment. The development of multiskilled workers was promoted to keep capacity utilization rates high. When automation was introduced, various problems needed to be resolved. As production was stabilized, however, production operations were divided into complex decision-making and tedious management. In such labor environment, labor management gave priority to assessing the attitudes and capabilities for stable working (Shiba 1961; Matsushima 1962; Hazama 1963, 1994).

In the high economic growth period, business environment differences between industries emerged, leading

working conditions to differ by industry. In response, each industry organized its *sangyo-betsu ro-shi kaigi* (respective labor-management congress) from the late 1960s. This trend later spread to many industries. Such labor-management practices indicate that labor and management became conscious of sharing business environment problems on an industry-by-industry basis (Koshiro and JTUC Research Institute for Advancement of Living Standards 1995, 429).

III. 1970s–1980s: Post-industrialization, growing technological innovation and expanding non-regular employment

This section summarizes the characteristics of symbolic industries and work styles in the 1970s–1980s from three aspects: 1) post-industrialization, 2) growing technological innovation, and 3) expanding non-regular employment. Post-industrialization was symbolized by the expansion of the tertiary industry or the expansion of service economy. Growing technological innovation was symbolized by the introduction of microelectronics and office automation technologies. Expanding non-regular employment was related partly to post-industrialization and a rise in women's share of the labor force.

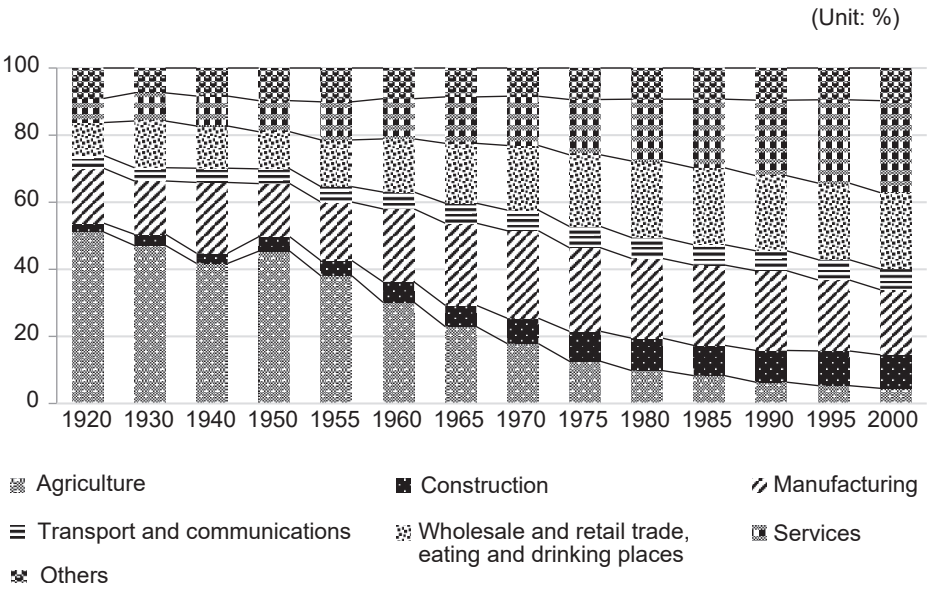
1. Post-industrialization

Post-industrialization generally refers to social and economic transformation where manufacturing replaces the industry core, which is industrialization ("*kogyoka*" or "*sangyoka*," see note 1), and then tertiary sector, exemplified by commerce and services, takes over its place. While post-industrialization is often linked to computer technology development and characterized as the rise of the knowledge society (Drucker 1969; Hayashi 1969; Bell 1973; Uchida 1975), computer technology impacted not only the tertiary industry but also manufacturing, as indicated by the abovementioned automation and as described later.

As symbolized by the term "services economy," post-industrialization also represents a shift from the society dominated by industries for developing, manufacturing, and selling goods (manufacturing, and wholesale and retail trade) to the society characterized by the increasing presence of the services industry for developing and marketing intangible services. The shift is clearly indicated by the chronological trend of employment share by industrial division (Japan Standard Industrial Classification before the revision in March 2002)[2], based on the *Population Census* (Figure 1).

The employment share for "manufacturing" in all industries continued to increase from 1950 to 1970 before turning downward. The share decreased persistently from 26.1% in 1970 to 19.4% in 2000. The employment share for "wholesale and retail trade, eating and drinking places" continued to rise from 1950 to 1985 before leveling off or falling slightly. The share dropped from 22.9% in 1985 to 22.7% in 2000.

The employment share for "services" continued to increase from 1920 to 2000, but was limited to 14.6% in 1970, below 26.1% for "manufacturing" and 19.3% for "wholesale and retail trade, eating and drinking places." The share for "services" rose to 22.5% in 1990, slightly higher than 22.4% for "wholesale and retail trade, eating and drinking places" and to 24.8% in 1995, above 21.1% for "manufacturing." "Wholesale and retail trade, eating and drinking places" and "services" are both classified as the tertiary industry. As seen by industrial division, the employment share for "wholesale and retail trade, eating and drinking places" declined in line with service economization. Since the 1970s, employment has structurally shifted from manufacturing tangibles to sell them through goods-dominant logic (*monozukuri*) to creating intangibles to through service-dominant logic (*kotozukuri*). Communications with customers are relatively important in "services," as well as "wholesale and retail trade, eating and drinking places." This implies an increase in employed workers who engage in "emotional labor" (Hochschild 1983; Ishikawa and Murofushi 2000), which requires controlling reacting emotions that occur when dealing with customers.



Source: Created by the authors based on the Statistics Bureau of the Ministry of Internal Affairs and Communications, *Population Census*.
Note: Industries are according to the division of the Japan Standard Industrial Classification, which has been revised accordingly. This paper uses the classification in the most suitable revision for each analysis.

Figure 1. Employment share by industry (men and women, 1920–2000)

2. Growing technological innovation

In the 1960s, technological innovation including computerization centered on iron and steel, thermal power generation, petrochemical, and other process industries with large plants. From the 1970s to the 1980s, micro-electronization (ME) made progress in processing and assembly industries, while office automation was promoted for office and reception work. The following reviews work style changes brought about by technological innovation during the period, based on Ogawa (2012) and Yamashita (2015).

Micro-electronization refers to the diffusion of computer-equipped machines for manufacturing through the miniaturization of electronic devices amid semiconductor technology advancement. Such machines include numerically controlled (NC) machine tools, computer-aided design (CAD) systems, computer-aided manufacturing (CAM) systems, and computer-integrated manufacturing (CIM) systems.

Micro-electronization forecasted a concern that skilled workers adapted to computer operations and those engaging in simple auxiliary jobs would be bipolarized. Generally, however, such differentiation has not been seen. Engineers played a great role in the initial micro-electronization phase. In line with later progress in micro-electronization, however, computer programming, maintenance, and operations were transferred to skilled workers. These workers were then required to have knowledge-based skills on the premise of job simplification and standardization. At smaller business establishments, skilled workers were less required to maintain and operate microelectronic systems. This means that the bipolarization was likelier at small and medium-sized business establishments and enterprises (Ito 1988).

Micro-electronization enabled the flexible limited production of wide-ranging products responding to market requirements, contributing to expanding manufacturing in Japan (Yamashita 2002). It must be noted that micro-electronization has not necessarily made manual skills unnecessary (Koseki 1997).

While manufacturing's share of total employment in Japan turned down in the 1970s, manufacturers boasted

their high international competitiveness through micro-electronization in the 1970–1980s period, with Japanese production systems attracting attention. In the mid-1980s, frontline workers' small-group quality circle (QC) activities to solve business problems peaked mainly among manufacturers in Japan (Ogawa 2020). Ogawa (2022) details the history of small-group activities at Japanese companies.

Symbolizing office automation were automatic ticket gates for railways (transport) and the financial industry's cash dispensers (CDs) and automatic teller machines (ATMs). Regarding office work, personal computers began to be used for document preparation, computing, and database management. Office automation was exploited to streamline reception and office work.

3. Expanding non-regular employment

Since the 1970s, the diversification of employment has made progress, expanding non-regular employment in Japan. Non-regular employment's share of total employment has increased both for men and women, but the share for women has been higher than for men.

Figure 2 shows the trend of non-regular employees' share of all employees other than board members by industrial division from 1982 to 1997, based on the *Employment Status Survey*, the most chronologically retroactive statistics among relevant surveys. It covers five industries ("construction," "manufacturing," "transport and communications," "wholesale and retail trade, eating and drinking places," and "services") in which the number of employees (including both men and women) other than board members continuously exceeded 3 million, of industries in which non-regular employment shares were consistent throughout the survey period.

Only in the "construction" industry, the non-regular employment share for the total employees, for men, or for women decreased throughout the survey period. In other four industries, the non-regular employment share

Source: Created by the authors based on the Statistics Bureau of the Ministry of Internal Affairs and Communications, *Employment Structure Survey*.
Notes: 1. Figures for 1982 are total of "part-time workers, *arbeit* (temporary workers)" and "*shokutaku* (entrusted employees), etc. and other"; for 1987 and 1992 are total of "part-time workers," "*arbeit*," "*shokutaku*, etc.," "dispatched workers," and "other"; and for 1997 are total of "part-time workers," "*arbeit*," "*shokutaku*, etc.," "dispatched workers from temporary labour agencies," and "other."
2. Figures between 1982 and 1992 are "employees excluding executives of private company or corporation."
3. Figures for 1982 are "wholesale and retail trade."

Figure 2. Non-regular employees'*1 share of all employees excluding executives*2 by industry (1982–1997)

followed an uptrend throughout the period (the share for women in the "manufacturing" industry decreased slightly from 1987 to 1992), indicating the same trend as for "all industries." In all the five industries, however, the non-regular employment share for women was higher than for men.

The non-regular employment shares for total employees and women in "wholesale and retail trade, eating and drinking places," were higher than in other four industries. The non-regular employment share of the industry for women in particular was as high as 42.5% in 1982, 50.4% in 1987, 52.7% in 1992, and 60.9% in 1997. While women's share of the total labor force turned upward in the 1970s, the so-called housewife part-timers, who work to supplement the family income, accounted for a considerable portion of the increased share.

Figure 2 symbolically indicates that "wholesale and retail trade, eating and drinking places," including chain stores, served as a major employer of housewife part-timers.[3] Although non-regular employees mostly engage in auxiliary jobs, employers have been required to simplify and standardize essential jobs and streamline capacity development in order to expand the use of non-regular employees. Although chain stores employed skilled meat and fish processors in their initial development stage, stores themselves promoted the simplification, standardization, and manualization of such processing jobs in the 1970s-1980s. Through the internalization of skill development, housewife part-timers and other non-regular employees have been allowed to undertake the essential jobs (Honda 2010, 71–81).[4]

Given that non-regular employment has expanded mainly in the tertiary industry, it may be one-sided to depict the post-industrialization society as a knowledge society. The post-industrialization society can be described as a society in which companies try to enhance business management by applying job simplification and standardization in the manufacturing industry to the tertiary industry.

IV. 1990s–2010s: Information technology development, care service industry expansion, and growing non-regular employment

This section summarizes the characteristics of symbolic industries and work styles between the 1990s and the 2010s into three elements: 1) information technology development, 2) care service industry expansion, and 3) growing non-regular employment. Information technology development is symbolized by the generalization of information technology (information and communications technology) use. The care service industry expansion refers to the expansion of childcare, nursing care, and other care services and an increase in the number of employees for these care services. The growing non-regular employment refers to the non-regular employment expansion continued from the 1970s–1980s period.

1. Information technology development

Since the 1990s, personal computers and mobile terminals have widely diffused, leading to the generalization of the use of websites, e-mails, social networking services, and other information technologies, or information and communications technologies.[5] Although the development of Internet and e-mail technologies' predecessors started in the 1960s, these technologies were made available for a wide range of people in the 1990s when easily handled operating systems were installed in personal computers.

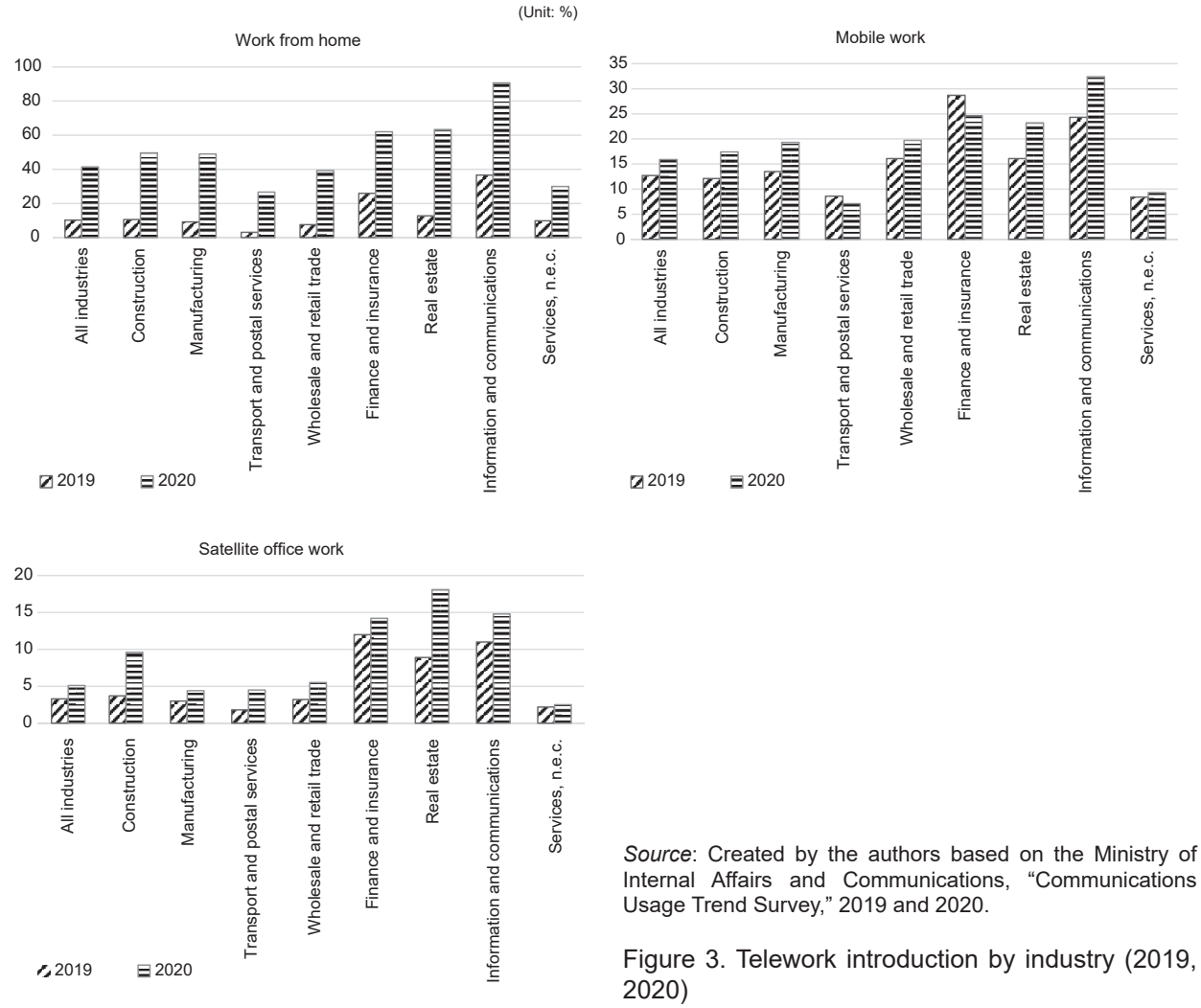
Internet diffusion has allowed people to easily acquire and send information without visiting relevant locations or depending on mail and make information search routine. It has also diversified communication means to include not only the communication of information to an unspecified number of people from media and other specific agents, but also telephone and other remote simultaneous person-to-person communications, e-mail and other remote non-simultaneous communications among multiple parties, and websites and social networking services that enable anyone to send information to a large number of people.

Since the 1990s, personal computers have replaced handwriting and word processors as a means to prepare

documents. In addition to electronic calculators, spreadsheet software has been utilized widely. Presenters can now use personal computers to project not only paper documents but also electronic documents prepared with presentation software, without depending on traditional overhead projectors. Supported by the development and introduction of various software applications, personal computers have turned around clerical work and business communications and taken advantage of their efficient multifunctionality to become an indispensable business tool.

The period since the 1990s has also been characterized by progress in the utilization of mobile communications. Although mobile communications have a long history, mobile phones including personal mobile phone systems have widely diffused since the 1990s when telecommunications deregulation and the reduction of terminals' size and weight made progress. Mobile phone diffusion has allowed people to talk with anyone at any location without searching for pay phones or lining up in front of them. As mobile phones have become multifunctional and smartphones have become available, people can do more business on the move. Over-the-counter services using touch-screen tablet computers have also spread.

However, responses to information technology development have differed by industry. Figure 3 indicates how companies introduced telework in 2019 and 2020, based on the "Communications Usage Trend Survey" both by the Ministry of Internal Affairs and Communications.[6] It classifies telework into three categories – work from home, mobile work, and satellite office work, showing the status of telework introduction in survey target



Source: Created by the authors based on the Ministry of Internal Affairs and Communications, "Communications Usage Trend Survey," 2019 and 2020.

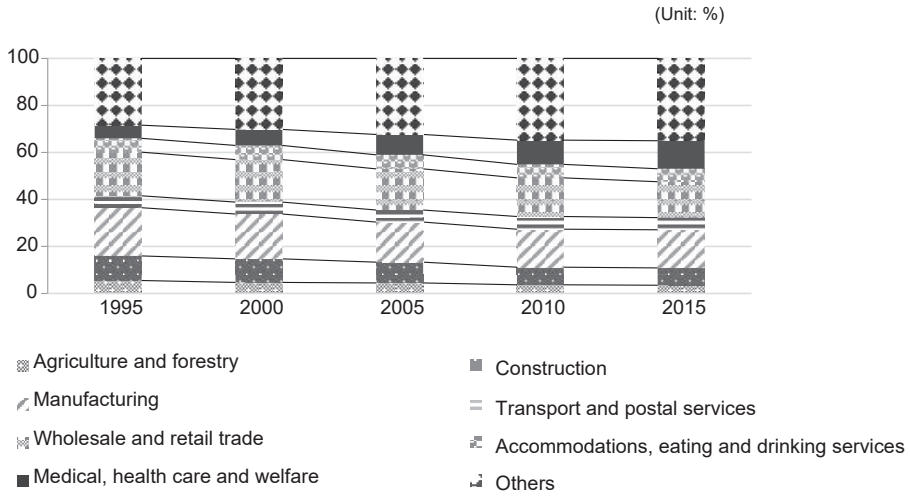
Figure 3. Telework introduction by industry (2019, 2020)

industries. Although 2020 is not covered by the target period for this paper, we provide data for the year to consider the impact of COVID-19.

In 2019, the "mobile work" introduction rate in all survey target industries was 12.7%, higher than the "work from home" introduction rate at 10.2%. In 2020, the rate for "work from home" increased substantially to 41.4%, surpassing 15.9% for "mobile work." While COVID-19 worked to substantially raise the overall telework introduction rate, the rise for "work from home" was particularly remarkable. Teleconferencing software was used to spread workers' conference participation from home. The introduction rate for "satellite office work" was lower than for the other two categories, standing at 5.1% for all target industries in 2020. In 2020, the "information and communications" industry posted the highest "work from home" introduction rate among industries, at 90.6%, followed by 63.3% for "real estate" and 62.0% for "finance and insurance." The rate was as low as 29.9% for "services, etc." and 26.6% for "transport and postal services." The telework introduction rate was higher for industries that make remote work available and have more office work. This means that the rate is lower for industries that give priority to face-to-face work or direct equipment operations at work sites. The "real estate" posted the highest "satellite office work" introduction rate in 2020, at 18.1%, possibly attributing to the fact that satellite office development has been undertaken frequently by the industry. We will have to watch medium- to long-term impacts of COVID-19 on future work styles, including whether telework will take root at Japanese companies or end up as a temporary practice.

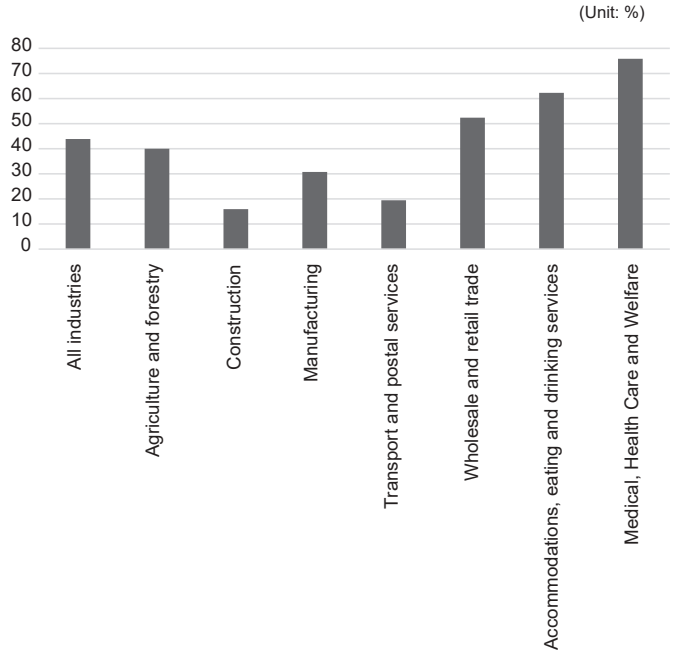
2. Care service industry expansion

Childcare and nursing care industry expansion is cited as a trend to characterize the period from the 1990s. In response to the rise and diversification of childcare needs against the backdrop of an increase in women's share of the labor force, the Child Welfare Act was revised in 1997 to transition childcare center entry from an administrative safeguarding system to a selective utilization system. The establishment of the Long-Term Care Insurance Act in 1997 and the creation of a long-term care insurance system in 2000 also transitioned elderly nursing care from an administrative safeguarding system to a contract-based facility utilization system. As



Source: Created by the authors based on the Statistics Bureau of the Ministry of Internal Affairs and Communications, *Population Census*.
Note: Industries are according to the division of the Japan Standard Industrial Classification.

Figure 4. Employment share by Industry (men and women, 1995–2015)



Source: Created by the authors based on the Statistics Bureau of the Ministry of Internal Affairs and Communications, *Population Census*.
Note: Industries are according to the division of the Japan Standard Industrial Classification.

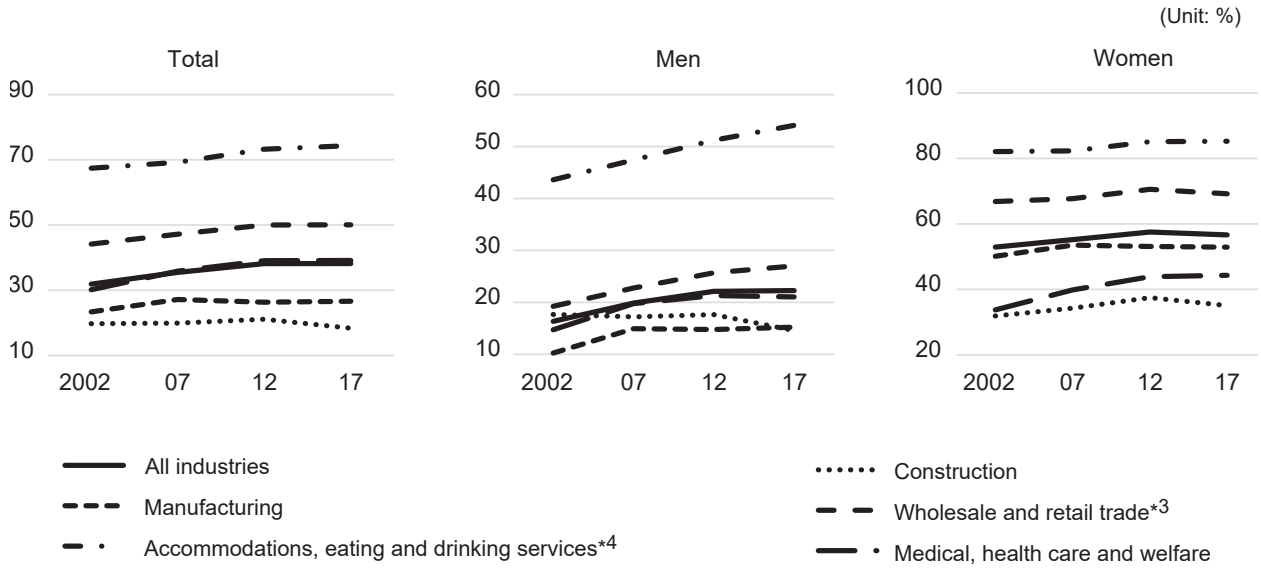
Figure 5. Women's employment share by Industry (2015)

business operators increasingly participated in childcare and nursing care services under deregulation, the so-called socialization of care made progress. The chronological trend of an employment breakdown by industrial division (Japan Standard Industrial Classification after the November 2007 revision)[7] based on the *Population Census* indicates the expansion of the care service industry from the 1990s (Figure 4). The employment share of the "medical, health care and welfare" industry, including care service industry, increased persistently from 5.6% in 1995 to 11.9% in 2015. The shares for "manufacturing" and "wholesale and retail trade" were high but in decline. The employment share for "manufacturing" dropped from 20.5% in 1995 to 16.2% in 2015. The share for "wholesale and retail trade" declined from 18.6% in 1995 to 15.3% in 2015.

Women account for a high share of employment for the care service industry and other face-to-face services. Figure 5 shows women's employment shares in 2015 by industrial category indicated in Figure 4. The share of women accounted for as much as 75.9% of employment for "medical, health care and welfare," which was remarkably higher compared with that of other face-to-face-service-related industries such as "accommodations, eating and drinking services" (62.3%) and "wholesale and retail trade" (52.4%).

3. Growing non-regular employment

Non-regular employment increased in the period from the 1990s as well as the 1970s–1980s period. Figure 6 shows the trend of non-regular employees' share of all employees other than board members by industrial category from 2002 to 2017, based on the *Employment Status Survey* used for Figure 2. This covers five industries ("construction," "manufacturing," "wholesale and retail trade," "accommodations, eating and drinking services," and "medical, health care and welfare") in which the number of employees (including both men and women) other than board members continuously exceeded 3 million, of industries in which non-regular employment shares were consistent throughout the survey period.



Source: Created by the authors based on the Statistics Bureau of the Ministry of Internal Affairs and Communications, Employment Status Survey for each year.
Notes: 1. Figures for 2002 are total of "part-time workers," "*arbeit* (temporary workers)," "dispatched workers from temporary labor agencies," "contract employees or *shokutaku* (entrusted employees)," and "other"; for 2007 are total of "part-time workers," "*arbeit*," "dispatched workers from temporary labour agencies," "contract employees," "*shokutaku*," and "other."
2. Figures between 2002 and 2017 are "employees excluding executives of company or corporation."
3. Figures for 2002 and 2007 are "wholesale and retail trade."
4. Figures for 2002 and 2007 are "eating and drinking places, accommodations."

Figure 6. Non-regular employees'*1 share of all employees excluding executives*2 (2002–2017)

In "accommodations, eating and drinking services" and "wholesale and retail trade," non-regular employment shares for the total employees, for men, or for women were higher than in the other industries. An apparent reason for higher non-regular employment shares in these industries may be that demand for services or goods is vulnerable to daily, weekly, or seasonal peak and off-peak changes. The non-regular employment share for "medical, health care and welfare" was lower than for the two industries. For women, the non-regular employment share for "medical, health care and welfare" was lower than for "manufacturing."

As far as indicated by this figure, an increase in the non-regular employment share as a whole has decelerated since the 2010s. The share for men and women for all industries stood at 38.2% in 2012 and 2017. The share rose slightly from 22.1% in 2012 to 22.3% in 2017 for men and fell from 57.5% to 56.5% for women. Whether the non-regular employment share will decelerate growth, turn down, or accelerate growth should be watched in the future.

V. Conclusion

This paper analyzed the industry-labor relationship in line with standard industry classification. In recent years, however, trends outside such industry framework are exerting influence on work styles. In the first place, specific industries alone rarely expand in the overall industry development process. Some industries' cooperative relations with others have driven economic growth. For instance, the spinning industry, which led the industrial revolution, was based on and interrelated with the progress of energy, raw materials, distribution, and other industries to produce economic development.

Recent years have been characterized by the transformation of industries' nature through such inter-industry

cooperation, information technology development, and further service economization. As production technologies in manufacturing have changed through information technology development, the skills required for employees are changing. The creation of businesses to contribute to resolving problems for individual customers—in other words, "transformation" of manufacturing industry to service industry—has been remarkable. Conversely, even tertiary industry players utilize production and information technologies to make work standardization, automation, and other streamlining efforts, which all originate from manufacturing. In such situation, we need to observe how labor-intensive industries—that are often seen in service industry and depend heavily on non-regular employment—would change and influence work styles. How will industry transformation influence work styles? Approaches to track such dynamic transformation is required for labor research.

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Notes

1. The English word "industry" means mainly 1) diligence or labor, 2) manufacturing, and 3) economic activity in a particular field. The Japanese corresponding word "*sangyo*" does not mean 1) diligence or labor. The English word "industrialization" is usually translated into "*sangyoka*," or used as "*kogyoka*" referring to 2) manufacturing. Note that, when "*sangyo*" is combined with specific industries such as music or tourism ("*ongaku sangyo*" or "*kanko sangyo*," respectively), the term means 3), not 2). For the concept of "industry," see Onozuka (2018, 208–210).
2. The 14 divisions of the Japan Standard Industrial Classification (before the March 2002 revision) were "agriculture," "forestry," "fisheries," "mining," "construction," "manufacturing," "electricity, gas, heat supply and water," "transport and communications," "wholesale and retail trade, eating and drinking places," "finance and insurance," "real estate," "services," "government, n.e.c.," and "establishments, not adequately described." For Figure 1 and related paragraph, we used the 1993 revision, which was available for the English translation.
3. Central matters of interest to housewife part-timers (Dubin 1956) include childcare and family affairs rather than jobs (Sato 2012, 145–165). Growth in the repertory of jobs adaptable to women's lifestyles has contributed to the increase in non-regular women employees (Hakim 2001).
4. A historical process in which work planning becomes managed and controlled by employers in line with the clearer separation between labor planning and implementation is a good instance (Braverman 1974–78) identified not only in manufacturing but also in other industries, such as retail trade.
5. Ogawa (2015) overviews the relationship between information technology and labor management in the 2000s–2010s period.
6. The classification of survey target industries roughly complies with the divisions of the Japan Standard Industrial Classification (revised in October 2013). However, the groupings of industries in Figure 3 have exceptions regarding "real estate, goods rental and leasing." "Real estate" in the figure does not include "goods rental and leasing." "Goods rental and leasing" is included in "services, others." Other divisions included in "services, others" are as follows: "agriculture and forestry," "fisheries," "mining and quarrying of stone and gravel," "electricity, gas, heat supply and water," "scientific research, professional and technical services," "accommodations, eating and drinking services," "living-related and personal services and amusement services," "education, learning support," "medical, health care and welfare," "compound services," and "services, n.e.c."
7. The 20 broad categories of the Japan Standard Industrial Classification (after the November 2007 revision) are "agriculture and forestry," "fisheries," "mining and quarrying of stone and gravel," "construction," "manufacturing," "electricity, gas, heat supply and water," "information and communications," "transport and postal activities," "wholesale and retail trade," "finance and insurance," "real estate and goods rental and leasing," "scientific research, professional and technical services," "accommodations, eating and drinking services," "living-related and personal services and amusement services," "education, learning support," "medical, health care and welfare," "compound services," "services, n.e.c.," "government, except elsewhere classified," and "industries unable to classify."

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