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Personnel Management and the Formation of Modern Business Organisation:
The Railway Industry in Japan before the First World War

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Naofumi Nakamura
(Institute of Social Science, University of Tokyo)
naofumin@iss.u-tokyo.ac.jp

Introduction

The purpose of this paper is to present the history of organisational reforms in Nippon Railway Co., the largest railway company in Meiji Japan, focussing mainly on the relationship between the personnel management and the internal organisation of the company. Through this work, I intend to have some insights into the background and implications of the formation of modern business enterprises in Japan.

In the seminal work *The Visible Hand*, which discusses the development of the modern business enterprise in the U.S., Chandler summarises the characteristics of the modern business enterprise into two points[1]: 1) it consists of multiple distinct operating

[1] Chandler 1977: 1.

units; 2) it is managed by a hierarchy of salaried executives. Based on those observations, he vividly depicts the process of the emergence of the first modern business enterprise and the class of salaried managers in the U.S. railway industry. In particular, the decentralised divisionalised structure introduced by J. Edger Thomson in 1857 to the Pennsylvania Railroad was an epoch-making event in the history of the modern business enterprise. According to Chandler, the Pennsylvania Railroad was the first American business to work out fully the line-and-staff concept of departmental organisation.[2] In the process of development and diffusion of this organisational form, the class of salaried managers was formed in the U.S., and accounting skills for managing organisations were developed, thus shaping an archetype of the modern business enterprise.[3]

As Chandler notes, due to industrial characteristics such as the large scale of capital investment, diversity of functions and the complexities in managing them, and sizeable geographical area, the railway industry led the formation of the elements of the modern business enterprise, including salaried managers and hierarchical management organisation, in addition to the use of multiple business units. Consequently, as Oliver Williamson discusses, in order to cut ballooning operational costs incurred by the unitary form (U-form) of functional organisations, multidivisional organisations (M-form) emerged.[4]

However, as Chandler himself noted, this decentralised divisionalised structure was not universal in the railway industry around the world. It is necessary to note that even in the U.S. the structure was applied only to 'long distance, heavy traffic' railways,[5] and when strategic management decisions, such as the building of new railway extensions, were needed. In fact, in Great Britain, Germany, and Japan, the basic organisation of railway companies was functional organisation, and the decentralised divisionalised structure was not diffused even in the beginning of the twentieth century.[6] Hence we need to examine the reasons why a specific company adopted the decentralised divisionalised structure in a specific time period by investigating not only changes in the external environment such as in the market, but also by investigating the internal issues of the company. Regarding these points, Chandler also made a detailed examination of the developmental process of decentralised divisionalised structures, mainly using the case of the Pennsylvania Railroad. However, as many researchers have pointed out, he excluded important

[2] Chandler 1962: 38.

[3] Chandler 1977: 105-21.

[4] Williamson 1975: 133-6.

[5] Chandler 1977: 106-7.

[6] Ibid. See Channon 2001: 142-7 and Yuzawa 1988: Chapter 6 for the case of Great Britain, and Kocka 1992: Chapter 6 for Germany.

aspects of business management, including personnel management and industrial relations, from his analyses; thus he makes no mention of inherent aspects of organisational reform.[7] However, as this paper shows with respect to the case of the Nippon Railway Co., personnel management was one of the determinants of the organisational structure. Nippon Railway Co. adopted an American-style decentralised divisionalised structure in 1903 and became the pioneer of modern business enterprises in Japan.

Nippon Railway Co. was established in 1881, capitalised at 20 million yen with an eight percent dividend guarantee from the government. A total of 557 miles of railways was planned, between Ueno and Takasaki, and between Omiya and Aomori. The company contracted with the Imperial Government Railway Company to construct railways, and to provide engine drivers and track maintenance, from the establishment until the opening of the planned railways. However, taking advantage of the opportunity of the full opening of the railway in 1892, the company cancelled the contract with Imperial Government Railway and gained managerial independence.[8] Along with the development of its business, the company implemented several organisational reforms until it was nationalised in 1906, and it continuously led the development of railway company organisation throughout the period. In particular, the development of a hierarchical functional organisation from 1892 to 1899, and the introduction of a decentralised divisionalised structure in April 1903 were innovative organisational reforms, which influenced not only the railway industry but also other industries in Japan. Hence, the development of business organisation in Nippon Railway Co. is an important research subject not only from the perspective of the history of the railway industry but also from the perspective of management history in Japan.

However, we have few studies on organisations in railway companies from those perspectives.[9] Even with regard to the introduction of the decentralised divisionalised structure in Nippon Railway Co., only a biography of Eitaro Yamada (a section chief of the General Affairs Section in Nippon Railway Co. in 1903), one of the leaders who led the organisational reform, examines the process of the reform and Yamada's role in it.[10] Therefore, focussing on the organisational reforms of 1899 and 1903, this paper attempts to 1) chronologically describe the process of organisational reforms 2) elucidate trends inside the organisation, focussing on personnel management before and after the organisational reforms. With regard to 2), using employees hired by the headquarters, who were at the core of the business organisation, as the main

[7] Lazonick 1990, Suzuki 2000 and Taniguchi 2002.

[8] See Nakamura 1998: Part 1.

[9] Yuzawa 1992.

[10] Yamada Eitaro Den Hensan-iinkai (ed.) 1995.

research objects,[11] I will analyse personnel transfers before and after the organisational reforms, focussing on a) changes in the ranking system; b) changes in trends of hiring and firing; c) methods of transfer and promotion, and consider the background and influence of the decentralised divisionalised structure in Nippon Railway Co..

The major data source used in this paper is the Nippon Railway employee database, which is newly compiled and contains 28,067 sets of the panel data of employees hired by the headquarters for 1898, 1899, 1900, 1901, 1902, 1903, 1904 and 1906. It is based mainly on three sources: '*Shokuinroku* (Staff list) 1898-1901'; '*Shahō* (the company's in-house magazine) 1902-4'; and '*Kaisan irōkin haibun tenmatsu hōkokusho* (A detailed report on bonuses distributed upon liquidation) 1906'. Advantages of this data set are that it includes data on individual names, division/section, work location, job, status, and salary (except for 1906) at the end of each year, and that personnel changes such as hiring, resignation, salary increase/promotion, and change of surname are recorded from 1902. On the other hand, the data is limited to employees who were hired by the headquarters. Nevertheless, employees hired by the headquarters were the core of railway business management during this period,[12] thus this data set is sufficient for examining the issues raised in this paper.

I. Formation of the functional organisation

1. Managerial independence and business organisation in Nippon Railway Co.

In April 1892, the railways of Nippon Railway Co. reached Aomori (at the north tip of the Honshu, the main island of Japan), which meant that the all of the lines which the company planned when it was established were completed. Then, Nippon Railway Co. cancelled the contract with the government to operate the railways and started controlling overall management by itself. With this change, the company, which had

[11] In Nippon Railway Co. there was a clear demarcation between people hired by the headquarters who consisted of three ranks of employees: directors (*Shuji*) and engineers; clerks and assistant engineers; employees (*Koin*), and people hired by divisions or sections (*Bu-ka Yatoi*). In the employees rank, in addition to the low level clerical white-collar employees in shops such as telegraph operators and conductors, blue-collar employees such as yardmen, engine drivers and engine driver assistants were also included.

[12] As of the end of 1899, the share of employees hired by the headquarters was more than 40 per cent even in the operational sections, except for factories and the Track Maintenance Section which used many workers and labourers. '*Houkoku*' (A Semi-annual Business Report) (second half of 1899).

had only non-operational sections (General Affairs, Accounting, and Storage), had to establish an organisation which included operational sections. Therefore, the company established three new sections – Construction, Engines and Traffic – and started managing work organisations.

In April 1892, Isaburo Kanbara,[13] deputy director (*Kanji-ho*) of the Traffic Section, submitted a proposal to the Traffic Section Chief. In the proposal, he asserted that the company should set up a new organisation which would apply the 'benefit of division of labour' in order to respond to the extension of railway lines. Moreover, he proposed to introduce a decentralised organisation by dividing the whole railway system into several geographic divisions and placing a superintendent in each division, who would have delegated authority from the Traffic Section Chief.[14]

----------Figure 1 near here----------

Figure 1 shows Kanbara's idea. We can see that Kanbara aimed to create a clearly stratified decentralised organisation. In response to this proposal, the Traffic Section decided to introduce a divisional structure based on Kanbara's idea in July 1892. The position of the division superintendent was created in Sendai and Morioka, with the Sendai division superintendent covering traffic duties between Fukushima and Ichinoseki (108 miles) and the Morioka division superintendent covering traffic between Ichinoseki and Aomori (182 miles). The Traffic Section Chief announced that wide ranging authorities would be delegated to the division superintendents according to twenty-nine '*Jimu Itaku Jōken'*(conditions of delegating clerical work), printed in the '*Un'yuka hō'*(the Traffic Section's in-house magazine).[15] The delegated authorities included important ones such as 1) the authority to operate trains and issue orders regarding service, 2) authority over personnel management of employees who were hired by divisions or sections, 3) authority to issue and discount train tickets and 4) authority to conduct external negotiations. Moreover, the division superintendents were only asked to produce a monthly report as an obligation to the Traffic Section Chief. From those facts, it can be said that in practice the division superintendents held absolute power over traffic duties, while the Traffic Section Chief collected information in a form of monthly report. As a result, together with areas south of and including

[13] A graduate from the Department of the Civil Engineering, Engineering College (Kobu Daigakko, the forerunner of the Faculty of Engineering of the University of Tokyo). He was assigned to be deputy director of the Traffic Section in August 1889. It is highly suggestive that a civil engineer was responsible for train operation and led the organisational reform, in comparison to the importance of the role of civil engineers in the organisational development process in the US railway industry (Chandler 1977: 95).

[14] 'Ikensho' (Proposals) (April 1892) in Kanbara (unknown).

[15] Nippon Railway Co.1892: Number 9, 22 August 1892.

Fukushima district which were controlled directly by the Traffic Section Chief, decentralised organisations which controlled train operations were formed in each district.

Having been stimulated by this organisational reform in the Traffic Section, other functional sections undertook the establishment of decentralised organisations. First, in September 1892, the Construction Section was divided into four regional subsections – Ueno, Oyama, Fukushima and Morioka. In the case of the Construction Section, the extent of decentralisation was more thorough than that of the Traffic Section. Each subsection autonomously constructed and maintained railways under each subsection manager. In the Engine Driving Section, an organisational structure was created where each engine shed was separately managed by the headquarters and two branches in Fukushima and Morioka, by the end of the same year. As a result, at the end of 1892, the organisation of Nippon Railway Co. came to be a functional hierarchy. As many other railway companies at that time, including the Kyushu Railway Co., adopted a unitary form of functional organisation,[16] the hierarchical organisation in Nippon Railway Co. was pioneering in Japan.

2. Expansion of transportation and managerial disorder

The Sino-Japanese war (1894-95) was one of the watersheds in the history of the Japanese railway industry. The Imperial Government Railway started rapid expansion of railway lines after 1896 through full-scale implementation of a railways construction plan, which had been formalised in the Railway Construction Law (1892). In the private railway sector, many companies were established in the second railway boom which occurred around the Sino-Japanese war. Meanwhile, existing railway companies, centring on the big five railway companies, also expanded rapidly through the extension of railway lines and mergers of other companies. In addition, the rapid industrial development after the war expanded the transportation market, and railway transportation finally began full-scale development.[17]

Nippon Railway Co., which had already opened all planned railways by April 1892, further opened the Tsuchiura line (Tabata-Tomobe, later Joban line) and Sumida line in 1896, and bought out Ryomo Railway Company in January 1897. In this period, the company reinforced its transportation capacity by making the Omiya-Ueno line a double track (completed in April 1894). In December 1894, construction of the Omiya Workshop was completed, which enabled the company to prepare for the manufacturing and maintenance of its own railway rolling stock. While expanding those capital investments, as Figure 2 shows, traffic density started to increase in 1894.

----------Figure 2 near here----------

[16] Nakamura 1998: Chapter 8.

[17] Nakamura 2002: 26.

The passenger traffic density (average numbers of passengers per day per mile) was 674 persons per day per mile in 1893. It increased to 1,096 persons per day per mile in 1897, a 60 per cent increase in only four years. The freight traffic density (average amount of freight per day per mile), on the other hand, increased by 80 per cent, from 244 tons per day per mile in 1893 to 453 tons per day per mile in 1897. Despite the rapid increase in traffic density, the company successfully controlled the increase in operating costs at a reasonably low level, as Figure 3 shows. As a result, from the second half of 1894 to the first half of 1897, the company was financially successful – operational costs were around 40 per cent of all costs, and return on equity (ROE) was around 10 per cent (see Figure 4).

----------Figure 3 and 4 near here----------

In 1898, however, the company's financial performance suddenly deteriorated. The current account balance consecutively declined in the second half of 1897 and in the first half of 1898. The ROE, which recorded 11 per cent in the first half of 1897, steeply decreased to 6.1 per cent in the first half of 1898. At the same time, the dividend rate which was 11 per cent in the first half of 1897, diminished by half, to 5.5 per cent. The main cause of this deteriorating financial performance was the steep increase in operating costs per mile, which had begun in the second half of 1897. In particular, as Figure 3 shows, the increase in the costs of engine driving, and repair and building of rolling stock were remarkable in the first half of 1898. Comparing the first half of 1897 and the first half of 1898, we find that these two costs increased by 612,192 yen, which was 53 per cent of the total increase (1,157,903yen) in operating costs. The main causes of these increases were the increase in fuel expenses due to the steep rise in coal prices, and the increase in building and repair costs due to the opening of the Joban line which was used mainly for coal transportation.

Furthermore, from February 24th to March 6th in 1898, a well-known, serious engine drivers' strike (Nittetsu Kikankata Sōgi) occurred, aggravating the confusion of the company. The engine drivers of the Nippon Railways Co. issued four requests in this dispute: 1) to raise wages; 2) to improve the status of engine drivers to be equal to that of the clerks 3) to change the job title of engine drivers and 4) to rehire dismissed employees. They conducted the strike at all engine sheds except for Ueno, and all their requests were accepted by the company.[18] A pressing concern caused by this dispute for the management was that the increase in engine drivers' wages also led to increases in related personnel costs. Engine drivers' costs accounted for 10.2 per cent of all engine driving costs in the second half of 1897; this then steeply increased to 11.6 per cent in the second half of 1898 and 14.2 per cent in the second half of 1899. In addition, the request to raise the engine drivers' status made a substantial impact on the overall framework of the company's ranking system, which is discussed later. Moreover, with

[18] Aoki 1979: 12.

this dispute as a turning point, a trade union called Kyōseikai (Reform Group), which all the engine drivers had an obligation to join, was formed.

Masahisa Aoki proposes two reasons why the management lost in the dispute: the strong solidarity of the engine drivers and support by engine drivers of other companies, including the Imperial Government Railway. However, from the point of view of this paper, it is also important that the organisation of the company at that time was a functional hierarchy, which caused the lack of communication between functional sections. As mentioned above, each function established geographical divisions from 1892; by around 1898, the geographical area covered by each administrative division had come to vary function by function, and hence the company's organisation had become one where orders from the headquarters only flowed down along vertical lines. This structure divided the employees by function, and it also made it difficult for the headquarters to coordinate the whole company. Moreover, the top executives were overwhelmed due to having to deal with other problems such as management scandals[19] and the Government's rejection of a proposed revision of a bylaw[20] in the period from 1897 to 1898. In general, severe burdens are put on senior managers' management capacity in a functional organisation,[21] and in Nippon Railway Co. the senior managers' capacity reached the limits in this period.

The declining financial performance and chaotic managerial situation had a negative impact on the stock price of the company, which had been regarded as a blue-chip stock until then. In July 1897, the stock price of the paid-up shares of the Nippon Railway Co. with a 50 yen face value was above 100 yen. However, it declined to 76yen at the end of the year, and further declined to 64 yen in March 1898.[22] As a result of the sudden decline of the stock price, together with a 50 percent reduction of the dividend, a group of shareholders blamed the management. In particular, the "reform group" pushed for replacement of the management and confronted Jūgo Bank, the largest shareholder, which supported the management. Eventually in August 1898, by a vote at the shareholders meeting, Yūjun Soga (a former lieutenant general), who was supported by the "reform group" was appointed as the president. In this manner, Nippon Railway Co. set out toward reforms of its business organisation and systems through dramatic changes in the board members.

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[19] An incident concerning misappropriation of transporting salaries for armies by a head of statistics in the Traffic Section. Detected in April 1897.

[20] An issue in which the government rejected the management's attempt to enforce a revision of a bylaw, in defiance of the quorum of the general meeting(Yamada Eitaro Den Hensan-iinkai (ed.) 1995: 97-102). The revision had aimed to remove the restriction of large stockholders' rights to vote in general meetings.

[21] Williamson 1975: 133-4.

[22] Yamada Eitaro Den Hensan-iinkai (ed.) 1995: 97.

3. The first organisational reform and the ranking system

The new executives led by Soga implemented accounting reforms aimed at reduction of fixed costs and operating costs as well as purchasing reforms centring on selling off redundant stocks.[23] After that they undertook organisational reform mainly in the Traffic Section.

For Nippon Railway Co., whose railway lines expanded due to the opening of the Tsuchiura (Joban) line, and whose train schedule and train operations became complex due to the increase in freight traffic, optimisation of the train operation was an urgent problem to be solved. Hence, in November 1898, the Train Operation Office, which was to be in charge of both train scheduling and train operation, was established in the Traffic Section.[24] Isaburo Kanbara, who played the leading role in organisational reform in the Traffic Section in 1892, was assigned to be the first chief of the Train Operation Office.[25] Furthermore, in January 1899, the company introduced the Traffic Division in Ueno and Utsunomiya, in addition to the divisions already established in Sendai, Morioka and Mito.[26] The aim of this reform was to limit the span of control of the headquarters in Ueno, which had covered a vast area, to the Daiichi-ku Sen (the first district lines: Takasaki-line and Shinagawa line) and freight lines in Tokyo city in response to the increase in freight traffic.

The organisational reform centralising train operation and reorganising of the functional divisions brought immediate results. According to a study by Masaki Nakabayashi, Nippon Railway Co., and Imperial Government Railway achieved swift and smooth transportation of raw silk cocoons, transporting them from areas along the Nippon Railway lines to Suwa region by the discretionary distribution of specialised wagons to Akihabara station and stations along the first district lines of the Nippon Railway Co., and by transportation based on meticulous operation plans. It should be noted that the company did not distribute raw silk cocoon wagons to all stations, but concentrated on stations in the Ueno division. In 1900, raw cocoon wagons always stopped at Takasaki station (in the case of the Mito line and the Ryomo line) or Akihabara station (in the case of the Tsuchiura line and the Sumidagawa line) or Omiya station (in case of the second district lines: Omiya – Shirakawa), for transhipment or relaying of freight. By doing this, raw silk cocoon wagons were inevitably at least once under the supervision of the Ueno Traffic Division Superintendent, which enabled the company to avoid over-shipping or confusion of train operation due to

[23] Ibid.: 108-109.

[24] Nippon Railway Co.1903: 50.

[25] Nippon Railway Co. Staff List 1899(as of 15 November 1899).

[26] Nippon Railway Co. (unknown): 235.

mismanagement.[27] This success in raw cocoon transportation was arguably achieved due to the organisational reforms, including the establishment of the Train Operation Office, which enabled harmonious operation of the specialised wagons, and subdivision which was achieved thorough traffic control.

Around the same time as the organisational reform in the Traffic Section, an organisational reform was also under way in other departments including the Track Maintenance Section and Engine Driving Section. In October 1899, the company enacted the "Shokumu Shōtei" (Organisational Chart) and the "Jimu Bunshō Kitei" (Rules of the Office Duties), thus beginning reforms of the organisation and the ranking system (the first organisational reform). The main part of the reform was the establishment of seven functional sections, i.e. General Affairs, Accounting, Storage, Traffic, Engine Driving, Track Maintenance, and Workshop, each of which, in turn, was divided into two to six regional divisions (Figure 5).

----------Figure 5 near here----------

Whereas the modes of division of regions were different section by section before the reform, after that the modes were standardized for the three operational sections (Traffic, Engine Driving and Track Maintenance). Also, each functional section was delegated authority by the headquarters to control the relevant issues.[28]

In many studies, this organisational reform was considered to be successful in rationalisation of administrative works by transferring accounting jobs from functional divisions to the Accounting Section, and in personnel reduction by rearrangement of the organisations.[29] In fact, the company fired 33 stationmasters in the Traffic Section, 15 engineers and assistant engineers in the Track Maintenance Section, and 19 directors (*Shuji*) and clerks in the Storage Section and the Accounting Section, after the first organisational reform. Particularly, as the Traffic Section implemented subdivision of divisions, senior stationmasters who had been assigned to main stations with high salaries became redundant. Meanwhile, in the Track Maintenance Section, as they finished construction of the new lines, expert engineers with high salaries were dismissed. In contrast, although eight engine drivers resigned in the Engine Driving Section, this was an average number of resignations at this period; therefore it could not be regarded as a special personnel reduction.[30] In fact the emptied positions were filled afterwards with assistant engine drivers who were promoted from being engine cleaners.

In addition to the above organisational reform, *Shokumu Shōtei* (Organisational

[27] Nakamura 2003: 126-8.

[28] Nakamura 2003: 123-6.

[29] Yamada Eitaro Den Hensan-iinkai (ed.) 1995: 115.

[30] According to Aoki's study, the average number of engine driver resignations (including resignation due to death) during 1900-1902 was 11.0 (Aoki 1977: 40).

Chart) implemented an important change in the ranking system. Before 1898, there were four ranks in the company: senior managers (*Koto Yakuin*), middle managers (*Tsūjyo Yakuin*), employees hired by the headquarters (*Koin*), and employees hired by divisions or sections (*Bu-ka Yatoi*). The employees at and above the manager level were all white-collar. Therefore, blue-collar employees such as engine drivers and foremen could not become managers even if their salaries were high.[31] Furthermore, the salaries for senior and middle managers were paid on an annual or monthly basis, and bonuses were paid once a year (one sixth of the salary).[32] In contrast, most of the other employees were paid on a daily basis, and bonuses for engine drivers were set at half the amount of the bonus for managers.[33] In other words, the difference in rank corresponded to the way in which salaries were paid.

----------Table 1 near here----------

The new ranking system introduced by the first organisational reform is shown in Table 1. First, it is noted that the new system introduced functional classifications such as engine driving, mechanics, and civil engineering into the assistant engineer rank. As a result, the engine drivers were promoted to the rank of the assistant engineer in engine driving, which means that they were promoted to the manager level. This was in response to the request in the engine drivers' strike mentioned above. Another point to be noted is that new managerial positions such as assistant clerk and assistant engineer trainee were created. Employees such as engine driver trainee, foremen and deputy foremen, who had been excluded from the management ranks, were subsumed into the new positions. The framework of managerial positions of the company expanded from a white-collar-only structure to a structure which included the upper level blue-collar workers, in the process of the company's ranking system review which had been implemented with the engine drivers' strike. This was the beginning of the 'white-collarisation of blue-collar employees', a remarkable process which occurred after the Second World War. In addition, it was especially notable as the process was implemented as a result of management's concessions to the demands of the labourers.

However, it should be noted that the engine drivers were not directly promoted to the rank of assistant engineer, but that a new category of "assistant engineer in engine driving" was created, and this position was paid wages on a daily basis. Therefore, what advantages did engine drivers really obtain when they were promoted, while still receiving pay on a daily-wage basis? There was no pecuniary improvement, apart from the improvement in bonus treatment which previously had been different for managers and standard employees. It may have been be important for the employees that new

[31] '*Shoku Dai 40-gō Honsha Shintatsu 22*' (August 1896) in Nippon Railway Co.1898.

[32] *'Yakuin Shōyokin Shikyū ni Kansuru Reiki'* (enacted in 1893) in Nippon Railway Co.1903: 254.

[33] Aoki 1979: 10.

career opportunities were opened to them. In fact, in the Engine Driving Section, positions such as engine shed managers, assistant managers, and driving inspectors were created by the organisational reform and some engine drivers were assigned to the new positions.

4. Labour force structure after the organisational reform

How did organisational reform affect the labour force structure of the Nippon Railway Co.? The proportion of middle and senior managers increased from 6.7 per cent to 11.3 per cent, which went along with the trend from 1899. A breakdown of the data shows middle managers increased, whereas senior managers decreased. The number of middle managers increased from 605 in 1898 to 1,042 in 1899. This increase of middle managers was due to the promotion of operating staff. In fact 430 operating staffs (297 engine drivers, 19 foremen and deputy foremen, 20 track maintenance assistants, 94 traffic related operating staffs) were promoted to middle manager (Table 1).

However, after the increase of middle managers due to the ranking system reform, the increase continued and was accelerated from 1900 to 1902. The ratio of the managers to total employees went up to 14.1 per cent in 1902. Breaking down the managers by function, we find that the managers in the General Affairs Section were doubled from 32 in 1899 to 62 in 1902. In this period, the total number of employees in the General Affairs Section was also doubled. Oliver Williamson pointed out that the enlarged functional hierarchy entails huge costs for coordination and communication among functions and strata.[34] Arguably the sharp increase in the number of employees in the General Affairs Section reflected the rise of coordination and communication costs.

----------Table .2 near here----------

We now analyze the characteristics of the labour force structure in this period focussing on employees' years of service (Table .2). It should be noted here that years of service of employees were relatively long in the Nippon Railway Co. According to Shinji Sugayama, the standard number of years of service of middle and lower level managers in Yawata Steel, the state owned iron works, was one to two years.[35] In contrast, in the Nippon Railway Co., the proportion of employees serving for four years and more[36] among clerks and assistant engineers was 60 – 80 per cent. The proportion

[34] Williamson 1975: 133-4.

[35] Sugayama 1993: 25.

[36] In Japan Railway Co., the established standard of years of service in the company was regarded as being three years and more; if an employee resigned with less than three years service, he was not paid retirement allowance('*Shokuin Taishoku Kyūyokin Kisoku*' (enacted in July 1898) in Nippon Railway Co.1903: 260-1).

of employees whose years of service were four or more among employees hired by the headquarters (*Koin*) was 35.1 per cent. With respect to the assistant engineers in engine driving (95.4 per cent served for four or more years) and clerks and deputy clerks in the Traffic Section (86.8 per cent), service years were especially long. For these functions, we can say that internal labour markets as described by Masahisa Aoki were formed.[37]

Next, we analyze the number of employees in and after 1899. In 1899, when the organisational reform and the personnel reductions were implemented, the number of employees was as small as 149. However, after 1900, the company hired more than 400 employees each year. The increase was particularly large for positions in the General Affairs Section, in the Traffic Section and in the Accounting Section. In the General Affairs Section, 62 per cent of employees (59 out of 95) were hired in and after 1901. This fact may reflect the above-mentioned high coordination and communication costs. At the same time, employees also increased rapidly in the Traffic Section. Regarding the 518 employees hired in 1900 and 1901, the following four points should be noted: 1) 465 employees worked at stations, whereas 53 employees worked in the head offices; 2) only three people were hired as managers (deputy stationmaster or freight manager); 3) the composition of employees working for stations by function was 207 telegraph operators, 137 conductors, 67 freight clerks, 27 booking clerks, and 24 yardmen; 4) the distribution of their daily wages was concentrated around 0.35yen.[38] As has been mentioned, in 1899 the company implemented a reduction of blue-collar workers and fired veteran station officers with relatively high salaries. However, the number of stations was never reduced, with the gradual increase in freight traffic, duties related to transportation gradually increased. Hence it is considered that the company hired white-collar operational employees and blue-collar workers with low salaries in order to deal with the situation. However, the rate of increase in unskilled employees was faster than the rate of increase in traffic density; as a result a decrease in labour productivity came to the surface around 1902.[39]

5. Business performance of Nippon Railway Co. 1899 – 1902

The effect of the first organisational reform is reflected in Figure 4. In the first half of 1898, ROE decreased by 45 per cent compared with the first half of 1897 and stagnated

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[37] Aoki 1979: 29-31.

[38] The median and the mode was 0.35 yen, the mean 0.38 yen, and the standard deviation 0.06 yen. According to a salary table of the Nippon Railway Co., a daily wage of 0.35 yen corresponded to the eighth grade of daily-wage grades, and it was one rank higher than the minimum wage of the employees (ninth grade, at or less than 0.3 yen) (Nippon Railway Co.1903: 225).

[39] '*Nittetsu Kubo Un'yu Kacho no Enzetsu*' (A speech by Mr. Kubo, a Traffic Section Chief). '*Tetsudo Jiho*' (The Railway Times) Number158 (27 September 1902): 8.

until the first half of 1899. However, it recovered sharply in the second half of 1899. Then, after 1900, it stabilised around 12 per cent per year. During this period, the return on investment (ROI) also showed the same trend as the ROE, as the ratio of liabilities to net worth shifted to lower levels. The biggest factor which contributed to the recovery of profitability was the increase in the ordinary profit along with the decrease in the operating costs per mile.[40] There were two factors which contributed to the decrease in the operating costs: 1) the decrease in engine driving costs caused by the decrease in the coal price[41] and 2) the decrease in personnel costs in the Traffic Section and the Track Maintenance Section,[42] which, in turn was mainly due to the personnel reductions mentioned above.

Meanwhile, labour productivity (value added per employee) decreased to 406 yen in 1898, and after that it gradually recovered to 647 yen in 1901. In contrast to this, labour share of costs decreased. In other words, the company enjoyed most of the gains in labour productivity. In this period, as previously mentioned, wages increased in the Engine Driving Section due to the labour movement. Therefore, the decline in the labour share was mainly due to the personnel reductions in the Traffic Section and the Track Maintenance Section. However, in 1902, labour productivity again decreased to the level of 500 yen. One of reasons for this may have been the gradual decrease in return on sales (ROS) from 1901 to 1902. An increase in operating costs (especially the general costs) may have accounted for this decrease in the ROS.[43] This was arguably caused by the enlargement of the administrative divisions due to the expansion of the functional organisation. In addition, with respect to the Engine Driving Section the labour movement was another factor in labour cost increases.[44]

The Kyoseikai union, which was formed during the engine drivers' strike,

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[40] 42 Operating costs per thousand miles was 625 yen in the second half of 1899, which was a 108 yen reduction from the second half of 1898 (733 yen) (Nakamura 2003: 117-8).

[41] The purchase unit price of coal for Nippon Railway Co. decreased from 8.4 yen per ton in the second half of 1898 to 5.4 yen in the second half of 1899(Nakamura 2003: 119).

[42] Personnel costs in the Traffic Section decreased from 278,999 yen in the second half of 1898 to 271,649 yen in the second half of 1899. In the Track Maintenance Section, costs were also reduced from 55,265 yen to 46,233 yen. In total costs were reduced by16,282 yen. Nippon Railway Co.'*Houkoku*' (A Semi-annual Business Report) several issues.

[43] Nakamura 2003: 118.

[44] The cost of engine drivers increased from 8.8 per cent of the total costs in Engine Driving Section in the first half of 1898 to 13.5 per cent in the first half of 1900(Nakamura 2003: 119).

strived to raise wages and maintain employment for the engine drivers and assistants. Following the Kyoseikai, other unions such as a platelayer union and a mechanics union, became active.[45] In response to this, the company proceeded to offer conciliatory measures to the engine drivers and assistants, and then drove Kyoseikai into dissolution by making use of an accident involving the Emperor's Train[46] as an opportunity to use police pressure against the union.[47] The company succeeded in reorganising the Kyoseikai into a management-led employees' association as a form of research group (Kenkyukai). To accomplish this, the company implemented additional conciliatory measures, such as changing the method of salary payment for assistant engineers in engine driving from a daily wage to a monthly wage, and stopping personnel reductions in the Engine Driving Section over 1901 to 1902.[48] While these measures calmed labour movements, it did not contribute to increasing labour productivity. In fact, labour productivity decreased from 1902. The company started groping for ways to reduce redundant personnel while avoiding the re-emergence of functional labour movements.

II. Introduction of the multidivisional organisation and its consequence

1. Establishment of the Business Operations Division

The organisation which was introduced by the organisational reform in 1899 was efficient in implementing each function of the railway business, as it was formed based on the experiences which the company had accumulated for a long time. In fact, most railway companies including the Imperial Government Railway adopted the functional organisation.[49] However, if the functional organisation becomes as large and complex

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[45] Ikeda 1979: 60-8.

[46] An incident whereby on 10 November 1901, two trains nearly collided near Semine station, as the Traffic Section Chief let the Imperial Train depart despite the forerunning train having stopped with engine trouble (Rodo undo shiryo kanko-iinkai (ed.) 1962: 623-8).

[47] See Rodo undo shiryo kanko-iinkai (ed.) 1962: 620-30 and Nakanishi 2003: 883-4 about the details of the dissolution of Kyoseikai.

[48] Only three had been paid monthly from among 123 engine drivers in 1901. In contrast, 136 out of 137 engine drivers were shifted to monthly basis wages in 1902. There were advantages included with monthly-based salaries – full salary for up to 90 days sick leave and 30 days absence for personal matters was guaranteed(Woo 2003: 56).

[49] 38 companies from among 40 railway companies which had already been established in 1900 adopted functional organisation, whereas the remaining two companies adopted a simple hierarchy. In 38 companies which adopted functional organisation, five of them, Imperial Government Railway, Nippon Railway, Sanyo

as in the case of Nippon Railway Co., it is likely that such problems as lack of communication, loss of control between functions or strata, and overloading of administrative duties on senior managers, come to be serious.[50] In fact, by the 1900s, the Nippon Railway people recognised that there were difficulties in communicating between functions on the ground, as well as a lack of communication among section chiefs.[51]

Moreover, administrative costs (total costs) as a proportion of operating costs increased from 9.7 per cent in the first half of 1899 to 16.8 per cent in the first half of 1903, due to expansion of investigative work for the purpose of divisional functions and controlling information (Figure 3). In addition, as Table 3 shows, the number of employees, which had been decreased by the organisational reform in 1899, again started increasing, and consequently operating income per head started declining.

----------Table 3 near here----------

In the face of the various problems mentioned above, the management of the Nippon Railway Co. started searching for a new organisational form at the beginning of 1903, and introduced a new organisation in April 1903 (Figure 6). The most notable characteristic of the new organisation was its clear demarcation between the line (Business Operations) employees, and the staff employees (Comptroller, Treasurer, General Affairs and Advisory).[52]

----------Figure 6 near here----------

The Business Operations Division, in turn, was divided into five regional divisions. The General Superintendent of the Business Operations Division delegated the following powers to the superintendent of each regional division (Division Superintendent): 1) authority to supervise and direct employees who had been hired by the headquarters (below clerk and assistant engineer level); 2) authority over appointment or dismissal of employees who had been hired by the divisions (hired locally); 3) management of the operations and distribution of trains; 4) authority to make direct requests to the factories for the maintenance of rolling stock and for spare parts; 5) authority to make direct requests for construction expenses.[53] The division superintendents were to have unitary control over operating functions in sites such as stations within the districts under jurisdiction, and over track maintenance and engine

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Railway, Kyushu Railway, and Hoshu Railway, changed to multi-layer organisations. From calculations by Kinoshita 1900.

[50] Williamson 1975: 134-6.

[51] A talk by the president Soga in '*Tetsudo Jiho*'(The Railway Times) Number189, 2 May 1903.

[52] 'A talk by the president Soga' in Nippon Railway Co.'*Sha-ho*' Number 1277, 14 April 1903.

[53] '*Jimu-Shochō Kariinin Jikō*' (18 May 1903) in Nippon Railway Co.1903: 79-80.

sheds. In order to avoid confusion due to the organisational reform at this time, the Business Operations Division made detailed work manuals in June 1903 in order to systemise work patterns.

Meanwhile, employees at the headquarters were under the direct control of the president, in order for them to support strategic decision making by the top management. Notably, the Treasury Section was moved from the Accounting Section to the General Affairs Section, which was the core of the headquarters' employees, in order to keep it away from day-to-day accounting work. By doing this, it became possible to ensure quick fund raising activities to achieve long-term management strategies. In addition, in order to control the bloated organisation, the Comptroller Department, which had previously been inside the Accounting Section, became independent as the Comptroller Section. It was an attempt to enforce the control of the flow of information through statistics.

2. Background of introducing the decentralised divisional structure

The new organisation of the Nippon Railway Co. was similar to the decentralised divisional structure[54] that the Pennsylvania Railroad had first adopted in 1857, and which had then gradually diffused in the major companies in the United States by the 1880s. Yūjun Soga, the president of the Nippon Railways Co. at that time stated as follows.

> As a result of the research on organisations in railway companies in Great Britain and the U.S., we have built the organisation which we just announced, and this system conforms to the principles of organisation in American railway companies.[55]

As Soga wrote, comparing the merits and demerits of the Great British style (functional organisation) and the American style (divisional organisation), Nippon Railway Co. ventured to establish a decentralised divisional organisation modelled on "American railway companies".

Soga also mentioned "…the fact is, there was a great distance between sections, and there was a lack of communication among them,"[56] which implies that the first purpose of this organisational reform was to resolve the lack of communication and information flow between functions. This problem became apparent in the engine drivers' strike in 1898. When the movement of engine drivers grew rapidly, the company's response was forestalled. One of the reasons for the delayed response was

[54] Chandler 1977: 106-8, 120-1.

[55] '*Tetsudo Jiho*'(The Railway Times) Number 189, 2 May 1903.

[56] Ibid.

that the company regarded the movement as a problem within the Engine Driving Section, and other functional sections including the Traffic Section, had nothing to do with it. This is evident from the fact that the Traffic Section Chief acted as a mediator in the settlement of the dispute between the Engine Driving Section Chief and the representatives of the engine drivers.[57] It implies that the Traffic Section Chief was regarded as the "third party." At that time, the Engine Driving Section and the Traffic Section were independent of each other like feudal lords in the pre-modern period.

Furthermore, lack of coordination and communication was also a problem on the shop floor level. For example, President Soga stated, '… if there is trouble with a train, engine drivers lay the blame on conductors' error, and conductors, in turn, lay the blame on engine drivers' error. Thus it always becomes an endless dispute.'[58] Also, regarding the request of the mechanics for improvement of their working conditions, Kyoseikai, the union of the engine drivers not only 'expressed no sympathy,' but also it displayed a 'contemptuous' attitude.[59] It is easy to imagine that because of this extremely vertically demarcated structure, communication between functions was impeded, which caused inefficiency. For example, one of the causes of the accident of the Emperor's Train mentioned above was a lack of communication between the Engine Driving Section and the Traffic Section. There was an urgent need for Nippon Railway Co., to recover its productivity by improving communication between the functions and work efficiency.

The second purpose of this organisational reform was the reduction of personnel costs. In the first organisational reform, Nippon Railways Co. could reduce some of the personnel costs by firing middle and upper class managers with high salaries in the Traffic Section and the Track Maintenance Section thorough restructuring of the organisation. However, due to the expansion of functional organisation, the number of employees in the administrative sections, especially in the General Affairs Section, substantially increased and the company could not undertake further personnel reductions in the Engine Driving Section for fear of labour disputes. Therefore, as mentioned above, labour productivity, which had increased once during 1900 to 1901, started decreasing again in 1902 (Table 3). Moreover, labour share which had continued to be at a low level since 1899 started increasing in 1902.

In order to recover profitability, it was necessary to deal with the labour movements. Given this situation, we can infer that the third purpose of the second organisational reform was to prevent labour movements. If one reason for introducing the decentralised divisional structure was to separate labour movements which had developed within vertically separated functions, this purpose would be reflected in personnel management policies put in place after the organisational reform. Hence, in

[57] Rodo undo shiryo kanko-iinkai (ed.) 1962: 22.

[58] '*Tetsudo Jiho*'(The Railway Times) Number 189.

[59] Aoki 1977: 47.

the following section we attempt to check this hypothesis by analysing in detail personnel management practices before and after the introduction of the divisional structure.

3. Personnel management policy after the introduction of the divisional structure.

(1) Transfers and promotions

Personnel changes from 1902 to 1904 are summarised in Table 4.

----------Table 4 near here----------

With regard to the changes in working locations which accompanied change in the geographical domain of the business, the proportion of personnel moved between locations, which had been 12.8 per cent in 1902, suddenly increased to 25.3 per cent in 1903, and stayed at 19.4 per cent in 1904. As for the personnel transfer between functions, the number of transfers was substantially higher in 1903 than the other years. This may be because the Comptroller Section was established as a part of the second organisational reform, and clerical employees were concentrated there. In addition, personnel transfers between on-site functions (stations, engine sheds and track maintenance positions) and off-site functions (divisions, operational and local offices) increased sharply, from 15 persons (0.4 per cent) in 1902 to 70 persons (1.8 per cent) in 1903. Unlike the personnel transfers between functions, which were centred on clerical workers, personnel changes between on-site and off-site functions occurred in every job and rank.

Next, we examine details of these personnel transfers, focussing on local offices which were the core of the decentralised divisional structure.

----------Table 5 near here----------

Table 5 shows the previous jobs of 174 employees who worked in the five local offices – Ueno, Utsunomiya, Sendai, Morioka, and Mito – from 1903 to 1904. In this Table we can observe that 1) the employees who were transferred from former functional offices of the same local offices were only 42.5 per cent of the total, which implies that there were many personnel transfers from other local offices and on-site positions; 2) the employees were transferred from various positions; 3) personnel transfers of on-site employees were mainly between stations, although some people were also from engine sheds and the track maintenance. From these observations, we can infer that Nippon Railway Co. attempted to revitalise information flows between functions, between local offices and between on-site and off-site functions, by gathering people from various functions at local offices which administered local divisions, and by implementing personnel exchanges between distant local offices, and between on-site and off-site positions. In fact, each local office often held social gatherings in order to achieve harmony between functions or between on-site and off-site employees.

----------Table 6 near here----------

Table 6 shows the frequency of salary increases by rank (in part by function).

The overall trend was that the frequency of the salary raise declined over 1903 to 1904. This trend is particularly notable among the senior managers such as section chiefs and directors (*Shuji*), and engine drivers. In particular, with regard to the engine drivers, until 1903, 80 per cent of them had salary raises once or more a year, however that ratio decreased to 50 per cent in 1904. This fact shows that engine drivers and assistants had been given favourable conditions before the organisational reform, but that their employment conditions declined after the organisational reform.

As for promotions, the framework which had been formed by the first organisational reform was not changed by the second organisational change. This framework consisted of three stages 1) employees hired by the headquarters (*Koin*) → assistant clerk/ assistant engineer trainee; 2) assistant clerk/assistant engineer trainee → clerk/ assistant engineer; 3) clerk/assistant engineer → director (*Shuji*) /engineer. The only change implemented by the second organisational reform was that the salary system for the engine drivers of assistant engineer rank changed from daily-basis to monthly basis, thus ensuring that all assistant engineers were basically paid monthly.

Based on those observations, a model career path for engine drivers and assistants can be described as follows. A future engine driver was hired by the section as a cleaner. After working as a cleaner for at least six months, he was promoted to assistant engine driver, which was an employee (paid on a daily basis) hired directly by the headquarters. Afterwards, he acquired skill in engine driving for more than two years through on-the-job training (OJT).[60] Once he established his skills, he was promoted to engine driver trainee as an assistant engineer trainee according to criteria such as 'seniority', skills, and seriousness. His salary had been paid on a daily basis while he had been an assistant engineer trainee. His salary shifted to the monthly basis when he was promoted to assistant engineer. The highest hurdle for engine drivers and assistants in developing their careers was the promotion from assistant engine driver to engine driver trainee. Originally under the OJT training system, there was a kind of apprentice relationship between engine drivers and assistant engine drivers. In addition, managers (for example engine shed managers and engine shed assistant managers) had great influence in employees' promotion.[61] Therefore the company could not control engine driver sections, which was a serious constraint in managing employee relations.

In order to resolve this problem, the company introduced examination systems for promoting assistant engine drivers to engine drivers trainees in June 1903.[62] At the first examination held on June 20th, 135 people took the examination for 50 positions, and 38 people passed. The examination revealed that assistant engine drivers who accumulated

[60] Aoki 1977: 35.

[61] Aoki 1977: 36.

[62] Nippon Railway Co.'*Kenkyukai Zasshi*'(Engine Driver's Circle Magazine) Number 18 (18 June 1903) : 3 and Number 19 (28 July 1903) : 7-9.

skills through the apprentice-like system lacked basic knowledge on the structure of locomotives and driving rules. The knowledge of driving techniques could be supplemented by attaining experience and proficiency. However, the lack of understanding of the rules of signals and driving, and the service regulations for engine drivers were serious concerns for train operation. Hence, the company introduced the examination systems not only to aid in promoting staff to engine driver rank, but also in recruiting and promoting staff from lower ranks such as assistant engine drivers and cleaners to the rank of engine driver and assistant engine driver. The Division Superintendents attempted to exercise control over those examinations. These changes meant that the company changed the old apprentice-like training system for engine drivers, and controlled the overall system of promotions by introducing the examination systems.[63]

The engine drivers and assistants whose vested interests were threatened were against those changes. However, they did not undertake a dispute again as they had lost power due to the dissolution of Kyoseikai in November 1901, and due to the conciliatory labour management adopted by the company. It seems that during this period, personnel transfers were strategically used by the company to prevent labour movements, and the frequency of the personnel transfers increased due to the introduction of the decentralised divisional structure. The company personnel policies, such as reorganising work organisations through the introduction of the divisionalised structure, disrupting labour connections by instituting personnel changes through organisational reform, and breaking down labour relationships through the introduction of examination systems and the proactive hiring of graduates from vocational schools (covered later), were very effective.[64]

(2) Hiring and firing

The trend of hiring and firing from 1902 to 1904 is shown in Table 7.

----------Table 7 near here----------

The number of resignations increased sharply from 1903, and at the same time, new employment decreased from 1902 to 1903. The resignation rate (number of resignation / average number of employees) also steeply increased from 8.2 per cent in 1902 to 16.4

[63] '*Ekifu / Hosen Kenchiku Kofu / Kurina Saiyo Shiken Kisoku*' (Regulations of entrance examinations for porters, platelayers and cleaners), '*Un'ten Joshu Minarai Saiyo Shiken Kisoku*' (Regulations of entrance examinations for engine driver assistant trainee) in Kanbara(unknown).

[64] This point coincides with Margin's argument that '… these innovations in work organisation were introduced so that the capitalist got himself a lager share of the pie at the expense of the worker' (Marglin 1974: 62), rather than to improve efficiency of production.

per cent in 1904. It is notable that the firing of employees occurred mainly after the introduction of the divisional system in April 1903. Although most of these people left the company through a form of voluntary resignation, at least 131 people who resigned after being transferred to the 'reserve employees list' were in fact fired.

Observing the resignations by rank, we find that many managers resigned in 1903. This fact is reflected in that the average salary of the resigned employees increased greatly in 1903. This implies that the main targets of the personnel reductions were managers with high salaries. If this point is examined from the perspective of function, the following facts can be ascertained: 1) among the directors (*Shuji*) and engineers, the former chief of the Engine Driving Sections and the former heads of offices whose annual salaries were above 2000 yen were fired; 2) among the assistant engineers, many engine drivers (28 people) and assistant civil engineers (12 people) were fired; 3) among the clerks, the proportion of employees in the Business Operations Division, in which most employees were concerned with traffic related work, was overwhelmingly high. This trend was also observed in 1904. From these facts it can be said that the employment adjustment during this period targeted senior managers and engine drivers who had been left in place by the personnel reductions in the past, in addition to the increased number of redundant clerical workers in the Traffic Section.

On the other hand, Table 7 shows the breakdown of the employees who were newly hired by the headquarters. 35 per cent of them were promoted from the employees who had been hired by divisions or sections. In other words, they were recruited in the internal labour market. In addition, 24 per cent were hired after an internship period, a group which included the graduates of the Iwakura Railway School. Whereas the graduates of the railway schools numbered less than 10 until 1903, the number suddenly increased to 29 in 1904. In response to the new practice of hiring from vocational schools, the company enacted internal rules for hiring employees, and introduced the entrance examination system. First, all of the new employees came to be recruited by the Business Operation Section, not by individual functional sections. To put it differently, the recruitment was centralised. Second, by expanding the range of qualified persons who were eligible to take the entrance examination to the graduates of secondary schools and vocational schools, the company aimed at hiring young and high quality employees for the lower ranks.

4. Business performance of the Nippon Railway Co. from 1903 to 1906

As a result of the new recruiting system in 1903, the proportion of low salaried persons among the newly hired employees increased, whereas the numbers of clerk rank and assistant engineer rank employees with relatively high salaries decreased. This fact, together with the reduction of the high salaried employees, may have reduced the personnel costs of the Nippon Railway Co. This point will now be examined with reference to Table .3.

First of all, the total number of the employees clearly decreased in 1903. This was due to the personnel reduction thorough the organisational reform. Notably, the proportion of middle and senior mangers decreased from 14.1 per cent in 1902 to 13.2 per cent in 1904, which implies that the personnel reduction targeted this group. With regard to the average salary, it decreased sharply from 11.6 yen in 1902 (in real terms, 1897=100) to 10.5 yen in 1903. As there is no evidence that the salary cut was implemented explicitly for each individual in this period, we can infer that the change in the composition of the employees by salary was the reason for this decline. Although real salaries gradually recovered from 1904, labour share continued decreasing from 23.3 per cent in 1902 to 21.8 per cent in 1903 and 20.9 per cent in 1904, reaching 18.4 per cent in 1905. This implies that the company was able to constantly receive a larger 'share of the pie' by obstructing labour movements with the introduction of the organisational reform, in addition to the personnel reduction in 1903.

As for the labour productivity, it rapidly increased from 1904. This phenomenon – labour share decreased while labour productivity increased – shows that the new organisation and the new systems which supported the new organisation enhanced efficiency, in addition to the rise of the capital share thorough decline of the labour movement. The factors which contributed to enhancing efficiency include 1) facilitated communication between functions; 2) increased opportunities for promotions by the introduction of the examination system. It can be assumed that transaction costs were reduced due to the facilitated information flows within the organisation, and employees' 'career concern' raised their motivation to work (2). The 'career concern' effect was supposed to be large especially for the upper level of blue-collar workers. This point was shown by the fact that many examinees rushed to take the examination for the engine driver internship position.

The financial performance of the Nippon Railway Co., substantially improved due to the decrease in labour costs and increase in labour productivity (Figure 4). ROE went over 13 per cent for the first time in the second half of 1903, and continued to rise, reaching 16.9 per cent in 1906. ROI changed in the same manner as ROE. [65]

It is true that this rapid financial recovery was partly due to the special procurement demand for wartime transportation during the Russo-Japanese War. As Figure 2 shows, the traffic density of both passengers and freight increased sharply from 1904 to 1905. Along with this, operating income which was 1,487 yen in the first half of 1904 increased to 1,857 yen in the second half of 1905. However, the total asset turnover rate (operating income/initial expense) also recovered from the second half of 1904 (Figure 4). This implies that the increase in revenue during this period was not brought about by additional investment. Also, the increase in traffic during this period was achieved without an increase in operating expenses. The operating costs as a share

[65] This financial data is based on Table 4.1 in Nakamura 2003: 117.

of operating income (operating costs/operating income) gradually decreased from 49.8 per cent in the first half of 1903 to 44.8 per cent in the second half of 1905. As a result, operating income per mile steadily increased from 762 yen to 1,026 yen in the same period, which enabled the company to have a high profit margin.

In other words, the cost reductions due to employment reduction as well as increase in labour productivity by the organisational reform contributed to the recovery of the financial performance of the Nippon Railway Co., notwithstanding the favourable conditions caused by the Russo-Japanese War.

Conclusion

This paper examined how the modern business enterprise emerged in Japan focussing on the case of Nippon Railway Co., the largest railway company.

The Nippon Railway Co. implemented two major organisational reforms before it was nationalised in 1906. The outline of those organisational reforms is as follows. The company consistently expanded and refined its functional organisation until 1899. The direction it took was to transform the organisation from a simple (unitary) form to a form consisting of multiple hierarchies. First, in 1892, when all of the planned railways were opened and the contract with the Imperial Government Railway was cancelled, the company began to introduce regional divisions under the functional departments. As each functional section set regional divisions at its own discretion, geographical areas covered by each regional division varied by functional section, which made it difficult for the company to respond to labour movements and the outbreak of moral hazard[66] among employees by the beginning of 1898. Decline of the financial performance resulted in a drastic change in the governance structure and the management of the company in 1898. Subsequently, Yujun Soga, a newly appointed president, implemented an organisational reform. In 1899 he introduced a new organisational form, which was a carefully designed functional organisation. This organisation was more efficient, as it placed the head offices of each functional division in the same cities, which covered equal geographical areas. However as the scale of the company grew, this functional organisation was faced with increases in administrative costs.

Hence the company then implemented another organisational reform to introduce a decentralised divisional structure. This new organisation was designed thorough of comparison of the organisations of railway companies in the U.S. and Great Britain. The new organisation was an innovative one which had not existed in Japan previously. Although there were concerns about human resource requirements in operating the new organisation, the company efficiently used existing human resources and ran the organisation effectively. As a result, its business, which once sharply

[66] A scandal involving the director in the Traffic Section. See footnote 19.

dropped off from 1898, started recovering in the second half of 1903, when the divisional organisation was introduced. Due to the reform, the controlling power of the division superintendents was reinforced and co-operation among functions was reinforced. Hence the company could deal with the sudden increase in traffic due to the outbreak of the Russo-Japanese war.

These organisational reforms corresponded to the reforms of the personnel management. With the first organisational reform in 1899, the upper ranks of the blue-collar workers were integrated into the manager ranks. The company finally shifted wages for engine drivers from being paid on a daily basis to being paid on a monthly basis in 1902, and this was institutionalised in April 1903 with the second organisational reform. This was a consequence of the demands from engine drivers and assistants to improve their status, which had begun with the engine drivers' strike, and at the same time it was a symbol of the company's conciliatory attitudes toward labour issues. Moreover, these ranking system reforms gave incentives to the blue-collar workers by increasing the opportunities for promotions.

In parallel with the increase in status of the workers, the company took measures to deal with labour movements. In particular, the Kyoseikai was dissolved and was reorganized into a study group in 1901. The introduction of the divisional organisation in the second organisational reform was effective in suppressing labour movements. In fact, neither functional unions nor an enterprise union were formed in Nippon Railway Co. from then on. From the point of view of personnel management, the series of organisational reforms in Nippon Railway Co. was a great success.

Finally, in terms of the financial performance, it is noteworthy that labour productivity increased and both operating costs and profit improved from 1903, when the divisional organisation was introduced. The company earned a large amount of profit by responding to the sudden increase in traffic under the Russo-Japanese War through improvement of work efficiency due to the organisational and personnel reforms. This point is notable as contrasted with the first organisational reform, where the company suffered from a decrease in productivity due to the new costs incurred with the expansion of the organisation. Therefore, whereas one of the purposes of the second organisational reform was to impede the labour movement and for the company to gain a bigger 'share of pie'[67], the second organisational reform greatly contributed to the improvement of the company's performance because the decentralised divisional organisation was well suited to the scale and the geographical sphere of the operations of the Nippon Railway Co.

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[67] Marglin 1974: 62.

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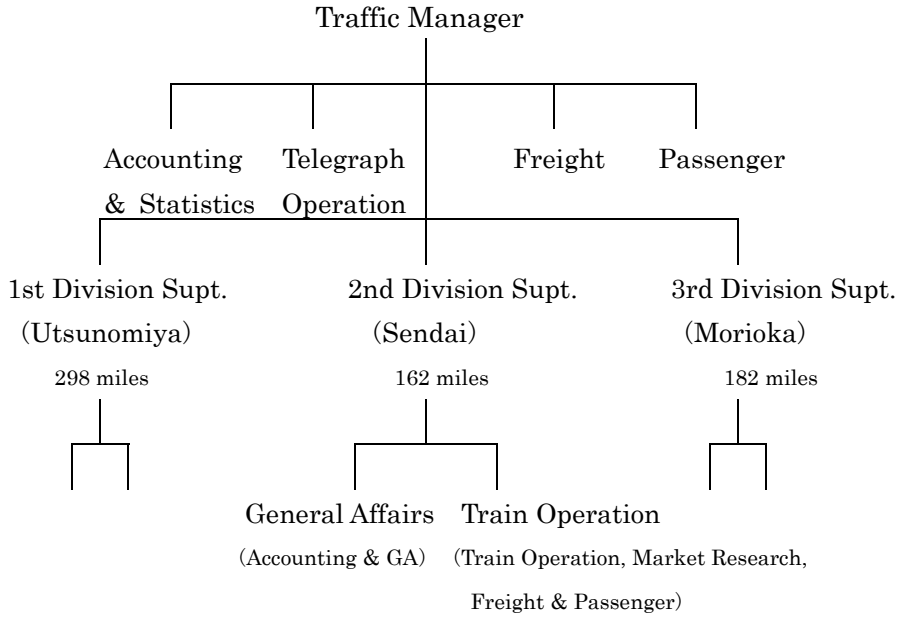

Figure 1　Isaburo Kanbara's Plan of Organization and Duties of the Traffic Section (as of April 1892)

Source: Kanbara (unkown).

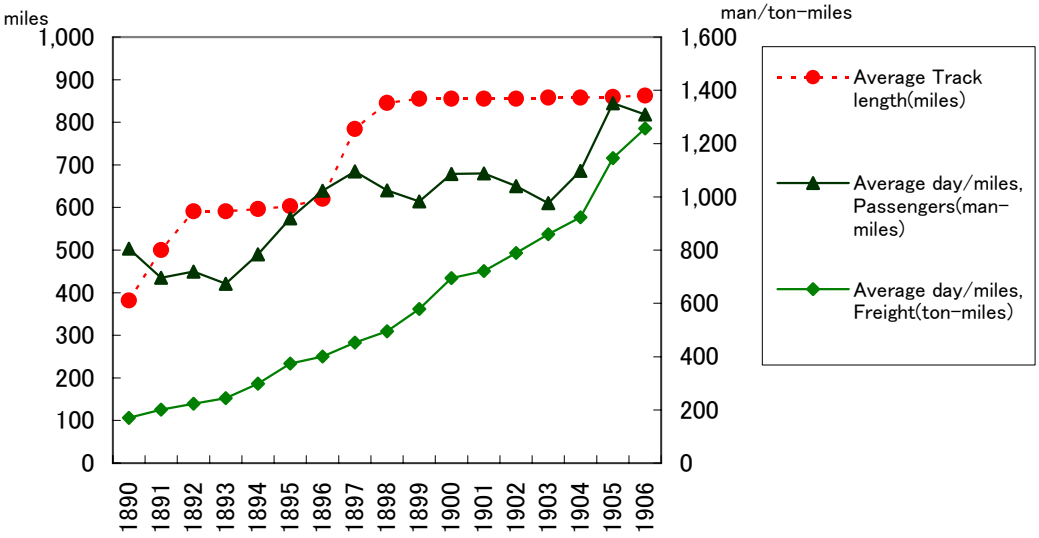

Figure 2. Track Lengths & Conveyance Figures for the Nippon Railway.

Souse: Nakamura 2003; 115.

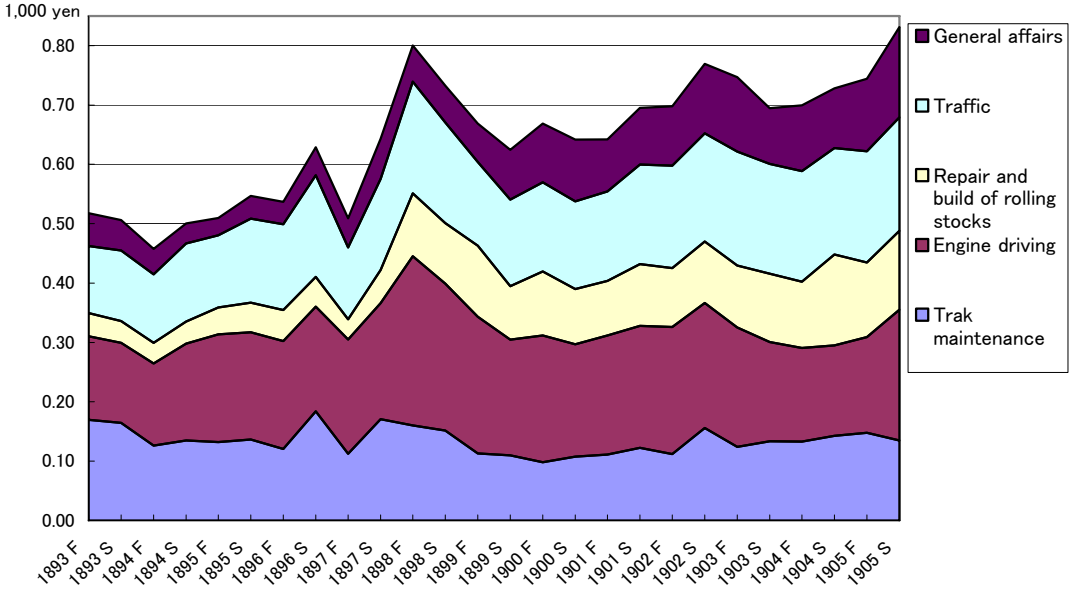

Figure 3. Details of Operating Costs per Distances covered by trains for Nippon Railway Co.

Souse: Nippon Railway Co.'Hokoku'1893-1905.

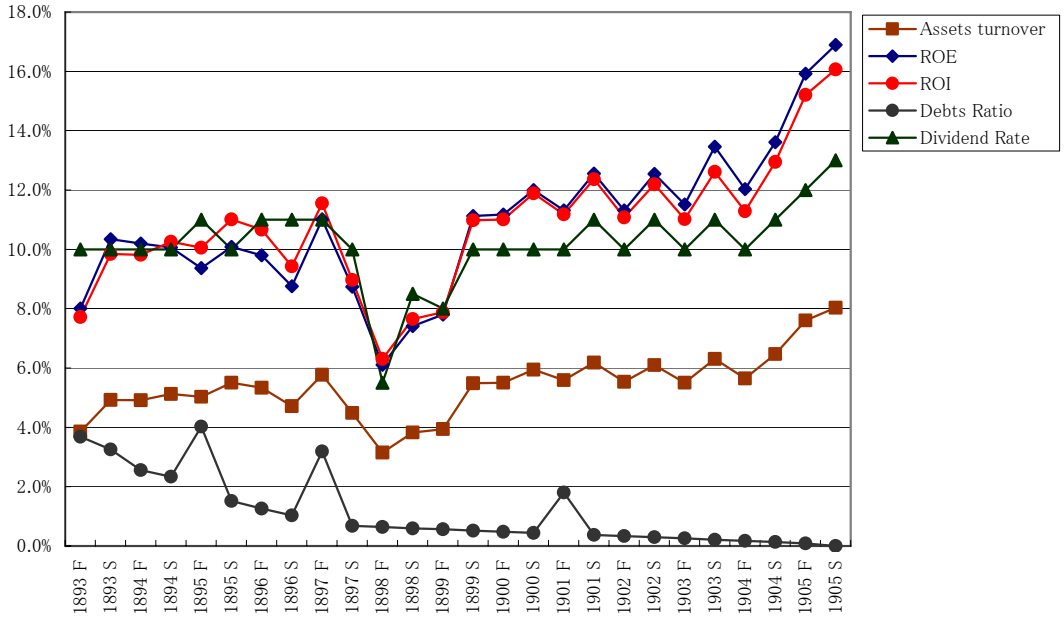

Figure 4. Bussiness Situations for the Nippon Railway Co.

Souse: Nippon Railway Co.'Hokoku'1893-1905.

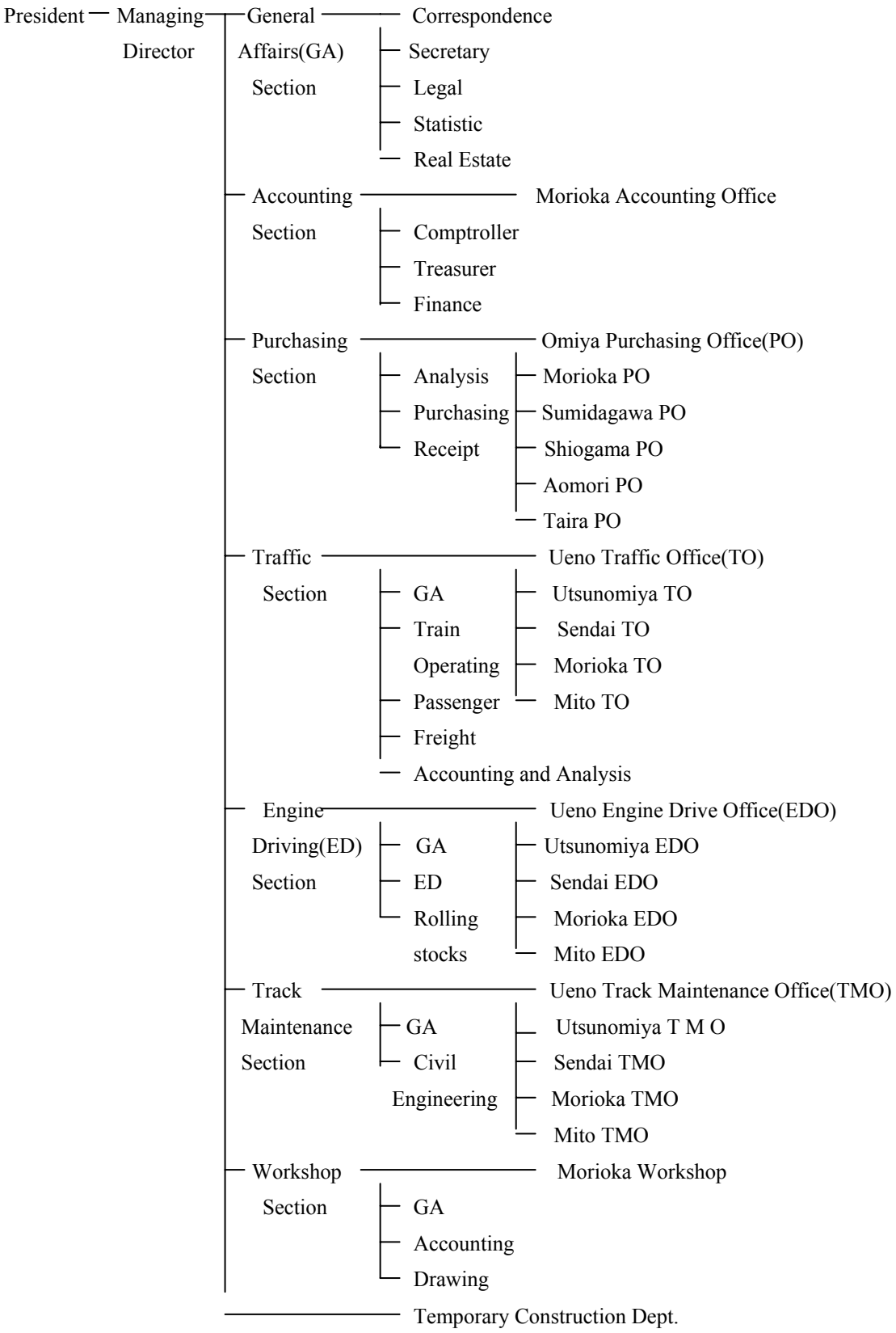

Figure 5　Organization of Nippon Railway Co.（October 1899）

Source: Kinoshita 1903: 68-92.

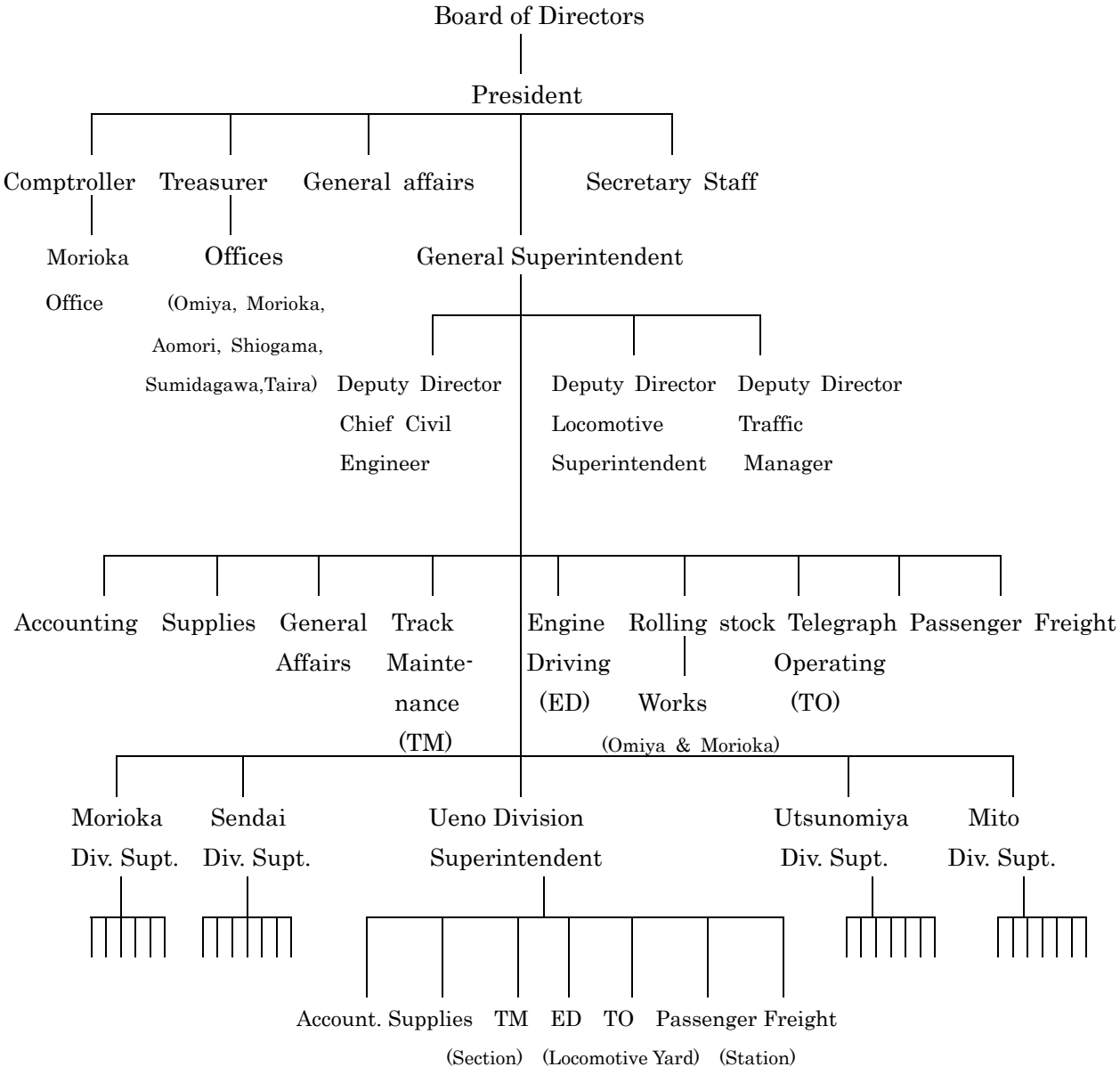

Figure 6 Organization of Nippon Railway Co. (April 1903)

Source: Nippon Railway 'Sha-ho' (4 April 1903).

Table 1. The Ranking System and Personnel Organisation (November 1899)

(man)

	Occupational Category	Number of Persons			
		Senior Class	Middle Class	Lower Class	Total
Section Chief	Section Chief	4			4
Director	Assistant Section Chief, Head of Offices, etc.	22			22
Engineer	Assistant Section Chief, Head of Offices, etc.	22			22
Clerk	Subtotal		208		208
	Clerk, Assistant Section Chief, Head of Offices		119		119
	Station Master, Assistant Station Master		78		78
	Inspector of Conductor, Fright Manager, Telegraph Operation Manager		11		11
Assistant Clark (AC)	Subtotal		159	295	454
	Assistant Clerk		81	4	85
	Station Master, Assistant Station Master		61	214	275
	Traffic staff, etc.		17	77	94
Assistant Engineer (AE)	Subtotal		105	75	180
AE in engine driving	Engine Shed Manager, Engine Shed Assistant Manager, Driving Inspector		13	20	33
AE in engine driving	Engine Driver			55	55
AE in mechanic	Engine Shed Manager, etc.		33		33
AE in civil engineering	Road master, Assistant of Road master.		59		59
Assistant Engineer Trainee(AET)	Subtotal		20	261	281
AET in engine driving	Engine Driver Trainee			242	242
AET in mechanic	Foreman, Assistant Foreman,etc.			19	19
AET in civil engineering	Assistant of Road master, etc.		20		20
Employee			117	1,472	1,589
Total		**48**	**609**	**2,103**	**2,760**

Souse: Nippon Railway Co.'Shokuin-roku' (15 November 1899)

Note: Traffic staff = Conductor, Fright Clerk, Booking Clerk, Parcel Clerk, Telegraph Operator, Chief Yardmen, etc.

Table 2　The Length of Continuous Service in Nippon Railway Co..(December 1902)

Length of service	less than 1 year		1 year or more		2 year or more		3 year or more		4 year or more		Total
Year of entering a firm	1902		1901		1900		1899		before 1898		
	man	ratio	man	ratio	man	ratio	man	ratio	man	ratio	man
Section Chief									6	100%	6
Director	1	3.4%	5	17.2%	3	10.3%			20	69.0%	29
Engineer			2	8.3%	8	33.3%	3	12.5%	11	45.8%	24
Clerk	36	3.7%	58	5.9%	60	6.1%	35	3.6%	790	80.7%	979
traffic	18	2.4%	25	3.4%	32	4.3%	22	3.0%	640	86.8%	737
accounting	1	2.7%	3	8.1%	4	10.8%	3	8.1%	26	70.3%	37
general affairs	7	14.6%	15	31.3%	3	6.3%	4	8.3%	19	39.6%	48
Assistant Engineer	16	2.7%	32	5.4%	34	5.7%	11	1.8%	503	84.4%	596
civil engineering	14	11.6%	19	15.7%	12	9.9%	4	3.3%	72	59.5%	121
mechanic	2	3.4%	8	13.8%	11	19.0%	4	6.9%	33	56.9%	58
engine driving			5	1.2%	11	2.6%	3	0.7%	398	95.4%	417
Employee	361	18.2%	476	23.9%	354	17.8%	100	5.0%	697	35.1%	1,988
traffic	239	18.9%	291	23.0%	227	18.0%	60	4.8%	446	35.3%	1,263
accounting	6	16.7%	7	19.4%	9	25.0%	4	11.1%	10	27.8%	36
general affairs	16	48.5%	12	36.4%	2	6.1%	2	6.1%	1	3.0%	33
Total	414	11.4%	573	15.8%	459	12.7%	149	4.1%	2,027	56.0%	3,622

Souse: Nippon Railway Co.'Shokuin-roku' (December 1902) and 'Shahou'

Table 3　The Number of Employee and Labour Productivity of the Nippon Railway Co.

Year	1896	1897	1898	1899	1900	1901	1902		1903	1904	1905
Number of All Employee (man)											
Total (a)	7,359	10,207	9,994	9,670	9,982	10,753	11,633		11,068	11,133	13,074
General Affairs	50	52	62	69	100	133	140	General Affairs	135	105	107
Track Maintenance	2,313	2,636	2,226	2,051	2,016	2,233	2,359	Temporary Construction Dept.	39		44
Engine Driving & Workshop	2,306	3,708	3,748	3,614	3,536	3,583	4,082	Business Operations Division	10,599	10,709	12,580
Traffic	2,481	3,575	3,747	3,723	4,108	4,575	4,821				
Accounting	68	72	70	75	76	77	80	Comptroller & Treasurer	291	314	335
Purchasing	141	164	141	138	144	149	148				
Secretary Staff						3	3	Secretary Staff	4	4	3
Chief Engineer's Staff					2			Auditor's Staff		1	5
Number of Managers (man)											
Total (b)	565	699	667	1,090	1,377	1,508	1,640		1,543	1,467	1,507
Senior Managers	62	71	62	48	57	60	59		62	56	56
Middle Managers	503	628	605	1,042	1,320	1,448	1,581		1,481	1,411	1,451
Manager Ratio…b/a	7.7%	6.8%	6.7%	11.3%	13.8%	14.0%	14.1%		13.9%	13.2%	11.5%
Average Number of Employee (man) (C		8,783	10,101	9,832	9,826	10,368	11,193		11,351	11,101	12,104
Operating Revenue (1,000yen) (d)		6,181	7,131	8,056	9,672	10,188	10,890		10,986	11,407	14,569
Wages (1,000yen) (e)		1,448	1,432	1,418	1,511	1,654	1,820		1,749	1,765	2,032
Operating Profit (1,000yen) (f)		3,474	2,875	4,229	5,233	5,460	5,530		5,806	6,115	8,175
Tax (1,000yen) (g)		70	138	243	394	421	453		480	553	825
Return on Sales (ROS) …f/d		56.2%	40.3%	52.5%	54.1%	53.6%	50.8%		52.9%	53.6%	56.1%
Monthly Wages par man (yen)		13.7	11.8	12.0	12.8	13.3	13.5		12.8	13.2	14.0
Real Wages par man (yen)		13.7	10.9	11.8	11.2	11.8	11.6		10.5	10.6	10.7
Labour Productivity (yen) …(e+f+g)/c		568.3	440.1	599.1	726.5	726.8	697.1		708.0	759.6	911.4
Real Labour Productivity (yen)		568.3	406.4	586.6	632.1	647.1	596.7		577.9	606.0	699.3
Retail Price Index (1896=100)		100.0	108.3	102.1	114.9	112.3	116.8		122.5	125.4	130.3
Labour Share …e/(e+f+g)		29.0%	32.2%	24.1%	21.2%	21.9%	23.3%		21.8%	20.9%	18.4%

Souse: Nippon Railway Co.'Nenpou'1901-1905, 'Houkoku'1896-1900, and Railway Bureau 'Annual Report'1896-1905.

Note: Section chief, director and engineer is included in Senior Manager. Clerk, assistant engineer, assistant clerk and assistant engineer trainee is included in Middle Manager.

Table 4. The Personnel Reshuffle: 1902-1903

(man)

Year	1902			1903			1904		
	Location	Section	on/off	Location	Section	on/off	Location	Section	on/off
Section Chief	0			0	1		0	1	
Director	2			8	6	1	1		
Engineer	4			9		1	5	1	
Clerk	170	6	7	330	13	27	219	10	15
officer	13	6	1	47	13	4	22	10	2
station master	128		3	233		14	158		7
traffic staff	29		3	50		9	39		6
Assistant Engineer	56		4	151	1	16	51	1	6
engine driving	42			110		3	26		1
mechanic	8		2	13		6	11		5
civil engineering	6		2	28	1	7	14	1	
Subtotal of manager rank	**232**	**6**	**11**	**498**	**21**	**45**	**276**	**13**	**21**
Employee	231	20	4	487	12	25	468	8	4
Total	**463**	**26**	**15**	**985**	**33**	**70**	**744**	**21**	**25**

Souse: Nippon Railway Co. 'Shahou'1902-1904

Note: 'on/off'=transfers between on-site functions and off-site functions.

Table 5. The Source of Supply of Local Office Staff from April 1903 to December 1904

(man)

	Former functional office	Head Office & the other division	On-site position	New hiring	Total
Division chief	1	5			6
Engineer	4	6	1		11
Clerk	31	29	19	2	81
general affairs		1		2	3
traffic	15	12	16		43
engine driving	7	5	2		14
track maintenance	9	11	1		21
Assistant Engineer	18	8	4	1	31
engine driving	2				2
mechanic	1	2	1	1	5
track maintenance	15	6	3		24
Subtotal of manager rank	54	48	24	3	129
Employee	20	3	8	14	45
Total	**74**	**51**	**32**	**17**	**174**

Souse: Nippon Railway Co. 'Shahou'1903-1904

Table 6　The Frequency of the　Salary Increases by Rank: 1902-1904

(man)

Year	1902		1903		1904	
	Total	Salary increase	Total	Salary increase	Total	Salary increase
Section Chief	5	3	6	4	6	0
Engineer	27	4	28	13	28	7
Director	30	12	31	13	31	8
Clerk	1,049	368	1,033	457	985	293
Assistant Engineer	590	415	563	365	515	228
engine driving	415	334	398	315	365	182
mechanic	57	29	60	11	57	19
civil engineering	118	52	105	39	93	27
Employee	1,863	751	2,198	938	2,286	761
Total	**3,564**	**1,553**	**3,859**	**1,790**	**3,851**	**1,297**

Souse: Nippon Railway Co. 'Shahou'1902-1904

Table 7　The Number of Hiring and Firing: 1902-1904

Year	1902		1903		(Jan.-Apr. 1903)		1904	
	man	ratio	man	ratio	man	ratio	man	ratio
At the end of previous year of employee (*t*)	3,431		3,597				3,443	
Number of hired (*h*)	477	13.6%	437	12.4%			454	13.4%
Number of resignation (*r*)	289	8.2%	520	14.8%			553	16.4%
Number of layoff (*l*)	6	0.2%	143	4.0%			11	0.3%
Hiring	477	100.0%	437	100.0%	234	100.0%	454	100.0%
Promoted from employees hired by divisions	11	2.3%	158	36.2%	56	23.9%	159	35.0%
Employees hired after a internship	30	6.3%	105	24.0%	24	10.3%	109	24.0%
Firing within a year	28	5.9%	31	7.1%			50	11.0%
Resignation	289	100.0%	520	100.0%	61	100.0%	553	100.0%
Voluntary resignation	278	96.2%	477	91.7%	51	83.6%	531	96.0%
Firing	2	0.7%	32	6.2%	7	11.5%	12	2.2%
unknown	9	3.1%	11	2.1%	3	4.9%	10	1.8%
Fired after layoff	1	0.3%	131	25.2%	1	1.6%	11	2.0%
Died	22		24		9		18	

Souse: Nippon Railway Co.'Shokuin-roku' and 'Shahou'1902-1904

Note: The ratio of resignation = $r \times 2 / (t + (t+1))$, the ratio of hired = $h \times 2 / (t + (t+1))$,
the ratio of layoff = l ×2／(t + (t+1))