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I A Study for Methodology

1. Foreword

The Delphi Method^{1 2} has been widely used as a method for long – term forecasting to date. The method, however, has a weakness in taking repetitive surveys of responding experts until a foreseeable period converges. Repetition of surveys is not only costly but also time – consuming. It also might lower the response rate of the survey.

The Fuzzy Delphi Method³ has been proposed to handle uncertainty in forecasting. This is how the method works. It seeks a distance between all the forecast values and values placed by each respondent. Algorithm converges when the distance satisfies a certain standard. The average value comes in the forecast value. In any rate, this method, like the traditional method, should require a few times of surveys using questionnaires, thus

wouldn't solve the problem of repetitive process.

On the other hand, a new forecasting method using Fuzzy Theory⁴ has been introduced to make up for the weakness of these methods, that is New Fuzzy Delphi Method.^{4,5} New Delphi Method takes respondent's expertise for forecasting items into consideration in the questionnaire survey stage and regulate it as respondent's forecasting degrees in order to seek forecast value through Max – Min criterion and fuzzy integration.

The New Delphi Method has the following merits :

- (1) To be able to express uncertainty of respondents in forecasting
- (2) To be able to reduce times of repetition of surveys
- (3) To be able to identify expertise of respondents

In this paper, we will introduce Revised New Delphi Method, an advanced version of New Delphi Method. The new method can read respondent's degree of expertise from his/her forecast value to obtain a more accurate forecast value. Also, we will apply these methods to forecasting Japanese HRM (Human Resource Management) system to verify the effectiveness of those methods. For an analysis of the results of the application to the HRM system, please refer to the following discussions.

- (1) 「Forecasting Future HRM using New Delphi Method — A Study of Applied Cases」 Daito Bunka University Economic Journal
- (2) 「Research Paper No.J – 22 Daito Bunka University」 (for materials of survey results)

2. Process of New Delphi Method and Revised New Delphi Method

Following is the objectives of study and development of New Delphi Method and Revised New Delphi Method :

- (1) Uncertainty of respondent over forecast items : To design and develop a way of establishing membership function and to examine a way of responding to forecast items for handling uncertainty of respondent over

forecast items.

(2) Convergence of forecast period : To reduce the number of surveys to one to cut costs and time required for survey.

(3) Reliability of forecast period : To obtain forecast period using Max – Min criterion and Fuzzy Integration⁷ based on data acquired from respondents. Revised New Delphi Method calculates expertise by using the density concept. Based on the calculated expertise and triangular membership function, and to obtain forecast period. Furthermore, the method will try to verify the coincidence between the new and the results by traditional Delphi Method. Figure 1 indicates how forecast period will be obtained through New Delphi Method and Revised New Delphi Method.

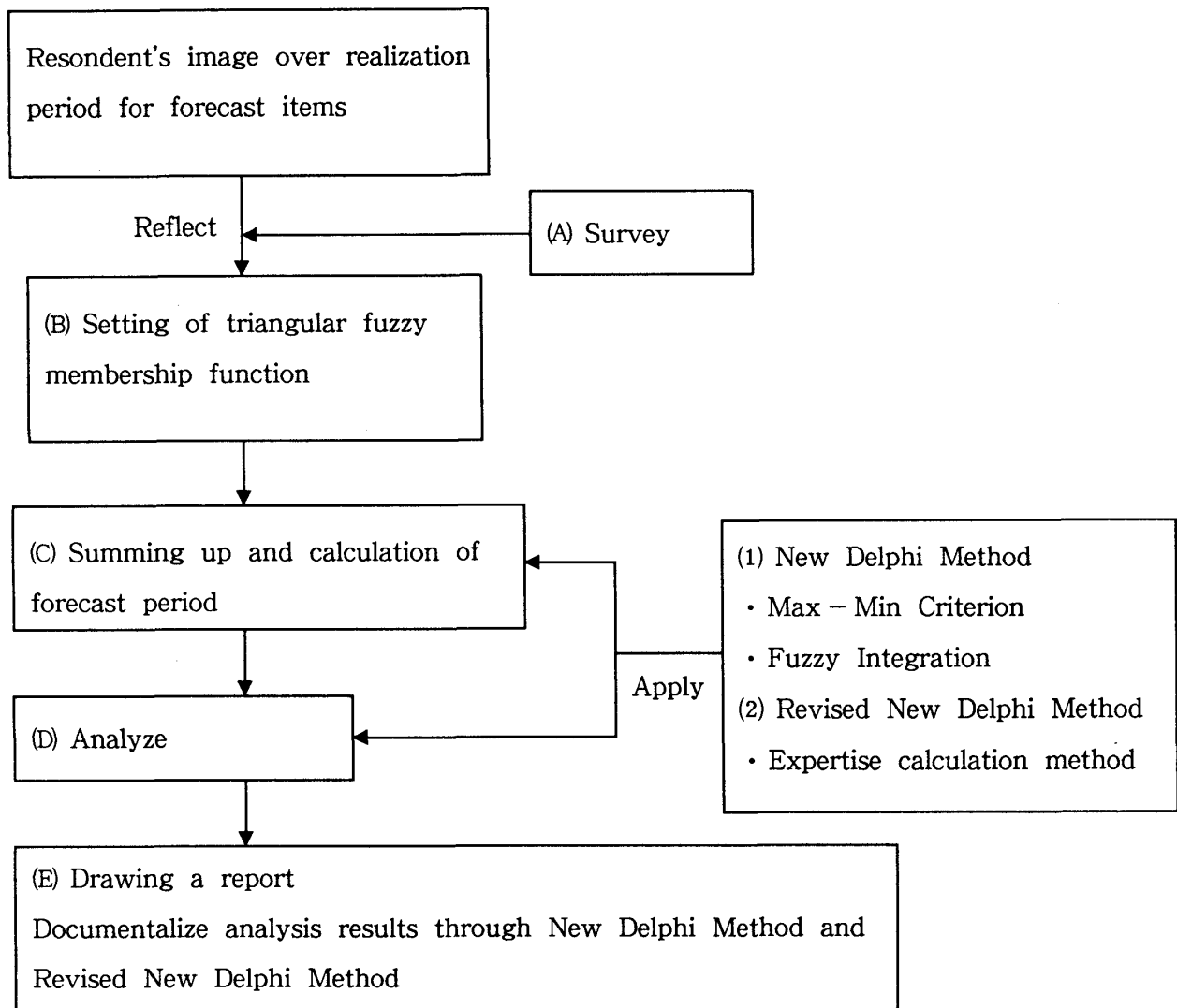


Figure 1 Developmental process of New Delphi Method and Revised New Delphi Method

In Step(A), a respondent's image for forecast items is extracted through a questionnaire survey. In Step(B) a triangular fuzzy membership function is established based on the survey result. In Step(C), forecast period is established based on the survey result. In Step(C), forecast period is calculated. In New Delphi Method, forecast period is obtained through Max - Min forecast method and fuzzy integration. In Revised New Delphi Method, on the other hand, the forecast period is esteemed through the method to have the range of both possible forecast period and impossible forecast period reflect respondent's expertise. In Step(D) an analysis is made based on the results of these two methods. In Step(E), a report is made based on the analysis result of Step(D).

3. Question items and establishment of membership function

3.1 Question items and questionnaire sheets

In New Delphi Method and Revised New Delphi Method, questions related to the realization period for the forecast items will be asked : (1) The period when realization is absolutely impossible (2) The period when realization is surely possible. Figure 2 indicates this.

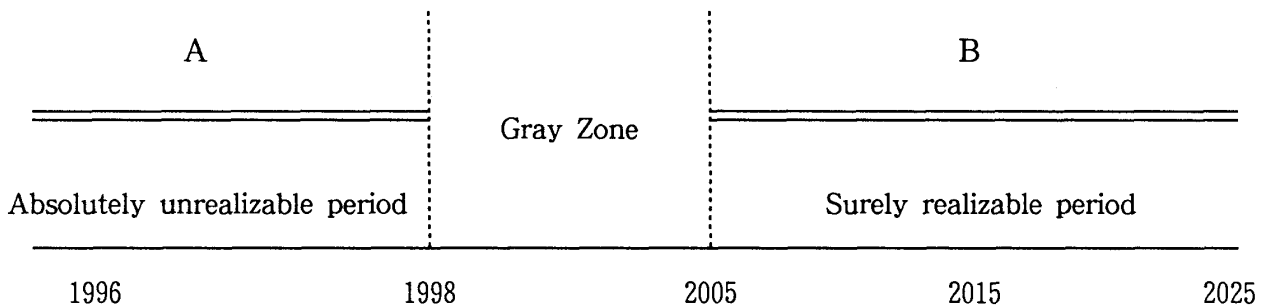


Figure 2 : Forecast Period

In Figure 2, for instance, an expert's answer to a certain forecast item indicates that realization is impossible until 1988, however, surely possible from 2005. It also shows that the period from 1988 to 2005 is where realization is not sure. Thus, this period is defined as "gray zone".

To set membership function to indicate respondent's uncertainty over a forecast item, the questionnaire sheet is provided as follows. (Table 1)

Table 1 Questionnaire items and design of reply sheets

Forecast of future HRM image with New Delphi Method Company name : Location _____ (Phone) Name of respondent : Title of respondent : Date :	a) Scale by importance • Use scale 1 (no importance) to scale 10 (very importance) 10 1 -----	b) Realizable period		c) Respondent's degree of expertise • Use scale 1 (no importance) to scale 10 (very importance) 10 1 -----
		Absolutely unrealizable period until approximately the year 20xx	Surely realizable period until approximately the year 20xx	
Q 1 : Do you think securing a labor force with emphasis on those fresh out of school will still continue ?	()	Until the year ()	Until the year ()	()
Q 2 : Do you think the tendency of placing priority on prestigious university grads when employing college graduates will still remain ?	()	Until the year ()	Until the year ()	()
Q 3 : Do you think employment of senior management staff (section chief or department chief) with careers will be a matter of course in general corporations ?	()	Until the year ()	Until the year ()	()
Q 4 : Do you think employing outside labor force from spinned – out companies or outplacement companies will become dominant as to reach approximately 50 % of all the annual employment ?	()	Until the year ()	Until the year ()	()

This is how to fill in the questionnaire form for each question in Table 1.

(1) Significance of reliability : Scale from 0 to 10 is used. In terms of reliability, 0 is for items with no significance whereas 10 is for items

with very significance. If the significance of reliability falls in between, a scale valued somewhere in between 0 to 10 is utilized instead.

(2) Period of realization: For a period when realization is absolutely impossible, “approximately until 20xx” is put whereas for period when realization seems to be surely possible, “approximately from 20xx” is utilized.

(3) Respondent’s expertise: If respondent’s expertise for the question item is nothing, zero is utilized whereas if the expertise is the highest, 10 is utilized. If the expertise falls in between, a scale valued somewhere in between 0 to 10 is utilized instead.

In Revised New Delphi Method, since expertise of respondent is calculated based on the distance between “realization is possible” period and “realization is impossible” period, respondent’s expertise need not to be included in the questionnaire items.

3.2 Setting respondent's triangular membership function

In the column B) “realization is possible” period in Table 1, if the year n_1 is put as B)–1 “realization is absolutely impossible” period and the year n_2 is put as B)–2 “realization is surely possible” period, $n_1 < n_2$ is produced. In this case, if membership function for both B)–1 and B)–2 is established as $f_1(x)$ and $f_2(x)$ respectively, these functions will be shown as follows.

$$f_1(x) = \begin{cases} 0, & x \leq n_1 \\ \frac{x-n_1}{n_2-n_1}, & n_1 \leq x \leq n_2 \\ 1, & n_2 \leq x \end{cases}$$

$$f_2(x) = \begin{cases} 1, & x \leq n_1 \\ \frac{n_2-x}{n_2-n_1}, & n_1 \leq x \leq n_2 \\ 0, & n_2 \leq x \end{cases}$$

$f(x)$, the compound function of $f_1(x)$ and $f_2(x)$ is defined by $f(x)$. (See Figure 3)

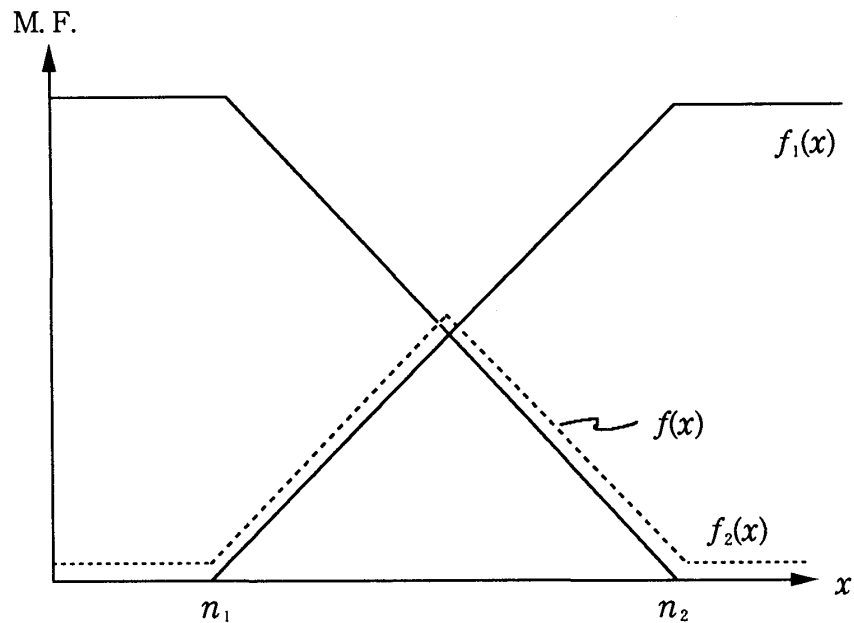


Figure 3 Triangular membership function

4. New Delphi Method and Revised New Delphi Method

In this section, we describe the following three methods. (1) Max – Min forecast method using Max – Min Criterion in New Delphi Method (2) Forecast method using Fuzzy Integration (3) Revised New Delphi Method that calculates expertise out of forecast value of two periods: “period when realization is possible” and “period when realization is impossible”.

4.1 Max – Min Forecast Method

Following is algorithm to obtain forecast value using Max – Min Criterion.

Establishing membership function for forecast items out of respondents’ data of persons by degree of expertise. Down below is the steps to obtain the forecast value. (See Figure 5)

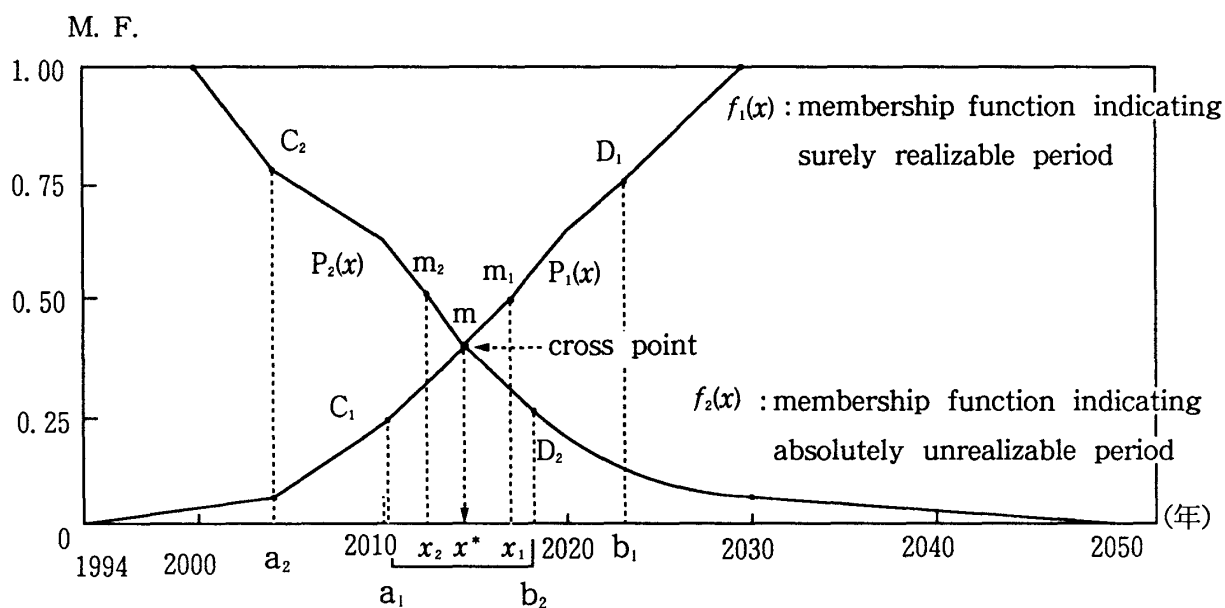


Figure 5 Membership function and Max – Min forecast value

(Forecast item Q4: Do you think employing an outside labor force from spinning – out companies or outplacement companies will become dominant as to reach approximately 50 % of all the annual employment?)

Algorithm of Max – Min Forecast Method

Step1: Construct cumulative frequency distribution table

$f_1(x)$: function which denotes surely realizable period

$f_2(x)$: function which denotes absolutely unrealizable period

Both $f_1(x)$ and $f_2(x)$ are cumulative frequency distribution.

Step2: Both upper and lower questions of $f_1(x)$ and $f_2(x)$ are obtained as showed at (C_1, D_1) and (C_2, D_2) , respectively. Furthermore, medians corresponding to $f_1(x)$ and $f_2(x)$ are designated as m_1 , and m_2 , respectively.

The membership functions denoting “realizable period” and “unrealizable period” are $P_1(x)$ that links C_1 , m_1 , D_1 , and $P_2(x)$ and that combines C_2 , m_2 , D_2 , respectively. In this arrangement, the region where realization

is achieved becomes the domain $[a_1, b_1]$ of $P_1(x)$ and the forecast period for realization $x_1 (\in [a_1, b_1])$ denotes the period when realization is most possible. In a similar manner, the domain of non-realization is defined as $[a_2, b_2]$ within $P_2(x)$ and becomes the forecast period of unrealization. $x_2 (\in [a_2, b_2])$ denotes the highest membership value out of the non-realization with an extremely high degree.

Step 3: The Max – Min forecast value x is to be obtained by computing Max – Min ($P_1(x), P_2(x)$).

This is the value of the forecast period on the basis of two contrastive periods of “surely realizable period” and “absolutely unrealizable period”.

The line connecting C_1, m with D_2 becomes the membership function which synthesizes both $P_1(x)$ and $P_2(x)$. We call m a “cross point”, and the defined zone of the membership function a “gray zone”. Thus, the Max – Min forecast value belongs to the gray zone in which both the realizable and unrealizable periods show the same value of the membership function. This could correspond to the period with the highest reliability.

4.2 Forecast method via fuzzy integration

This method, on the basis of the data obtained from the object through the questionnaires as shown in 3.2, constructs membership functions to the forecast items and computes the forecast value via fuzzy integration using Choquet integration or S – integration, where the extent of specialization becomes fuzzy measure. (When we call fuzzy integration, we mean a mix of Choquet integration and S – integration.)

Algorithm of forecast method via fuzzy integration

Step 1: Establish a membership function for each respondent with respect to the forecast period using the setting method shown in 3.2.

Establishing membership function to i – th respondent

Suppose a forecast result of a forecast item done by i – th respondent

is shown as “absolutely unrealizable until approximately the year X_u and “surely realizable after the year X_t . In this case, each membership function is expressed by $h_u(x)$ and $h_t(x)$ as shown in Figure 6. The synthetic function $h_i (= \min(h_u(x), h_t(x)))$ becomes the membership function for the i -th respondent. The membership function that gives $h_i^* = \max h_i(x)$ is the realizable forecast period with the highest respondent’s membership.

As shown above, all membership function for each respondent (total number of respondents : n) are identified.

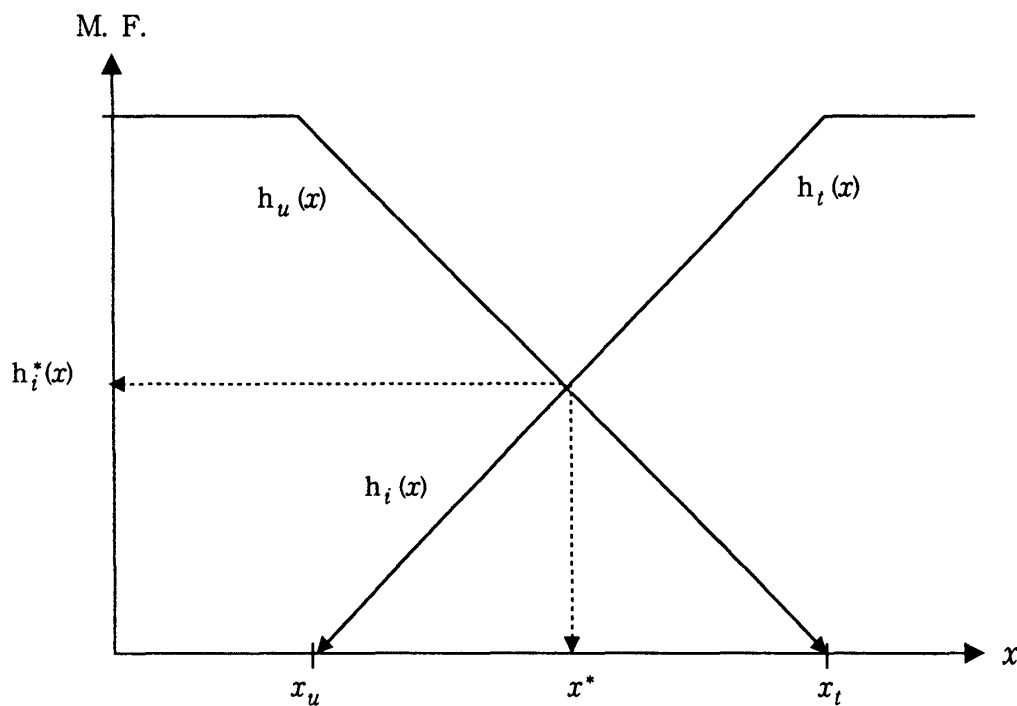


Figure 6 Membership function of i – th respondent

Step2: Using $h_i(x)$, $i = 1, 2, \dots, n$, obtained in Step 1 and the extent of expertise for the corresponding forecast item, g_i , $i = 1, 2, \dots, n$, fuzzy integration is undertaken to decide the overall assessment value taking all the specialty of respondents for each forecast year into account. Thus, the forecast value taking every respondent’s extent of expertise into consideration can be obtained as a point estimated value.

4.3 Revised New Delphi Method

Revised New Delphi Method is to estimate forecast period adapting the hypothesis “The higher the degree of speciality, the narrower the distance between surely realizable period and absolutely unrealizable period becomes” through reading degree of specialty from the triangular membership function shown in Figure 6. The algorithm of Revised New Delphi Method will be shown as follows.

The Algorithm of Revised New Delphi Method

Step 1: Each respondent's (total of n persons, $P_i, (i = 1, 2, \dots, n)$) will put both “surely realizable period” and “absolutely unrealizable period” to the corresponding questions in the questionnaire sheet shown in Table 1.

Step 2: Establish membership function for each respondent based on the estimated forecast period ($i = 1, 2, \dots, n$) shown in Figure 6.

Step 3: Obtain \bar{S} , an average value of the area S_i of respondent's triangular membership function g_i is to be obtained as the degree of expertise of the respondent P_i if \bar{S} is divided by S_i .

$$g_i = \left(\sum_{j=1}^l S_j / n \right) / S_i$$

Step 4: Slide the triangular membership function of S towards a positive number from the point 0 on the X axis by a year (period). Then compute $\sum_{j=1}^l U_j g_j$, ($j = 1, 2, \dots, l$) crossed with the triangular function of respondent P_j ($j = 1, 2, \dots, l$), g_j : the degree of expertise)

Step 5: User denoting degree of relationship with distance between “realizable” and “unrealizable” period and the degree of expertise. Then, obtain G_k denoting realizability of each year through the following computation.

$$G_k = r \sum_{j=1}^l U_j \cdot g_j + (1-r) \sum_{j=1}^l U_j, \quad 0 \leq r \leq 1$$

In this computing, note the following. k denotes corresponding forecast year. The higher the degree of expertise of respondent, the closer the value of r comes to 1. On the contrary, the lower the degree of expertise of respondent, the closer the value of r comes to 0.)

Step6: x^* is to become the forecast period if x^* satisfies Max G_k (k is the corresponding forecast period). In this case, x^* is defined as being denoted by medians of both “realizable” and “unrealizable” periods. The above described three methods, Max – Min forecast method, forecast method by fuzzy integration, and Revised New Delphi Method, have been proved to be able to identify each respondent’s forecast period. In applying these methods, the characteristics of each method should be taken into consideration as following.

Max – Min forecast method is effective when the degree of expertise between respondents are not critical. Forecast method by fuzzy integration is employed to identify a forecast period taking each respondent’s degree of expertise into full consideration. Revised New Delphi Method is employed to identify a forecast period to check the reliability of New Delphi Method on the degree of expertise put in the questionnaire sheets. Also, Revised New Delphi Method is the option that identifies a forecast period like the forecast by fuzzy integration, when the respondent’s degree of expertise is taken into good consideration. The way r is given, in the revised Delphi Method, is desirably to be put as $r=0.4$ empirically according to result of simulation so far done, although it depends on respondent’s expertise and contents of forecast items. This should require a clear warrant based on further simulations using the revised method.

5. Applying the New Delphi Method for future Image of HRM(Human Resource Management)system

We conducted a survey in the form a questionnaire with regard to forecast the type of HRM system in Japan. The questionnaire, consisting of 17 questions asking “realizable period” and “unrealizable period”, were

sent to 38 experts (20 corporate human resource managers, 11 management consultants, 11 academics) randomly chosen.

[Forecast items]

Q1: Do you think securing a labor force with emphasis on those fresh out of school will still continue?

Q2: Do you think the trend of putting priority to prestigious university graduates when employing college graduates will still remain?

Q3: Do you think employment of senior management staff (section chief or department chief) who have worked for other companies will be a matter of course in generally corporations?

Q4: Do you think employing an outside labor force through *"Shukko" or outplacement companies will become dominant as to reach approximately 50% of all the annual employment?

*"Syukko" means for an employee to be transferred to a spun-out company usually with remained belongingness to the original company.

Q5: Do you think a HRM system common to Japanese and foreign workers (i.e. fair promotion standard or wage system) not distinguishing foreign workers from Japanese counterparts will operate as the number of jobs relying on foreign workers increase?

Q6: Do you think employees will become more conscious about changing companies if better working conditions are offered rather than staying at the one same company as long as possible?

Q7: Do you think many employees will opt for the so-called "limited employee" with limited working hours, limited working areas and limited jobs as they lean towards a sense of "promotion is not everything"?

Q8: Do you think the position of personnel appraisal (including personnel assessment and other methods of assessments) in HRM system will be ranked high as the influence of personnel evaluation on promotion, pay raise, and so forth becomes more and more significant?

Q9: Do you think result-oriented appraisal will be commonplace as performance appraisal takes on more significance rather than other appraisal elements such as competency, attitude or sentiments?

Q10: Do you think the idea of a positive use of an evaluation system will be taken for granted? This idea involves to strengthening ability development and job development through the feedback of evaluation results.

Q11: What do you think of the opinion saying "From now on, a job-oriented (job-centered) HRM system should be realized"?

Q12: Do you think corporate measures for middle aged and elderly workers (i.e.: option for early retirement at the age of 45) will increase in number?

And do you think evaluation will be taken for granted as management of middle and high aged workers in corporations becomes stricter?

Q13: Do you think designing and executing training and development planning for middle aged and elderly workers will be a way of life in each company so that they can lead their career life independently not relying on companies in the future?

Q14: Do you think male and female workers will make little difference in their consciousness about their career (i.e.: staying long at one company, passion for promotion or skill development)

Q15: Do you think companies will vary greatly in general in working time management with some companies opting for a flex-time system and others for reduced working days such as 4-day working week?

Q16: Do you think employing specialist doctors such as counseling specialists (i.e.: hiring a psychiatrist full time or on contract basis at companies) will be commonplace as mental troubles caused by stress increase?

Q17: Do you think so-called annually-past system (applied to management and decides the amount of payment on year-by-year contract) will be dominant in companies?

Table 2 indicates the result of applying Max-Min forecast method in New Delphi Method and forecast method via fuzzy integration to the survey results gained out of the above forecast items.

Table 2 Realizable period forecasted by corporate HRM staff, management consultants and academics

Question	average year	max – min	Fazzy Integration	
			Choquet Integration	S – Integration
Q 1	2016	2011	2012	2008
Q 2	2015	2011	2012	2008
Q 3	2017	2011	2014	2018
Q 4	2019	2015	2014	2012
Q 5	2020	2017	2012	2012
Q 6	2013	2005	2002	2008
Q 7	2015	2009	2014	2014
Q 8	2003	2001	2002	2002
Q 9	2005	2001	2002	1998
Q 10	2006	2001	2002	2002
Q 11	2011	2005	2008	2008
Q 12	2006	2001	1998	1996
Q 13	2008	2003	2008	1996
Q 14	2016	2010	2002	2014
Q 15	2011	2005	2002	2002
Q 16	2013	2005	2012	2008
Q 17	2009	2003	2006	2002

Note : Fuzzy measurement of 1.00 was set for the 38 respondents as they are all experts in HRM.

In Table 2, the average year indicates simple average of realizable periods the 38 respondents forecasted. This shows, except part of forecast items, the forecast period by Max – Min forecast method is in accordance with that of fuzzy integration within the average errors of about 3 years.

The below Figure, citing the survey result from Q9 (Do you think result – oriented appraisal will be common as performance appraisal takes on more significance rather than the other appraisal elements such as competency, attitude or sentiments?), will demonstrate this.

(1) Figure 7 denotes the forecast period of the year 2001 through Max – Min method. In this Figure, the gray zone falls in between the year 1998 and 2003 and indicates high realizability of the forecast item.

(2) Figure 8 indicates the respondent's triangular membership function for Q9. Also, it indicates evaluation value to the forecast period obtained by fuzzy integration (Choquet integration) using a triangular membership function shown in Figure 8. In this case, x_1^* which exceeds the maximum value of assessment value, indicates the year 2002 and the year 1998 as the closest quasi – biggest value.

Also, Figure 10 indicates the result by S-integration of fuzzy integration. This result shows an assessment value which has the same tendency with the result of Choquet integration in Figure 9. In Figure 10, the year 1998 is indicated as x_2^* where as in Figure 9 the year 2002 is indicated. This is because of a slight difference with the assessment value.

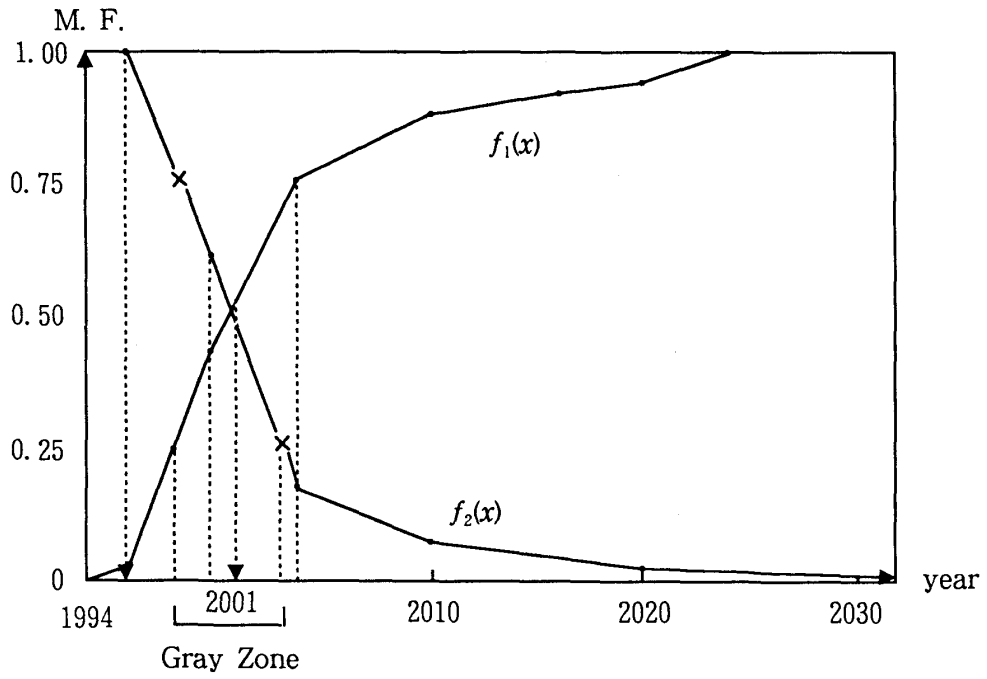


Figure 7 Result on Q 9 via Max – Min forecast method

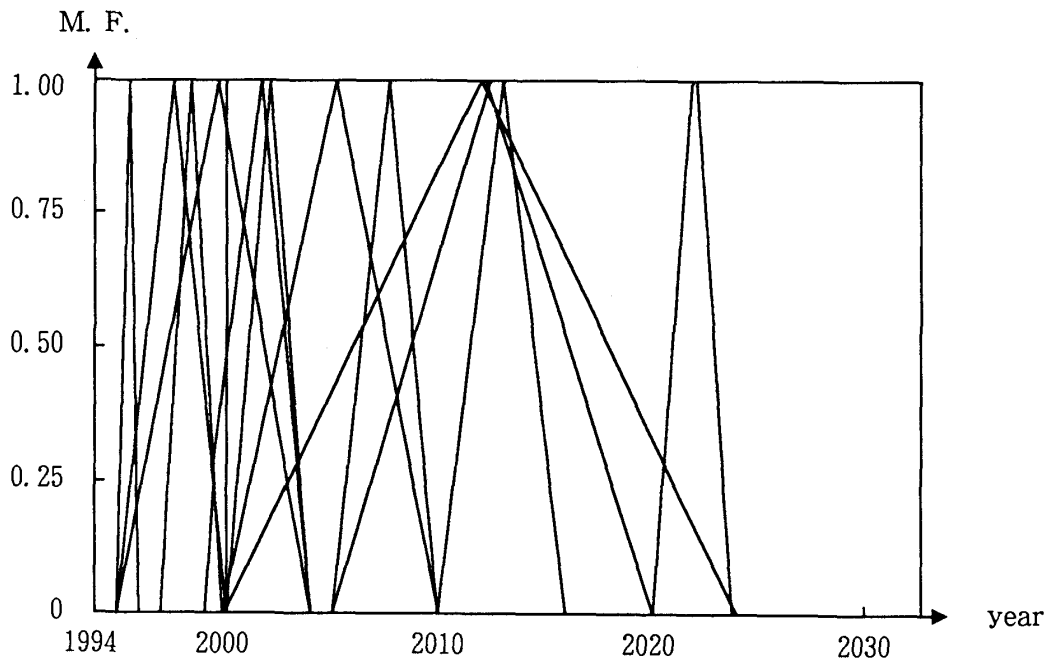


Figure 8 Membership function of the 38 respondents regarding Question 9

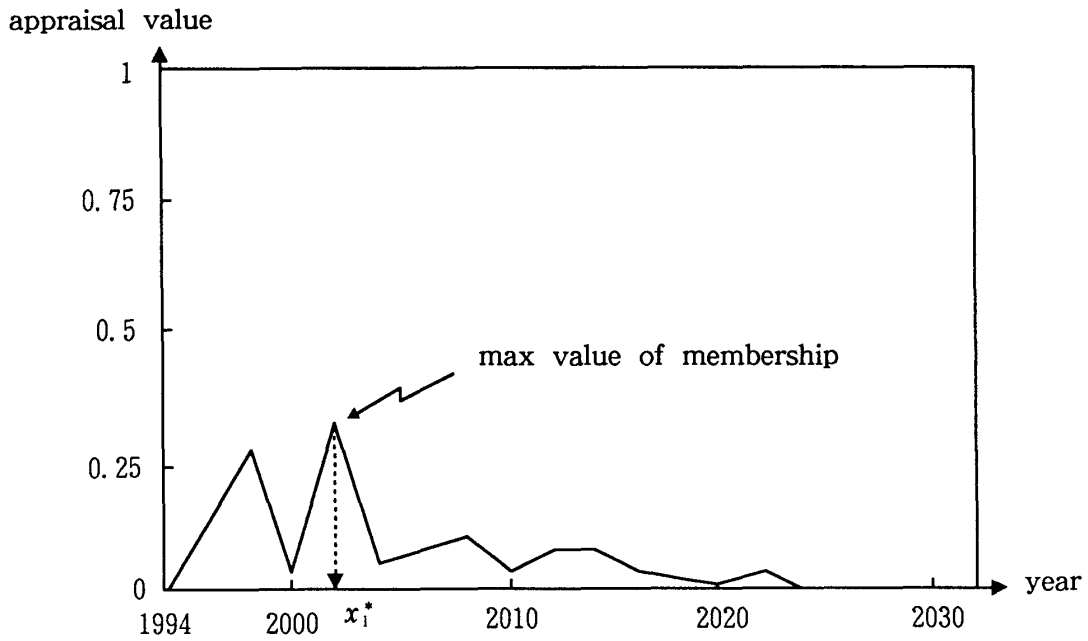


Figure 9 Result of forecast on Q 9 via fuzzy integration
(Choquet- Integration) x_i^* :the year 2002)

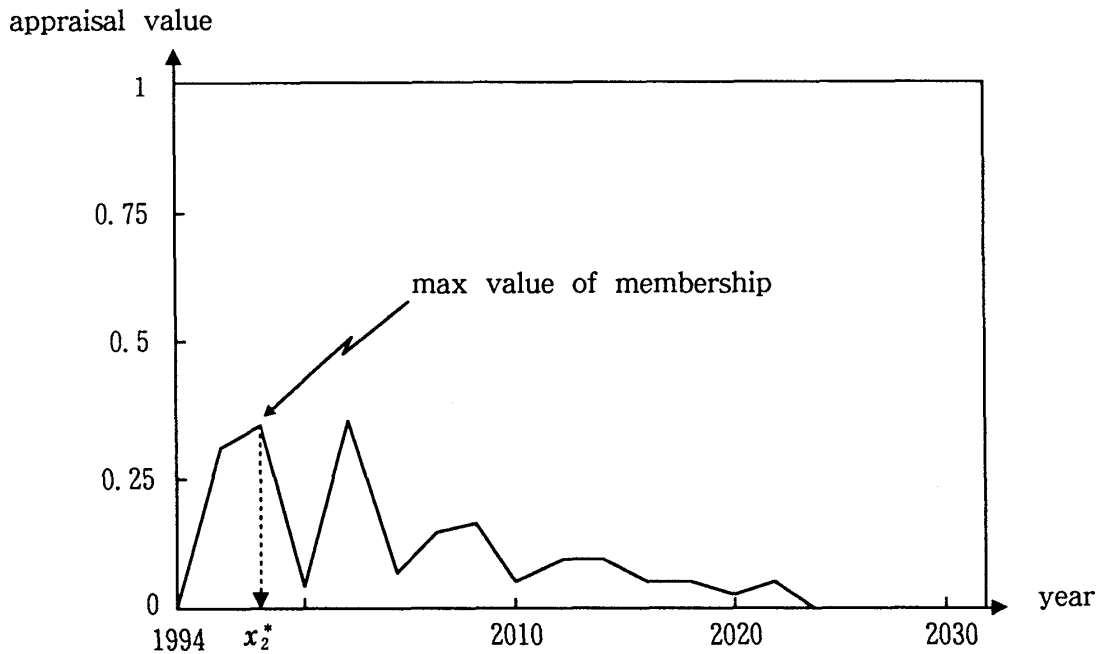


Figure 10 Forecast result regarding Q 9 via Fuzzy Integration
(S - Integration) (x_2^* :the year 1998)

As the above result clearly shows, we could judge that the results of applying Choquet integration and that of S-integration indicate almost the same although with a minor difference. In any rate, these results indicate the forecast item Q9 will be realized between the year 1998 and the year 2002. Also, they forecast the age will soon come when personnel evaluation is conducted by results rather than by competence, attitude or sentiments.

(3) Forecast by Revised New Delphi Method

Here, an example is a question other than the 17 questions. The forecast item of the question is “When do you think job – request system in which one can choose his/her favorite job will be commonplace?”. The 20 respondents are 4th year students of a liberal – arts university. Figure 11 indicates triangular membership function of the students while Figure 12 the assessment values.

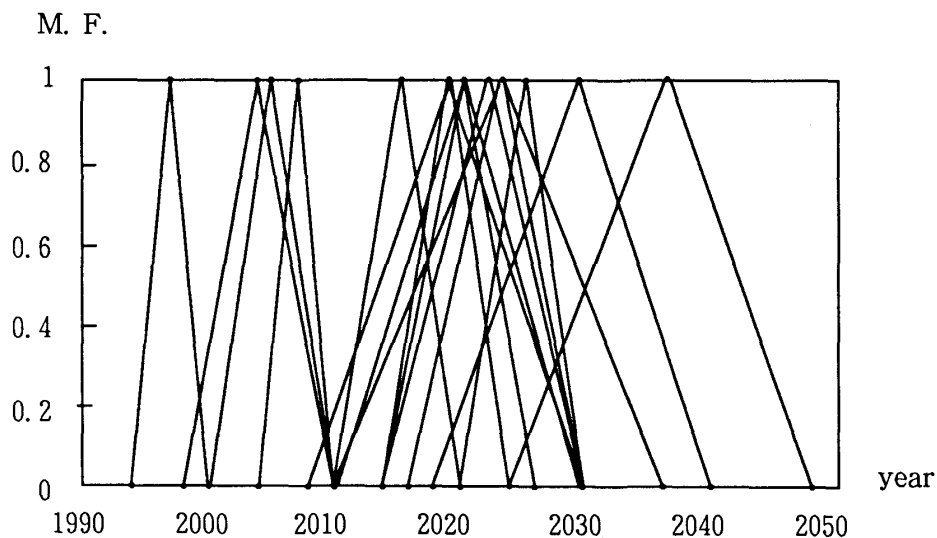


Figure 11 Membership function of the 20 respondents

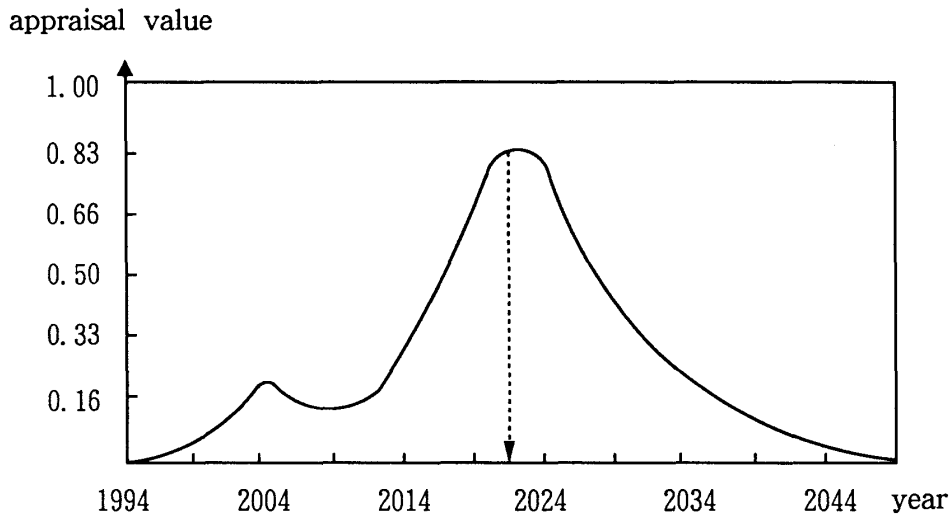


Figure 12 Appraisal value for each forecast period (year)

As the graph of Figure 12 evidently demonstrates, the forecast item will be realized at around the year 2022 according to the forecast of those 20 students. This result is confirmed to be in accordance with the result done by Delphi Method (the result : the year 2021). Also, the results of the other 13 forecast items simultaneously surveyed by Revised Delphi Method are proved to be very much in accordance with the result of the Delphi Method.

6. Afterword

This paper proposed three kinds of forecasting methods ; The Max – Min forecast method in New Delph Method, forecast method via fuzzy integration and Revised New Delphi Method and furthermore, tried to apply those methods in forecasting the nature of the HRM system in Japan to prove the effectiveness of the system.

The effectiveness of Max – Min forecast method and forecast method by fuzzy integration has been proven. The effectiveness is further proven by the appropriate results after applying these methods to forecasting future HRM model this time. As to the Revised New Delphi Method, further consideration is required. For example, obtaining the degree of expertise or deciding the coefficient r to seek the assessment value needs to be

decided taking the forecast items or the expertise of the respondents into account. Also, further simulations are necessary to suggest the guidelines as to how to decide it. This paper has proved that the proposed methods, compared to the traditional methods, have merits of being able to do detailed analysis such as: (1) to be able to reduce the repetition of survey (2) to be able to rationally handle respondent's uncertainty over forecast items and (3) to be able to identify the expertise of respondent over forecast items.

As for the usage of these methods, the following need to be taken into account :

① Max – Min forecast method is effective basically when expertise among the respondents is not often asked for. If expertise among the respondents varies, classify those respondents by the degree of expertise and apply Max – Min Method to the classified group one by one.

② Forecast method via fuzzy integration such as Choquet integration or S – integration should be used when stressing the difference in each respondent's expertise.

③ Revised New Delphi Method should be used to examine respondent's expertise or to identify forecast period taking respondent's expertise into consideration like with fuzzy integration when little reliability on respondent's expertise exist.

Therefore, although either method can identify forecast period, using the right method at the right time should make more detailed analysis possible than that of the traditional methods.

This paper proposed new methods of forecasting future and referred to the effectiveness. The analysis of the result is omitted in this paper because of the limitation of pages, A more detailed article titled "Forecast of future HRM system through New Delphi Method – A study on applied cases –" is available in the same journal. Also, you will find the materials of organizing the forecast results in the research paper No.J – 22 issued by Daito Bunka University, Management Research Center. Lastly we would

like to express deep gratitude to Daito Bunka University for supporting this paper with its special research grant.

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⁴ L.A. Zadeh (1965), "Fuzzy Sets", *Information and Control Vol. 8*, pp.338 – 353

⁵ A.Ishikawa,M.Amagasa et.al.(1993) "The Max – Min Delphi Method and Fuzzy Delphi Method via Fuzzy Integration", *Fuzzy Sets and Systems 55* pp.241 – 253 .

⁶ M.Amagasa (1995) : "New Delphi Method and Its Application", *Daito Bunka University Economic Journal Vol.62* pp.87 – 106 .

⁷ M.Sugeno (1972), "Fuzzy Measures and Fuzzy Integrals", *Trans. Soc. Instrument and Control Engineers (Japan) Vol. 18* . pp.218 – 266

⁸ Japan Society for Fuzzy Theory and Systems (1993), 『Fuzzy Measure, Lecture Fuzzy 3』, Nikkan Kogyo Shuppan Sha, pp.151 – 200,

II A Study for Application

1. Foreword

The Delphi method is one of qualitative forecasting techniques (A method of forecasting future used when there are no quantitative data indicating past trends). This method has been employed to organize professionals' views and their forecasts mainly in the field of social science. The characteristics of the Delphi method lie in the following.

1. To research and organize opinions of plural professionals and experts in a certain field regarding the future image of a phenomena
2. To converge those opinions through feedbacking the research results in a repetitious manner.

This characteristics, however, involves two disadvantages. One is that it takes a few times of research. The other is low response rate owing to the number of times cooperation is required from the professionals.

We discussed research methodology in the preceding thesis titled "A forecast of future models of HRM through New Delphi Method — — — — A study for methodology". In the thesis, we pointed out the superiority of the New Delphi Method to the conventional Delphi Method in methodology.

In this paper, we attempted an empirical analysis of applicability in the field of HRM (Human Resource Management). This trial is to examine the potential applicability of the New Delphi Method from a qualitative aspect through forecasting future HRM figure. The contents of the questions reflect our consideration for burden of respondents as much as possible.

2. Outline of research method

Mentioned below are profile of respondents, research period, procedures of the research and so on.

(1) Profile of respondents

① Cooperation

Managers of Human Resource department of 100 companies. The companies'

profile: 1. listed companies in the first and second section of Tokyo Stock Exchange Market 2. companies that have previously cooperated in several research activities we have done before.

② Academics

20 academics including those belonging to Japan Personnel Management & Labour Relations Society.

③ Management consultants.

14 management consultants among which 7 belongs to former Japan Productivity Center.

40 out of all the above returned the filled – out questionnaires. They are: ① 22 Corporate HRM staffs ② 11 academics ③ 7 management consultants

This indicates a high response rate.

(2) Research period

The questionnaires were sent out in October and collected in November in 1995.

(3) Contents of the questionnaire

The questionnaire consists of 24 questions concerning HRM. Out of them 7 are basic questions and the remaining 17 are questions concerning HRM to examine the New Delphi Method.

3. Research results concerning future HRM

The research results indicate that the estimated turning point of Japanese HRM would likely be around the year 2010. In the followings we will discuss what the widely – believed Japanese two major HRM characteristics (Life – time employment system and Japanese seniority system) would be like in the future through examining the results of the questionnaires. We categorized the questions for our better understanding as follows.

(1) Questions related to life – time employment system

Three questions (Question Number 2, 5 and 6) out of the 7 basic questions relate to life – time employment system.

Question Number 2: Reduction of workforce such as compulsory redundancies, voluntary redundancies or transferring staff to a group company is unavoidable when cooperate management faces difficulties in recession (including when on verge of bankruptcy)

5. Absolutely unavoidable
4. Unavoidable
3. Difficult to answer
2. Reduction of workforce should not be done, if possible.
1. Reduction of workforce should never be done.

(The above figure 1 through 5 indicates scales.)

The results :

Average point	Corporate staff	Academics	management consultants
3.86	4.08	3.18	4.14

Question Number 5: In general, sense of value and attitude among younger people are changing.

Do you think companies should give this a serious thought?

5. Yes, Very much so.
4. Yes, I think so.
3. Difficult to answer
2. No, company should take this as a trifle matter
1. No, company should take this as a very trifle matter.

The results :

Average point	Corporate staff	Academics	management consultants
4.10	4.13	4.18	3.86

Question Number 6 : Do you think that younger people will become more and more less life – time commitment conscious and that the so – called Japanese management climate will fade ?

5. It will surely fade
4. Fading
3. Difficult to answer
2. Not fading
1. Never fading

The results :

Average point	Corporate staff	Academics	management consultants
3.29	3.26	3.10	3.71

In Question 2, the higher point among consultants and corporate staffs (the average = 3.86) indicates that those witnessing real movement of human resource in the practical field think the last stage options in employment reduction such as Shukko (transferring staff to a group company), volunteer early retirement and firing can't be helped. In Question 5, the point over 4.00 among corporate staffs and consultants (the average = 4.10) indicate that they strongly recognize a change in sense of value and attitude among young workers. In Question 6, the average point 3.29 indicate that the life – time commitment practice is on the direction towards fading rather than remaining.

As the results of the basic questions above show, something of a change seems to be taking place in views and thinking over the life – time employment practice. Following is our analysis of the related questions.

Q1 : Do you think securing a labor force with emphasis on those fresh out of school will still continue ?

- ① By approximately what time do you think it will remain ?
- ② Approximately what time do you think it will collapse and employing

those with careers will become dominant?

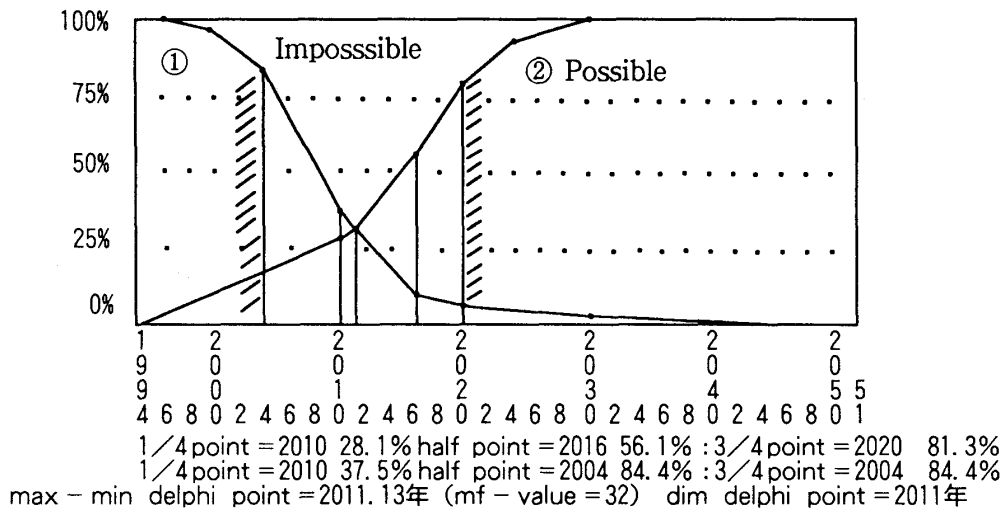
Down below is a distribution of the points by year regarding the above question. the columns under impossible and possible shows number of responses regarding ① and ② of the above question respectively.

Year	(# of replies)		(Total %)	
	Impossible ①	Possible ②	Impossible ①	Possible ②
1944	0	0	100.0	0.0
1996	1	0	100.0	0.0
1998	0	0	96.9	0.0
2000	4	0	96.9	0.0
2002	0	0	84.4	0.0
2004	15	0	84.4	0.0
2006	0	0	37.5	0.0
2008	0	0	37.5	0.0
2010	9	9	37.5	28.1
2012	0	0	9.4	28.1
2014	0	0	9.4	28.1
2016	1	9	9.4	56.3
2018	0	0	6.3	56.3
2020	1	8	6.3	81.3
2022	0	0	3.1	81.3
2024	0	4	3.1	93.8
2026	0	0	3.1	93.8
2028	0	0	3.1	93.8
2030	1	2	3.1	100.0
2032	0	0	0.0	100.0
2034	0	0	0.0	100.0
2036	0	0	0.0	100.0
2038	0	0	0.0	100.0

Year	(# of replies)		(Total %)	
	Impossible ①	Possible ②	Impossible ①	Possible ②
2040	0	0	0.0	100.0
2042	0	0	0.0	100.0
2044	0	0	0.0	100.0
2046	0	0	0.0	100.0
2048	0	0	0.0	100.0
2050	0	0	0.0	100.0
2051	0	0	0.0	100.0

The above points distribution table can be described in a graph format as Chart 1 down below.

Chart 1 : Cumulative Frequency Distribution



The Max - Min Delphi point, the point where line ① and line ② crosses, corresponds to the year 2011.13. Also, the quantiles of line ① and ② correspond to the year 2004 and 2020 respectively. If the area outside of the year 2004 and 2020 (indicated by the slashing lines) indicating 50% of the whole responses is regarded as an abnormal value, the Max - Min Delphi point should be a forecast point decided between the year 2004 and the year 2020.

The result out of Q1 could be interpreted as follows. Employment of those with previous work experience will become common and the policy of hiring those fresh out of college will lose importance between the year 2004 and the year 2020, especially in the year 2011. 13.

According to the survey of turnover among those fresh from college by the Bureau of Job Stabilization of Labor Ministry, the rate of quitting job is high among those people as shown in Chart 2. This high rate suggests that the employment of workers with previous work careers must be on the rise.

Chart 2 : Turnover by length of service with varied educational backgrounds

Chart 2 – 1 : Turnover rate amongst junior – high school graduates

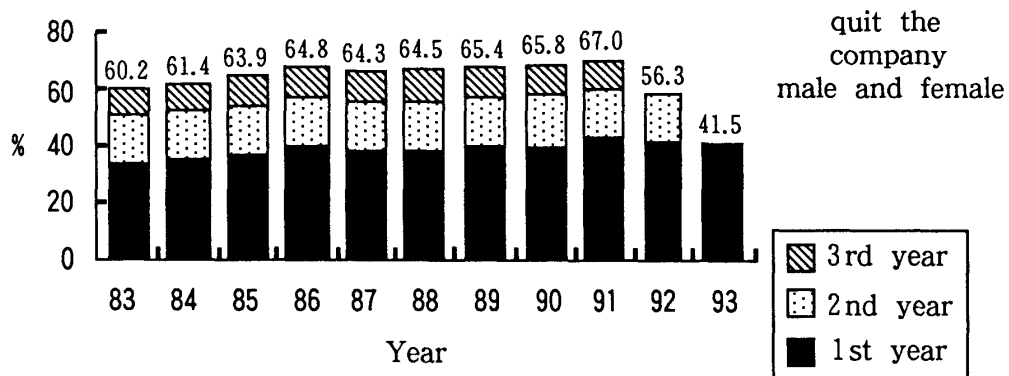


Chart 2 – 2 : Turnover rate amongst high – school graduates

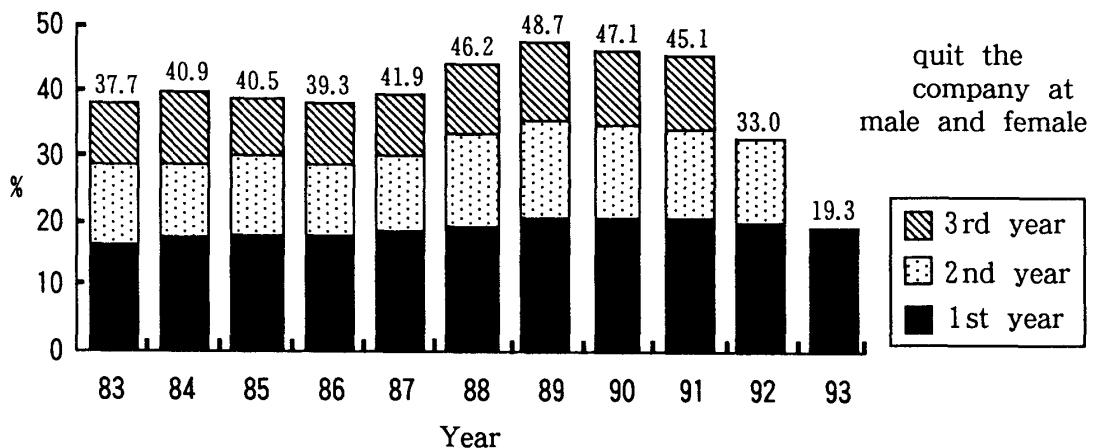
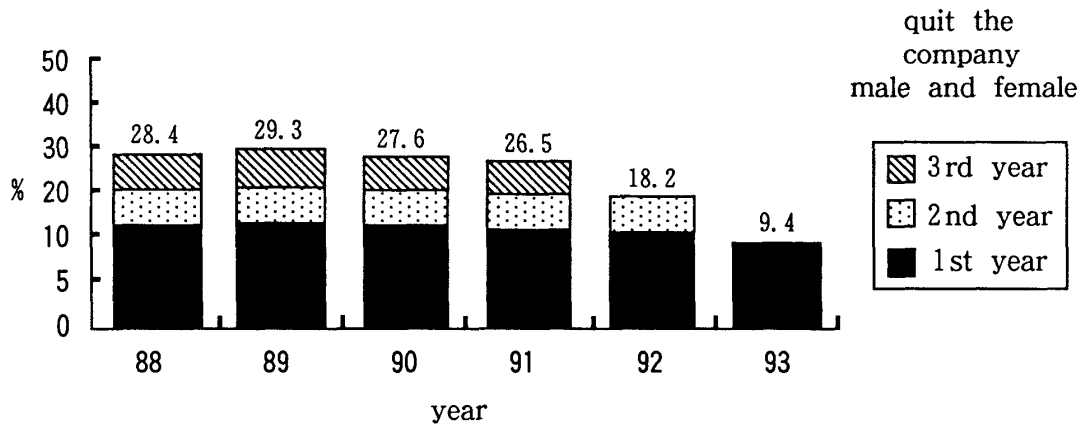


Chart 2 – 3 : Turnover rate amongst college graduates



(Hiring management from outside of the company)

Q3: Do you think employment of senior management staffs (section chief or department chief) who have worked for other company will be a matter of course in generally corporations?

- ① Until approximately what time do you think the present system in which insiders get promoted to become management without little exception will continue?
- ② Approximately what time do you think hiring management from outside of the company will become common?

The Max – Min Delphi point is the year 2012 with the year 2024 and the year 2000 as the quantile point of ② and ① respectively. The year 2002 by Consultants and the year 2016 by corporate staff. (In the subsequent parts, the same description will be used.) Note that 4 out of 7 consultants opted for “before the year 2004” as the answer to ②. This reflects their strong recognition that in the near future hiring management from outside will soon become a norm.

If hiring management outside of the company becomes commonplace, a HRM system with emphasis on jobs (job – centered) will be emphasized in due course making management by ability widespread. Therefore, both the life – time commitment practice and the Japanese seniority system will weaken.

Q6: Do you think employees will become more conscious about changing companies if better working conditions are offered rather than staying at the one same company as long as possible?

① Until approximately what time do you think many employees believe in belonging to one company as long as possible?

② Approximately what time do you think many employees do not mind changing companies depending upon jobs and working conditions?

The Max – Min Delphi point is the year 2006 with the year 2016 and the year 2000 as the quantile point of ② and ① respectively. That of consultants is the year 2002 and the year 2016 by corporate staff. According to the Labor White Paper of 1993, 30 to 40 % of new college graduates quit jobs within 3 years of experience. Although this kind of data varies with the economic condition, it might be expected in around the year 2006 that little difference should be recognized between Japan and America in working mind of employees as well as labor transition ratio.

(Measures for middle – aged and elderly workers)

Q12: Do you think corporate measures for middle and high aged workers (i.e.: option for early retirement at the age of 45) will increase in number? And do you think evaluation will be taken for granted as management of middle and high aged workers in corporations becomes stricter?

① Approximately until what time do you think such a strict measure won't be taken?

② Approximately what time do you think such a strict measure will be a norm?

The Max – Min Delphi point is the year 2000 with the year 2010 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 1999 and the year 2001 by both corporate staff and academics. This already shows what the present situation is like. The rapidly emerging aging issue is a vital issue for Japan and an appropriate measure seems to be a must at present. Chart 3 down below indicates many measures to help with the middle – aged and elderly are taken and now the efforts are actively pursued.²

Chart 3 : The executing ratio of measures supporting middle – aged and elderly by %

() year when each measure was executed

Items of measures,	Major corporations			Small & medium – sized corporations executing the measures for 7 years
	(executing years) 7	(executing years) 5	(executing years) 3	
● Education of changing job classifications (1977)	1.9%	1.4%	1.9%	0.5%
● Flexible work system allowing elderly people to work for limited days weekly/monthly (1978)	0.8%	0.3%	1.9%	1.3%
● Career path advisory system (1979)	4.2%	6.2%	6.7%	1.6%
● Early retirement option with privilege (1980)	38.2%	39.2%	36.3%	17.3%
● Establishing companies to absorb elderly people	6.4%	6.8%	10.1%	4.0%
● Systems to help them become self – employed or independent (including ownership granting at new branch offices, etc.) (1982)	6.4%	4.3%	3.5%	0.5%
● Special vacations for preparation for new career path (1983)	8.9%	4.9%	4.0%	0.8%
● Retirement at the age of 61 over (1984)	1.9%	1.6%		3.5%
● Salary system change to the advantage of those over 61 as New Retirement Age law takes effect (1985)	5.8%			6.9%
● Retirement preparation program	12.3%	15.1%		1.9%

(Difference in views on working among men and women)

Q14: Do you think male and female workers will make little difference in their consciousness about their career (i.e.: staying long at one company, passion for promotion or skill development)

- ① Approximately until what time do you think men and women will greatly differ in views on working in general?
- ② Approximately what time do you think men and women will differ little in views on working?

The Max – Min Delphi point is the year 2010 with the year 2024 and the year 2000 as the quantile point of ② and ① respectively. That of academics is the year 2006, the year 2009 by corporate staff and the year 2018 by consultants showing some gaps in opinion between them. 8 out of all the respondents marked the year 2030, the maximum year to be chosen in the questionnaire. This must indicate that they believe difference between men and women in views on working at present won't change much. This indicates the higher the position of work life will become, the more HRM system with employment fluidity and diversity will be necessary. Also, this could suggest the life – long employment practice and the seniority system will be weakened.

For reference, down below is the response of a survey³ regarding how Japanese women work for reference.

Chart 4 : The status – quo of how women work

- ① How many women workforce (4 – year college graduates coed) stay at companies in as of the 5th year of service

Less than 30% still stay	Less than 30 – 50% still	Less than 50 – 80% still	More than 80% still stay	No idea	Not applicable
11.4 %	15.5 %	28.9 %	18.0 %	3.0 %	16.1 %

② Whether or not there exists a tendency for women stay longer at the one company

It does exist	It exists somehow	No idea	It doesn't exist obviously	It doesn't exist
39.8 %	41.7 %	12.5 %	1.1 %	0.5 %

③ Ratio of women who continue to work after marriage

Less than 30%	Less than 30 – 50 %	Less than 50 – 80 %	More than 80%	No idea
46.9 %	22.3 %	17.2 %	5.4 %	7.4 %

④ Whether or not such a practice exists that women retire when they marry

Widely exists	Partly exists	No such practice but they are to rotate	Neither practice nor rotation
7.9 %	10.6 %	42.5 %	37.3 %

⑤ Do you think following items make a barrier in further utilizing women workfore ?

1. Social acceptance that women don't stay at company long

Yes	Partly yes	No idea	No, not really	No, not at all
16.9 %	42.8 %	17.7 %	14.2 %	7.6 %

2. Women having low professional ambition

Yes	Partly yes	No idea	No, not really	No, not at all
28.3 %	46.6 %	15.8 %	6.8 %	2.5 %

3. Japanese office practice (little sense of public and private, long – hours of working, etc.)

Yes	Partly yes	No idea	No, not really	No, not at all
9.3 %	37.6 %	19.9 %	24.0 %	7.6 %

4. Little expectation for women workforce by the company

Yes	Partly yes	No idea	No, not really	No, not at all
7.9 %	33.5 %	22.3 %	22.6 %	12.8 %

Q 4: Do you think employing an outside labor force from spun – out companies or outplacement companies will become dominant as to reach approximately 50 % of all the annual employment?

① Approximately until what time do you think employment of those fresh out of college and careered workforce will occupy over 50 % of workforce?

② Approximately what time do you think an outside workforce such as outplacement or Shukko will occupy over 50 % of the workforce?

The Max – Min Delphi point is the year 2014 with the year 2024 and the year 2004 as the quantile point of ② and ① respectively. That of corporate staff is the year 2012, the year 2016 by consultants and the year 2018 by academics.

In 1985 outplacement business was officially legalized by the revised Occupation Stability Law when Outplacement Law was enacted.⁴ This is what Roumu Gyosei Kenkyujo had to analyze regarding using outside – the – company workforce such as *Shukko.⁵

*Shukko means the state in which one is sent from his/her original company to the subsidiary company.

Let's take a look at the statistics on "Zaiseki – Shukko" (Shukko with his/her belonging to the original company remained the same). 86.4 % of companies surveyed are executing Zaiseki – Shukko. As for leading companies, 93.5 % pursue Zaiseki – Shukko. A gradual increase shows in

statistics suggesting companies with excessive workforce due to depression are trying to be slimmer by reducing workforce. On the other hand, 1 out of 3 companies are executing “Tenseki – Shukko” (Shukko with his/her belonging to the original company changes to the company he/she was sent to.). The exception rate of both kind of Shukko is higher among larger companies. In mid – sized and smaller companies, the exaction rate is 52.7 % for “Zaiseki Shukko”and 15.4 % for “Tenseki Shukko”.

Q5: Do you think a HRM system common to Japanese and foreign workers (i.e., fair promotion standard or wage system) not distinguishing foreign workers from Japanese counterparts will operate as the number of jobs relying on foreign workers increase?

- ① Approximately until what time do you think discriminating foreign employees will continue/
- ② Approximately what time do you think a HRM system without discrimination will be operating?

The Max – Min Delphi point is the year 2017 with the year 2030 and the year 2004 as the quantile point of ② and ① respectively. That of academics is the year 2014, the year 2017 by corporate staff and the year 2020 by consultants.

According to a survey done by Labor Administration Research Center (Chart 5, down below), the employment ratio of foreign workers is 38.4 %, in other words 38.4 % of surveyed companies employ foreign workers. ⁶Many of the HRM system for those foreign workers, however, could be regarded as not the same as that of for Japanese workers. The question items could force respondents to predict too – long a distance future phenomena thinking of the status quo of Japanese HRM.

Chart 5 : Employment of foreign workers

Forms of employment	Major corporations			Small & medium – sized corporations executing the measures for 7 years
	(executing years) 7	(executing years) 5	(executing years) 3	
● Employment of foreign workers (excluding employment overseas)	38.4%	38.9%	34.1%	22.6%
● Acceptance of foreign trainees	23.4%	26.8%	30.7%	5.6%

(2) Questions concerning the Japanese seniority system

Following are replies to the basic questions concerning the Japanese seniority system.

Question 3. Do you think as employees become elderly, they lose willingness at work and become burden to management in many cases unlike when they were young?

5. Yes, absolutely
4. Yes, in many cases.
3. Difficult to answer.
2. No, except small number of them do.
1. No, they never do.

(The above 5-1 indicate scales)

Average	Corporate staff	Academics	Consultant
3.14	3.25	3.00	3.00

Question 4. Do you think more and more efforts are needed in measures for elderly?

5. Yes, very much so.
4. Yes, I think so.
3. Difficult to answer.
2. No, they are not needed so much.
1. No, they are not at all needed.

Average	Corporate staff	Academics	Consultant
4.29	4.35	4.18	4.29

By facing with graying of the population, measures for elderly at corporations are regarded as important.

Question 3 asks about employee's view on life as they become elderly. Although the average point of 3.14 is a little closer to positive to the question, it should be more closer to difficult to answer considering wide gaps between each respondent's view.

Question 3 asks about whether corporations need to place more importance on the effort for taking measures for elderly workers. The average point 4.29 falls in between "it's needed" and "it is very much needed".

Now we have reviewed two questions regarding the seniority system out of 7 basic questions. This suggests that we somehow need to reconsider the elderly and seniority issues.

We will make some analyses on the following questions regarding the seniority system. For question 3,6,12,14, we have already referred to them in the previous part concerning the life – long commitment practice.

(Positioning of personnel appraisal)

Q8: Do you think the position of personnel appraisal (including personnel assessment and other methods of assessments) in HRM system will be

ranked high as the influence of personnel appraisal on promotion, pay raise, and so forth becomes more and more significant?

① Approximately until what time do you think personnel appraisal will be regarded as not so highly positioned?

② Approximately what time do you think personnel appraisal will hold a important position?

The Max – Min Delphi point is the year 2000 with the year 2010 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 1997, the year 2000 by corporate staff and the year 2003 by academics. This question corresponds to a previously asked question in a survey of future image of conducted in 1989.⁷ The question was “Do you think as an emphasis on the influence of personnel appraisal on promotion and pay raise increases more and more, the position of personnel appraisal in HRM will be absolutely positioned high?”. The result of this question indicated high realizability of 80 % and the year 1994, 4 years after the year surveyed 1989, as the realizable period suggesting the present period. This result is almost the same with that of Question 8.

Q9 : Do you think result – oriented appraisal will be commonplace as performance appraisal takes on more significance rather than the other appraisal elements such as competency, attitude or sentiments?

① Approximately by what time do you think emphasis on performance will not be commonplace?

② Approximately what time do you think emphasis on performance will be regarded as critical to personnel appraisal?

The Max – Min Delphi point is the year 2001 with the year 2004 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 2000, the year 2000 by corporate staff and the year 2001 by academics. The three groups unanimously pointed to the present point. The result of this question is the same as that of the survey of 1989

just like Question 8. As short – term performance appraisal and incentive bonus system prevail in many corporations, appraisal elements weighing results are taking place of the traditional superficial appraisal elements. An example : At Company A, a whole wages are decided based on pay by results (personal performance pay + collective performance pay) with no pay raise by other factors for deciding pay raise. This should reflect the present situation in which a shift is on its way from the seniority system to HRM emphasizing results.

(Utilization of appraisal results)

Q10 : Do you think the idea of a positive use of an evaluation system will be taken for granted? This idea involves to strengthening ability development and job development through the feedback of evaluation results.

① Approximately until what time do you think the following idea will continue : Only the management side can utilize personnel evaluation as management information such as pay raise or promotion because personnel evaluation is confidential to each individual.

② Approximately what time do you think disclosing and positively using of appraisal results will be a way of life ?

The Max – Min Delphi point is the year 2001 with the year 2010 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 1999, the year 2001 by corporae staff and the year 2003 by academics. The three groups unanimously pointed to the closest to the present point. Formerly personnel evaluation decided employee's points which was in turn used as information to decide his/her working conditions.

Now at present, personnel evaluation is open and used for job and ability development. The importance and necessity of feedback is clearly indicated by an emergence of "the 360 degree feedback concept" with Tacoma – based Weyerhaeuser Company in the U.S.⁸

The following chart⁹ is a survey result done by Labor Administration

Research Center explaining feedback of personnel appraisal to ability development.

Chart 6 : Companies feedbacking personnel appraisal results to HR development and the plans

Note : by %. () = # of companies

Industry	All industries				Manufacture	Non – Manufactur
	Size of company (182)	Over 3,000 (employees) (62)	1,000~ 2,999 (60)	Less than 1,000 (60)		
Total	100.0%	100.0%	100.0%	100.0%	(120) 100.0%	(62) 100.0%
Feedbacking	48.4%	61.3%	43.3%	40.0%	46.7%	51.6%
Not feedbacking	51.6%	38.7%	56.7%	60.0%	53.3%	48.4%

From this chart we could guess that utilization of personnel appraisal for ability development takes forms of OJT, self development or information for promotion and rotation.

(Ability development for middle – aged and elderly)

Q13 : Do you think designing and executing training and development planning for middle aged and elderly workers will be a way of life in each company so that they can lead their career life independently not relying on companies in the future ?

① Approximately until what time do you think a special ability development for middle – aged and elderly will not necessarily be introduced in corporations at large ?

② Approximately what time do you think an education supporting independence of middle – aged and elderly will be underway in many corporations ?

The Max – Min Delphi point is the year 2001 with the year 2016 and the year 1996 as the quantile point of ② and ① respectively. That of academics is the year 2000, the year 2003 by corporate staff and the year 2005 by consultants. This result shows that helping middle – aged and elderly in the above mentioned way is becoming more apparent. Today, the issue of middle – aged and elderly is drawing many attentions. Companies suffering poor performance seem to be coming up with management system and ability development to cope with the severe situation.

We organized points to help middle – aged and elderly become independent as follows.¹⁰

① Jobwise

- Ability to decide the content of his/her own job by himself/herself
- Ability to improve his/her job
- Planned career steps through the idea of career path

② Abilitywise

Ability to check his/her own weakness in need of development

- Ability to check with his/her ability development plan for life
- Through education to make him/her competitive in unique expertise both inside and outside the company

③ Personnel appraisal

- Self – evaluation
- Direction of weakness by his/her boss or skippers

④ Future planning

- Job planning
- Ability development planning
- Planning as a career holder

(Working hours)

Q15 : Do you think companies will vary greatly in general in working time management like some companies opting for a flex – time system and others for reduced working days such as 4 – day working week ?

① Approximately until what time do you think working hours management

between companies will not make that much difference?

② Approximately what time do you think working hours management between companies will make much difference?

The Max – Min Delphi point is the year 2005 with the year 2016 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 2002, the year 2005 by corporate staff and the year 2007 by academics. Measures related to working hour reduction or vacation to be taken are on the rise every year according to the statistics down below. (See Chart 7) This suggest that gaps between companies in working hours are emerging."

Chart 7 : Working hour and vacation related measures taken by years

Forms of employment	Major corporations			Small & medium – sized corporations executing the measures for 7 years
	(executing years) 7	(executing years) 5	(executing years) 3	
● Varied working hours system	67.4%	53.0%	47.5%	44.1%
● Labor out of working site	12.3%	14.6%	13.9%	12.2%
● Work by performance	3.6%	3.5%	1.6%	2.7%
● Flex time system (including partly applying companies)	47.6%	43.2%	36.5%	22.6%
● Working by shifts	52.9%	50.8%	49.1%	30.9%
● Policy of commuting off the traffic peak hours	15.9%	18.6%	16.5%	15.2%
● Working time management by time recorder	27.6%	30.0%	41.3%	45.2%
● Working time management by ID card	12.8%	11.6%		9.3%
● No – extra – work – day a week	47.1%	50.0%	42.7%	27.9%
● Planned paid holidays	37.0%	39.2%	33.6%	28.7%
● Accurate counting of paid holidays a year	76.9%	75.1%	75.7%	80.1%
● Company – buy – unconsumed – paid – holidays – policy	10.9%	8.1%	9.3%	17.3%
● Accrued unconsumed paid holidays	56.3%	48.1%	37.9%	40.4%
● Granting half – day – off	63.8%	51.1%	38.4%	62.0%
● Vacation for self enlightenment/development	4.2%	1.6%	1.9%	1.1%
● Special series of paid holidays given to those with long years of service	68.0%	62.4%	49.1%	45.7%
● Long, continuous holidays (excluding typical vacation season such as summer and year – end)	7.8%	11.6%	10.9%	5.6%
● 3 or 4 day – work – week system (established)	0.3%	1.4%	1.9%	0.8%
● Flexible vacation	4.7%	4.1%	4.0%	4.0%
● Birthday day – off	16.2%	18.6%	9.9%	9.8%
● Leave for volunteering activities	7.8%	5.4%	0.3%	1.6%
● Learn for donor's activities				
● Leave for taking care of sick family	1.7%			1.1%
● After – the – hour meal supply	39.0%	31.9%	15.2%	14.4%

(Annually paid salary)

Q17: Do you think so-called annually-paid system (applied to management and decides the amount of payment on year-by-year contract) will be dominant in companies?

① Approximately until what time do you think annually-paid system will not be introduced as a way of life in companies?

② Approximately what time do you think annually-paid system will be introduced as a way of life in companies?

The Max-Min Delphi point is the year 2003 with the year 2010 and the year 1996 as the quantile point of ② and ① respectively. That of consultants is the year 2000, the year 2005 by corporate staff and the year 2005 by academics.

According to a survey titled "Status quo of to what extent personnel management measures are executed" by Roumu Gyosei Kenkyujo (literally translated as Labor Administration Research Center) in 1995, the execution rate of annually-paid system in the salary-related items is on the rise like as in the last survey. See Chart 8.¹²

Chart 8 : Execution rate of salary-related measures



Note: In the above chart, contents of A to N are as follows.

A = Transfer salary into bank account 98.3%

B = Salary by job-ability 65.7%

C = Salary based on age 54.3%

D = Meal allowance 39.8%
 E = Agreement on minimum guaranteed salary 30.1%
 F = Separate retirement allowance from the regular salary 25.1%
 G = Bonus system by performance and results 20.6%
 H = Salary taking service years into account 19.8%
 I = Annual salary system (excluding executives) 15.3%
 J = Incentive pay for sales staff 13.6%
 K = Introduction of pay by competence and pay by job 10.0%
 L = Salary raise by point system 8.1%
 M = Pocket bell allowance 1.1%
 N = Abolish automatic pay raise after 1994 0.3%

(Discrimination by prestige with school)

Q2: Do you think the trend of putting priority to prestigious university graduates when employing college graduates will still remain?

① Approximately until what time do you think the flow will probably still remain?

② Approximately what time do you think identifying superiority depending on names of school will fade out?

The Max – Min Delphi point is the year 2010 with the year 2020 and the year 2000 as the quantile point of ② and ① respectively. That of corporate staff and academics is the year 2010, the year 2012 by the year consultants. That of consultants stands out by two years after that of the other two groups.

Corporations not using candidate's school names into employment consideration are increasing. They are Sony, INAX, Japan McDonald, and so forth. These movements could be considered as a shift to an ability – centered HRM system devoid of too many school – factions.

(Change in views on promotion)

Q7: Do you think many employees will opt for the so – called “limited

employee”with limited working hours, limited working areas and limited jobs as they lean towards a sense of “promotion is not everything” ?

① Approximately until what time do you think the tendency will not be remarkable ?

② Approximately what time do you think the number of employees cherishing their own life more having less passion for promotion will occupy nearly 50 % ?

The Max – Min Delphi point is the year 2009 with the year 2020 and the year 2000 as the quantile point of ② and ① respectively. That of consultants is the year 2004. The year 2010 by corporate staff and academics.

A survey titled “Views on working”by Nihon Keizai Seinen Kyogikai (literally translated as Japan Economic Youth Federation) ¹³indicates a shift in sense of value at work among young generation.

Chart 9 : A shift in sence of value

Note : The upper column indicates answers from newly hired employees, the lower from other than them. (unit = %)

Questions :	Absolutely	Yes.	No,not really	No way
Would you opt for your family rather than promotion if no other options ?	40.2%	41.4%	14.7%	2.3%
	43.9%	46.5%	8.3%	1.3%
Would you agree with the idea of taking a paid day – off to take a girl friend to a small trip on her birthday ?	35.6%	33.7%	24.8%	4.3%
	32.6%	36.2%	26.2%	5.0%
DO you have a lot of friends outside of your company ?	43.2%	42.6%	11.4%	1.8%
	32.0%	40.6%	18.0%	1.3%

(Job – oriented HRM system being weighed)

Q 11 : Many Japanese corporations employ competence (an ability to achieve jobs) – oriented HRM systems as they say that is necessary when operating

HRM system based on competency. What do you think of the opinion saying “From now on a job – oriented (job – centered) HRM system should be realigned” ?

① Approximately until what time do you think job – oriented HRM systems will not be evidently seen ?

② Approximately what time do you think job – oriented HRM system will be commonplace ?

The Max – Min Delphi point is the year 2007 with the year 2016 and the year 2000 as the quantile point of ② and ① respectively. That of corporate staff is the year 2005. The year 2006 by consultants and the year 2012 by academics.

After the War, some Japanese companies attempted to employ job – oriented HRM systems introducing job – analysis methods from America.

They, however, modified them into Japanese way in actual operation. In this way, so – called competence – oriented grading system and pay by competence became commonplace. According to the previously mentioned survey titled “Status quo of to what extent personnel management measures are executed” by Labor Administration Research Center in 1995, the execution rate of pay by competence marks 65.7 %. This pay by competency, however, needs to be reconsidered in today’s depression period. Now the shift is on its way from competence to jobs as the replies of this question forecasted. Japanese companies are introducing annually – paid systems based on performance and results or “New version of pay by competency system” that Keidanren or Japanese Management Federation advocates.

They are on a turning point towards job – oriented HRM systems. A substantial change in identifying competence seems to be underway.

(Stress – related)

Q16: Do you think employing specialist doctors such as counseling specialists (i.e.: hiring a psychiatrist full time or on contract basis at companies) will be common as mental troubles caused by stress increase ?

① Approximately until what time do you think the time will come when those doctors are not employed at companies although stress issues are problems ?

② Approximately what time do you think employing specialist doctors in many corporations will be taken for granted ?

The Max – Min Delphi point is the year 2007 with the year 2020 and the year 2000 as the quantile point of ② and ① respectively. That of corporate staff is the year 2007. The year 2008 by consultants and academics.

As Sutoresu Shikkan Rousai Kenkyukai (literally translated as Stress – related (diseases of brain, cardiac or mental) Labor Accidents Study Group was established in 1985, activities saving stress – related Karoshi (death by overworking) and other related issues are underway by academics, law specialists, doctors, labor activists and others.¹⁴

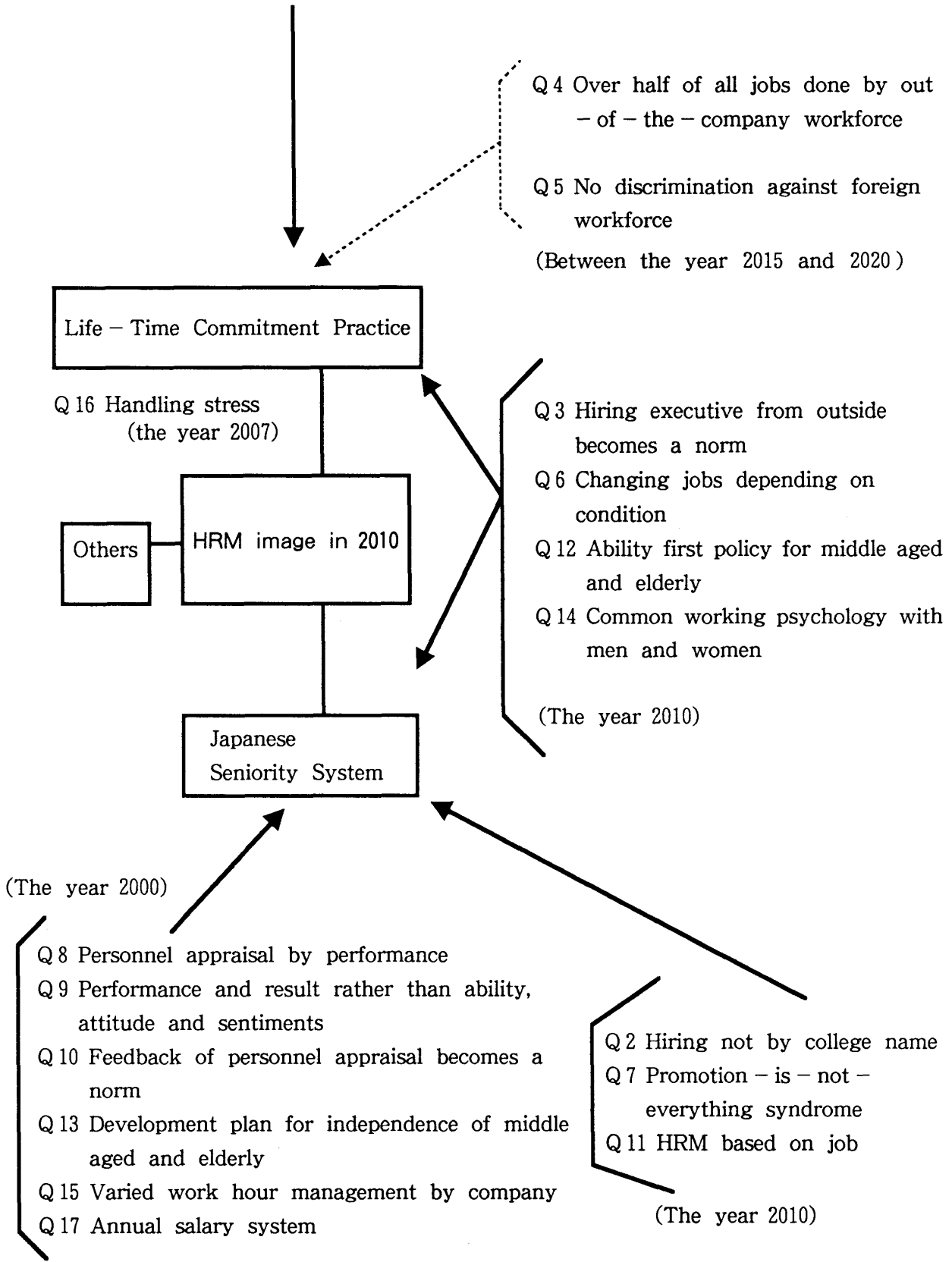
Stress – related diseases triggered by management being advanced and complicated are becoming critical issues in corporate management.

4. HRM system image in the year 2010

So far, we analyzed the survey results by question in the light of two major axes : Life – long employment practice and the seniority system. Down below chart is a summary of the analyses.

Chart 10 : Characteristics of HRM system in 2010

Q1 Hiring changes. Careered staffs in, those fresh from college out. (The year 2014)



The seniority system has had a lot of revision to date. It is predicted that the system will collapse at least by the year 2000. As explained in the six questions (Q8, Q9, Q13, Q10, Q15 and Q17), HRM systems responding to independent individuals and the contribution such as personnel appraisal by results and performance, ability development through independence or annually – paid system are taking place. According to the forecast, followings become commonplace : in 2010 : Employees believing in competency (showed in Question 2,7 and 10) and diversity, job – oriented HRM with diversity, Job – orientedness having something to do with life – long commitment system (shown in Question 3,6,12 and 14), appraisal by ability for middle – aged and elderly, views at work admiring merit and hating discrimination between men and women.

A change in employment method and form with the life – long employment practice, according to the forecast, will take place approximately in 2010 preceded by the changes with the seniority system as indicated in Question 1, 3, 6, 12, and 14. Also, the forecast indicates that employment of outside workforce and foreign workers will increase during 2015 through 2020 as explained in Q4 and 5.

Here is the reply of the remaining two questions out of the 7 basic questions.

Question 1 : Weigh the following management resources by importance using scale 1 to 5.

Example : man (4,5), money (4,2)

man (), money (), material (), technology (), information ()

	Total	Corporation	University	Consultant
man	4.78	4.76	4.77	4.86
money	3.89	4.02	3.70	3.74
material	3.20	3.12	3.19	3.54
technology	4.19	4.10	4.32	4.29
information	4.01	3.95	3.96	4.29

Question 7 : Weigh the following management items by importance in your company's HRM from scale 1 to 5. Example : 1. Securing human resource (3.2), 2. Ability development (3.8), 3. Salary management (3.0)

1. Securing human resource ()
2. Ability development ()
3. Salary ()
4. Rotation, Promotion, Replacement
5. Employee's welfare ()
6. HRM strategy ()

	Total	Corporation	University	Consultant
Securing human resource	3.91	4.02	3.54	4.07
Ability development	4.04	4.21	3.92	3.64
Salary	3.82	3.83	3.86	3.71
Rotation, Promotion, Replacement	3.71	3.73	3.62	3.76
Employee's welfare	3.10	3.24	3.12	2.57

Question 1 asks positioning of each management resource by importance.

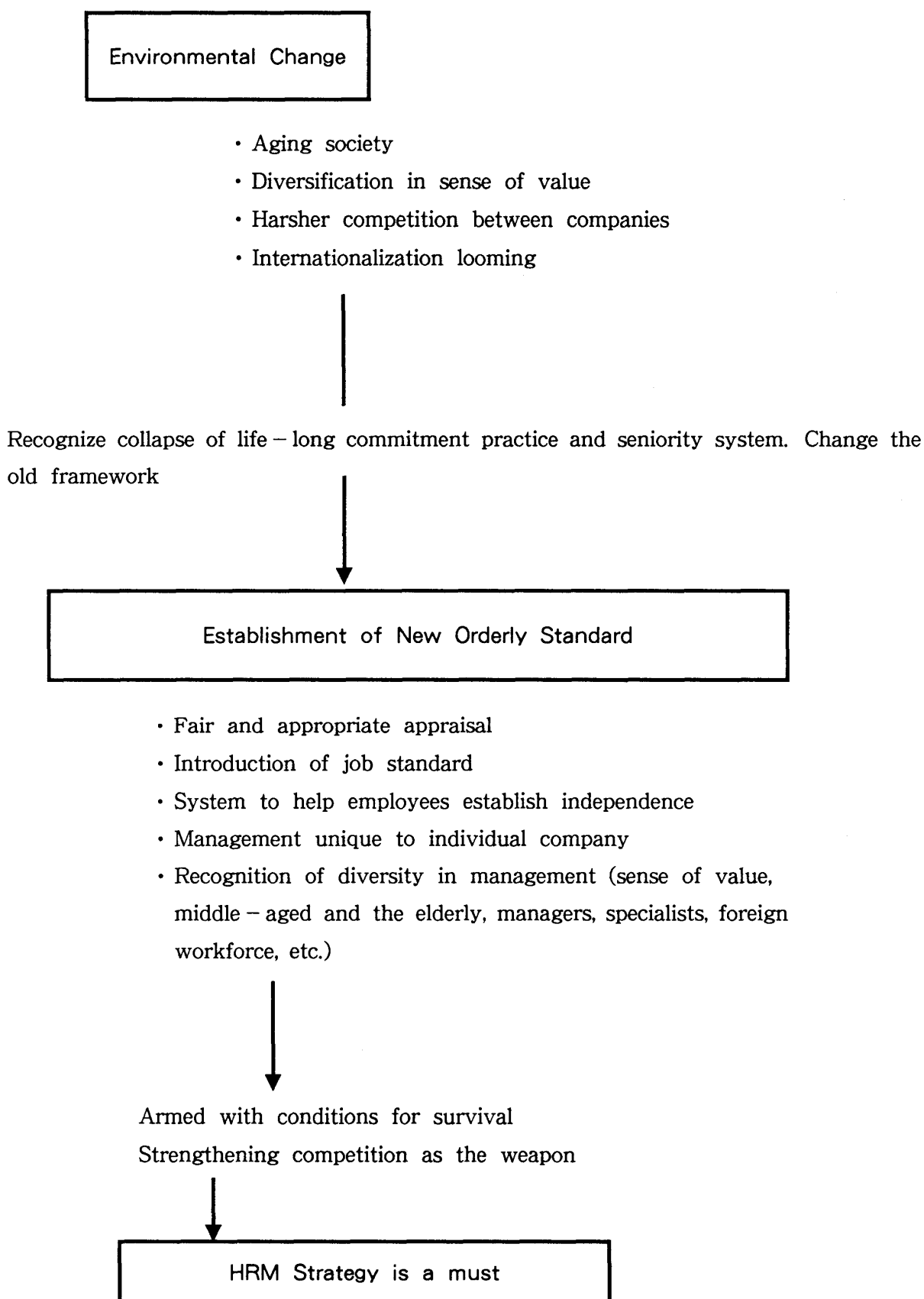
Note that human ranked first at point 4.78. This might be due to the fact that HRM is the shared interest with surveyed companies. In Question 7, HRM strategy ranked first followed by Ability development and Securing

man power.

Thus far, we have made some analyses on future HRM image in the year 2010 through New Delphi Method. Even at present, in 1996, a great change in environments surrounding HRM is underway. And each company facing the tough times is responding to the environmental change.

The chart below is a summary of each company's new response to the future.

Chart 11 : Response to new order



Innovation in the “management mind” is required. Collapse of the seniority system and life – long commitment practice must be taken into account. Basement for the new order in Japanese (or Japanese companies’) HRM must be established as soon as possible. That is, each company must cultivate and innovate its competitiveness to win the race in order to survive. In other words, the importance of HRM strategy development to towards the year 2010 will ever be increasing.

5. Conclusion

This survey tried to confirm the effectiveness of New Delphi method, between Delphi method and New Delphi method, we felt no difference in processing of forecast data and reliability. As for the computer – processed result of New Delphi method, we interviewed some of the respondents, had their comments and exchanged views. Despite a some differences in views, if any, respondents all share the idea that HRM in Japan must be changed. At the end, we can have confidence that New Delphi method is effective as a forecast method in the social science arena.

Lastly we would like to express our gratitude for all the respondents who cooperated with the survey and Daito Bunka University for supporting this special research project.

¹ Rosei Jiho, Vol. 3174, Roumu Gyosei Kenkyujo, June 8, 1995

² Ibid., Vol. 3239, August 1, 1994

³ Ibid., Vol. 3230, October 27, 1995

Note : Survey period : September through October in 1995

Respondents : HR managers in 970 member companies of Keidanren
(Federation of Economic Organization)

Total # of replies : 367 (response rate : 37.8)

⁴ Haken Roudou (Dispatched workforce), Michio Nita, pp.80 – 81, Nihon Roudou Kenkyu

Zasshi, No. 408, 1994

⁵ Rosei Jiho, Vol. 3239, p 32, August 1, 1994

⁶ Ibid. p. 32

⁷ Nihongata Roumu Kanri No Tokushitsu (Characteristics of Japanese Style Personnel Management), Masao Hanaoka, pp. 111 – 144, Hakuto Shobo, 1994

⁸ Ibid., pp. 167 – 168

⁹ Rosei Jiho, Vol. 3185, November 11, 1995

¹⁰ Chukonenreika Mondai to Wagakuni no Roumu Kanri Tokushitsu (Middle Aged and the Elderly Issues and Features of Japan's Personnel Management), Masao Hanaoka, p 133, Keiei Kakushin no Nihonteki Taiyou, Daito Bunka University Management Research Book 12, 1995

¹¹ Rosei Jiho, Vol. 3239, p 12, August 1, 1994

¹² ibid., p 8

¹³ Survey period : March 11 through April 20, 1995

Respondents : 3312 Newly hired employees and 1.86 of those serving 2 to 5 years

¹⁴ Sutoresu Shikkan Rousai Kenkyukai wo Meguru Ugoki (Status quo of stress – related labor issues), Toshiro Ueyanagi, Roudou Houritsu Junpo March 10 issue, 1994