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Diagnostic System for KIS Productivity —Organizational Climate Nexus

Kazukiyo KUROSAWA*1)

知識集約型スタッフ（KIS）の生産性と組織風土との関係の診断システム

黒　澤　一　清

要　旨

知識集約型スタッフ（KISと略称する）の生産性に，彼等が所属する組織の状態が与える影響は，ある意味で決定的でさえある．本研究は，このような問題意識から，KIS組織を，その組織風土とKISの生産性との関係の観点から診断する方法についての，ひとつの試論である．診断活動の全体の仕組み，それに基づいた実際例への適用，そこから導き出される幾つかの典型的知見，などが報告されている．この研究に示されている方法は，これ自体として実務界に応用可能であるが，具体的な手続きの上に，なおノウ・ハウの洗練が必要であって，今後の実践経験の集積が望まれる．これとの関連において，組織状態の構造化の手段として用いられている林の数量化理論の適用におけるノウ・ハウの洗練・客観化は，実務界へのこの方法の普及の上で，きわめて重要な課題である．
最後に，KIS組織の状態と組織生産性との関係の数量化の部分の研究は，なお著しく未成熟な段階にあることを告白せざるを得ず，今後に残された最も大きな課題の1つであるといわなくてはならない．

Introduction

KIS, knowledge-intenstive staff members are generally very sensitive to the organizational climate to which they belong and their productivity is decisively influenced by the organizational climate. Organizational productivity and each staff's productivity are therefore very subtly interrelated. One of the most urgent tasks in the present day situation in the management of large-scale enterprises in Japan is how to reform the organizational climate so that the productivity of each KIS member and

*1) 放送大学教授（産業と技術）

of their organization can be improved.

In this study, the author wishes to show a diagnostic system for studying the organizational situation constructed mainly by KIS members.

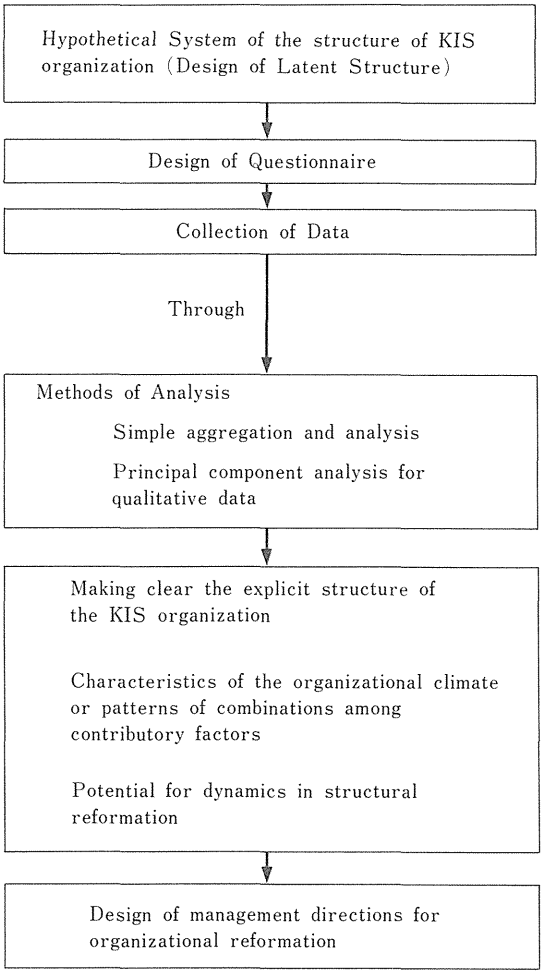
The organizational climate has been studied a great deal since the 1960s, but there are very few works in which the KIS organization and its productivity are treated as the study object, although our study has necessarily developed through examination of the preceding work on business organization in general (Bowney, A.M. and Carlisle B., 1979) and the organizational climate in particular (Foreh, G.A, and von Gilmer, B. H., 1964 ; James, L.R. and Jones, A.P. 1974 ; Litwin, G.H. and Stinger, R.A. Jr. 1968 ; Taylor, C.W., 1972 ; Gruneberg, M.M. and Oborne, D.J. 1981 ; Whitney, p. 1988 ; Campbell, J.P. et al. 1988.).

Our focus is put on the psychological distance specifically between the section manager/superior and his/her subordinates as to the key dimensions which are defined by the structure of the organizational climate. Our major tool was a questionnaire sent to members of an organization and their superiors and the data thus collected were analysed statistically. On the other hand, we took several opportunities to interview some representative staff members of the organizations studied.

While our work has been developed through theoretical examination of preceding studies of the organization and productiveness nexus which have been conducted since MacGregor's X theory versus Y theory, especially a study of motivation to work (Herzberg, F., *et al.*, 1959), our study has rather been concentrated on KIS and KIS work groups. There are, however, some unresolved problems, among which the most urgent is how to link the organizational situation/pattern and its corresponding productivity quantitatively. Although we have tried to show this successfully in the case of the inter-branch comparison of the productivity-organizational climate nexus of a bank (Kurosawa, 1986), we adopt in this study a treatment of research and development in certain machinery manufacturing companies. This time, we cannot say we have been so successful as in the former case. The major reason for this is first the difficulty of defining the measuring indices in the R&D departments which are our study object in this case, and secondly there are certain time lags between R&D activity and its realization.

I. Total Framework of Diagnosis and Management of KIS Organization

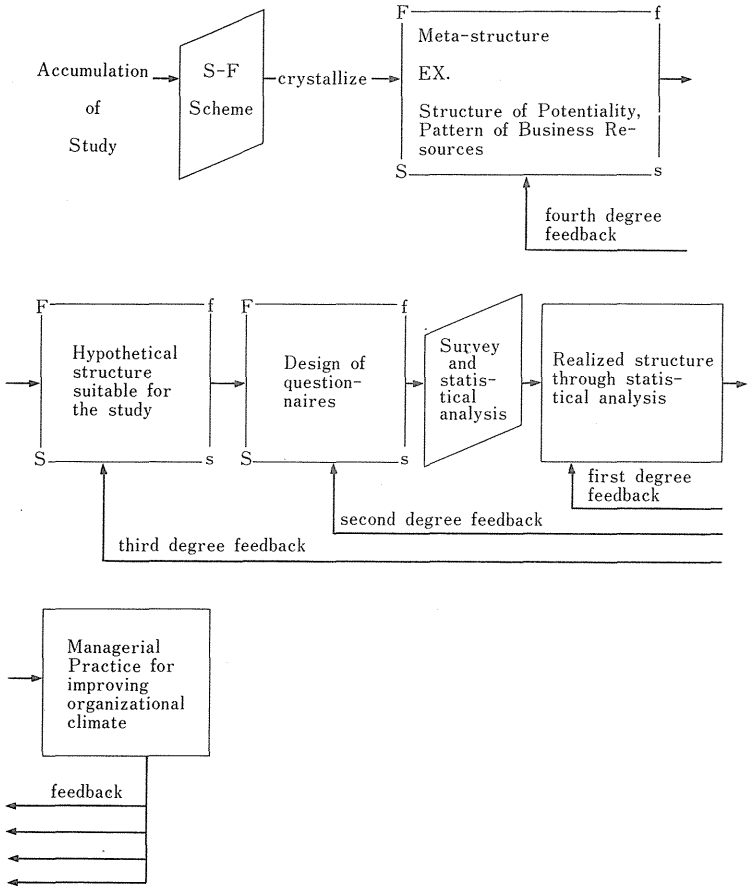
The total framework is shown briefly as follows :



The hypothetical system of the structure of KIS organization is designed based on exactly the S-F scheme.*1 For example, in the case of organizational climate diagnostic study, we have to start from the Structure of Potentiality and Pattern of Business Resources*2 and to develop it adequately for the purpose in detail. The

*1 See the footnote of Fig. 1. Detailed explanations are given in Kurosawa (1990, Chapter 1, especially 2.5)

*2 Detailed discussions are given in Kurosawa (1990, Chapter 2.5)



detailed structure thus designed is of course a kind of hypothetical one but it becomes the foundation upon which survey systems and systems of questionnaires are designed. Thus, it is a matter of course that we can and must be able to improve our directly used hypothetical structure constructed by the S-F scheme through analytical work on the data thus collected. Sometimes we have to improve the more fundamental meta-structure shown by the S-F scheme, for example the Structure of Potentiality *per se*.

The structure realized through the statistical analysis of data collected through the questionnaire is mainly composed of factors which first stand opposite between superior and subordinates and secondly by similar factors and opposite factors, which are also depicted through analysis of the data collected, i.e. through principal component analysis (PCA) for qualitative data (Hayashi, C. 1950, 1952 ; Suzuki, T. 1982). The PCA for qualitative data is suitable for treating categorical data and ordinal data, which are the data in our case instead of quantitative-interval data, which are reasonably operated by ordinary principal component analysis or factor analysis.

Diagnostic survey is desirably carried out based on a standardized system of questionnaires instead of arbitrarily arrived at ideas. The S-F scheme might be able to prepare the logical and theoretical basis for this purpose.

The results of analysis must be examined by persons connected with the problem, desirably by all members of the organization studied, so that the study cannot only be used productively but can also be improved in its study scheme, specifically its hypothetically designed survey structure or even its meta-structure.

The pattern of the scheme of execution for improving the organizational climate is a sort of historical entity which can be developed in steps according to organizational characteristics which have been formed based on the attitude of each staff member to the work team and the decision made by top executives on the pattern of the scheme. They might have the following patterns.

The most primitive pattern is decided by the section manager alone.

The intermediate pattern is decided in a one-on-one meeting of section manager and staff member, which is called a councelling meeting.

The most thorough going pattern is discussed in an open meeting which consists of all the members and the section manager, which is called a group counselling meeting. Throughout the discussion the reformation plan is designed in the name of the group/organization. It is a matter of course that experts in industrial engineering or management science, or generally productivity science must take a role in conducting the collection and analysis of the data and related information, and managers should take proper leadership during this whole process.

An organizational climate survey can be done at several levels of organization, i. e.

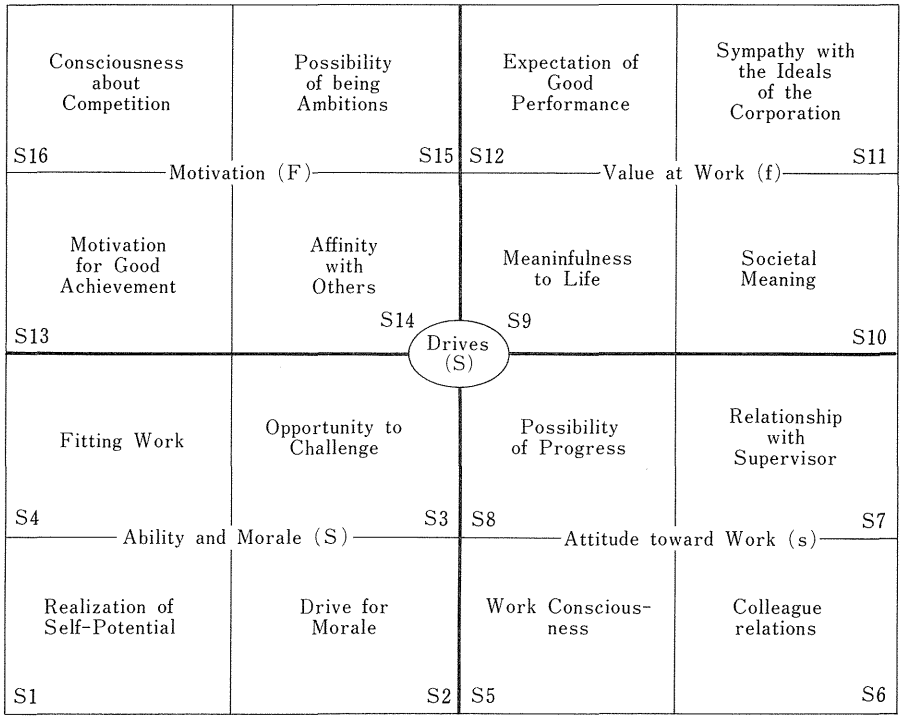
Inter-firm comparison
Inter-sectional comparison in a firm
Inter-personal comparison in a group
International comparison
Comparison between different industries

Through an international comparison we can define some national characteristics and gain insights with a view to internationalizing the management or even to get some suggestions for improving the weak points of the organization.

Through inter-firm comparison at home, while we can find out our own nature and characteristics and even some weak points, we can get some important suggestions to overcome our own weak points.

Through inter-sectional comparison we can obtain our section's characteristics and weak points and suggestions to overcome the problematic points.

Through inter-personal comparison, we can obtain each persons strengths and weaknesses and some suggestions for improving personal characteristics and ability as well as team strength.



Notes: This figure shows the detailed structure of the four subdimensions of organizational climate (s 2), i.e. Drives (S 3), Communication (s 3), Organizational Effectiveness (f 3) and Performance (F 3) shown in Fig. 2. 5. 1 in the former study (Kurosawa, 1990, Chapter 2.5.) Number shown at each dimension denotes the logical location of the concept in each upper dimension and at the same time it shows the order number in the questionnaire.

Symbols used in the diagram correspond to the following categories.

S : substance, foundation of the system. Socially-functionally it represents a value system.

s : Structure, elements plus law. Functionally it repressents an innovating or integrating function.

f : Form of the thing. Functionally it represents a goal gratification function or administering function, and

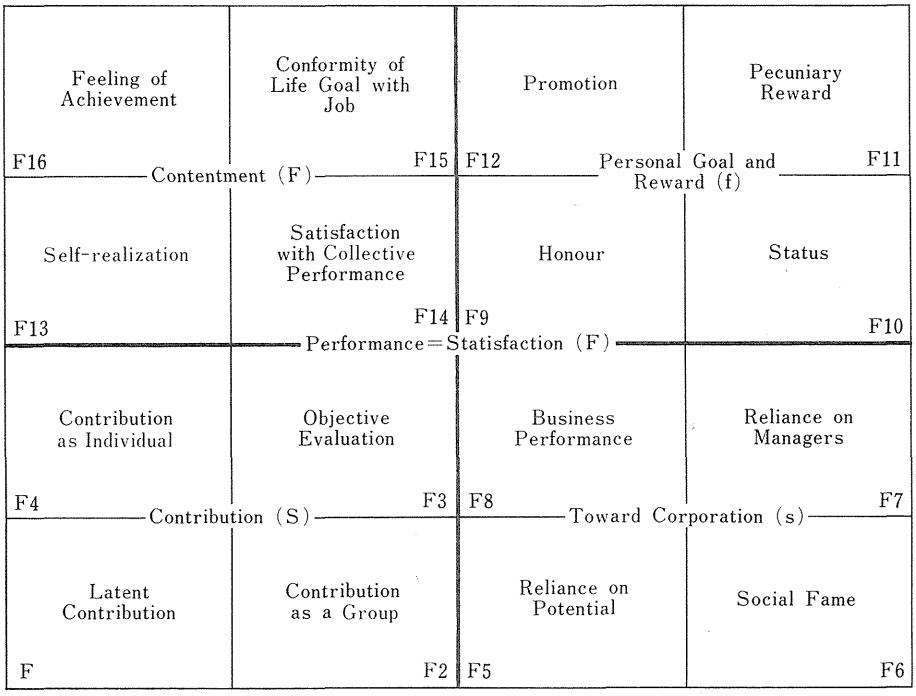
F : Function. Functionally it represents roles and their plays.

Suffix attached to each symbol denotes the organizational level in which the category is located. In reading through the meaning of Fig. 1, we have to keep in mind that while positive aspect of each category is expressed, there is of course a possibility of being negative in accordance with the situation. Each dimension is also structured with four subdimensions. Xn-Xm denotes the m subdimension of the dimension of n. n or m is possible to select among S. s. f. and F. For example s_2-f_3-f_4 denates f_4 as a subdimension of f_3 under s_2.

Fig. 1 Structure of Subsystem of the Organizational Climate

Challenging s16	Supportive s15	Goal-oriented Management s12	Formalistic Management s11
Atmosphere (F)		Vertical Relations (f)	
Warm-hearted s13	Co-operative s14	Realistic Management s9	Participative Management s10
Communication (s)			
Admiring High Performance s4	Self-reliance s3	Practice--centered Pattern s8	Formal Communication s7
Colleague Relations (S)		Communication Pattern (s)	
Depending on others s1	Good Friend-ship s2	Informal Communication s5	Theory-centered Pattern s6

Flexibility of Leader's Adaptability f16	Goal Setting by the Leader f15	Controlling by Standardized Procedures f12	Self-checking f11
Leadership Style (F)		Control (f)	
Strength of Leadership f13	Evaluation of Subordinates by the Leader f14	Sympathizing Function f9	Co-ordination Function f10
Organizational Effectiveness (f)			
Role Recognition f4	Adequacy of Job Allocation f3	Foresightedness and Insightful--ness of Decision Making f8	Clarity of the Goal f7
Competence (S)		Pattern of Decision Making (s)	
Consciousness of Belongingness f1	Responsibility and Authority f2	Correspondence of Organizational Nature and Decision Making (Participative Decision Making) f5	Decision of Organizational Behaviour (Observance of Decisions by the Members) f6



II. A Case Study : Diagnostic Survey on the Organizational Climate and KIS Productivity in R&D Sections

In this section, the author wishes to introduce a summary of a case study on the organizational climate-KIS productivity nexus in some R&D sections. It was carried out on several numbers of representative big scale corporations in the machinery industry in Japan. In order to show clearly some essential framework and results of the study, just two companies, i.e. Co. A and Co. B, are represented here.

II.1. Designing the Detailed Structure of Subsystem of the Organizational Climate

First of all, we have to develop the structure of subsystem of the organizational climate given in the Structure of Potentiality and Pattern of Business Resources as shown in Fig. 2. 5. 1. in the former study.[*3] In this section, we have to develop a more detailed sub-structure to it. The final conclusion of this work is shown in Fig. 1.

[*3] Detailed explanations are given in (2) Organizational Climate in Chapter 2.5 of Kurosawa (1990).

II.2. Diagnostic Study

Study System

Based on the organizational climate S-F scheme shown above, we designed the related questionnaires.

This study primarily treats the psychological relation between group managers and their subordinates, and in particular detects gaps in perception, i.e. consciousness. It was designed to enable an evaluation of these situations in order to assist in the formulation and implementation of a policy to activate organizational management.

Work Situation Questionnaire (Subordinates)

Position Number[*4]	
S 1	Are you suited to your present work?
S 2	Is your job boring or is it full of variation and interest?
S 3	Are you always given good opportunity to make full use of your real ability?
S 4	Is your job what you want to do?
S 5	Do you believe that working is a thing which gains respectful?
S 6	Are you working with nice colleagues?
S 7	Are you working under a nice supervisor?
S 8	Are you developing your ability and capacity through job achievement?
S 9	Is your job meaningful for your life?
S 10	Is your job societally meanigful?
S 11	Do you place a high value on the social mission of the company by which you are employed?
S 12	Do you strongly believe that the company can achieve a high business performance?
S 13	Do you think it will gain you respect to achieve a high performance?
S 14	Do you feel happy because you are working with nice colleagues whom you can respect?
S 15	Are you working with big aspirations?
S 16	Do you have a strong consciousness of competition with colleagues?
s 1	In your work section, does anybody ask questionable things of colleagues?
s 2	In your work section, do all members try to solve difficulties cooperatively?
s 3	In your work section, does each person make an effort to pursue his job by himself?
s 4	In your work section, is great job success by anybody highly admired by all the other members?

[*4] The place of each questionnaire in the S-F scheme is shown in Fig. 1.

s 5 In your work section, do workers quite often have associations with colleagues and superiors outside the job.?

s 6 In your work section, is there an inclination to solve difficulties by theoretical study?

s 7 In your work section, is the relationship between the superior and his/her subordinates treated in a highly formalistic way?

s 8 In your work section, is there an inclination to treat problems in a realistic/practical way?

s 9 Does your superior (here and in the following questions, this refers to your section chief) listen to the distress or complaints of his/her subordinates and try to take proper measures to alleviate problems.?

s 10 Does your superior actively support and encourage his/her subordinates' proposals or ideas?

s 11 Does your superior respect customs and formalities?

s 12 Does your superior always demand that his/her subordinates try to reach goals or strictly maintain the job terms?

s 13 In your work section, is there human warmness?

s 14 In your work section, do all members have a friendly spirit towards cooperatively solving the difficulties of colleagues?

s 15 Is your superior supportive towards subordinates and easy to consult?

s 16 In your work section, is there a good spirit towards challenging difficult problems?

f 1 Do you have a strong consciousness of belonging to the corporation?

f 2 Do you recognize and understand clearly your responsibilities and rights?

f 3 Have you been given a job suitable for your ability?

f 4 Do you clearly understand your role in your work section?

f 5 When a major policy has to be decided or a problem resolved in your work section, does your superior discuss the issue adequately with everyone involved?

f 6 In your work section, do all members faithfully follow the decisions made for the work section?

f 7 In your work section, are goals and policies clearly shown?

f 8 Are decisions made by the superior in your work section farsighted and insightful?

f 9 In your work section, does everybody work in conformity with the pace of others?

f 10 In your work section, are jobs allotted among members well coordinated?

f 11 In your work section, is the goal/task of each person always checked as to its tempo and performance by each person spontaneously?

f 12 In your work section, is everybody requested to follow the proper procedures in pursuing a job?
f 13 Does your superior have enough strength to lead members even if faced with any kind of big difficulty?
f 14 Does your superior highly admire his/her subordinates when they achieve good performance?
f 15 Are the goals set by your chief superior in strategic perspective?
f 16 Is your superior flexible in determining means and methods?
F 1 Do you think you are playing an important role in your company?
F 2 Does your work section greately contribute to your company?
F 3 Is your work section recognized by others in the company as having a high performance?
F 4 Are you recognized by others to be a person admirably contributing to the company?
F 5 Does your company have enough potential to overcome any depressed business conditions?
F 6 Does your company have a good reputation in society?
F 7 Do you have great trust in the executives of your corporation?
F 8 Does your company have a better performance than any rival companies?
F 9 In your company, is anybody recognized and admired by his/her superior and colleagues when he/she can show good job performance?
F 10 Have you been given a position suitable for your work ability?
F 11 Are you remunerated with an income suitable for your job performance?
F 12 Can you expect to be promoted if you make good endeavours?
F 13 Can you express your competence to its full extent in your job?
F 14 Are you satisfied with the perforance of your work section?
F 15 Do you think that there is agreement between you and your corporation in respect of the ideal purposes?
F 16 Are you satisfied to have your present job as an expert in this field?

The above questionnaire is designed to be sent to subordinates. The same content in a differently expressed questionnaire is sent to superiors. On the other hand, some items of the questionnaire are designed to show desirable situations. The results are used to compare recognition of existing situations obtained from the former questionnaire.

For each question the respondent is requested to choose one of the following responses.

Response Number	Response
1.	Yes, this is presently the case (positive affirmation).
2.	Yes, this tends to be the case (negative affirmation).
3.	No, this tends not to be the case (negative negation).
4.	No, this is rarely the case (positive negation).

As seen here, the lower the response number, the greater the degree of positive response and the higher the degree of consciousness towards the problem at hand.

Analysis

A. Basic Directions

The analysis aims to detect gaps in consciousness between superiors and subordinates within the same group. It entails the following : a graphic description of the results of the questionnaire introduced earlier ; the detection, according to a principal component analysis of qualitative data, of the structure behind various phenomena ; the extraction of comprehensive organizational climate indices for each department/company ; and a visual means of expressing these indices. Using these factors, the structure of the organizational climate within the group is expressed and distortions in the phenomenological structure are detected, thereby enabling acquisition of information which is extremely beneficial and effective in terms of KIS productivity management. The results for typical companies "A" and "B" based on our questionnaire and diagnostic method are introduced.*5

B. The total framework of analysis.

Detection of patterns of the organizational climate.

The observed situation of each dimension of the S-F scheme is analysed.

These are compared between the following.

a. Different companies and different work sections
   To make clear the characteristics and to depict the problematic points of each section.
b. The manager and his/her subordinates
   To make clear the gaps in the recognition of a given situation between the manager and his/her subordinates.
c. The ideal situation and the present situation.

*5 The total number of people surveyed in Co. A is 623 in which number of superiors is 63 and that of subordinates is 560 ; in Co. B the number surveyed is 703 in which number of superiors is 111 and that of subordinates is 592. This work carried out though a cooperative study committee between groups at the Tokyo Institute of Technology and some staff members belonging to the Japan Management Association in 1987.

Table 1 Comparative Indices for Co. A and Co. B in respect of the Average Values for Manufacturing in Japan : average of the first and last halves of 1987

	Average of Manufacturing	Co. A	Co. B
Added Value labour productivity (1,000¥)	7,543.5	4,522	9,427
Added value ratio (%)	16.43	12.13	17.48
Capital-labour ratio (1,000¥)	33,188	27,831	40,418.5
Share of labour cost in added value (%)	69.2	75.43	48.03
Labour income per worker (1,000¥)	5,218	4,260	5,846.5
Rate of growth in terms of added value (%)	5.11	9.64	9.51
Rate of recurring profit to total capital (%)	5.50	1.26	6.45
Added value total productivity	1	0.65	1.20

Notes. The data is obtained from *Business Analysis Indices,* by Kansai Productivity Centre, Japan, 1987.

$$\text{Added Value Total Productivity} = \frac{\text{(Net) Added value}}{\text{Labour cost} + \text{Investor's service}}$$

Labour cost is evaluated from the average wage cost of total manufacturing. The investor's service is estimated by (average rate of return on total capital in total manufacturing) × (total capital in each company).

C. The fundamental forms and tools used in analysis

A simple mean value for each dimension is calculated and compared.

The principal component analysis for qualitative data is applied*6 for each dimension at the first order of the S-F scheme, i.e. drives, communication, organizational

Dimension		Connotations of Positive Direction of the Sample Score.
Drives	(s)	There is positive force for drives.
Communication	(s)	There is good communication.
Organizational Effectiveness	(f)	Organizational effectiveness is high.
Performance	(F)	There is a positive force toward high performance.

*6 General explanations on the method are given in Tatsuzo Suzuki (1982).

effectiveness and performance. In this study, however, we extract just the first axis. The reason for this is that the first axis, in fact, forms an overall comprehensive index, i.e. it shows the dichotomy, positive or negative, about all the items, i.e. sixteen items, constructed in the first order of the four dimensions. The contents of the sample score ascribed to each dimension are given the following meanings.

Inter-Company Comparisons

For the sake of simplicity, two companies, i.e. Co. A and Co. B, are used here for reference. These two companies are representative machine manufacturers in Japan. As shown in Table 1, Co.B has extremely good business performance and Co.A shows the other extreme.

Consciousness Gap between Superior and Subordinates : Inter-Company Comparison

For the sake of reference, some typical and problematic aspects are shown below. Fig. 2 shows gaps of consciousness between a superior and his/her subordinates in the R&D function of the two companies. As seen in this case, Co. B which has good business performance shows (a) a positive direction of average value in any dimension, and (b) relatively narrow gaps between superior and subordinates. On the contrary, Co. A has the opposite tendencies. Although it is a natural phenomenon to

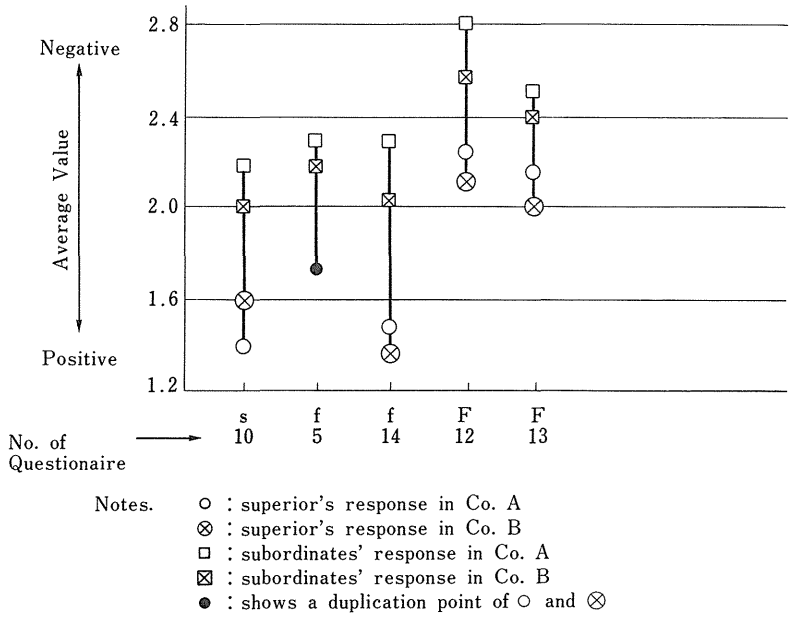


Fig. 2 Consciousness Gap between Superior and Subordinate about Organizational Climate, in R & D function in the Two Companies

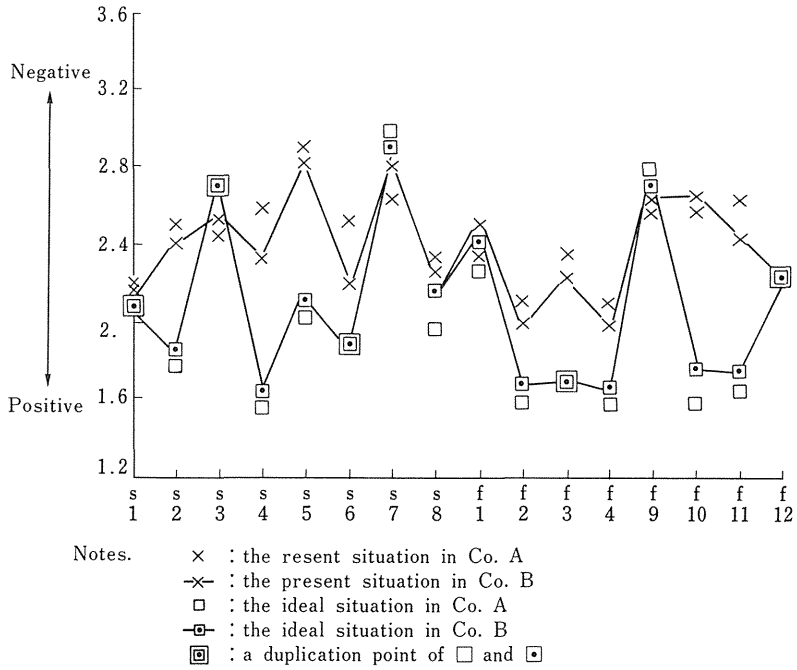


Fig. 3 Consciousness Gap between the Present Situation and the Ideal Situation of the Organizational Climate in the R & D Function of the Two Companies : (Responses of subordinates)

find gaps in consciousness between superior and subordinates it must show a problematic situation if we can find abnormally big gaps at any dimension. Inter-firm comparison will of course be useful in uncovering such abnormalities.

Gaps between the Present and the Ideal Situation : Inter-Company Comparison

Fig. 3 shows gaps between the present situation and the ideal situation for each dimension in Communication and Organizational Effectiveness. As seen clearly, Co.A has bigger distances generally between the present and ideal situations than those of Co.B and the present situations lie more on the negative side than for Co.B, although the phases are very similar. It is a matter of course that the distance shows the potential to improve the present situation. However, to realize the potential, we have to reform the present organizational climate.

Gaps between the Individual's Situation and the Work Section's Situation

Fig. 4 shows the gaps of consciousness between the individual's situation and the

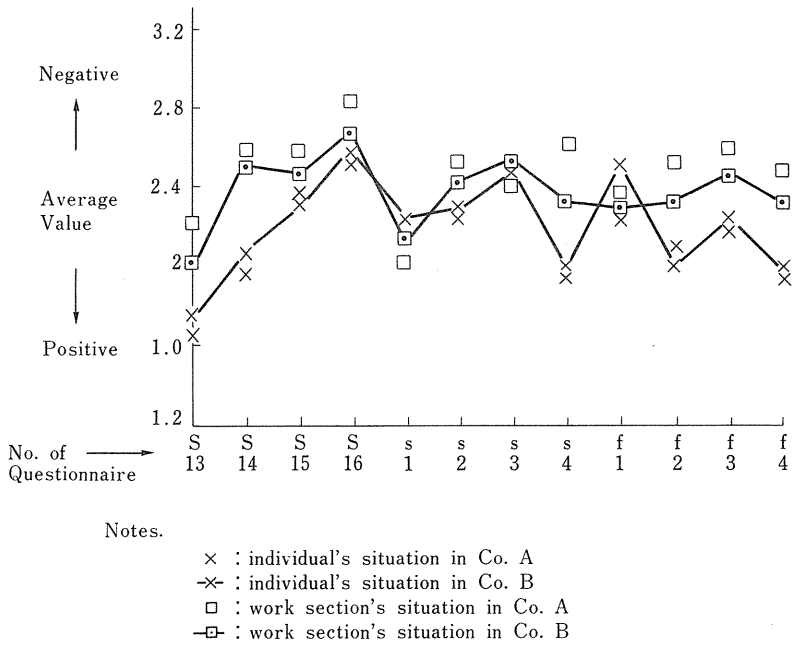


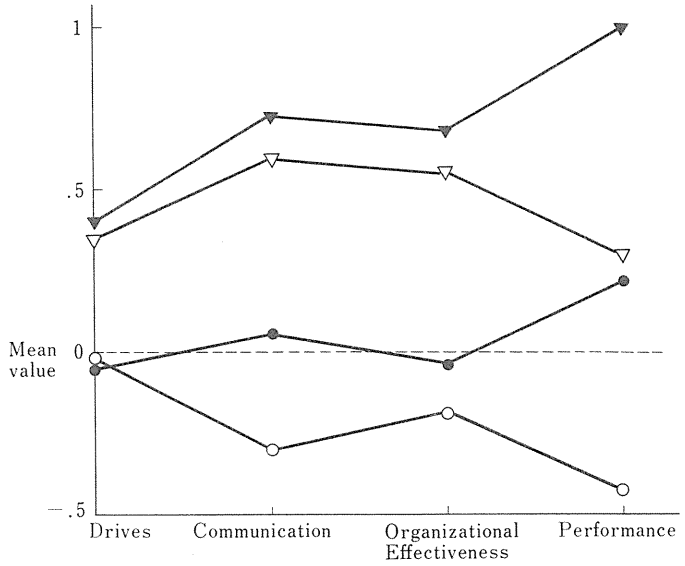
Fig. 4 Consciousness Gap between two Situations of Organizational Climate, i.e. judged from the Individual's Standpoint and as to the Situation of the Work Section to which the Individual belongs (Responses of Subordinates).

work section's situation*7 In this aspect also, we discover a bigger gap for Co. A in each dimension of communication and organizational effectiveness than for those of Co.B.

Fig. 5 shows the comparative results for the mean values of sample scores in each dimension of the four dimensions defined in the S-F scheme for the two companies. First, the configuration of the score distribution is very similar for the two companies. Secondly, however, the scores of Co. B are far higher than those of Co. A. Thirdly, the gaps between superior and subordinates are specially significant for Co. A. Fourthly, the degree of dispersion of the gaps is far greater for Co. A than for Co. B. This might indicate the instability of Co. A's organizational situation. The very big deviation in the dimension is of course a reflection of the business performances of these two companies.

Inter-Section Comparison

*7 For example, the question in the questionnaire on the individual's situation as regards S 13 is "Do you think it will gain you respect to achieve a high performance in your job?". This is rewritten as follows for the work section : "In your work section, do members think it will gain them respect to achieve high performance in their jobs?".



Notes. ▽ : superior in Co. A
▼ : superior in Co. B
○ : subordinates in Co. A
● : subordinates in Co. B

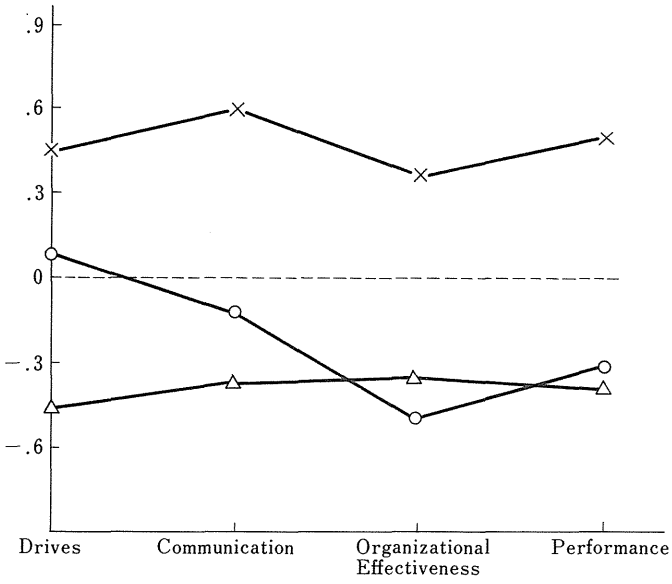
A positive figure in each dimension shows a positive situation of a members' attitude at that dimension and vice versa. For example, in the dimension of Communication, if the figure has a positive value it means that the group climate is felt to be warm, cooperative and lively.

Fig. 5 Inter-company Comparison by Sample Score in Four Dimensions
—Comparison Between Superior and Subordinates—

By applying the same method to the case of inter-section comparison, we can discover the characteristics of each section in terms of the organizational climate. For the sake of making our discussion simple, just three sections are cited here. It is clear that there are several different patterns of organizational climate within the different sections, even if they belong to the same company (see Figs. 6～9).

As shown in Fig. 6 the low productivity performance section has low scores in almost all dimensions. Fig. 7 shows the situation of psychological gap between superior and subordinates in the dimension of communication for Co. A. Items which have big gaps are s 10 (Does your superior actively support and encourage his/her subordinates' proposals or ideas?), s 9 (Does your superior listen to the distress or complaints of his/her subordinates and try to take proper measures to alleviate problems?), and s 15, s 4, and s 5.(See the questionnaire shown above).

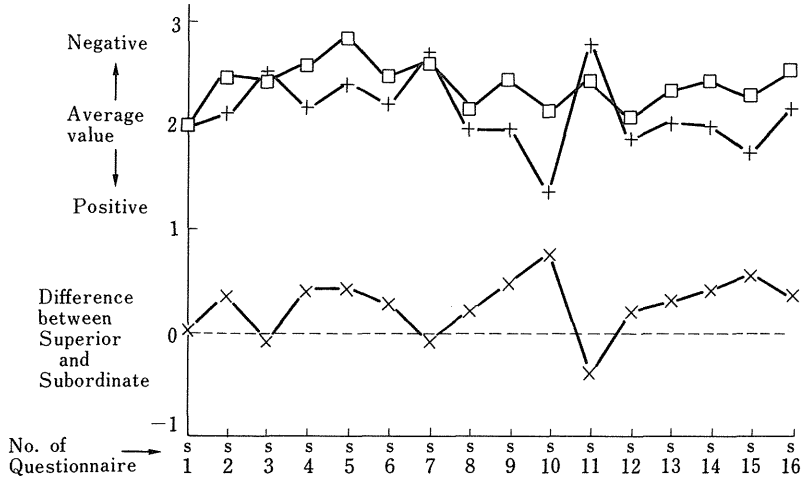
Fig. 8 shows further the situation in the dimension of communication, but it shows the gap by section. In this pattern of expression, the Z score is calculated, the form



Notes. × : Commodity Planning Office
○ : Small-scale Machinery Controller
△ : First Section of Design

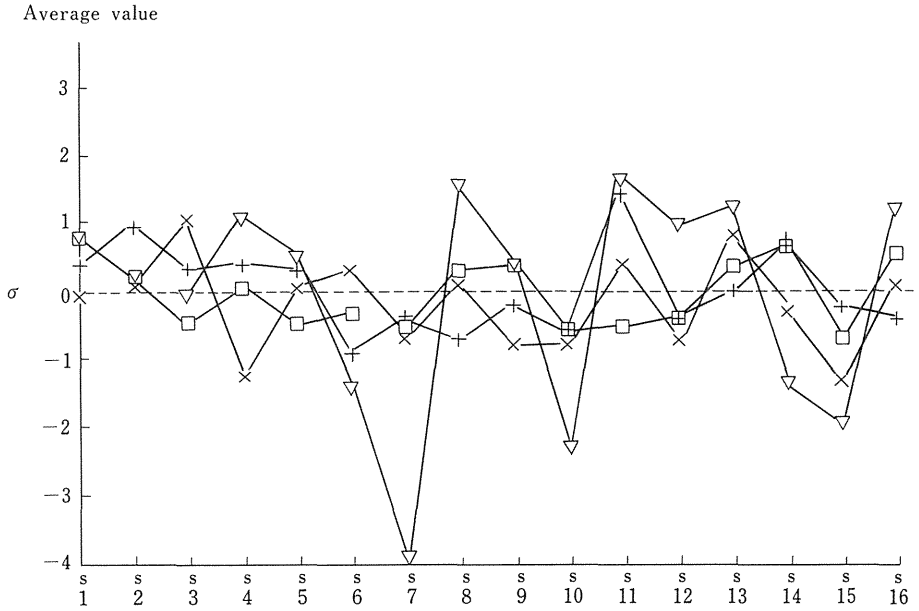
The zero value shows the mean value of the sample scores of twelve sections in Co. A and five sections in Co. B.

Fig. 6 Inter-Section Comparison by Sample Score in Four Dimesions : Co. A.



Notes.
+ : average value of superior
□ : average value of subordinates
× : gap (average value of subordinates − average value of superior)

Fig. 7 Gaps in terms of Average Values between Superior and Subordinates at the Dimension of Communication in Co. A.



Notes.

+ : section 1
□ : section 2
× : section 3
▽ : section 4

Gaps are shown in terms of the z score

$$z_i \text{ score} = \frac{x_i - \bar{x}}{\sigma}$$

where

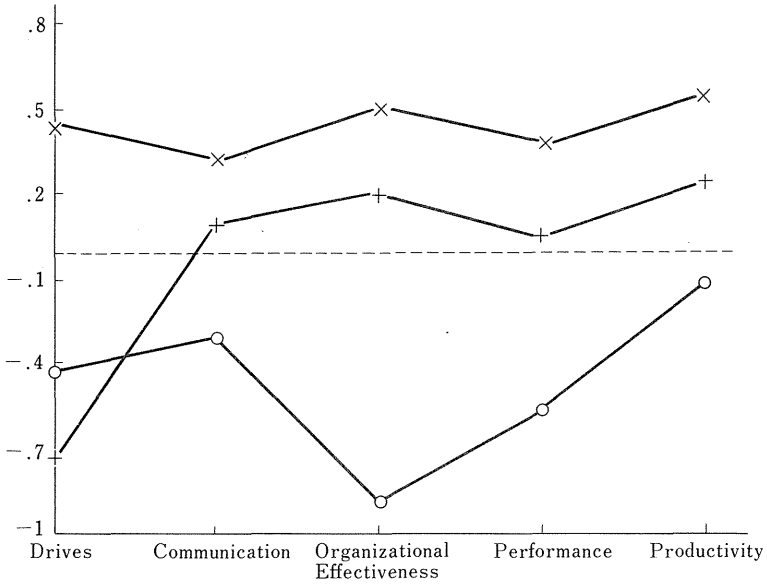
x_i : gap in each section,
$\bar{x}$: average value of gaps,
σ : standard deviation,

Fig. 8 Comparison of Gaps among Sections at the Dimension of Communication : Co. A.

of which is shown in the lower part of the figure, by which we can see the degree of the gap instinctively. It is a matter of course that we have to check the normalty of the distribution at each dimension so that we can use the Z score.

Fig. 9 shows the comparison of sample scores in each dimension of the first axis by the principal component analysis for qualitative data. In this figure, we have also shown the level of the value of productivity in each section.

There is a tendency for the higher scoring sections to have higher productivities. However, there are some problems as to the relatinship between sample scores and the productivity index. We cannot say that by using this form we can exactly depict the organizational climate and its productivity.



Notes.

× : section 1
+ : section 2
○ : section 3

$$\text{Productivity} = \frac{\text{Number of Patents}}{\text{Number of KIS}} \times W_1 + \text{Merchandizing Ratio} \times W_2 + \text{Drawing Efficiency} \times W_3$$

Fig. 9 Comparison of Sample Scores and Productivity among Sections : Co. B.

Structuralization of Organizathonal Climate by the PCA

By applying the PCA for qualitative data to the pooled data from all the dimensions, we can depict three axes which include 26 items of the questionnaire. By observing the size of item scores on each axis, we can give the following names to each axis (see Table 2).

First axis : Opportunity for fulfilment of self-ability

Second axis : Attitude towards work

Third axis : Reliability towards the company

By using the score values on each axis, we can compare the generalized organizational climate of the company, as well as of the sections observed. For example, Figures 10 and 11 show a comparison of two corporations. Here we can see, first, Co. A which has relatively low productivity and shows a low score on the third axis for both superior and subordinates. Co. B, which has a relatively high productivity, shows the contrasting position. Secondly, superiors in any company show a relatively higher score than subordinates, but in the case of Co. A subordinates show more critical/low

Table 2 Item Scores of Each Axis in KIS Organization —by Principal Component Analysis for Qualitative Data

Items	Axes		
	First	Second	Third
S 3	−0.37657	−0.49419	0.32963
S 5	0.30373	−0.41021	0.14171
S 6	−0.37751	0.08652	0.54580
S 7	−0.76786	0.09554	0.33778
S 13	0.06940	−0.41053	0.24522
S 15	0.10525	−0.39914	−0.07698
S 16	0.25928	−0.45314	0.02955
s 17	0.22757	0.34617	0.01587
s 18	0.03605	0.37053	−0.14491
s 21	0.10016	0.46576	0.11832
s 26	−0.69492	0.13326	0.28905
s 27	0.70436	0.26334	0.46180
s 29	−0.02543	0.32431	−0.16285
s 30	−0.00092	0.41479	−0.15764
f 33	0.20981	−0.25676	−0.05038
f 41	0.54181	0.27669	0.11957
f 42	−0.14113	0.27024	−0.19162
f 44	0.34825	0.05551	0.01108
f 46	−0.61873	0.11100	0.25999
F 53	0.05479	0.03180	−0.30733
F 55	0.13718	−0.11977	−0.32268
F 58	−0.03845	−0.02750	−0.29976
F 59	−0.01242	0.08641	−0.43163
F 60	−0.13098	−0.17751	−0.51097
F 63	0.08255	−0.30039	−0.10873
F 64	0.00473	−0.28274	−0.13986

Note : We have defined the boundaries to keep item scores to 0.25 and over.

scores.

It must also be interesting that in both companies superiors experience a relatively more co-operative atmosphehe than subordinates and subordinates have a stronger inclination toward work. Specifically, subordinates in Co. A have the stronger tendency toward work (see Fig. 11).

Figures 12 and 13 show comparisons between different sections. By observing the results, we can say broadly that the stronger the feeling of fulfilment of self-ability and the higher the feeling that work is valued, the higher the productivity of the section becomes. Furthermore, the higher the feeling of members of reliability towards the

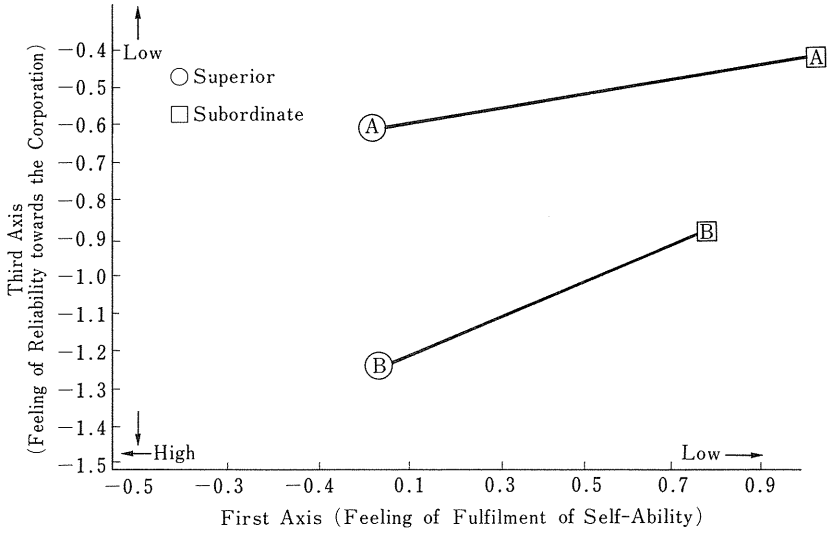


Fig. 10 Relationship between the First and the Third Axes : Company Level, Co. A and Co. B—Principal Component Analysis for Qualitative Data

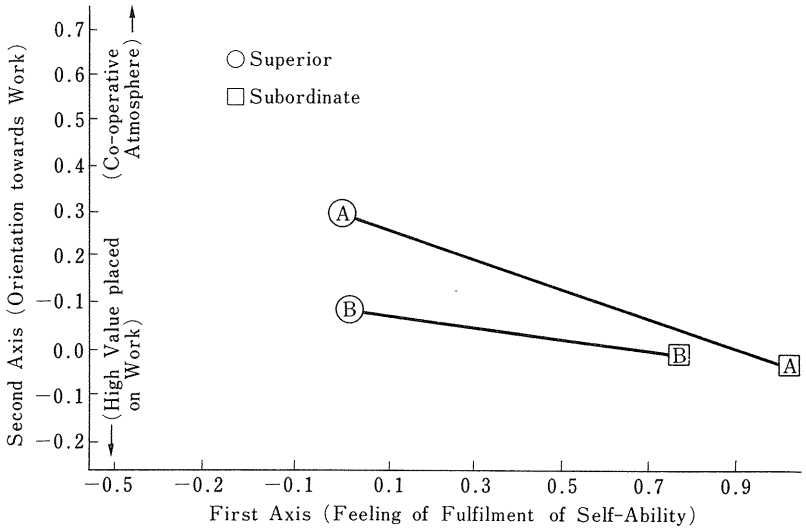


Fig. 11 Relationship between the First and the Second Axes : Company Level, Co. A and Co. B—Principal Component Analysis for Qualitative Data

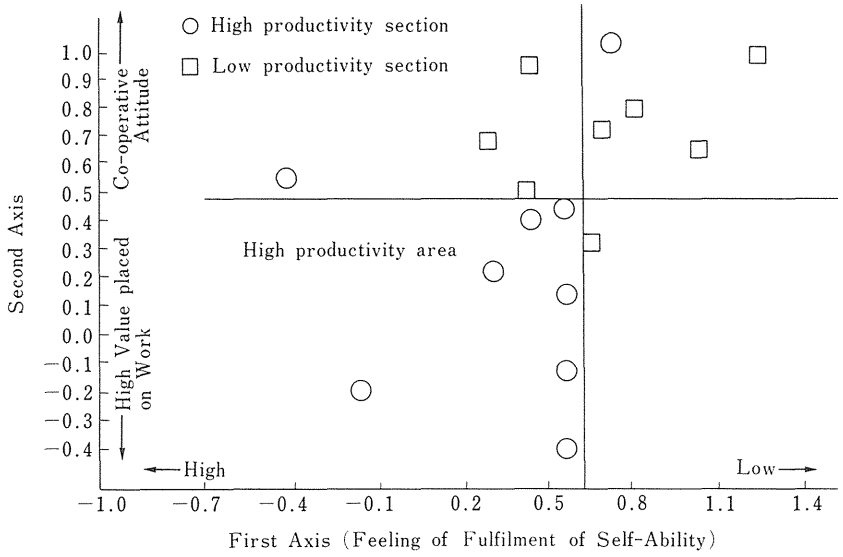


Fig. 12 Relationship between the First and the Second Axes : Section Level

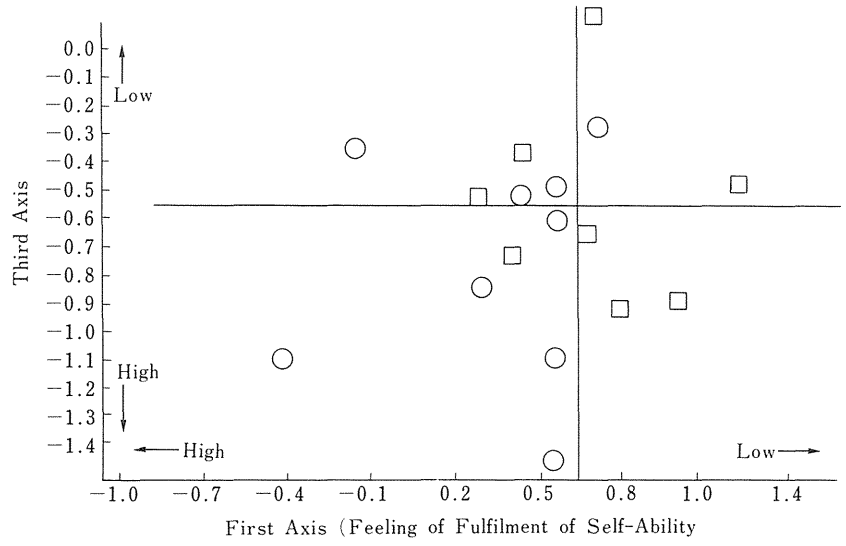


Fig. 13 Relationship between the First and the Third Axes : Section Level

company the higher is the tendency to become more productive. But, we have to be careful to evaluate the sectional situation by using the above scheme, e.g. in some sections if members have a more co-operative attitude or group oriented pattern of doing work they can be relatively more productive. On the contrary, even if they have a relatively high reliability towards the company and a relatively high feeling of self -fulfilment they might have low productivity.

As such, the schemes developed above are just a generalized framework by which we can get the general direction or nature of the section. In order to obtain a detailed understanding of the real situation, we have to use more sophisticated procedures in the diagnosis.

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