

The Historical Origins of High Performance Work Systems: Two Case Studies from Prewar Japan

KOIKE, Kazuo / 小池, 和男

(出版者 / Publisher)

法政大学経営学会

(雑誌名 / Journal or Publication Title)

経営志林 / The Hosei journal of business

(巻 / Volume)

51

(号 / Number)

3

(開始ページ / Start Page)

17

(終了ページ / End Page)

31

(発行年 / Year)

2014-10-30

(URL)

<https://doi.org/10.15002/00014702>

[Article]

The Historical Origins of High Performance Work Systems : Two Case Studies from Prewar Japan

Kazuo Koike

Abstract

This paper aims to disclose the historical origin of high performance work systems in Japan. Two cases are investigated: cotton spinning works and a trade union affiliated with *Sōdōmei* in the 1920s and 30s. Cotton spinning is a focus area since Japanese production surpassed that of the UK in the early 1930s. It is commonly thought that this achievement was possible due to the low wages of young female laborers working short periods of service. Yet, an increasing number of workers acquired skills to deal with problems in the production process as the share of groups with longer periods of service grew, particularly workers commuting from home rather than living in company dormitories. The key incentive system was an individual base pay, which increased significantly over a worker's career, in light of performance evaluations of his or her ability to handle production problems.

Another case is that of the trade union for the rope and cable manufacturing industry, which gave workers voice. Affiliated to *Sōdōmei*, a non-left wing national center, this union not only declared its intention to promote productivity in the labor agreement, but in practice cooperated to achieve this as well. These cases imply that high performance work systems have an earlier origin, and that Japan may have firmer foundations in these systems, than usually thought. This historical analysis aims to shed light on the origins and functioning of these systems.

1. Problems to be Tackled

1.1 Objectives

Many studies suggest that high performance work systems are well diffused in European countries as well as in the U.S., and that the systems contribute considerably to the promotion of productivity (Osterman [1994], Hamilton, Nickerson and Owan [2003], Black and Lynch [2004], Blooms and Reenen [2007], Ichniovski, Shaw, and Prenusi [1997], Jones and Kato [2010], Kato and Owan

[2011]). Yet only a few works have probed their historical origins, and even most of those studies examine only recent decades (Kato and Morishima [2003]). If the origin might be observed in an earlier period, then this could contribute much to our understanding of the path through which these systems have evolved. By investigating two Japanese cases in the 1920s and 1930s, this paper aims to elucidate the historical origins of the systems.

As an additional motivation, this paper casts serious doubt on the majority view in contemporary Japan that insists that Japan's work system lacks any effective incentives, due to seniority-based

wages (Abegglen [1969] p.113). This is really curious, given that Western scholars tend to think that Japan has been one of the frontrunners in the field of worker involvement (Ichniowski and Shaw [2003]).

1.2 Two cases

Here we analyze only two cases, cotton spinning works and a trade union in the rope and cable manufacturing industry belonging to *Sōdōmei* (General Federation of Trade Unions). The former, cotton spinning, was indeed the largest sector of Japanese industry in the 1920s and 1930s, accounting for nearly half of the manufacturing industries in terms of the number of employees, and fully half of overall exports. Moreover, in the early 1930s this sector surpassed the UK cotton spinning industry, which had dominated international markets for a century. Therefore, we have every reason to investigate this crucial sector.

The rope and cable union belonged to a national center of trade unions that lasted for the longest period before World War II. Among *Sōdōmei* unions, we focus on a trade union at the enterprise level with a membership of around 2,000. Labor historians in Japan have often looked down up this small national center because of its non-left wing unionism. Yet, This rope and cable union clearly was not merely a subservient company union. First, nearly a quarter of the dues collected from union members were used to subscribe yearly to the national center. Second, the top representative of the union leaders at the enterprise-level had never been an employee of the firm, but was a professional union officer of *Sōdōmei*.

One may ask if trade unions in Japan of the 1920s and 1930s were too small to function in an industrial society, since the rate of unionization was as low as 8% in 1931. Yet 8% is almost half of the union participation ratio in contemporary Japan (and well over half of that of the US), so we cannot neglect the trade unions of the time.

1.3 Constraints

A historical study can often cover only some of the crucial variables relating to an issue in focus, due to limited data availability. In this study, the relevant issue is high performance work systems. According to many excellent studies, the most crucial variables are the following three: workers' voice, which may take various forms, such as formal trade unions or joint consultation plans; the technical skills of workers, which are usually difficult to measure; and effective incentive systems to encourage workers to contribute their own ideas to enhance productivity (Osterman [1994], Ichniowski et al. [1997], Kato and Morishima [2002], Black and Lynch [2004], Kato and Owan [2011]).

For the first case of cotton spinning, we only have data on the incentive system, whereas direct data on the skills and voice of workers are not available. Yet an analysis of the incentive system suggests that there were indeed some incentives for skill development for workers. Moreover, the surge in Japan's share of the international market in the 1920s and 30s, compared particularly with the UK, seems consistent with my contention that skills upgrading contributed to the remarkable growth in the productivity of the Japanese cotton spinning industry. The second case of the rope and cable trade union offers empirical data on the integration of workers' voice, which is documented in the collective bargaining records. Moreover, quantitative data is available that provides vivid examples of improvements in productivity as a result of ideas contributed by union members. In the following section, we will investigate the case of cotton spinning. The third section discusses the case of the rope and cable trade union. In the final section, we discuss the implications of these case studies for the existing literature on high performance work systems.

2. Cotton Spinning Industry

2.1 Short periods of work experience?

Some may question the reason for taking the cotton spinning as a case study for high performance work systems in Japan. First of all, workers' skills were minimal, given that the core workforce in the largest cotton spinning companies is believed to be comprised primarily of young girls whose service or experience was naturally too short to allow for skills development. In fact, the ratio of female workers was as high as 85% even in the ten largest firms in this industry. This is higher than in the UK, which had slightly more than 50% women, and far more than in the US and India, where female workers were a small minority. If we take the final spinning process, one of the most important departments, then almost all operatives on the production line were female, with a few men mostly working maintenance jobs.

The lowest supervisors (called *mimawari kō*, a literal translation of *overlookers* in English) were largely female veteran workers in the department. According to a laborious study on *Fujibō*, one of the ten largest companies, male overlookers in 1911 numbered 31 in one factory with many departments, while female overlookers numbered 41 (Kaneko [2009] p.79). Considering that there were few workshops composed of male workers, and that men were mainly engaged in maintenance and handling heavy materials, it was natural that most of the overlookers would be female in departments occupied mostly by female workers. Therefore, we focus on female workers as the core workforce of the industry in those days. Our analysis begins by examining the length of their service and experience in the 1920s and 1930s.

Fortunately, high quality statistics on the length of service and experience are available for the cotton spinning industry for the year 1927. This was conducted by Japanese government central

placement agency, with a large coverage of nearly 10% of all cotton spinning workers, collecting responses from 21,852 female workers in 34 factories across Japan. In particular, the detailed questions in the survey allow us to distinguish clearly between the length of service and 'experience in the same industry.' This is extremely valuable, given that few contemporary statistical surveys of this large scale ask about these two distinct human capital variables.

In addition, an in-depth case study by Kaneko [2009] compiled previously undisclosed internal documents from *Fujibō*. His study provides detailed statistics on the length of service for the year 1921. This is precious data because the length of service is disaggregated into 'commuting female workers' and 'dormitory residents,' which was a crucial distinction affecting the length of service. Although we have more comprehensive government statistics for the 1920s and 30s, a crucial defect lies in the key category employed in the statistics, making it too vague to identify whether data refers to the length of service (tenure/years of employment with the same firm) or work experience in the same industry.

Based on the aforementioned, high quality sources, Table 1 clearly indicates that, first, many female workers had a service of three years or longer, and that some even had over five years' experience. Those with three or more years of service constituted nearly a quarter of the workforce, and when those with three or more years of experience in the cotton spinning industry are taken, the share amounts to 37%. Industry experience is thought to be a better indicator of the level of workers' skills than length of service within one firm because the skills presumably were hardly firm specific, as attested by the many anecdotes of worker raiding in the industry at the time. Even those with five or more years of experience comprised more than one-sixth of the workforce. Furthermore, we must note the remarkable fact that even supervisors at the lowest level were overwhelmingly female, overseeing workshops mostly composed of female operatives.

Table 1 Length of Service and Experience of Female Workers in Cotton Spinning Industry
—Percentage distribution of workers (%)

	Central Placement Agency, 1927		Kaneko Survey, 1921		
	Length of service	Length of experience in the same industry	Length of service		
			Commuters	Dormitory	Total
Total	100	100	100	100	100
3 years and longer	23.8	36.8	49.5	17.6	27.8
5 years and longer	8.8	15.7	33.3	6.4	14.3
10 years and longer	1.4	2.2	8.8	0.7	3.3

Source:

- a. Central Placement Agency: Chuo Shokugyo Shokai Jimukyoku (Central Placement Agency) 1929
b. Kaneko Survey: Kaneko. 2009: 72.

Why do we focus on workers with three to five or more years of experience? We intend to utilize the major findings deduced from one of the most in-depth field surveys of workers' skills in contemporary Japan (Koike, Chuma, & Ōta [2001]). Koike et al. [2001] insist that the most crucial skill in promoting productivity is the ability to deal with problems that occur unpredictably but nonetheless relatively frequently. Despite the distance between the two time periods in question, we believe it possible to apply these findings retroactively to assess the situation of the early twentieth-century. The core hypothesis is that many workers with three or more years of experience will be able to deal with small-scale problems on the shop floor, if provided with the opportunity to develop the skills to handle them. Those with experience of five or more years will be able to understand the root causes of the problems to some extent. A further explanation of workers skills and skill development will be provided later in our discussion of the reasons for the large increase in base pay.

Undoubtedly, the most vital factor affecting the length of service was the growing number of commuting workers who did not live in company dormitories. Fortunately, a large-scale survey by the cotton spinning employers' association is available for the year 1926, and it reveals that commuting workers were 25% of female workers and 79% of male (Chimoto [1999]). Why did the number

of commuting female workers increase from a few? The major reason lies in management policy. Worried about the rising cost of recruitment due to remarkably expanding demands for labor, management encouraged female incumbents to stay longer. In particular, they developed policies that encouraged female workers to get married, offered company housing for continuing years of service, and in some cases even provided money for the care of the children of female workers.

Conversely, the prevailing opinions have heavily emphasized the importance of low wages and the effect of standardization in the production process in reducing skill requirements. They look only at the average years of service and neglect the growing group of workers with a longer service record. Thus, they suggest that the main reason why the Japanese cotton spinning industry surpassed that of the UK was simply the low wages in Japan (Takamura [1971] I, p. 338). Yet, if low wages were the main reason, then India or China would have surpassed the UK, since both countries had wages lower than Japan's. In particular, India started large-scale cotton spinning factories more than a decade before Japan, yet it increasingly fell behind Japan.

2.2 A Large Increase in the Base Salary Profiles

In analyzing the incentives offered to workers,

it is best to concentrate on the final spinning department, where female workers and female supervisors were predominant. Payment based on group performance was common in most cotton spinning firms, in particular for this department. The size of the unit constituting a group for the purposes of group pay is unclear—it is likely that those who were under one supervisor, consisting of two to three dozen workers, made one unit or group. The aggregate amount given in the form of group pay depended on output measures, considering the count of yarn produced. Additional parameters considered in the group pay formula were climate (particularly the level of humidity), and the condition of the spinning machines. When humidity was low, yarn cuts occurred more frequently, causing output to fall. When a machine had more trouble than usual, naturally output decreased. These factors were taken into account by an adjustment coefficient of perhaps 15% (Kaneko [2009] p.122). This suggests that the pay system was elaborately designed even back then.

More important is the way in which this aggregate sum for a group was allocated to each individual. The individual’s base pay played the decisive role. The aggregate sum was divided in proportion to each individual base pay. Even more important was that the individual’s base pay increased with almost regular increments, subject to performance evaluation. Table 2 shows the wage table of Fujibō, for the year 1907. Clearly there was not a single uniform pay rate for a job category, but

rather, was basically a range rate under “pay-for-job grade” plans with performance evaluation.¹⁾ This is different from the standard blue-collar payment system in the West, and resembles somewhat the white-collar pay system in the West and Japan, which we discuss in the final section.

The ‘new hire’ pay grade was applied only for a probationary period, usually for as short as a few months. Once promoted to ‘regular worker’, employees were placed at Pay Grade 1, Step 1, which led to a day wage rate of 18 *sen* (cents). For the initial period, everyone could be promoted regularly every two months within Pay Grade 1; in other words, during the first year no evaluations took place. For Pay Grades 2 and 3, only half of the workers would be promoted, in light of attendance records and performance evaluations. Promotion to Pay Grade 4 and the upper-level steps depended heavily on performance evaluation. In addition to the subjective performance evaluations of female blue-collar workers, another remarkable feature was the large increase in their base pay. If we take Step 1 of Grade 1 as the base, then the highest rate of pay for Grade 4 was as much as two and a half times more. Even if a worker stopped at Grade 3, the increase over base pay was almost 180% of Step 1, Grade 1.

A plausible hypothesis is that this large increase reflected to some extent the skill development of workers, which management sought to encourage. Though evidence is insufficient to describe the particular skill development, it is

Table 2 Base Pay for Female Workers 1907, Fujibō

(*sen*)

Job grade	Step						
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
New hire	14	15	16	17			
Grade 1	18	19	20	21	22	23	
Grade 2	24	25	26	27			
Grade 3	28	30	32				
Grade 4	34	36	38	40	42	44	46

Source: Kaneko. 2009: 113

difficult to find other hypotheses equally consistent with this pay policy. For example, the traditional hypothesis emphasizing the low level of Japanese wages might suggest that companies were forced to increase pay to account for growing costs of living, neglecting the issue of skill development, but this argument is less appealing, given that the workers were mostly young women. A relevant comparison, however, is provided by the profile of Japanese carpenters' pay in the 18th and 19th century, since this was a typical skilled occupation for male breadwinners supporting their families, so that individual pay would need to increase as they became older, according to Japanese traditional theory. In fact, individual pay hardly increased once carpenters became journeymen (Koike [2012] pp.142–145). Similarly, skilled mechanics in one of the largest shipbuilding yards in late 19th century Japan were paid almost a flat rate, with little increases in base pay after finishing their training years. This is confirmed in an in-depth study of individual pay throughout a worker's career during the 1870s–80s (Nakanishi [1983] pp.648–659). These wage profiles share similarities with those of craftsmen, or mechanics, in the late 19th century in the UK (Bowley and Wood [1906] p.154; Koike [2012] pp.134–136). Therefore, traditional Japanese theories are ill suited to explain the features of the cotton spinning industry discussed above.

Another noteworthy fact is the size of the increase in base pay for female workers at the beginning of the 20th century in the Japanese cotton spinning industry: the increase in base pay profiles was far larger than that of semi-skilled British workers of the late 19th century, which was only 30–35% (Bowley and Wood [1906] p.154).

As for the deferred payment theory of wages that encourages workers to stay longer, this seems insufficient to explain such a large increase in base pay, unless we take into account of significant skill development.

In short, if we do not make an assumption that employers placed value on workers' skills, it is

difficult to explain the wage profiles of Japanese female workers of cotton spinning industry in this period.

2.3 Female Workers' Skills

In light of the limited but valuable available information provided above, it becomes essential to discuss what valuable skills female workers acquired during their service at that early period of the Japanese cotton industry: in particular, workers' skills to deal with problems arising in the production process. What kinds of problems occurred? What problems were not necessarily explained in manuals, or in other words, not handled by simple routine operations? Dealing with problems requires non-routine operations, such as detecting defects and even reasoning about their causes. To give an example, one of the crucial defects in the quality of yarn produced was unevenness, which caused much trouble at the subsequent stage of weaving. This was emphasized in many circulars written in 1907–08 by Mutō Sanji, the distinguished leader of *Kanebō*, one of the three biggest cotton spinning companies (Kuwabara [1996]). This factor is also specified by the contemporary official standards of quality for cotton products, such as JIS (Japan Industrial Standards).

According to a study by a veteran engineer (Kamimae [1970]), the major reasons for unevenness in yarn were unskillful tying by operators and trouble in the spinning machine. We will explain the latter case. A frequent cause of unevenness was a lean of the rollers through which yarn was drawn. If a worker could guess, albeit without full accuracy, that the cause might lie in the rollers, and proceed to report this to her supervisor, then the maintenance workers could repair it without delay, and the production of defective yarn would diminish. Circumstantial evidence supports the above occurrences. Several *Kanebō* and *Fujibō* factories reportedly set up off-the-job training courses, including for female workers, to instruct them on

how to find the cause of yarn cuts, and how to guess the troublesome spot in the spinning machine (Kuwabara [1996], Kaneko [2009]).

The hypothesis that blue-collar workers who have been on the line for three or more years have sufficient experience to deal with some production problems was originally deduced from field studies on the final assembly line work of car manufacturing. At a glance, the work done in car manufacturing is seemingly simple and involves repetitive operations that require little skill. In fact, small-scale problems occur far more frequently than usually imagined, and how skillfully they are handled significantly affects productivity (Koike, Chuma, Ota [2001], or earlier Koike [1977], and Koike and Inoki [1987], Koike and Inoki [1990]). The same hypothesis can be, at least partly, examined for the case of cotton spinning operations in the early 20th century. To state it in a general framework, problems often arise at particular times and places and require local and specific knowledge of a sort pointed out by Frank Knight [1921, 71] and Friedrich Hayek [1937],[1945]. Since some of them occur more frequently than usually thought, the worker's skill in dealing with them substantially affects production efficiency on the shop floor.

As for yarn cuts, one specific factor was particularly crucial for Japan at that time. The content mixture of raw cottons changed often, and this significantly affected the frequency of yarn cuts. The Japanese cotton spinning industry commonly mixed raw cottons imported from different parts of the world in search of the lowest price. This surely made the operations of spinners more demanding, since yarn cuts occur more frequently when raw materials change.

A similar line of reasoning can be applied to climate. Low humidity gave rise to more frequent yarn cuts. If workers on the production line paid due attention to which part of the machine might cause trouble, it would be of great assistance to the maintenance workers. This is likely the reason that climate as well as troubles with the spinning machine

was taken into account in calculating the aggregate amount of group payment. This we put forward as merely a hypothesis, given the lack of direct, decisive evidence. Yet we can say that circumstantial evidence points to large differentials in productivity by individual operators on the same type of machine.

2.4. The Grounds for Pay-for-Job Grade with Performance Evaluation

When considering workers' skills, as described above, incentives could not be based solely on the piecework output of individual workers. It was feasible to identify individual output for only some of the workers. Half of the operatives in the final spinning department were called 'piecers' and their individual outputs could roughly be measured. One indicator was the span of control in handling the spinning machines, and was measured as a) half of one spinning machine, b) one spinning machine as a whole, c) one and half machines, and so on. This reflected the number of spindles operated, since one spinning machine usually had a certain number of spindles, say 144. The other indicator employed actual production of yarn by each individual.

Yet, other variables had to be considered as well. Firstly, half of the workers in the department, those in charge of doffing or bobbin collecting, were encouraged to help the piecers when they had time. Thus, some teamwork existed. Veteran workers instructed less experienced workers, which was crucial for elevating productivity in the long run. Secondly, and more important, skills in handling problems could not be measured simply by output, because unevenness in yarn caused by trouble with the rollers, for example, was not well identified by straight production or other figures. Considering these realities, we could say that performance evaluation taking into account of not necessarily objective factors was an appropriate way to assess individual skill level, although there was no guarantee that the evaluation would precisely reflect the individual's skills.

Taking female workers in cotton spinning as a whole, a considerable group, 30–40%, were paid on an hourly basis of an individual base pay without group payment by results. Considering a large increase in base pay, this is clearly a pay-for-job grade plan, and yet this gives no indication that a pay-for-job grade was established at the beginning of the 20th century. Although rules stipulating a pay-for-job grade plan did exist, the presence of rules does not prove full implementation. Fortunately, *Kanebō*, one of the big three cotton spinning firms, left records of the number of female workers by the level of base pay for the years 1890 and 1897. Table 3 indicates its percentage distribution.

The above table clearly shows that regular increments in base pay had not diffused in the 1890s. In 1890, 70% of female workers were concentrated at the base pay level of 8–10 *sen*, while fewer than 17% were paid higher in the range of 11–20 *sen*. In 1897, concentration became less distinct and the distribution looks more consistent with regular increments; 73% concentration could be found in a broader range of 11–15 *sen*. Yet those who were paid even higher remained a minority. Full diffusion of regular increments in base pay among blue-collar workers had to wait until later, roughly until the 1920s.

Table 3 Percentage Distribution of Female Workers by Base Pay—Kanebō, 1890, 1897

Level of Base Pay (<i>sen</i>)	(%)	
	1890	1897
1–5	0.1	
6–7	13.4	
8–10	69.9	1.6
11–12	7.1	33.7
13–14	3.1	39
15–17	5.4	9.6
18–20	0.9	10.5
21–25		4.5
26–30		0.9
Total	100	100

Source: Rōdō Undō Shiryō linkai. 1962.1:267–9.

To investigate the actual situation in applying regular increments in base pay we need more in-depth data disclosing the extent of actual implementation of such rules. So far as we have searched, only one case presents a detailed breakdown of the percentage of blue-collar workers whose base pay actually increased in a year: an aircraft manufacturer left records for each of 49 occupations for the years 1923–24 (Tsuji [1956] p. 875). These records suggest that most blue-collar workers received regular increments. For males, 70–90% of workers had regular increments, whose variation ranged from 4 to 12 *sen*. Diffusion of the practice was also remarkable for female blue-collar workers at 75%, with variation in increments ranging from 2 *sen* to 5 *sen*. Naturally, it would be dangerous to draw strong conclusions on the basis of a single case. Yet, considering this case in conjunction with high quality studies on the regular increments in base pay, although they lack in-depth data of the kind shown above (Hyōdō [1971], Oda [1984]), it would be safe to say that regular increments in base pay among regular blue-collar workers in large firms—mostly yearly or with a certain interval—had become broadly diffused in the 1920s and 1930s. Notably, the implementation of regular increments in base pay for blue-collar workers occurred far earlier than in the West.

The implications are twofold. First, skills development for blue-collar jobs was implemented earlier than usually thought, and secondly, some demanding tasks, such as problem solving, were delegated not just to maintenance workers, but also to a part of regular blue-collar workers on the production lines in Japan. If this holds true, some elements of high performance work system already existed in prewar Japan. This premise will be strengthened in the following section using the case of a trade union.

3. Union Voice in Promoting Productivity

3.1 Collective Bargaining

To introduce the rope manufacturing trade union, we start by explaining how it came into existence in 1926, as people tend to think that trade unions in pre-WWII Japan were highly exceptional. Trade unions appeared at the end of the 19th century, covering such workers as turners, printers, and locomotive engineers. Most unions soon disappeared, however, mainly because they could not succeed in establishing solid union finances, due to organizational problems such as lax administration. It is *Sōdōmei* that succeeded in creating lasting organizations, mostly led by Christians. A few years later, a socialist revolution produced Soviet Russia, which strongly encouraged the development of the Japanese labor movement. Unions in the rope and cable industry were not isolated exceptions.

The trade union analyzed here organized all blue-collar workers of a large firm, *Tokyo Seikō* (Tokyo Rope Manufacturing Co.). A manufacturer of ropes and cables for warships and civilian ships, and for industrial uses such as coal mining and electrical power plants, Tokyo Seikō employed about 2,000 workers. In two out of its three factories, trade unions appeared, though both covered only a small minority of workers; one belonged to a national center of leftist unions and the other to *Sōdōmei* or non-left wing unions. Faced with this situation, the management of Tokyo Seikō decided to accept *Sōdōmei* to organize all blue-collar workers, so as to prevent the union from being dominated by left wing influences. This was the birth of *Seikō* Trade Union.

The first labor agreement in 1926, proposed and written by the leader of *Sōdōmei*, Matsuoaka Komakichi, had only five articles. After stipulating the recognition of a closed union shop (Article 1), collective bargaining (Article 2), paying due

attention to the standard of working conditions in the industry (Article 3), and controlling troublesome union members by the union (Article 4), Article 5 reads as follows: “The company shall treat its employees as favorably as possible, while the union shall make efforts to promote the efficiency of work.” (*Seikō Rōdō Kumiai* [1936] p.56, *Tokyo Seikō* [1957] p.86)

This article 5 was not a mere paper plan. Surviving records demonstrate that the union repeatedly proposed concrete measures in annual collective bargaining from 1928 to 1939 except for a couple of years when the great depression led to tough layoffs. For example, the union proposed to establish a commendation plan for those who improved machinery or methods of production. Moreover, the union repeatedly asked management to hear and adopt the union’s opinion in selecting equipment and machinery. Not only did the union present proposals at collective bargaining, but it also put many of its own ideas in practice, such as creating union committees to study how to improve productivity (Koike [2012] pp. 237–241). Similarly, in the first collective bargaining at the enterprise level in 1928 (before that, negotiations were conducted mostly at the plant level), the union proposed to let veteran union members transfer to other factories, even for a short while, in order to exchange their knowhow and to develop their skills. Unfortunately, this plan was not accepted by hesitant management, as the transfer of blue-collar workers to other factories was rare at the time.

The union’s willingness to contribute to improving productivity, however, never implied that industrial relations lacked any conflict. The great depression beginning in 1929 induced the management to conduct large-scale layoffs. The union negotiated tenaciously to decrease the number of workers to be laid off, from 160 to 109, and to obtain for laid-off workers an additional severance payment of six month wages, in addition to what had been stipulated as redundancy payment. This was far larger than common standards at the

time, so that 188 workers applied finally for voluntary separation, even more than the numbers first proposed by management (*Seikō Rōdō Kumiai* [1936], Koike [2012] p. 218).

3.2. Examples of Promoting Productivity

Vivid description of worker activities to promote productivity can be found in the record of a round-table talk as a part of *Ten Year History of the Union* (*Seikō Rōdō Kumiai* [1936]). For three days, nearly 30 union members discussed various issues that had arisen in the union's history. Of 40 pages printed in small type, four pages were allocated to describing vivid examples of promoting productivity. Let me introduce some of them.

Example 1 was told by a participant from *Kokura* Factory. A union member named Morioka contributed greatly to inventing a way to save a great deal of labor in stretching cables. For stretching cables, it was necessary to reheat the cables several times, followed by additional processes such as acid washing. Morioka made efforts to improve the method to stretch the cables a few times while reheating only once, though no detailed explanation about how Morioka did it is provided (*Seikō Rōdō Kumiai* [1936] p. 248).²⁾

Example 2 was told by a participant from *Kawasaki* Factory. That was a change in the system from "one machine operated by one worker" to "two machines by one worker". The speaker emphasized that the major driving force behind this change was not new machines, but workers' idea due to their study of work (*Seikō Rōdō Kumiai* [1936] p. 247).

Example 3 was told by another participant from a different department of *Kawasaki* Factory. He mentioned figures illustrating how much productivity had improved. Around 1927 or 28, roughly 20 thousand pounds of output were produced by 76 female and 7 male workers. Eight or nine years later, their study and effort made it possible to produce almost an equivalent output

with fewer people—51 female and 9 male workers. This indicates an increase in productivity of nearly 40%. Clearly, workers contributed to this improvement in productivity (*Seikō Rōdō Kumiai* [1936] p. 247).

Example 4 was told by a participant from *Hyōgo* Factory. Ten years ago, he said, 280 workers produced about 12,000–13,000 pounds of rope and cable. Ten years later, little more than half the workers produced 17,000–18,000 pounds per day. Although this was partly due to installation of more efficient machines and equipment, he said, no one could deny workers' contribution. Workers proposed better machinery and the atmosphere on the shop floor had changed for workers to handle work so earnestly (*Seikō Rōdō Kumiai* [1936] p. 248).

The change in atmosphere was also emphasized by a participant from *Kawasaki* Factory. In the initial period when the union started to improve productivity, many union members criticized those who promoted improved methods as entering into a conspiracy with management; some even called them company spies (*Seikō Rōdō Kumiai* [1936] p. 246). Yet, year-by-year, those who were against promoting productivity shrank in number. Another anecdote describing the atmosphere on the shop floor before the union started supports this. A worker reported that bloody brawls used to break out almost every day, but after the union came in violent conflicts disappeared (*Seikō Rōdō Kumiai* [1936] pp. 239–240).

3.3 Union Voice

Here, one simple question may be raised: why did trade union members eagerly promote productivity? This is a natural question, considering ordinary perceptions of trade unionism at the time, according to which cooperative behavior was nothing other than abandoning the duty of unions to oppose management. A first step to answer to this question is to identify which workers were most

eager to promote productivity.

Existing evidence suggests that the workers most enthusiastic about promoting productivity on the shop floor were active in union activities. Participants in the round-table talk were mostly union committeemen or union delegates. Another question naturally follows: why were union activists able to persuade their fellow union members to take an active attitude toward improving productivity? In answering this question, we have to discuss two implications of crucial importance. One is a doubt against a common theory of skill specificity and the other is the importance of union voice. Let me begin with the former.

Needless to say, the central mission of trade unionism is to protect employment even in severe competition in the market. *Tokyo Seikō* was not a monopolist, but faced several competitors. Without improving productivity, workers would be exposed to the danger of being laid off. According to ordinary economics, the willingness of workers to cooperate to raise productivity could usually be explained by a. enterprise-specific skills, or b. job security, both of which would have been thought especially important in Japan.

To begin with the first point, this explanation, however, overlooks a visible feature of market economies. If a worker without any specific skills is laid off from a company, he or she would find it difficult to gain a similar job in the same industry within a short time. The reason is plain. In a tough situation in which a company has to conduct layoffs, it is natural that other companies in the same industry also suffer. Even if they do not dare to conduct layoffs, few would recruit more employees. Thus, laid-off workers would be compelled to find different jobs in other industries, for which they could hardly utilize their skills.

As for the latter point that emphasizes job security, it is questionable for a firm to secure jobs perfectly in tough competition of the market. Less efficient firms have no way other than fading away from markets. To prevent from this destiny, firms

are compelled to decrease production so as to lay off a part of workers: if not, all employees may lose jobs. Therefore, the essence of the issue of job security is a choice which part of the workers are burdened to be laid off; less senior workers as the US blue collar or more senior workers in contemporary Japan. The announcement of job security by the firm cannot be any guarantee of employment. Consequently, it is reasonable for union members to follow their leaders in promoting productivity, so far as market competition prevails.

A short look at other trade unions in those days is helpful in showing that the cooperative approach of the rope and cable union was not a rare exception. Consulting *Rōdō* (Labor), the monthly journal issued by *Sōdōmei*, we can find occasional, though not numerous, reports of trade unions whose members were eager to promote productivity (Koike [2012] pp. 242–244). This was an essential part of the union policy of *Sōdōmei*, realizing that this activity was crucial for maintaining employment under tough market competition.

The above story, however, should not be misinterpreted to imply that *Sōdōmei* was so submissive and compliant that it rarely went on strike. The frequency of strikes was actually greater than the average for all unions, and according to government statistics the duration of strikes by *Sōdōmei* was longer than that of other unions. In fact, the longest and largest strike in pre-war Japan was conducted by *Noda Shōyu Rōdō Kumiai* (*Noda Soy Source Union*) under the leadership of *Sōdōmei*'s Matsuoka Komakichi (Matsuoka [1928], Koike [2012] Chap.12). In other words, without effective union voice, how could workers expect to see returns for presenting their own ideas, and if they could not anticipate securing adequate returns, why they present their ideas?

Incentive systems for workers in the *Seikō* union likely shared (though available data are still insufficient to determine with certainty) common features with other large corporations in Japan at that date. These consisted of base pay and some

group payment by results. The former increased in yearly increments in accordance with performance evaluation. The latter, as most companies, had a kind of group payment depending on group outputs, though the weight of the two is unclear. These features largely coincided with the findings in the frequently cited studies of high quality as Hyodo [1971] and Odaka [1984].

In short, we can surmise that an initial stage of worker collaboration with management to improve productivity started as early as the 1920s, which is much earlier than has usually been thought (Kato and Morishima [2002], Shimazaki, Mori, and Umeshaki [2012]).

4. Implications and Discussion

We title the final section “Implications and Discussion” rather than the conventional “Conclusions” to emphasize our intention to discuss some conjectures as well as implications that are crucial to understanding how contemporary high performance work systems operate on the shop floor.

Implication 1 : The collaborative type of industrial relations in contemporary Japan has a root that could be observed at least as early as the 1920s. This suggests that the observed willingness of Japanese workers to collaborate with management to promote productivity has a firmer earlier foundation in terms of workers skill development than ordinarily thought. This raises a further question: why did Japan develop so early the foundations of high performance work systems? My conjecture is a kind of latecomer theory. World industrialization has roughly two stages. Each developed specific work systems, such as craft unionism in the first stage and industrial unionism based on workplace organizations in the second stage. As a latecomer, Japan started her industrialization in the late 19th century, which was almost the end of the first stage. For Japan, there was not enough time to establish the features of the work systems of the first stage. This implies that the cost to throw off the work systems of the first stage

was small. Consequently, she could easily move to the second stage and to acquire its features. Contrarily, earlier starters in the first stage needed a longer time to change the whole systems fit to the second stage. This would be a possible answer why high performance work systems developed early in Japan (Koike [1988] pp. 281–284).

The majority opinion in Japan have long insisted that Japanese industrial society has lagged behind that of the West, and that workers were easily induced to acquiesce meekly to management prerogatives (Ōkōchi [1980]). Seeming collaboration, the argument goes, was nothing other than workers following management directives owing to weak union voice. Many important facts can hardly be explained by this interpretation, however. To mention one of them, why would workers who were wise enough to devise efficient work methods allow themselves to be easily trapped by management?

Implementation 2 : These case studies provide support for a hypothesis of ‘white-collarization’. The concept of white-collarization was originated by Koike to explain Japanese features in industrial relations.³⁾ This hypothesis insists that a considerable part of the Japanese blue-collar workers have shared similarity to some extent with the white-collar workers in the West both in age-wage profiles and in their skills. This can explain a large increase in base pay with yearly increments under performance evaluation of blue-collar workers, the major feature of incentives in the 1920s and 1930s. The evidence given earlier shows that even for female blue-collar workers around the beginning of the 20th century, base pay for experienced workers increased to almost twice the starting rate. The system was in its infancy in those days, however, since in practice the wages of many workers concentrated around a narrow band of base pay. By the 1920s and 1930s, this system had been applied to most blue-collar workers in large firms in Japan.

This feature has long been accounted for in a different way that is full of misunderstanding by almost all sides including management, labor and

academy. Under “seniority wages,” many analysts believe (Abgglen [1969]) that base pay is largely determined by seniority, and lacks effective incentives. Yet, this majority opinion has neglected the true feature: regular increments in base pay that vary in accordance with performance evaluation have been applied even to blue-collar workers, both in prewar and post war Japan. Moreover, contrary to the common perception in Japan, since the 1920s and 1930s Japanese white-collar and blue-collar workers have shared with European and American white-collar workers two crucial features: base pay plans with a large increase in pay profiles (in the case of prewar Japanese cotton spinners eventually amounting to nearly twice base pay), and yearly increments under performance evaluation. These could be called white-collarization of blue collar workers.

Implication 3: The third implication concerns the ability of workers to deal with problems and changes—the knowhow to identify defects in product quality or to reason the causes of the defects and of trouble in equipment. This is a conjecture that is not directly derived from the analysis in this paper, but is discussed as a remaining task.

At their highest level, these skills enable workers to participate in the implementation of changes in production lines or even to have a say in the design of the new model. Unfortunately, it has been possible to touch only briefly upon this topic here. Nonetheless, there are two reasons to dare to discuss production-related problem-solving here. One is that a certain character of workers’ skills is, in my opinion, a vital factor for high performance work systems. Few papers, however, seem to deal with this factor in depth. Usually off-the-job training courses for skill development or job rotation systems are referred to, but the very core of the character of skills has not yet been analyzed: participation in designing a new production line, and a voice in the design of new products.

Incentives for individual skill development are

crucial. They may take a form of pay-for-job grade with performance evaluation to encourage individual skill development. Without elucidating the character and content of these worker skills as well as incentive systems to encourage them, we can hardly clarify the major way to promote productivity.

* This is largely a digested English version of Koike [2013], highlighting its essential parts. It is grateful for helpful comments from Profs. Takenori Inoki, Susumu Hagiwara, Yoshio Okunishi, Hiroshi Kumon, Chieko Kanbayashi, Ryoji Kaneko, and Hideo Owan. This work was supported by the grant of Nihon Keizai Kenkyu Center (Kenkyu Shoreikin N.2012-02).

Notes:

- 1) For preventing possible misunderstandings, it would be in order to explain the key word in this paper, “pay-for-job grade” plans:
 - a. Here, a job grade, or a pay grade, is “one of the classes, levels, or groups into which jobs of the same or similar values are grouped into for compensation purposes. All jobs in a pay grade have the same pay range—maximum, minimum, and midpoint.” (Milkovich and Newman [2005] pp.608,611). Thus, pay-for-job grade plans are different from “pay-for-job” plans with a single rate or a small range for a job, but have relatively a large range for each grade; the maximum is usually higher than the minimum by 50–60%.
 - b. Base pay of the pay-for-job grade plans has normally yearly increments within the range, subject to performance appraisal whose measures are not necessarily objective, so as to assess non-quantitative factors, and neighboring ranges commonly overlap to some extent.
 - c. The number of job grades are ordinarily 10–15 for exempted white collar workers.
 - d. In my understanding, pay-for-job grade plans are broadly applied for white collar workers in the Western Europe and the US. Other technical wording concerning pay follows mostly those of Milkovich and Newman [2005].
- 2) Morioka surely was a blue-collar worker because his name was listed as one of the representatives of the workers side, when his union was converted by the government to a branch of *Sangyō Hōkokukai* (Industry

Joint Organization Serving to the State), following the creation of *Arbeitsfront* (Labor-Front) in Germany (*Tokyo Seikō* [1957] p.112).

- 3) This hypothesis of white collarization was first presented in Japanese (Koike [1981]), and later in English as a paper (Koike [1983]) and a book (Koike [1988]). This Hypothesis is a product of European-Japan comparison utilizing two monumental statistics surveys: For the (then) European Community (EC), *Structure of Earnings in Industry, for the year 1972*, and in the case of Japan, Ministry of Labor, Japan, "Chingin Kōzō Kihon Tōkei Chōsa (Basic Statistics of Wage Structure)", yearly. Originally, the hypothesis was deduced from the similarity of age-wage profiles and length of service between white-collar workers in both the West and Japan, and blue-collar workers in large firms in Japan. Hence, it predicts smaller difference in wage patterns between blue-collar and white-collar workers in Japan. Later, the concept was extended to the character of skills in dealing with novel problems, and even other areas. Although Koike [1988] discusses this hypothesis at length, extended analysis is developed in Koike [2012] in Japanese.

References:

- Aegglen, James C. [1969] "Organizational Change," *The Japanese Employees*, ed. Robert J. Ballon. Rutland, Vermont: Charles E. Tuttle, pp.99-119.
- Black, Sandra E. and Lisa M. Lynch.[2004] "What's Driving the New Economy? The Benefits of Workplace Innovation," *Economic Journal* 114 (493), pp.97-116.
- Bloom, Nicholas and John Van Reenen [2007]"Measuring and Explaining Management Practices Across Firms and Countries," *Quarterly Journal of Economics* 72(4): pp.1351-1408.
- Bowley, A.L. and G.H. Wood. [1906] "The Statistics of Wages in the UK during Last 100 Years, Part 14, Engineering and Shipbuilding," *Journal of the Royal Statistical Society* 69: pp.148-196.
- Chimoto Akiko. [1999] "20 Seiki Shotō ni okeru Bōsekigyō no Kishukusha Jōkō to Shataku Seido no Dōnyū" (Female Workers in Dormitory and Introduction of Company houses at the Beginning of the 20th Century in Japanese Cotton Spinning Industry). *Hannan Ronshu Shakai Kagakuhen* (Hannan Journal of Social Science) 34(3):pp.57-67.
- Chuō Shokugyō Shōkai Jimukyoku (Central Placement Agency) [1929] *Bōseki Rōdo Fujin Chōsa—Sokugyō betu Rōdō Jijō* (A Survey of Female Workers—Working Condition by Occupation 5). Tokyo: Chuō Shokugyō Shōkai Jimukyoku.
- Dainihon Bōseki Rengōkai (Japan Employers Association in Cotton Spinning Industry) [1937]. *Sekai Seni Kōgyō* (Textile Industry in the World). Tokyo: Chikura Shōbō.
- Hamilton, Barton H., Jack A. Nickerson and Hideo Owan. [2003]. "Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation." *Journal of Political Economy* 111(3): pp.465-497.
- Hayek, Friedrich A. [1939] "Economics and Knowledge," *Economica* 4:pp.33-54.
- Hayek, Friedrich A. [1945]. "The Use of Knowledge in Society," *American Economic Review*, 13: pp.519-530.
- Hyōdō, Tsutomu. 1971. *Nihon ni okeru Rōshi Kankei no Tenkai* (Development of Industrial Relations in Japan). Tokyo: Tokyo Daigaku Shuppankai.
- Ichniowski, Casey, Katharyn Shaw, and Giovanna Prenushi. [1997] "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines," *American Economic Review* 87(3): pp.291-313.
- Ichniowski, Casey and Kathryn Shaw. [2003] "Beyond Incentive Pay: Insiders' Estimates of the Value of Complimentary Human Resource Management Practices," *Journal of Economic Perspective* 17(1), pp.155-80.
- Jones, Derek C. and Takao Kato.[2010] "The Impact of Teams on Output, Quality and Downtime: An Empirical Analysis Using Individual Panel Data," *Industrial & Labor Relations Review* 64(2): pp.215-240.
- Kamimae Masayuki, [1977]. *Bōseki Hikkei* (Handbook for Cotton Spinning). Tokyo: Nihon Seni Gakkai.
- Kaneko Ryōji [2009]. *Senzenki, Fujigasubōseki niokeru Rōmukanri Seido no Keiseikatei* (The Process of Formation of Labor Management Systems in Fujigas Cotton Spinning Co. in Prewar Period). Unpublished Dissertation, Tokyo University.
- Kato Takao and Michio Morishima.[2002] "The Impact of Teams on Output, Quality and Downtime: An Empirical Analysis Using Individual Panel Data," *Industrial & Labor Relations Review* 41(4): pp.487-520.
- Kato Takao and Hideo Owan. [2011] "Market Characteristics, Intra-Firm Coordination, and the Choice of Human Resource Management Systems: Theory and Evidence," *Journal of Economic Behavior & Organization* 80:pp.375-396.
- Knight, Frank H. [1971] *Uncertainty, Risk, and Profit*. Chicago: University of Chicago Press.

- Koike Kazuo, [1977] *Shokuba no Rōdō Kumiai to Sanka—Rōshikakei no Nichibei Hikaku* (Trade Unions on the Shop Floor and Participation—US-Japan Comparison). Tokyo: Tōyō Keizai.
- . [1981] *Nihon no Jukuren* (Workers' Skills in Japan). Tokyo: Yuhikaku.
- . [1983] "Internal Labor Markets: Workers in Large Firms." In *Contemporary Industrial Relations in Japan*, ed. Taishirō Shirai. Madison: University of Wisconsin Press: pp.29-61.
- . [1988] *Understanding Industrial Relations in Modern Japan*. London: MacMillan.
- . [2012] *Kō Hinshitsu no Kigen—Hatsugen Suru Shokuba wa Kōsite Umareta* (The Historical Origin of High Quality Products—How Workers Voice on the Shop Floor Has Been Brought About). Tokyo: Nihon Keizai Shinbun Shuppansha.
- . [2013] *Tsuyoi Genba no Tanjō—Toyota Sōgi ga Umidasita Kyōdō no Ronri* (The Birth of Productive Workshops—The Logic of Collaboration That Was Produced through Toyota Dispute). Tokyo: Nihon Keizai Shinbun Shuppansha.
- Koike Kazuo, and Takenori Inoki, [1987] *Jinzai Keisei no Kokusai Hikaku—Tōnan Azia to Nihon* (A Comparative Study on Human Resource Development—Southeast Asia and Japan). Tokyo: Tokyo Daigaku Shuppankai.
- Koike Kazuo, and Takenori Inoki, [1990] *Skill Formation in Japan and Southeast Asia*. Tokyo: Tokyo University Press.
- Koike Kazuo, Hiroyuki Chuma, & Sōichi Ōta [2001]. *Mono Tukurī no Ginō—Jidōsha Sangyō no Shokuba de* (Workers' Skills in Manufacturing Industry—On the Shop Floor of Making Cars). Tokyo: Tōyō Keizai.
- Kuwabara Tetsuya [1996] "Nihon ni okeru Kōjō Kanri no Kindaika—Nichiro Sensō Go no Kanegafuchi Bōseki Kaisha" (Modernization of Factory Management in Japan—Kanegafuchi Cotton Spinning Co. After Japan-Russia War). *Kokumin Keizai Zasshi* 174(6): pp.49-78.
- Milkovich, George T. and Jerry M. Newman. [2005]. *Compensation*. New York: McGraw-Hill.
- Nakanishi Hiroshi [1983] *Nihon Kindaika no Kiso Katei* (Basic Process of Modernization of Japan) 2. Tokyo: Tokyo Daigaku Shuppankai.
- Odaka Kōnosuke [1984] *Rōdō Shijō Bunseki* (Analysis of Labor Markets). Tokyo: Iwanami.
- Ōkōchi Kazuo [1980] *Rōshikankeiron* (Industrial Relations). Tokyo: Rōdōjunpōsha.
- Osterman, Paul [1994] "How Common Is Work Place Transformation and Who Adopts It?" *Industrial and Labor Relations Review* 47(2):pp.173-88.
- Rōdō Undō Shiryō linkai [1962] *Nihon Rōdō Undō Shiryō* (Historical Materials of Labor Movements in Japan) 1. Tokyo: Rōdō Undō Shiryō Kankōkai.
- Seikō Rōdō Kumiai (Seikō Trade Union) [1936] *Dantai Kyōyaku 10 Nen* (10 Years History of Collective Agreements). Tokyo: Seikō Rōdō Kumiai.
- Shimazaki Tomoteru, Naoko Mori, and Osamu Umeshaki [2012] "Kōdo Seichōki niokeru Nihon Seisanseihonbu no Katudō-Sōgo Shinrai teki Rōshikankei no Keisei eno Eikyō" (The Activity of Japan Productivity Center in the Rapid Growing Period of Economy—Its influence on the Formation of Mutually Reliable Industrial Relations)'. *Nihon Rōdō Kenkyū Zasshi*: 625:pp.70-86.
- Takamura Naosuke [1971] *Nihon Bōseki Shi Josetsu* (Introduction to the History of Japanese Cotton Spinning Industry) I. Tokyo: Hanawa Shobō,
- Tokyo Seikō Kabushikikaisha [1957] *Tokyo Seikō 70 Nen Shi* (70 Years History of Tokyo Rope Manufacturing Co.). Tokyo Seikō Kabushikikaisha.
- Tsuji Hideo [1956] "Shōkyū Seido no Jissai" (Practices of Yearly Increments Plans) *Chingin Kōzō Kihon Chōsa* (Basic Survey of Wage Structure). Tokyo: Tōyō Keizai: pp.864-913.