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# The Reform of Researchers/Engineers' Employment System :

## From the Perspectives of Legislation and Motives<sup>\*</sup>

Masaharu NOSE<sup>\*\*</sup>

### Abstract

In a new era, innovation is indispensable to prosperity in any developed country. Needless to say, as new technology is invented by researchers/engineers, it is no exaggeration to say that the country's prosperity thus depends on researchers/engineers.

On the other hand, Japan has made great progress in industrial society owing to the Japanese employment system based on collectivity. But the paradigm has changed. Japanese collectivity is increasingly unsuited to the information and communications age. In this paper, I argue two points concerning normative effects, such as legislation and agreements, after clarifying mainly two points through four surveys. Namely, the surveys showed that researchers/engineers' individualization has been diffused and that the effective coordinating of researchers/engineers and their companies has been related to making their morale higher. On the basis of these surveys, I point out what part of the present employment system related to researchers/engineers should be reformed and argue that normative effects, such as collective agreements and workplace regulations should especially be reformed along with the paradigm change.

**Keywords :** individual, collectivity, agreement, coordination, professional, norm, HRM, morale, neutrality.

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## Preface

As global depression gets more serious, international competition increases more than usual. As markets get smaller and smaller, companies are required to produce goods and services not only at low costs but also with an added value.

Japan, poor in natural resources, is specially required to have an added value and innovation in order to survive and to prosper. On this awareness Japan has already passed the new law, which is Intellectual Property Basic Act (Effective 1 March, 2003).

Article 8-2 of this Act is described as follows. “Business operators shall endeavour to assure proper treatment of inventors and other employees who are engaged in creative activities so that the duties of such inventors and other employees who are engaged in creative activities will be attractive and suitable for their importance.” This provision provides for responsibilities of business operators.

In this paper, I argue how the Japanese employment system<sup>1)</sup> should be changed in order for researchers/engineers to be motivated through a reform of normative effect (Model of Collective). Namely, I propose that the Japanese employment system which had been suitable to industrial society should be changed to a new system suitable for the new era. And I argue this theme, “how to strengthen Japanese industries” by investigating how to motivate researchers/engineers.

This theme is argued through hearing surveys and questionnaire surveys which are as follows.

1. The Questionnaire of Employment for Strengthening Industries (2002), hereafter, The 2002 survey.
2. The Questionnaire of Collective and Individual Labour disputes and resolutions; questionnaire to companies (2007), hereafter, The 2007 survey of companies.
3. The Questionnaire of Collective and Individual Labour disputes and resolutions; questionnaire to employees (2007), hereafter, The 2007 Survey of employees.
4. The Questionnaire to scientists, engineers and creators (2008), hereafter, The 2008 Survey.

The 2002 survey<sup>2)</sup> was sent by mail to 797 companies which had been chosen by making telephone calls to 1,601 companies which were listed on the Tokyo Stock Exchange (The survey was commissioned by: The Ministry of Economy, Trade and Industry. Investigation implementation by: Japan Research Institute. The design of a questionnaire: The author of this paper).

The 2007 survey<sup>3)</sup> of companies was sent by mail to 700 companies which had been chosen at random

1) J.C. Abegglen pointed out that the characteristic of the Japanese employment system was the lifetime employment system and the seniority wage system in *Japanese factory* (1958 edition). But in the revised edition (1974) the low evaluation of Japanese employment system was changed.

2) Japan Research Institute(2002) *The research concerning employment relation to strengthen industries* (A commissioning agency: Ministry of Economy, Trade and Industry).

3) Masaharu Nose(2007) *The research concerning Collective and Individual Labour disputes and resolutions*. (Ministry of Education, Culture,

from companies listed on Tokyo Stock Exchange. (Ministry of Education, Culture, Sports, Science and Technology Grants-in-Aid for Scientific Research)

This questionnaire addresses issues such as communication, amendments, personnel administration, administration of researchers/engineers, ways of dispute resolution etc.

The 2007 survey<sup>4)</sup> of employees (Grants-in-Aid for Scientific Research) was implemented through the companies to which the 2007 questionnaire of companies were sent.

The 2008 survey of employees (Grants-in-Aid for Scientific Research) was implemented through the 12 companies which were chosen from the companies which I had built human resource administration of or which I had taken part in managing and which does not adopt a dual human resource management system<sup>5)</sup>.

I will argue this theme through these questionnaires and hearings.

## 1. Individualization of researchers/engineers and Inside/Outside Reward

### (1) Which is more important, Collective or Individual?

There is much research which explains that the Japanese are more group-oriented than other advanced countries. This Japanese characteristic has contributed to increasing productivity. The explanations of this by Japanese scholars are The Cooperation Life Organization Theory by Masumi Tuda, The Japanese family Ie Theory by Hiroshi Hazama and The Japanese Village Mura Theory by Ryusi Iwata. These writers concluded that Organizations in Japan have strong collectivity. And as a result, the normative effect on employees, by law and rule, has made collectivity concerning workplace culture stronger. One of these laws and rules is Article 16 of the Trade Union Law.

The interpretation of Article 16 of the Trade Union Law strengthens Japanese collectivity. Namely, this interpretation leads to the negation of an advantageous principle<sup>6)</sup>. This negation of a principle denies better terms and conditions of researchers/engineers. That is, if a trade union member contracts with a company to work under better conditions than other trade union members owing to his talent, this better contract would be denied. The normative effectiveness is too strong<sup>7)</sup>. But Article 16 is not directly described as to the negation of an advantageous principle, as follows:

“Article 16 (Effectiveness of the standards)”

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Sports, Science and Technology Grants-in-Aid for Scientific Research. No 18530423)

4) *ibid*

5) A dual human resource management system consists of two different systems. One is a system for researchers/engineers. The other is a system for non-researchers/non-engineers.

6) The approval of advantageous principle means the approval of the right of persons who are beyond their collective agreement. Article 16 (Effectiveness of the Standards) prescribes “Any part of an individual labor contract contravening the standards concerning working conditions and other matters relating to the treatment of workers provided in the collective agreement shall be void. In such a case, the invalidated part of the individual labor contract shall be governed by those standards. With respect to matters as to which the individual labor contract does not provide, the same shall apply”.

7) The disapproval of the advantageous principle is inclined to be supported by more scholars. (Takasi Shimoi 2000)

Any part of an individual labour contract contravening the standards concerning working conditions and other matters relating to the treatment of workers provided in the collective agreement shall be void. In such a case, the invalidated part of the individual labour contract shall be governed by those standards. With respect to matters as to which the individual labour contract does not provide, the same shall apply.

On the other hand, a big company manages employees according to each entrance year of employee. Consequently, a criterion of promotion is generally based on seniority. This culture leads to a collectivity management.

Finally, Japanese researchers/engineers are managed through the same human resource management system which is not different from other occupations. In this situation it is not easy that Article 8-2 of Intellectual Property Basic Act comes true.

According to the 2007 survey of companies<sup>8)</sup> and the 2002 survey of companies, the ratio which is not adopting a dual human resource management system is respectively 73.8% of companies, 74.5%. The ratio of not-adopting a dual system is very high. Compared with these results, a US company usually manages researchers/engineers according to each individual (Sakakibara 1995) .

#### Are researchers/engineers group-oriented in nature or not?

Compared with the 2002 survey of companies, researchers/engineers of the 2007 survey of companies have a tendency to regard the individual as important. By five-point scale questions<sup>9)</sup> about importance of collectivity-individual, each average of each questionnaire of the 2002 survey and the 2007 survey of companies is respectively 2.67 and 3.35(Table1). And by t-test, a significant difference was recognized between them ( $t=-4.501$ ,  $df=155$ ,  $p<.01$ ) .

Table1. The difference of importance of collectivity  
between the 2002 survey and the 2007 survey

| The 2002 survey (n=97) |         | The 2007 survey (n=60) |        | p    |
|------------------------|---------|------------------------|--------|------|
| M                      | SD      | M                      | SD     |      |
| 2.6701                 | 0.88649 | 3.3500                 | 0.9712 | .000 |

$p<.01$

And this tendency is similar to the result analyzed by Fisher's exact test (expanded) (Table2). A company with a trade union had been inclined to attach importance to collectivity according to the 2002 survey of companies. But when I saw the 2007 survey of companies, I found a company with a trade

8) Is your company's human resource management of researchers/engineers different from human resource management of other occupations? 1. Yes. 2. NO.

9) How do you think of culture of a division to which researchers/engineers belong? It regards individual as more important than collectivity. Please choose a suitable one. 1. Yes. 2. Partly Yes. 3. Fair. 4. Partly NO. 5. NO.

union did not always attach importance to collectivity (Table 3). Though a significant difference was recognized in the 2002 survey ( $p < .05$ ), there was not a significant difference in the 2007 survey ( $p = n.s.$ ). I recognized that the importance of individuality was getting diffused in the 2007 survey of companies.

Table2. The situation of importance of collectivity by non-trade union and trade union in The 2002 survey.

|             | Importance     |                         |        |                       |              |       | Total |
|-------------|----------------|-------------------------|--------|-----------------------|--------------|-------|-------|
|             | 1.Collectivity | 2.a little Collectivity | 3 Fair | 4.a little Individual | 5.Individual | 6.n/a |       |
| 1. union    | 2              | 40                      | 24     | 9                     | 2            | 3     | 80    |
| 2. no union | 1              | 2                       | 5      | 2                     | 2            | 2     | 14    |
| Total       | 3              | 42                      | 29     | 11                    | 4            | 5     | 94    |

$p = .021$  by Fisher's Exact Test (expanded).

Table3. The situation of importance of collectivity by non-trade union and trade union in The 2007 survey of companies.

|             | Importance   |                        |        |                          |                | Total |
|-------------|--------------|------------------------|--------|--------------------------|----------------|-------|
|             | 1.Individual | 2. a little Individual | 3 Fair | 4. a little Collectivity | 5.Collectivity |       |
| 1. union    | 0            | 15                     | 6      | 4                        | 3              | 28    |
| 2. no union | 1            | 6                      | 8      | 1                        | 1              | 17    |
| Total       | 1            | 21                     | 14     | 5                        | 4              | 45    |

$p = .219$  by Fisher's Exact Test (expanded).

Namely as importance of collectivity becomes weaker, importance of individual becomes stronger. A similar tendency is found in the 2008 survey. The tendency of individualization is growing among researchers/engineers.

One of the backgrounds of individualization is a company's management policy which has been adopted by companies for the past 10 years. This management policy is a similar policy to American companies, which was leading to a white-collar recession or a jobless recovery in the 1990's. In the process of recovery of economy in Japan from 2001 to 2008, there was a company's policy to make the ratio of fluidity of wage higher. By doing so, companies have gotten to be able to control the payroll of those amounts according to their achievement. In fact the average labour wage was almost equal. It was from ¥371,500 in 2001 to ¥371,700 in 2008. But GDP (real) growth rate was increasing since 2001 in which the rate was bottom of  $\Delta 0.8$  and after which a company's profit rapidly recovered.

This situation has let individuality culture of companies make progress and a relationship between a company and researchers/engineers has come to be influenced by an individual ability. And they began to esteem their own research through their work more than before.

## (2) Researchers/Engineers and Achievement Evaluation System

When I examine the 2007 survey of employees<sup>10)</sup> (non-researcher/non-engineer: 77.4%), the ratio of approval of achievement evaluation system is 69.8% (Chart1). It shows that an achievement evaluation system has spread in Japan.

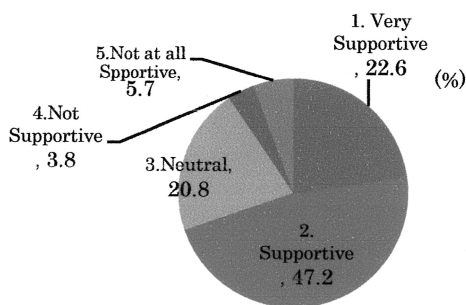


Chart1. The situation of an approval of achievement policy

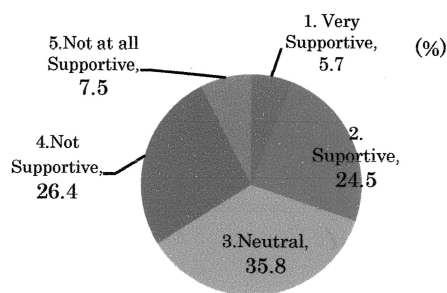


Chart2. The situation of approval of Individual Culture

On the other hand, the ratio of approval of individual culture<sup>11)</sup> is only 30.2% (Chart2). There are large differences of spread ratio between ratio of approval of achievement evaluation system and that of individual culture. A culture of individual has not spread in Japan as achievement evaluation system has spread.

Table4 The comparison between Achievement and Individual in The 2007 survey.

| Q6-1 Achievement Policy (n=53) |       | Q6-5 Evaluation by Achievement (n=53) |       |      |
|--------------------------------|-------|---------------------------------------|-------|------|
| M                              | SD    | M                                     | SD    |      |
| 2.23                           | 1.031 | 3.06                                  | 1.027 | .000 |

$p < .01$

By five-point scale questions about approval of achievement<sup>12)</sup>, each average, approval of achievement evaluation system and approval of individual culture, is respectively 2.23 and 3.06 (Table4). And by t-test, there is a significant difference ( $t = -4.660$ ,  $df = 52$ ,  $p < .01$ ).

Table5-1. The comparison between Achievement and Individual in The 2008 survey.

| Q1-1 Achievement Policy (n=68) |       | Q1-2 Individual Culture (n=68) |       | p    |
|--------------------------------|-------|--------------------------------|-------|------|
| M                              | SD    | M                              | SD    |      |
| 2.66                           | 1.128 | 2.81                           | 0.966 | .254 |

$p > .10$

10) Do researchers/engineers regard achievement principle as more important than seniority principle? Please choose a suitable one. 1. Yes. 2. Partly Yes. 3. Fair. 4. Partly NO. 5. NO.

11) How do you think of culture of a division to which researchers/engineers belong? It regards individual as more important than collectivity. Please choose a suitable one. 1. Yes. 2. Partly Yes. 3. Fair. 4. Partly NO. 5. NO.

12) Is researchers/engineers' wage (including bonus) decided by their own achievement? Please choose a suitable one. 1. Yes. 2. Partly Yes. 3. Fair. 4. Partly NO. 5. NO.

Table5-2. The comparison between Achievement and Evaluation in The 2008 survey.

| Q1-1 Achievement Policy (n=68) |       | Q1-7 Evaluation by Achievement (n=68) |       | p    |
|--------------------------------|-------|---------------------------------------|-------|------|
| M                              | SD    | M                                     | SD    |      |
| 2.66                           | 1.128 | 3.31                                  | 1.083 | .000 |

$p < .01$

But when I examine the average of approval of achievement policy and the average of approval of culture of individual in the 2008 survey of researcher/engineers, it is respectively 2.66, 2.81 (Table5-1). There is not a large difference between them. And by t-test, there is not a significant difference ( $t = -1.150$ ,  $df = 67$ ,  $p = n.s.$ ) (Table5-1).

Namely, as achievement policy spreads, so culture of individual in a researcher/engineer spreads too. This difference between the 2007 survey of employees (non-researcher/non-engineer: 77.4%) and the 2008 survey of researchers/engineers implies that an achievement policy has two different natures. One nature of achievement evaluation system is based on a culture of a group achievement and the other nature is based on a culture of an individual achievement.

An achievement evaluation system of researchers/engineers is not based on a culture of a group achievement but based on a personal (individual) achievement. When an achievement evaluation system is applied to researchers/engineers, this system should be based on individual and their works individually. If researchers/engineers are managed by an individual management of them, this system applied to them would be effective. This distinctiveness depends on the characteristic of their works.

Another important point is that researchers/engineers have not thought they are being treated according to their achievement, though achievement policy has been diffused in their companies. When concerning this point I refer to the 2008 survey of researchers/engineers, the average of the treatment according to their own achievement is 3.31. On the other hand, the average of the approval of achievement policy is 2.66. By t-test (Table5-2), there is a significant difference ( $t = -5.661$ ,  $df = 67$ ,  $p < .01$ ).

Researchers/engineers think that their workplace culture regards an achievement evaluation system as important. But they do not think their treatment is decided according to their own achievement.

### (3) Researchers/Engineers and Reward

Reward is classified into two categories, one category is inner reward and the other category is outer reward. Both rewards are strongly concerning morale of researchers/engineers (Ishida Hideo 2000). And morale of researchers/engineers is especially related to self-realization (Pelz and Andrews 1976). These explanations have been supported by many scholars. At least I can say what contributes to morale of researchers/engineers is not only inner reward but also outer reward.

But there aren't many surveys concerning a relation between criterion of a pay system and morale of researchers/engineers. I wonder how a pay system has an influence on morale of researchers/engineers.

In order to consider this question I classified morale as high or low and classified type of a pay system as treatment according to their achievement or treatment according to other criterion. When I analyzed the data of the 2007 survey of employees (non-researcher/non-engineer: 77.4%) by Fisher's exact test (expanded), I found that there was a significant difference ( $p < .10$ ) (Table6). Namely the annual salary of the group which was classified into a high morale group was inclined to be decided according to their achievement.

Table 6. The situation of methods of deciding annual salary and morale in The 2007 survey of employees

|             |              | Q6-5 the method of deciding a salary |                         |        |                         |                      |       |
|-------------|--------------|--------------------------------------|-------------------------|--------|-------------------------|----------------------|-------|
|             |              | 1.By achievement                     | 2.Almost by achievement | 3.Fair | 4.Weakly by achievement | 5.Not by achievement | Total |
| Q6-6 morale | 1.high group | 1                                    | 15                      | 4      | 3                       | 0                    | 23    |
|             | 5.low group  | 2                                    | 2                       | 1      | 3                       | 3                    | 11    |
|             | total        | 3                                    | 17                      | 5      | 6                       | 3                    | 34    |

$p = .008$  by Fisher's Exact Test (expanded).

Table7. The situation of methods of deciding annual salary and morale in The 2008 survey of R/E

|             |              | Q1(7) the method of deciding a salary |                         |        |                         |                      |       |
|-------------|--------------|---------------------------------------|-------------------------|--------|-------------------------|----------------------|-------|
|             |              | 1.By achievement                      | 2.Almost by achievement | 3.Fair | 4.Weakly by achievement | 5.Not by achievement | total |
| Q1-8 morale | 1.high group | 2                                     | 10                      | 7      | 3                       | 4                    | 26    |
|             | 5.low group  | 1                                     | 3                       | 3      | 8                       | 2                    | 17    |
|             | Total        | 3                                     | 13                      | 10     | 11                      | 6                    | 43    |

$p = .133$  by Fisher's Exact Test (expanded).

But when I analyzed the data of the 2008 survey of researchers/engineers, I found that an annual salary of the group which was classified into a high morale group was not always decided by their achievement. I classified morale of the group as high or low after classifying the way of decision of salary as an achievement criterion or other criterion. And I analyzed the data of the 2008 survey by Fisher's exact test (expanded) (Table7). I couldn't found a significant difference between them ( $p = n.s.$ ).

Namely morale of researchers/engineers does not always depend on their achievement criterion of themselves and is different from morale of other occupations in this point.

## 2. Management of Researchers/Engineers' Grievances

### ( 1 ) Grievances and Morale

In the foregoing paragraph I considered the relationship among morale, individualization, achievement evaluation, and the way of deciding annual salary of each occupation (researchers/engineers and other occupations). In this paragraph I will consider relationship between morale of researchers/engineers and grievances and I will consider characteristics of grievances, too. When I examined the 2008 survey about

morale (Table8), I found that numbers of grievances of the higher morale group had a tendency to decline and by t-test there was a significant difference ( $t=2.115$ ,  $df=40$ ,  $p<.05$ ).

Table8. The difference of situation of grievances concerning morale in The 2008 survey

| higher morale group (n=26) |         | lower morale group (n=16) |         | p    |
|----------------------------|---------|---------------------------|---------|------|
| M                          | SD      | M                         | SD      |      |
| 2.8846                     | 0.95192 | 2.2500                    | 0.93095 | .041 |

$p<.05$

When I made another attempt to examine the 2007 survey of employees (Table9), I found a similar result. There was a tendency for the higher morale group to have less numbers of grievances. I realized also a significant difference ( $t=2.467$ ,  $df=31$ ,  $p<.05$ ).

Table9. The difference of situation of grievances concerning morale in The 2007 survey

| higher morale group (n=22) |         | lower morale group (n=11) |         | p    |
|----------------------------|---------|---------------------------|---------|------|
| M                          | SD      | M                         | SD      |      |
| 3.4091                     | 1.05375 | 2.4545                    | 1.03573 | .019 |

$p<.05$

I found this tendency but I wonder what are the characteristics of researchers/engineers' grievances. Next I will consider this matter.

The 2008 survey of researchers/engineers shows that larger numbers of grievances are concerning evaluation, wage, content of jobs and workplace managements. And characteristics of grievances of researchers/engineers are particularly concerning contents of their jobs (Chart3).

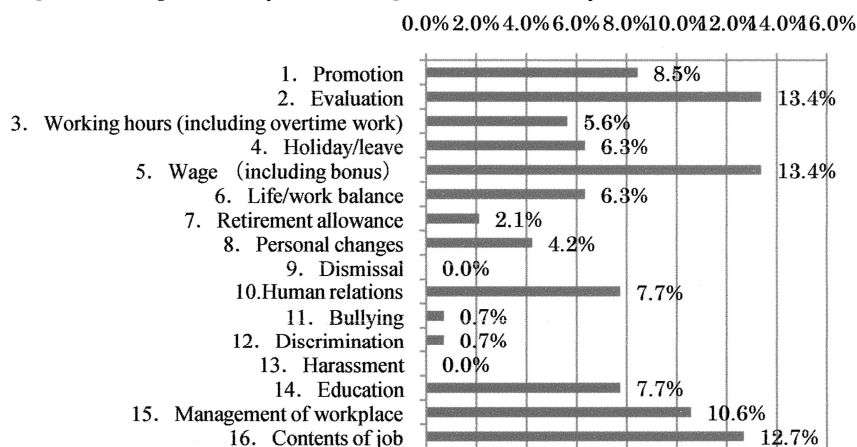


Chart3. The 2008 survey. Q4 Grievances/claims (M.A.)

When I investigated main reasons of their resignation in the 2002 survey of companies, I found a problem concerning their research theme a main reason to leave one's company.

In order to motivate researchers/engineers, it is very important for them to be able to tackle what they want to research (Chart4). Furthermore, I investigated something which was a more important matter for them, themes of their research or the way of their research. And I found that the number of grievances, “little freedom of their research theme”, were larger than the number of grievances, “little freedom of the way of research”. Namely, Managers of companies should consider whether researchers/engineers are researching on a theme they are willing to research or not.

When I saw another investigation to electronics engineers which was conducted by Nikkei Electronics<sup>13)</sup> in 2001, the percentage of answers, “I have experienced thinking of resigning from my company”, was 77.6%. And 59.6% of those answers were “I would resign from my company because of dissatisfaction of my job (research)”. This investigation similarly shows that it is important whether researchers/engineers can research with mutual consent or not.

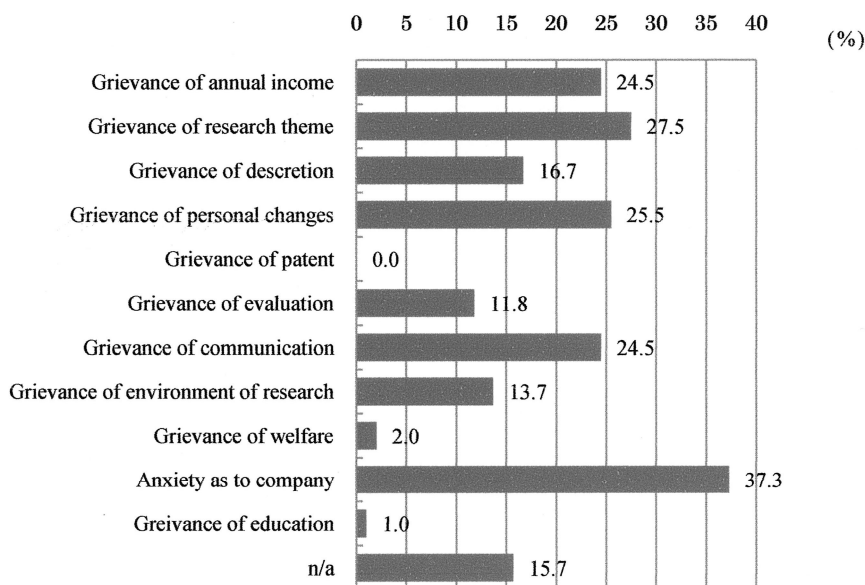


Chart4. The 2002 survey of companies;  
Reasons of job changes or resignation of researchers/engineers (M.A.)

In order to motivate researchers/engineers, we need to manage a gap between their requests regarding their research theme and their given research theme by a company. This problem is nothing but the problem of a restriction to coordinating and a way of coordinating.

## (2) Coordinator and Advantageous principal<sup>14)</sup>

I wonder whom researchers/engineers consult when they have grievances or requests. I investigated

13) Nikkei BP (2001) “To keep my job as an engineer” *Nikkei Electronics* (5<sup>th</sup> November 2001)

characteristics of coordinator through the 2008 survey. In this questionnaire I prepared one question as follows. “You have special ability to do your work and you have contributed to your company. But your achievement has not been respected by your company. Though you claimed that your company should have respected your achievement, your company denied it because the company could not treat only you as a special person. Under this situation whom do you consult?”

The result was very revealing: (Chart 5.) To address a grievance, most research/engineers, 32.8%, chose to go to a neutral person, then 28.4% of researcher/engineers went to consult a colleague, 16.4% decided there was nobody to consult and even fewer researcher/engineers, 10.4%, chose to go to “a trade union, or employee representative”(The ratio of trade union existence in this investigation is 82.0%)

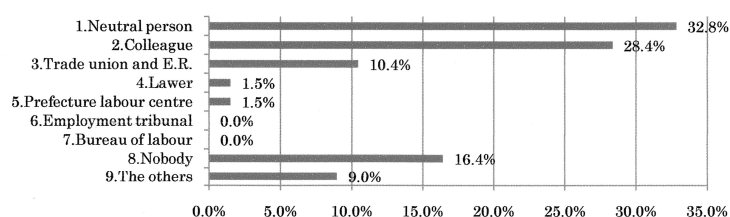


Chart 5. The 2008 survey of liaison officer for grievances of researchers/engineers

It should be noted that researchers/engineers select a colleague as an informal coordinator and select a neutral third party as an institutional coordinator. They prefer keeping quiet to selecting a trade union or employee representative as a coordinator. Needless to say, a private company's trade union has the three labour rights which are protected by the Constitution Article 28. And a trade union of company certified by the Trade Union Law is protected by an unfair labour practice.

On the other hand, when I analyzed the answers to a similar question in the 2007 survey of companies, I found the “trade union or employee representative” to be in general (except bullying) the preferred choice for complaints in most grievance areas. (Chart 6).

The result of the 2007 survey of companies is different from the result of researchers/engineers of the 2008 survey. But, again the company's preferred route, via Collective Industrial Relations was not chosen by researchers/engineers. Clearly the researchers/engineers regard individual relations as more important than Collective Industrial Relations. And this result shows an advantageous principle should be approved, too.

Though in Japan an advantageous principle is generally denied in law norm, some theories<sup>15)</sup> approve an advantageous principle as the case may be.

14) see note 6.

15) An advantageous principle is not easily admitted because Japanese union is not an industrial union but a company union. But it is pointed out that if a collective agreement makes terms and conditions of some employees much worse, a normative effect of a collective agreement is denied. The reason is that this case is exceedingly against the rational expectation of them to their trade union. (Shimoi 2000)

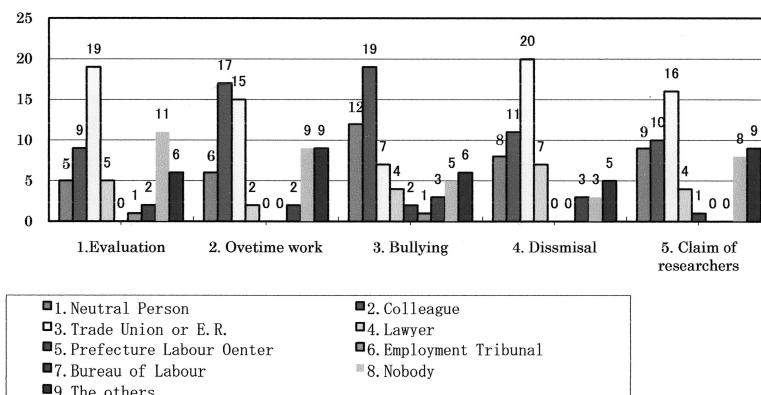


Chart 6. The 2007 survey of companies Q15 Responses to grievances (n=61)

Namely, so as to reform this situation and motivate researchers/engineers, we need to reform the basic rule/restriction. In other words we need to approve the advantageous principle. We should approve applying this principle to researchers/engineers, especially young researchers/engineers.

### (3) Coordination and Neutral persons

The categories of coordination of conflicts are mainly put into two categories, formal coordination and informal coordination. “A trade union and an employee representative” and “a neutral person” belong to formal coordinator category and “a colleague” belongs to informal coordinator category.

When I thought of characteristics of grievances such as achievement evaluation, allowance for overtime work, bullying and lay-off, I found a coordinator of grievances of bullying was mainly “colleague” (informal coordinator) in the 2007 survey of companies. On the other hand, a coordinator of grievances of achievement evaluation was mainly “a trade union and an employee representative” (formal coordinator).

Grievances of allowance for overtime work are tackled by two approaches. One approach is “colleague” and the other approach is “trade union or employee representative”. This problem is being tackled by both categories.

On the other hand, grievances of researchers/engineers are similarly tackled by two categories, too. If an approach from informal coordination fails, the other approach (formal coordination) is tried. That is to say the coordination of conflicts between researchers/engineers and their company need to consist of dual approaches.

For examples of grievances of allowance for overtime work, coordination is firstly tried in informal approaches and unless those grievances are resolved, coordination is secondly tried in formal approaches such as a trade union, a labour centre, a labour bureau and the labour tribunal system.

If researchers/engineers can use efficiently those approaches, it would be desirable for them. But jobs of researchers/engineers require high ability, specialty and originality in their companies, therefore a characteristic of a content of grievance of them tends to be individual matters as to speciality etc.

In order to resolve efficiently their grievances, they expect neutral person as a coordinator considering speciality (Chart5).

## 5. Researchers/engineers and Human Resource Management

### ( 1 ) Collective Agreements and Dual Personal Management System

Collective agreements and shop regulations have a strong influence on researchers/engineers. Especially in Japan, employees (including researchers/engineers) are strongly affected by them. A characteristic of a trade union in Japan is a company union, and is not an industrial union or a craft union. Generally speaking, a trade union in Japan is established in each company. Human resource management after the Second World War has not distinguished the human resource management of researchers/engineers from the human resource management of other occupations. Researchers/engineers are usually applied to a same wage table. An annual wage increase is awarded according to a same wage table. Numbers of companies adopting a dual personal management system are small, as I mentioned before.

Researchers/engineers in Japan are under both the labour law and a human resource management system by which researchers/engineers are strongly bound. For example, there is a negation of an advantageous principle. That is, researchers/engineers can't contract with their own company, even if they can negotiate with their company better terms and conditions than collective agreements.

In that situation a dual human resource management system contributes to diversifying terms and conditions for researchers/engineers.

When I examined the result of the 2002 and 2007 survey of companies, I found that an annual wage of companies which introduced dual personal management systems had a tendency to be decided by their achievement. I analyzed the data by Fisher's exact test (expanded) after I classified the situation of introduction of a dual personal system as an introduced company or non introduced company and classified a way of deciding annual wage as deciding annual wage according to achievement evaluation or deciding annual wage according to other criterion. I found there was a significant difference ( $p < .10$ ). The probability by Fisher's exact test (expanded) was 0.053 in the 2002 survey and that was 0.096 in the 2007 survey.

There is a similar research result concerning the research on the correlation between outer motivation and inner motivation. It is pointed out that the group of researchers with high achievement is motivated by higher terms and conditions than other occupations (Hirakimoto 2006).

A dual human resource management system is one of the important approaches which motivate researchers/engineers.

## (2) Young Researchers/engineers and Seniority Management System

A characteristic of transition of relationship between a company and employee is the great change without modifying main legislation.

Achievement evaluation system has admittedly prevailed in Japan without modifying the rule of collective agreement and shop rules for 20 years. This case is uncommon, internationally speaking (Mitchell 1999).

The important problem has not been solved by this change yet. The seniority system is still being applied to young researchers/engineers now. As they are one of a trade union member, they are bound by their collective agreement and can't contract with their company beyond a collective agreement. Their collective agreement is applied to all employees of their company. There are no differences between researchers/engineers and other occupations. Employees who belong to their trade union are applied to their collective agreement which is on the same level with terms and conditions. As a result of this, young researchers/engineers are not managed by an individual. According to the investigation (Fukutani 1996) concerning the gap of recognition of their wage between companies and researchers/engineers, researchers/engineers under 35 years old have dissatisfaction with their wage and bonus. In order to resolve this problem, young researchers/engineers need to be partly applied to a collective agreement and to be partly applied to an advantageous principle.

## (3) Reform of Human Resource Management

It is not easy in Japan for employees or researchers/engineers to establish a new company or find a new better job. When I see the question "Do you think a new company will be able to be successful" in the 2002 and 2008 survey, the percentage of affirmative answers is 1.0%, 10.3%, respectively. And percentage of negative answers is 57.9%, 44.1%, respectively. The ratio of starting business is not high in Japan. Researchers/engineers cannot lightly resign from their company to start their business. Therefore they should continue to work in their same company in which an advantageous principle is not applied to them.

Under this situation it is difficult to introduce a human resource management system which can manage researchers/engineers according to each individual. But when we try to introduce that system we have two approaches. One approach is a dual human resource management system built after a trade union's approval of that system. The other approach is individual contracts which can partly precede collective agreement like AWAs in Australia<sup>16)</sup>.

The former partly needs cooperation with a trade union but the latter needs to pass a new law. Both approaches are important to motivate researchers/engineers in a new era.

## Conclusion

The relationship between a company and an employee has changed without amending basic employment law. I investigated this change through four questionnaire surveys and I found this change particularly meant individualization of the researchers/engineers.

But this change has not been structurally caused in Japan. The present employment system has a problem to work efficiently in the new era. These problems, such as a negation of an advantageous principle, a seniority wage system, have a strong influence on employees. Young researchers/engineers especially are consequently being affected by such problems and they have grievances of their treatment.

From the legislative perspective the four surveys suggest the following conclusions:

1. The tendency of individualization is growing among researchers/engineers which are different from other occupations.
2. An advantageous principle should be approved of to resolve conflicts Researcher/engineers are involved in.
3. The group of higher ratio of resolution of conflicts between researchers/engineers and their company tend to have the higher morale.
4. Researcher/engineers prefer an individualized system of dispute resolution.
5. Collective bargaining systems by trade unions do not work efficiently in solving Researcher/engineer's problems in a company.
6. Researcher/engineers prefer a neutral third party or person as coordinator to a trade union or an employee representative.
7. A dual coordination system, "informal approaches and formal approaches" should be considered as part of dispute resolution involving Researcher/engineers.

And in order to motivate researchers/engineers, coordinating two standpoints, researchers/engineers' standpoint and companies' standpoint, is needed. Without their consent to research themes, a company can't motivate researchers/engineers. Coordination or negotiation systems between

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16) Under Australian Workplace Agreements (AWAs), an employee can make a contract with a company in principle. This system was introduced by the Workplace Relations Act 1996. The Labour government had set about reforming employment relations law to catch up with a change of the society thinking individual bargaining more important than before. Especially under the Howard coalition Government this trend was promoted on his policy based on the new liberalism. At the beginning, No-disadvantage test was carried out by OEA (The Office of the Employment Advocate) which was established in 1997 and was reorganized into The Workplace Authority in 2007. After the Howard coalition Government won the 2005 general election and held a majority in the Senate, he abolished No-disadvantage test by Workplace Relations Amendment Act 2005. But in the 2007 general election, when one of its issues was "Work Choices", he was defeated. The Rudd Government made the Transition Act 2008 pass and established ITEA (Individual Transitional Employment Agreement) system instead of AWAs system.

researchers/engineers and a company are needed so that a company can motivate researchers/engineers. In addition, this problem is not only a problem within a company but also a problem outside the company such as a patent.

Researchers/engineers should be managed according to each necessity of the individual. They not only need a collective bargaining system but also an individual coordination system.

The new systems or new policies, such as an affirmative of an advantageous principle for researchers/engineers, coordination system by a neutral third party or person, a dual human resource management system, are needed. These new systems or new policies contribute to a decision of compensation for a patent, too.

In a new paradigm which needs an added value, in order for Japan to prosper; the present employment system should go through historic change from the present Japanese collective bargaining system to the new Japanese collective individual bargaining system.

### The remaining problems

This paper's main concern has been with the part of legislation/motivation of innovators. But addition to this matter, there are other avenues of encouraging innovation which have to be studied and considered. These include the researcher/engineers' status, environment, another kind of motivation, another kind of reward, selection process etc so that they can become creative and hence efficient at innovation.

In addition, there are problems concerning Patent Law. The way of agreements between researchers/engineers is not only considered by the collective model but also by the individual model. There is a need to better define the patent rights of companies and researcher/engineers so that appropriate levels of motivation are given to both to encourage and motivate the process of innovation.

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