
Notes

Problems in Cost Management in
Manufacturing Companies in Japan

—The situation of 1990—

Yoshiho Tanaka

1. Introduction—The necessity for the survey on cost management
2. Outline of the survey
3. Outline of the companies from which the responses were received
4. Manufacturing operations, diversifying products and being automated
 - (1) Manufacturing operations, diversifying products
 - (2) Manufacturing operations, being automated
 - (3) Diversification of products and automation of production
 - (4) Effects on the structure of manufacturing cost
5. Kinds of cost accounting and details of cost information
 - (1) Practicing forms of cost accounting and their methods
 - (2) The details of product costing
 - (3) The details of department costing
6. The situation of cost management and its evaluation
 - (1) The management cycle in cost management
 - (2) The use of information in planning process
 - (3) The use of information in controlling process
 - (4) The use of information in evaluating process
 - (5) The stress in cost management
 - (6) Evaluating of practices in cost management
7. Conclusion—Problems to be solved in cost management

1. Introduction—The necessity for the survey on cost management

A survey on the manufacturing industry in Japan was done in order to promote the understanding of its cost management. The purpose of this article is to analyze the responses from the companies and to provide the results, concerning the situations and problems those companies face

In this article, it is sincerely hoped that the present situations and the real life problems in cost management are understood as grounded in reality. The survey was conducted, relying on a statistical method even though it is the strong conviction of this author that the matters concerning cost management should be understood essentially from the standpoint of an individual management.

One necessity of this statistical approach is to make more sure of the general condition of real companies. Statistical observation makes it possible to find the typical conditions of the current period, important tendencies and trends that should not to be ignored, and potential basic meanings underlying the situations. Further, the results of statistical observation may be used as a standard to evaluate the special situation of each company. That is, this statistical method should be added to many other case studies.

Another necessity of statistical method derives from the lack of surveys on cost management. There would be no need to say that variables, expressing quality and quantity, are necessary to understand the tendencies and the situations prevailing in cost management by means of statistical observation. As a matter of fact, however, appropriate and commonly accepted measures, which can be used in order to ascertain the characteristics of cost management, are lacking. What sort of commonly accepted variables can be used to measure for example, differences of management levels in each company, kinds of cost information to be used, the degree of details in cost information, differences in organizational systems of cost management in each company, classifications of the typical

management cycle, kinds of cost accounting ... etc.? It is a certainty that ways to survey companies need to be refined by trial-and-error, in order to ascertain the reality prevailing in cost management in Japan.

For all these necessities of statistical method, one cannot help having the feeling that one is peeling an apple with a rusty knife, due to the lack of enough data. This author requests the reader to look over this article as an interim report on the problems included in cost management in Japan.

2. Outline of the survey

Manufacturing companies were requested to fill out a questionnaire, and to return it by mail. The questionnaire was sent by mail to manufacturing companies listed at least in one of the stock exchanges in Japan, and to non-listed manufacturing companies with a capital of ¥1 billion or more, which apparently had almost the same scale of capital as listed companies. Therefore, this article is intended to observe the typical conditions of listed manufacturing companies and the other similar-sized companies in Japan.

The questionnaires were sent and collected from the companies during the period between July, 1990 and March, 1991. The result of the collection is shown in Table-1. Though 1,397 companies received questionnaires, 12 of them were found to be inadequate samples during the process of the survey because of their lack of internal manufacturing operations. The substantial rate of collection turned out to be about 30%, as the table shows.

Table-1 Collection of Questionnaires

Collection Forms	Listed Companies	Non-listed Companies	Total
Responses collected	322(28 0)	105(44 3)	427(30 8)
Valid Responses	315(27 4)	102(43 0)	417(30 1)
Rejected Responses	7(0 6)	3(1 3)	10(0 7)
Responses not collected	826(72 0)	132(55 7)	958(69 2)
Subtotal	1,148(100 0)	237(100 0)	1,385(100 0)
Inadequate samples	9	3	12
Total(companies mailed)	1,157	240	1,397

The figures in () in each table show a proportion (%) to the total respondents and this notation will be used throughout the article.

Though sample size ($n=417$) may not be large enough to educe statistically stable results, I would like to avoid extremely twisted interpretations, by analyzing them in as many various aspects as possible.

3. Outline of the companies from which the responses were received

The characteristics of 417 companies which were analyzed are as follows.

First, the outline of listed and non-listed respondents is shown in Table-2. Listed companies make up about three-fourths of the total respondents, and non-listed ones, one-fourth. For reference purposes, the actual number of companies listed in each stock exchange are given in the third column. These numbers show that the respondents reflect closely the geographically real state.

The classification of the respondents by industries, based on the Middle Classification of "Japan Standard Industry Classification" (the Administrative

Table-2 Listed or Non-listed(Q 2)

Year	1990	
Listed companies	315(75.5)	
Non-listed companies	99(23.7)	
Total	414(99.3)	
Not filled in	3(0.7)	
Total respondents	417(100.0)	
	1990	1990 actual(%)
Tokyo Stock Exchange	260(82.5)	1,627(78.6)
Osaka Stock Exchange	176(55.9)	1,138(54.9)
Nagoya Stock Exchange	86(27.3)	544(26.3)
Other stock exchanges	64(20.3)	Unknown
Listed companies	315(100.0)	2,071(100.0)

Note: The actual numbers of the listed companies in 1990 are quoted from Kinbara, Sakutaro ed Handbook of Tokyo Stock Exchange. Research Section of Tokyo Stock Exchange Tokyo: Tokyo Stock Exchange, 1991: 58.

Management Agency of Japanese Government) is shown in Table-3. The distribution does not seem to be considerably different from the actual state as compared with companies listed on the Tokyo Stock Exchange at the same period.

Paid-up capital, annual sales, the number of employees and factories of the companies that were involved in this study are shown in Table-4~7 in order to see the scale of the respondents. The actual average figures of paid-up capital, annual sales and employees of listed manufacturing companies of the previous year are also shown in the footnote of each table. The respondents may be somewhat large in terms of a scale as compared to the actual state.

In the following chapters, the current situation of production operations, cost accounting and cost management, and the problems found in the situation will be

Table-3 Companies by industry(Q 1)

Year	1990	1990 actual (%) (Tokyo St Ex.)
Food	26(6.2)	77(7.8)
Beverage, feed, cigarette	8(1.9)	
Textile fibers	15(3.6)	59(6.0)
Fabric & apparel, other textiles	0	
Lumber, wood products	0	
Furniture & furnishings	3(0.7)	
Pulp & paper, paper products	9(2.2)	26(2.6)
Publishing, printing & related industries	0	
Chemicals	67(16.1)	163(16.5)
Petroleum refinery products, coal products	10(2.4)	12(1.2)
Plastic products	9(2.2)	
Rubber products	7(1.7)	17(1.7)
Leather & related industries, furs	0	
Ceramics, stone & clay	13(3.1)	44(4.5)
Iron & steel	22(5.3)	51(5.2)
Nonferrous metals	17(4.1)	35(3.6)
Fabricated metals	18(4.3)	40(4.1)
Machinery	43(10.3)	138(14.0)
Electrical machinery	70(16.8)	171(17.4)
Transport equipment	43(10.3)	74(7.5)
Precision instruments	18(4.3)	35(3.6)
Weapons	1(0.2)	
Other manufacturing industries	18(4.3)	43(4.4)
Other industries	0	
Not filled in	0	—
Total	417(100.0)	985(100.0)

Note: The actual numbers of the listed companies in 1990 on the Tokyo Stock Exchange are quoted from Kinbara, Sakutaro ed. op. cit. : 48.

Table-4 Paid-up capital(Q 1)

Year	1990
¥70 billion and more	22(5 3)
60~less than 70 billion	5(1 2)
50~ " 60 "	2(0 5)
40~ " 50 "	10(2 4)
30~ " 40 "	13(3 1)
20~ " 30 "	28(6 7)
10~ " 20 "	64(15 3)
8~ " 10 "	20(4 8)
6~ " 8 "	30(7 2)
4~ " 6 "	35(8 4)
2~ " 4 "	69(16 5)
Less than 2 "	119(28.5)
Total	417(100.0)
Average of respondents	¥16.4 billion

Note: The average of manufacturing companies listed in 1989 on the Stock Exchanges of Tokyo, Osaka and Nagoya continuously during the past 11 years is ¥14.4 billion, according to the Information System Section, Institute of Investment Research, Japan Development Bank ed. Handbook of Management Index: 1990 Tokyo: Institute of Investment Research, Japan Development Bank, 1990: 14.

Table-5 Annual Sales(Q 1)

Year	1990
¥700 billion and more	23(5 5)
600~less than 700 billion	8(1 9)
500~ " 600 "	1(0 2)
400~ " 500 "	9(2 2)
300~ " 400 "	10(2 4)
200~ " 300 "	26(6 2)
100~ " 200 "	60(14 4)
80~ " 100 "	16(3 8)
60~ " 80 "	33(7 9)
40~ " 60 "	49(11 8)
20~ " 40 "	82(19 7)
Less than 20 "	100(24 0)
Total	417(100.0)
Average of respondents	¥181.4 billion

Note: The average of manufacturing companies listed in 1989 on the Stock Exchanges of Tokyo, Osaka and Nagoya continuously during the past 11 years is ¥145.4 billion, according to the Information System Section, Institute of Investment Research, Japan Development Bank ed op cit : 14.

Table-6 Employees(Q 1)

Year	1990
10,000 persons and more	25(6 0)
8,000~less than 10,000 persons	3(0 7)
6,000~ " 8,000 "	17(4 1)
4,000~ " 6,000 "	34(8 2)
2,000~ " 4,000 "	66(15 8)
1,500~ " 2,000 "	31(7 4)
1,000~ " 1,500 "	57(13 7)
500~ " 1,000 "	101(24 2)
Less than 500 "	83(19 9)
Total	417(100.0)
Average of respondents	3,305 persons

Note: The average of manufacturing companies listed in 1989 on the Stock Exchanges of Tokyo, Osaka and Nagoya continuously during the past 11 years is 2,701 persons, according to the Information System Section; Institute of Investment Research, Japan Development Bank ed op cit : 14.

Table-7 Number of factories(Q 1)

Year	1990
16 factories and more	11(2.6)
14~15 factories	5(1.2)
12~13 "	6(1.4)
10~11 "	5(1.2)
8~ 9 "	22(5.3)
6~ 7 "	40(9.6)
4~ 5 "	82(19.7)
2~ 3 "	157(37.6)
1 factory	83(19.9)
Not filled in	6(1.4)
Total	417(100.0)
Average of respondents	4.2 factories
Maximum	26.0 "
Minimum	1.0 factory

explored.

4. Manufacturing operations, diversifying products and being automated

(1) Manufacturing operations, diversifying products

As is generally known, the products dealt with in each company are remarkably diversified. This might be one of characteristics in the recent matured market, where the fundamental demands for the products have already been fully met, and in the recent competitive market, where competitions among manufacturers in the same trade have already become sufficiently enlarged, even internationally. The current trend in diversification is partly shown in Table-8. Though the trend may not necessarily seem as clear, due to the rough understanding of a variety of products and slight difference in the surveys during the past 10 years, the trend toward diversification, which appears to have started much earlier, seems to be progressing little by little, even during 1980s.

The diversification appears to be fundamentally caused by adapting to the changing market environment, and one can actually observe to a certain extent how each company has been adapting itself to a changing market by examining

Table-8 Trends of the diversification of products(Q 6)

Year	1981	1986	1990
Large variety of products	439(72 2)	499(69 3)	306(73. 4)
Medium variety of products	—	97(13. 5)	58(13 9)
Small variety of products	134(22 0)	115(16 0)	53(12 7)
Others	20(3 3)	6(0 8)	2(0 5)
Total	593(97 5)	717(99 6)	419(100 5)
Not filled in	15(2 5)	3(0 4)	1(0 2)
Total respondents	608(100 0)	720(100 0)	417(100 0)

Note: The data in 1981 are the result of the survey conducted on the manufacturing companies listed in 1982 on the Tokyo Stock Exchange, quoted from Inoue, Shin-ichi, and Yoshiho Tanaka "Production Style and Cost Accounting: The Situation of 1982 in Japan" The Kagawa University Economic Review 57. 1(1983): 64

The data in 1986 are the result of the survey conducted on the listed manufacturing companies and non-listed manufacturing companies with a capital of ¥1 billion and more in Japan, quoted from Miura, Kazuo, Shin-ichi Inoue, and Yoshiho Tanaka, "Recent Development of Production Methods and Cost Management in Japanese Manufacturing Corporations." Annals (Faculty of Economics, Kagawa University) 27(1987)

Tables-9 and 10. During this decade, more manufacturers seem to have accepted the requirements of the market in general for the new types of products or the delicate specifications of them. They seem to have accepted more requirements for product specifications from customers by introducing more order-production styles, or similar styles, that contribute to smaller inventories than in a market

Table-9 Methods of accepting orders(Q 6)

Year	1981	1986	1990
Order production	258(42 4)	327(45 4)	112(26 9)
Mixture of the other two	—	—	167(40 0)
Market production	314(51 6)	371(51 5)	139(33 3)
Others	30(4 9)	19(2 6)	2(0 5)
Total	602(99 0)	717(99 6)	420(100 7)
Not filled in	6(1 0)	3(0 4)	0
Total respondents	608(100 0)	720(100 0)	417(100 0)

Note: See the note of Table-8 for the source of the data in 1981 and 1986.

Table-10 Average proportionate ratio of annual sales by the years elapsed since the products sold (Q 9)

Year	1986	1990
Less than 3 years	21.0%	25.7%
3~less than 6 years	20.8	17.7
6 years and more	58.2	45.6
Not filled in	—	92(22.1)
Total respondents	720(100.0)	417(100.0)

Note: See the note of Table-8 for the source of the data in 1986

production style. They also have tried to develop new models or new products in order to meet customers' requirements more promptly in the market.

Adapting to the changing market in this way would make it necessary partly, for each manufacturer to change its production style, converting from manufacturing products repeatedly in a larger lot-size, to making them in a smaller lot-size with more ability to switch their facilities more often from one model to another. The larger variety of products they have, the smaller quantity of each model in a smaller lot-size they would have to make in reply to their market.

The trends in quantities and production lot-sizes are shown in Tables-11 and 12. According to these tables, during the 1980's, bulks of quantities and lot-sizes don't appear to have proceeded straight toward minimization as a whole, without

Table-11 Trends of quantities of products(Q 6)

Year	1981	1986	1990
Small quantities	234(38.5)	312(43.3)	165(39.6)
Medium quantities	205(33.7)	166(23.1)	136(32.6)
Large quantities	134(22.0)	217(30.1)	133(31.9)
Others	20(3.3)	19(2.6)	6(1.4)
Total	593(97.5)	714(99.2)	440(105.5)
Not filled in	15(2.5)	6(0.8)	2(0.5)
Total respondents	608(100.0)	720(100.0)	417(100.0)

Note: See the note of Table-8 for the source of the data in 1981 and 1986.

Table-12 Trends of production lot-size(Q 6)

Year	1981	1986	1990
Small-sized lot	415(68 3)	463(64 3)	259(62 1)
Single product	101(16 6)	150(20 8)	80(19 2)
Mixed flow	—	139(19 3)	67(16 1)
Small lot	314(51 6)	174(24 2)	127(30 5)
Medium lot	—	133(18 5)	114(27 3)
Large-sized lot	141(23 2)	106(14 7)	66(15 9)
Large lot	58(9 5)	56(7 8)	37(8 9)
Mass production	83(13 7)	50(6 9)	30(7 2)
Others	44(7 1)	11(1 5)	9(2 2)
Total	600(98 7)	713(99 0)	448(107 4)
Not filled in	8(1 3)	7(1 0)	4(1 0)
Total respondents	608(100 0)	720(100 0)	417(100 0)

Note: See the note of Table-8 for the source of the data in 1981 and 1986.

considering any possible different adaptations in different industries. In the first half of the 1980's, the trend toward smaller quantities and smaller lot-sizes were sufficiently clear in some companies, though some other companies produced in larger quantities during the same period. However, in the latter half of the 1980's, the trend toward smaller quantities and smaller lot-sizes appears to have reversed as a whole, as if the former overdoing had been reconsidered in many companies. Even though manufacturers were required to reconsider their diversification policies during that period, it seems that reconsideration has never occurred uniformly among them. They seem to have considered the balance between a good and a bad economy, accompanied by a minimization of quantities and lot-sizes of their output. In general, the trends toward subdivision of production by variety, quantities and lot-sized have arrived at a certain high level and adequate new balances appear to be groped for in many companies.

Tables-13-1 and 13-2 show the entire situation described before in a bird's eye view. Some patterns of production styles are indicated, based on three aspects of production, namely, variety, quantity, and lot-size of output. The patterns of production may be divided into four basic types and others: i.e a subdivided

Table-13-1 Trends in types of the subdivision of production(Q 6)

Basic types	Typical types	1986
Subdivided-product type	Large variety—small quantity—small-sized lot Single product Mixed flow Small lot	266(36.9) 88 56 122
	Small variety—small quantity—small-sized lot (Transformation) Single product Small lot	21(2.9) 18 3
Lot-size-divided type (Medium typeII)	Large variety—medium quantity—small-sized lot Single product Mixed flow Small lot	56(7.8) 8 26 22
	Medium variety—medium quantity—small-sized lot Single product Mixed flow Small lot	20(2.8) 3 9 8
	Large variety—large quantity—small-sized lot Single product Mixed flow Small lot	44(6.1) 9 29 6
Variety-divided type (Medium typeI)	Large variety—medium quantity—medium lot	49(6.8)
	Medium variety—medium quantity—medium lot	27(3.8)
Mass-product type	Small variety—large quantity—large-sized lot Large lot Mass production	58(8.1) 20 38
	Large variety—large quantity—large-sized lot (Transformation) Large lot Mass production	30(4.2) 23 7
Other types		149(20.7)
Not filled in		
Total respondents		720(100.0)

Note: The data in 1986 is quoted from Miura, Kazuo, Yoshiho Tanaka, and Shin-ichi Inoue. op cit : 15.

-product type, a lot-size-divided type, a variety-divided type and a mass-product type. These types were found from the survey by means of the following procedure: first, the particular set of a certain variety, certain quantity and certain lot-size that each company had in its manufacturing was ascertained; then, the

Table-13-2 Trends in types of the subdivision of production(Q 6)

Basic types	Typical types	1990	
Subdivided-product type	Large variety—small quantity—small-sized lot Single product Mixed flow Small lot	132(31.7) 36 23 85	141(33.8)
	Small variety—small quantity—small-sized lot (Transformation) Single product Small lot	10(2.4) 6 4	
Lot-size-divided type (Medium type II)	Large variety—medium quantity—small-sized lot Single product Mixed flow Small lot	45(10.8) 11 19 20	97(23.3)
	Medium variety—medium quantity—small-sized lot Single product Mixed flow Small lot	14(3.4) 6 4 4	
	Large variety—large quantity—small-sized lot Single product Mixed flow Small lot	43(10.3) 7 19 19	
Variety-divided type (Medium type I)	Large variety—medium quantity—medium lot	53(12.7)	74(17.7)
	Medium variety—medium quantity—medium lot	22(5.3)	
Mass-product type	Small variety—large quantity—large-sized lot Large lot Mass production	19(4.6) 6 13	53(12.7)
	Large variety—large quantity—large-sized lot (Transformation) Large lot Mass production	35(8.4) 26 10	
Other types			64(15.3)
Not filled in			20(4.8)
Total respondents			417(100.0)

numbers of companies with a same set of these aspects were accumulated and each set were ranked in the order of the number of companies; lastly, about 80% of the companies were picked up from the top in this order. These sets selected in this way were compiled as typical types in these tables. Further, they are grouped into four as basic types, as described before, where those typical patterns of production are classified, based on the similarity in the degree of subdivision of

387 Problems in Cost Management in Manufacturing Companies in Japan —209—
production

In a mass-product type, a large quantity of each model in a small variety will be produced repeatedly by each manufacturer. This used to be the type which was traditional, or leading in the past, but is not the case nowadays. In this category, however, the type with a large variety of models is partly included, though each model is manufactured in large quantities and large sized-lots as well. Many production lines for a large variety of products are equipped in each plant. Despite this, since each product is made in a large quantity and a large lot-size, the degree of the subdivision of each production line is essentially comparable to the typical mass-product type. In a way, this may be called a transformation of the typical mass-product type.

On the contrary, in a subdivided-product type, each product in a large variety is made in a smaller quantity and lot-size. Therefore, the production operations tend to be needed to make products of a dissimilar and separate nature. In this category, the type with a small variety of models is partly included, while each model is made in a small quantity and a small-sized lot as well. In this type, each product needs more time and space to be produced because it will likely be highly precise or huge in its size. Here, a variety of products to be dealt with simultaneously may be sufficiently limited, but the operations will be required to be dissimilar. This would be better to be included as a sort of transformation in this category because of the similar degree of the subdivision of production.

The other two, i. e., a variety-divided type and a lot-size-divided type, will be positioned as medium types between those two extremes, as to the degree of the subdivision. In the variety-divided type, products will be made in a larger variety but fortunately in a medium-sized quantity and lot-size. On the other hand, in the lot-size-divided type, the lot-sizes will be further minimized due to the further progress of the variety, but fortunately still a large or medium quantity will be maintained.

In this situation as a whole, the more subdivided-product type and the similar ones can be said to be a leading composition at the present time. However, following a trend begun during the latter half of the 1980's, it seems, on one hand, that the share of the subdivided-product type has reduced, and on the other hand, the share of the medium types has increased, owing to the reconsideration of the subdivision policies, as indicated earlier. The trend of the subdivision of production seems to have plunged into a period of adjustment.

In summary, it would be certain, that the main stream of the production is not in the type where the same patterns of operations are repeated in each process. However, the subdivision of production primarily based on a wide variety of product specifications has been conducted prudently, not to go beyond the basis of profitability. This delicate adjustment appears to be being made in the new production system

(2) Manufacturing operations, being automated

It goes without saying that the effects on production operations should also be observed from the standpoint of the production skills, aside from the product market. In order to understand the basic technical aspects of the recent production skills, Table-14 was compiled.

One would agree that the proportionate ratio of basic types of production skills, such as assembly production, mechanical-procession production and chem-

Table-14 Trends of fundamental production skills(Q 6)

Year	1981	1986	1990
Assembly production	248(40.8)	306(42.5)	182(43.6)
Mechanical procession production	109(17.9)	173(24.0)	130(31.2)
Chemical procession production	161(26.5)	173(24.0)	85(20.4)
Others	75(12.3)	68(9.4)	32(7.7)
Total	593(97.5)	720(100.0)	429(102.9)
Not filled in	15(2.5)	0	10(2.4)
Total respondents	608(100.0)	720(100.0)	417(100.0)

Note: See the note of Table-8 for the source of the data in 1981 and 1986.

ical procession production, did not cange rapidly and drastically. However, we actually experienced a steady progress in technical production type change during this decade in the number of companies. The industrial structure of Japan is said to have laid its primary stress on production by mechanical forming and parts -assembling, rather than on chemical processing, as compared with other devel- oped countries. According to Table-14, this tendency apparently was promoted even further during this period. It can't be denied that, in general, there is a gradual shift toward an increasing number of companies forming materials and assembling parts physically, rather than processing materials chemically. A more careful survey, however, will be needed, in order to understand what this shift really means.

Connected with these changes of production skills, how were the automatic skills of production, which are said to be changing rapidly, actually introduced in each company? The situation of various skills can be seen on the right side of Table-15-2. In Table-15-1 and 15-2, the automatic facilities associated with production were divided into three rough classes ; i. e., stand-alone types of facil- ities, FMS (Flexible Manufacturing System), and CIM (Computer Integrated

Table-15-1 Forms of the state-of-the-art production skills(Q 8)

Year	1990		
	Assembly	Mechanical procession	Chemical procession
Fundamental production skills			
Standalones	175(96 2)	126(96 9)	82(96 5)
CAD, CAE, CAM	165(90 7)	70(53.8)	45(52 9)
Robot	128(70 3)	58(44.6)	23(27 1)
NC machine	143(78.6)	94(72.3)	51(60 0)
Other automatic manufacturing system	91(50.0)	75(57.7)	56(65 9)
Automatic conveyance, storage system	103(56.6)	64(49.2)	47(55.3)
Measurement, inspection, checking by a computer	109(59.9)	97(74.6)	66(77.6)
Others	2(1.1)	1(0.8)	1(1.2)
FMS	58(31.9)	21(16.2)	16(18.8)
CIM	25(13.7)	25(19.2)	15(17.6)
Others	3(1.6)	1(0.8)	1(1.2)
Not filled in	6(3.3)	3(2.3)	2(2.4)
Total respondents	182(100.0)	130(100.0)	85(100.0)

Table-15-2 Forms of the state-of-the-art production skills(Q 8)

Year	1990	
	Others	Total respondents
Fundamental production skills		
Standalones	32(100 0)	402(96 4)
CAD, CAE CAM	16(50 0)	282(67 6)
Robot	16(50 0)	216(51 8)
NC machine	21(65 6)	296(71 0)
Other automatic manufacturing system	23(71 9)	234(56 1)
Automatic conveyance, storage system	12(37 5)	213(51 1)
Measurement, inspection, checking by a computer	20(62 5)	279(66 9)
Others	1(3 1)	5(1 2)
FMS	3(9 4)	88(21 1)
CIM	8(25 0)	68(16 3)
Others	0	5(1 2)
Not filled in	0	13(3 1)
Total respondents	32(100.0)	417(100.0)

Manufacturing). A stand-alone is made use of as a single unit in the processes of each factory. FMS is a mechanical system, where stand-alones are connected by a computer and operated in cooperation with each other. CIM covers a broader area, where some departments, with manufacturing departments included as an inevitable part, are connected mutually more tightly by a computer network, and are intended to adjust different functions more automatically on a larger scale. As can be seen in Table-15-2, stand-alones are widely spread at 96% of the respondents. On the other hand, since FMS and CIM are employed in about 20% of the companies, there can be many companies which install equipment just as independent units in their production processes. The grappling with the automation of production using a computer has already extended to almost all kinds of industries, but it would be acceptable to say that this trend will likely continue on a fuller scale.

Table-15-1 and 15-2 will also show us comparative differences of the spreading rates of various equipments. CAD, CAE, CAM and robots were found more in assembly production than other procession production. On the contrary,

measurement, inspection and abnormality-checking by a computer were found more in these procession productions than in assembly production. NC machines were used more in mechanical forming and assembling than in chemical processing. However, there would be no clear-cut difference in the spreading ratios of total automatic equipment among those different industries, probably because the primarily necessary types of equipment will be diverse depending upon different industries.

There will be an increasing number of companies, where the operations will be conducted more systematically by connecting stand-alone types of equipment by means of a computer system such as in a cell, FMS, CIM etc.

(3) Diversification of products and automation of production

When production is realized, considering two aspects, i. e. the present requirements from the competitive product market and the present stage of production skills, as already shown, what sort of situation could be seen there? Table-16-1 and 16-2 suggest something to us.

According to these tables, stand-alone equipment prevails more than 94%, without regard to the degrees of the subdivision of production. Looking at the

Table-16-1 Usage of the state-of-the-art production skills(Q 6 & 8)

Year	1990		
	Subdivided-product type	Lot-size-divided type	Variety-divided type
Standalones	133(94 3)	97(100.0)	74(100.0)
CAD, CAE, CAM	102(72.3)	77(79.4)	46(62.2)
Robot	72(51.1)	67(69.1)	36(48.6)
NC machine	101(71.6)	72(74.2)	55(74.3)
Other automatic manufacturing system	59(41.8)	62(63.9)	51(68.9)
Automatic conveyance, storage system	65(46.1)	61(62.9)	41(55.4)
Measurement, inspection, checking by a computer	82(58.2)	77(79.4)	52(70.2)
Others	3(2.1)	0	0
FMS	30(21.3)	34(35.1)	15(20.3)
CIM	21(14.9)	22(22.7)	10(13.5)
Others	4(2.8)	0	0
Not filled in	6(4.3)	0	0
Total respondents	141(100.0)	97(100.0)	74(100.0)

Table-16-2 Usage of the state-of-the-art production skills(Q 6 & 8)

Year	1990	
	Mass-product type	Total Respondents
Basic types of subdivision		
Standalones	53(100.0)	402(96.4)
CAD, CAE, CAM	28(52.8)	282(67.6)
Robot	27(50.9)	216(51.8)
NC machine	38(71.7)	296(71.0)
Other automatic manufacturing system	41(77.4)	234(56.1)
Automatic conveyance, storage system	33(62.3)	213(51.1)
Measurement, inspection, checking by a computer	47(88.7)	279(66.9)
Others	1(1.9)	5(1.2)
FMS	10(18.9)	88(21.1)
CIM	11(20.8)	68(16.3)
Others	0	5(1.2)
Not filled in	0	13(3.1)
Total respondents	53(100.0)	417(100.0)

spreading ratios by different equipment, NC machines seem to be used at a high level regardless of the degrees of the subdivision. Other equipment apparently prevails differently, depending on different types of the subdivision. However, no clear tendency was found that indicate that the more subdivided the production is, the more or the less automatic equipment is used. This suggests that the introduction of automatic equipment was motivated not only by the necessity of the subdivision of production, but also by some other influential factors. Since, in my belief, the subdivided production and automation are not positively contradictory, the correlation of these factors, which could rather have been stimulated by each other, might have been offset by some other factors. Even according to the spreading ratios of FMS and CIM, which are supposed to use automatic equipment on a fuller scale, the correlation between these equipment and the degrees of the subdivision is not clear. In short, the automation of production has been promoted not only in relation to the subdivision but also in relation to some others.

Then, one would like to know how and what aspects of the operations have been actually improved by using these production skills? Table-17 shows the

Table-17 Improvements of production operations during the past 5 years(Q 7)

Aspects of operations to be improved	Steadily larger	On a stable level	Steadily smaller	No steady trend	Not filled in	Total respondents
[Installation of production lines]						
Number of large kinds of products	105 (25.2)	305 (73.1)	1 (0.2)	4 (1.0)	2 (0.5)	417 (100.0)
Number of production lines	172 (41.2)	213 (51.1)	12 (2.9)	15 (3.6)	5 (1.2)	417 (100.0)
[Location of equipment & workers]						
Traveling distance of works within a plant	5 (1.2)	268 (64.3)	106 (25.4)	29 (7.0)	9 (2.2)	417 (100.0)
Number of machines & processes which each worker is in charge of	140 (33.6)	225 (54.0)	39 (9.4)	7 (1.7)	6 (1.4)	417 (100.0)
Number of direct workers	75 (18.0)	180 (43.2)	148 (35.5)	9 (2.2)	5 (1.2)	417 (100.0)
[Smooth setting-up]						
Number of small kinds of main products	208 (49.9)	185 (44.4)	3 (0.7)	18 (4.3)	3 (0.7)	417 (100.0)
Set-up time of main equipment	13 (3.1)	219 (52.5)	164 (39.3)	13 (3.1)	8 (1.9)	417 (100.0)
Lot-size of main products	30 (7.2)	262 (62.8)	85 (20.4)	34 (8.2)	6 (1.4)	417 (100.0)
[To simplify & optimize operations]						
Number of processes or manufacturing steps	70 (16.8)	294 (70.5)	31 (7.4)	17 (4.1)	5 (1.2)	417 (100.0)
Number of tools & instruments	169 (40.5)	212 (50.8)	7 (1.7)	19 (4.6)	10 (2.4)	417 (100.0)
Number of kinds of materials, purchased parts & work-in-process	175 (42.0)	212 (50.8)	6 (1.4)	22 (5.3)	2 (0.5)	417 (100.0)
Inventory of materials	52 (12.5)	251 (60.2)	86 (20.6)	26 (6.2)	2 (0.5)	417 (100.0)
[Smooth flow of operations]						
Waiting time of work-in-process (for next process or finishing lot)	9 (2.2)	207 (49.6)	166 (39.8)	24 (5.8)	11 (2.6)	417 (100.0)
Breakdown ratio of main equipment	10 (2.4)	194 (46.5)	168 (40.3)	38 (9.1)	7 (1.7)	417 (100.0)
Waiting time of workers & machines	10 (2.4)	195 (46.8)	173 (41.5)	29 (7.0)	10 (2.4)	417 (100.0)
Ratio of reject works vs complete works	5 (1.2)	180 (43.2)	199 (47.7)	26 (6.2)	7 (1.7)	417 (100.0)
Inventory of work-in-process	78 (18.7)	226 (54.2)	84 (20.1)	27 (6.5)	2 (0.5)	417 (100.0)
[To avoid a risk/product inventory]						
Throughput time of main products	12 (2.9)	255 (61.2)	128 (30.7)	20 (4.8)	2 (0.5)	417 (100.0)
Inventory of products	66 (15.8)	236 (56.6)	77 (18.5)	31 (7.4)	7 (1.7)	417 (100.0)

trends of improvement observed during the past 5 years. If some improvement had been made, it seems clear that they are consciously aimed at a certain purpose or purposes; therefore, in many cases, the trends of improvement in each aspect, are regular, or at least not obscure in their directions. In order to ascertain the

real trends in general, Table-17 will be helpful.

First, regarding the trend of the installation of production lines, as high as 41% of the companies have responded that production lines increased steadily during the past 5 years, probably due to the trends toward the increasing number of kinds of products by both large and small classifications. By the impression received from this situation, production lines seem to have been installed, in order to adjust themselves to the requirement not only to produce more kinds of functionally different products, but also even more to diversify similar products.

In regard to the optimal location of various equipment or workers, many companies seem to have considered to reduce traveling distances of various works-in-process in their plants, and to extend the number of machines or processes which each worker was supposed to be in charge of in his/her workshop. Despite the fact of increasing production lines and kinds of products, the number of direct workers seems to have been decreased in general by the efforts toward optimization. Since total employees of each company is said to have been unchanged in general, sales personnel, indirect workers or managing staff might have been likely to grow.

Concerning the aspect of setting up machines and equipment smoothly, the necessary number of times to set them up must have been increased, in order to switch the production of various models, more frequently and quickly in a small lot-size. According to the data, as many as 40% of companies have succeeded in reducing the set-up time in reply to this.

In regard to the aspect of simplifying and optimizing various operations on a shop floor, more than 40% of the respondents have never escaped in spite of their effort from increasing the number of tools and instruments and the number of kinds of materials, purchased parts, and work-in process. Furthermore, some companies have added to the number of processes and/or manufacturing steps, though these situations must have stimulated the manufacturing operations to get

more complicated and minute. The reduction of the inventory of materials seem to have borne good fruit to some extent, probably owing to the severe adjustments with many suppliers on the date of purchasing delivery.

Regarding the aspect of the smooth procession of operations, more than 40% apparently achieved sufficient success in taking necessary measures for the reduction of waiting time. The waiting time of each work-in-process on a shop floor usually arises owing to the finishing of one lot of work-in-process in each process and the frequent breakdowns of machines and equipment. Conversely, the waiting time of workers and machines rises due to the delay of work-in process by slow operations and inferior goods. Though this smooth flow of works and operations to be achieved seems to have been one of the main topics and must have encouraged the reduction of inventories, the decreasing and increasing trends of the inventory have been in fact competing with each other. It seems that the more grappling is needed to reduce inventories more aggressively.

Finally, regarding the aspect of evading the risk of the inventory of final products, the reduction of throughput time appears to have succeeded to some extent. In fact, almost all the aspects described before could have contributed to realize the reduction of throughput time as a final result. In spite of these efforts, the reduction of the inventory of completed products does not seem to have been as simple as generally expected. Because of the diversification of products, the greater uncertainty of product markets, etc., the fruit from the reduction of throughput time might have been likely to be offset during this period.

In this way, the recent improvements of production operations apparently have attained the diversification of products and production lines and more variety and minuteness of operations, on one hand; and they have suppressed the disturbing factors on the other hand, by taking measures for optimizing the layout of equipment and workers, making set-ups and operation processions smoother, simplifying operations and evading the risk of inventories. It would be acceptable

to say that various automatic production equipment, as described before, may have been introduced as part of these efforts. Automatic machines must have been introduced to stimulate smooth operations flow and also to reduce direct labor which people want to evade. In spite of these, in general, the reduction of inventories of materials, work-in-process and final products, which have usually been regarded as evidence of many troubles in the work flow, may not have been sufficiently attained. Will it be allowed to say that the ideal of the non-stock production industry have never come to the surface yet in general?

(4) Effects on the structure of manufacturing cost

How is this situation of production operations reflected on the phase of the structure of manufacturing cost?

According to Tables-18~20, the average ratio of each cost factor toward manufacturing cost is as follows, i.e., the ratios of direct material cost, direct labor cost and overhead manufacturing cost were 62%, 14% and 24% respectively.

The trends of these ratios are shown in Tables-21 and 24. However, the 1990 data of Table-21 is not necessarily be compared directly with other years because of the defective survey, where direct manufacturing expenses, i.e. direct manufacturing cost except direct material cost and direct labor cost (which includes the

Table-18 Ratio of direct material cost vs manufacturing cost(Q 10)

Year	1990
81~100%	36(8.6)
61~ 80 "	165(39.6)
41~ 60 "	116(27.8)
21~ 40 "	31(7.4)
20% and less	6(1.4)
Not filled in	63(15.1)
Total	417(100.0)
Average of respondents	62.1%
Maximum	96.0 "
Minimum	15.0 "

Table-19 Ratio of direct labor cost vs manufacturing cost(Q 10)

Year	1990
81~100%	0
61~ 80 "	0
41~ 60 "	1(0.2)
21~ 40 "	54(12.9)
20% and less	291(69.8)
Not filled in	71(17.0)
Total	417(100.0)
Average of respondents	14.0%
Maximum	41.0 "
Minimum	1.0 "

Table-20 Ratio of overhead manufacturing cost vs. manufacturing cost(Q 10)

Year	1990
81~100%	0
61~ 80 "	6(1 4)
41~ 60 "	27(6 5)
21~ 40 "	143(34 3)
20% and less	174(41 7)
Not filled in	67(16 1)
Total	417(100. 0)
Average of respondents	23.9%
Maximum	80.0%
Minimum	3.0%

Table-21 Trends of ratio toward manufacturing cost(Q 10)

Year	1981	1986	1990
Direct material cost	59.2%	57.1%	62.1%
Processing expenses arising from outside manufacture	8.3	8.5	—
Direct labor cost	12.1	11.9	14.0
Overhead manufacturing cost	20.4	22.5	23.9
Manufacturing cost	100.0%	100.0%	100.0%

Note: The data in 1981 is quoted from Inoue, Shin-ichi "Some Aspects on Production Method and Cost Management : A Survey of Manufacturing Companies Listed on the Tokyo Stock Exchange." Development of Modern Accounting Ed Kagawa University Accounting Group Takamatsu: Kagawa University, 1983: 311

The data in 1986 is owing to the reference to Miura, Kazuo, Yoshiho Tanaka, and Shin-ichi Inoue op cit. : 29-31.

processing expenses arising from outside manufacture) was vaguely defined. Despite this, since the unknown ratio of the processing expenses arising from outside manufacture in 1990 seems to correspond approximately to that of other years, if all the data are compared, this can be interpreted as almost the same as other years. Following this step, it can be said that the ratio of direct material cost has been consistently reduced, and that the ratio of manufacturing overhead cost is likely to have been increased. This situation corresponds to that underlying the data of Table-24, where the trend of cost ratios during the past 5 years

were requested of the respondents. The ratio of direct labor cost has swayed, probably because of the delicate involvement of the reduction of direct workers and the higher wage level. More surveys are needed to obtain an exact understanding.

According to Tables-22 and 23, the average ratios of variable and fixed manufacturing costs were 70% and 30% respectively. Looking at the trends of the past 5 years in Table-24, it is observed that the recent improvements of operations are likely accompanied by the reduction of the ratio of variable manufacturing cost and the rising shift of the ratio of fixed manufacturing cost.

Table-22 Ratio of variable manufacturing cost vs manufacturing cost(Q 10)

Year	1990
81~100%	85(20 4)
61~ 80 "	179(42 9)
41~ 60 "	60(14 4)
21~ 40 "	14(3 4)
20% and less	4(1 0)
Not filled in	75(18 0)
Total	417(100 0)
Average of respondents	70.4%
Maximum	97.0"
Minimum	10.0"

Table-23 Ratio of fixed manufacturing cost vs manufacturing cost(Q 10)

Year	1990
81~100%	3(0 7)
61~ 80 "	9(2 2)
41~ 60 "	48(11 5)
21~ 40 "	165(39 6)
20% and less	117(28 1)
Not filled in	75(18 0)
Total	417(100 0)
Average of respondents	29.5%
Maximum	90.0"
Minimum	3.0"

Table-24 Trend of ratio toward manufacturing cost during the past 5 years(Q 10)

Cost factors	Steadily increased	On a stable level	Steadily decreased	No steady trend	Not filled in	Total respondents
Direct material cost	53 (12.7)	205 (49.2)	63 (15.1)	51 (12.2)	45 (10.8)	417 (100.0)
Direct labor cost	84 (20.1)	199 (47.7)	68 (16.3)	17 (4.1)	49 (11.8)	417 (100.0)
Overhead manufacturing cost	88 (21.1)	216 (51.8)	42 (10.1)	22 (5.3)	49 (11.8)	417 (100.0)
Variable manufacturing cost	53 (12.7)	201 (48.2)	57 (13.7)	41 (9.8)	65 (15.6)	417 (100.0)
Fixed manufacturing cost	81 (19.4)	214 (51.3)	42 (10.1)	16 (3.8)	64 (15.3)	417 (100.0)

This shift may be said to essentially correspond to the trend of the ratios of direct material cost and overhead manufacturing cost.

As for the problem of cost management, this situation suggests the background, where the management of overhead cost and fixed cost are substantially more and more stressed.

5. Kinds of cost accounting and details of cost information

In this chapter, it is hoped to see in what forms and in what detail the recent cost accounting practices have offered cost information for management use.

(1) Practicing forms of cost accounting and product costing methods

The fundamental forms of today's cost accounting are shown in Table-25. There are exceptionally few companies which don't use any systematic cost accounting. There were also just a few companies which only develop isolated cost accounting systems for their own internal use, where any input and output data are not exchanged as a rule with their bookkeeping systems. In terms of the practicing forms of cost accounting, about one-third of the total respondents are developing both cost accounting systems which have close input-output connections with their bookkeeping systems, and also isolated cost accounting systems for their own management use. The rest, or about two-thirds of the respondents takes use of cost accounting systems which are only developed as constituent parts

Table-25 Practicing forms of cost accounting(Q 3)

Year	1990
Practicing both inside & outside of accounting system	139(33.3)
Practicing only inside of accounting system	266(63.8)
Practicing only outside of accounting system	8(1.9)
Under consideration at present	0
Not filled in	4(1.0)
Total	417(100.0)

of their connected accounting systems. In these companies, their cost accounting systems seem to have served both for making their financial statements and for their management usage.

Further details of the forms of cost accounting practiced are shown in Tables -26 and 27. According to these data where the multiple answers are permitted, actual costing (80%) prevails more than standard costing (63%) and absorption costing (85%) prevails more than direct costing (53%), without regard to different practicing forms. In short, the leading group is composed of these traditional actual costing and absorption costing even at present. Today's situation will be said to be derived from the fact that many cost accountings are limited to the form where a cost accounting is developed as a part of a connected accounting system. Greater difference is also seen between absorption costing and direct costing than between actual costing and standard costing.

Table-26 Practicing forms of cost accounting and their methods-1(Q 3)

Year		1990		
Cost accounting methods Practicing forms		Actual costing	Standard costing	Total respondents
Practicing inside of accounting system	Practicing companywide inside of accounting system	286(68.6)	186(44.6)	388(93.0)
	Practicing partly inside of accounting system	39(9.4)	43(10.3)	73(17.5)
Practicing inside of accounting system		314(75.3)	226(54.2)	405(97.1)
Practicing outside of accounting system	Practicing companywide outside of accounting system	39(9.4)	49(11.8)	76(18.2)
	Practicing partly outside of accounting system	55(13.2)	47(11.3)	83(19.9)
Practicing outside of accounting system		89(21.3)	91(21.8)	147(35.3)
Practicing		335(80.3)	263(63.1)	413(99.0)
Not practicing		0	6(1.4)	0
Not filled in		82(19.7)	148(35.5)	4(1.0)
Total respondents		417(100.0)	417(100.0)	417(100.0)

Table-27 Practicing forms of cost accounting and their methods—2(Q 3)

Year	1990		
	Absorption costing	Direct costing	Total respondents
Practicing forms			
Cost accounting methods			
Practicing companywide inside of accounting system	329(78.9)	103(24.7)	388(93.0)
Practicing partly inside of accounting system	58(13.9)	24(5.8)	73(17.5)
Practicing inside of accounting system	343(82.3)	120(28.8)	405(97.1)
Practicing companywide outside of accounting system	34(8.2)	50(12.0)	76(18.2)
Practicing partly outside of accounting system	20(4.8)	72(17.3)	83(19.9)
Practicing outside of accounting system	53(12.7)	118(28.3)	147(35.3)
Practicing	354(84.9)	222(53.2)	413(99.0)
Not practicing	1(0.2)	5(1.2)	0
Not filled in	62(14.9)	190(45.6)	4(1.0)
Total respondents	417(100.0)	417(100.0)	417(100.0)

Regarding standard costing and direct costing, these trends that arose during the past 30 years are shown in Tables-28-1~3 and 29-1-3. According to the former data, standard costing became widespread as follows. The majority of the companies have consistently developed their standard cost accountings especially on a companywide basis, as a constituent part of a connected accounting system. Further, this trend apparently still holds at present.

On the other hand, direct costing seems to have spread, following the fact that the majority of the companies have developed as isolated systems for their own diverse management use. And this situation appears to have been present even in the 1980's. However, in this period, direct costing, which had developed mainly as an isolated cost accounting system up to that time, is most likely to tend to recede from its spreading ratios in the former period.

Despite this, these two cost accounting methods seem to have gradually

Table-28-1 Trends of practicing forms of standard costing

Practicing forms	Year	1959	1960	1961	1962	1963
Practicing companywide inside of accounting system		—	—	—	48 (14.3)	59 (14.4)
Practicing partly inside of accounting system		—	—	—	32 (9.5)	49 (12.0)
Practicing inside of accounting system		45 (24.7)	47 (29.4)	52 (22.4)	80 (23.8)	108 (26.3)
Practicing companywide outside of accounting system		—	—	—	22 (6.5)	30 (7.3)
Practicing partly outside of accounting system		—	—	—	30 (8.9)	66 (16.1)
Practicing outside of accounting system		26 (14.3)	50 (31.3)	64 (27.6)	52 (15.5)	96 (23.4)
Practicing		71 (39.0)	97 (60.6)	116 (50.0)	132 (39.3)	204 (49.8)
Not practicing		100 (54.9)	56 (35.0)	113 (48.7)	180 (53.6)	174 (42.4)
Not filled in		11 (6.0)	7 (4.4)	3 (1.3)	24 (7.1)	32 (7.8)
Total		182 (100.0)	160 (100.0)	232 (100.0)	336 (100.0)	410 (100.0)
Total respondents		"	"	"	"	"

Note: The data in 1959~1986 is quoted from Tanaka, Yoshiho "The Situation and Trends of Cost Accounting in Japan(1): Based on the Survey in 1986" The Kagawa University Economic Review 61 1(1988): 23, 24

spread on a fuller scale, exhibiting a trend toward an increasing number of companies which have made their companywide cost accounting systems richer as a part of an overall accounting system. Through this progress, as Tables-30-1 and 30-2 indicate, actual absorption costing and the total of the other costings compete nowadays with each other in terms of a companywide form connected with a bookkeeping system. The everlasting effect of financial accounting on cost accounting appears to have started to decline at long last, though cost accounting for the most part has been developed as an accounting system for the purpose of financial statements.

Table-28-2 Trends of practicing forms of standard costing

Practicing forms	Year	1964	1965	1966	1967	1968	1969
Practicing companywide inside of accounting system		44 (12 5)	57 (16.5)	74 (21.4)	84 (18.8)	66 (22.6)	85 (22.7)
	Practicing partly inside of accounting system	48 (13 6)	53 (15 3)	61 (17 7)	78 (17 5)	53 (18 2)	81 (21 6)
Practicing inside of accounting system		92 (26 1)	110 (31 8)	135 (39 1)	162 (36 3)	119 (40 8)	166 (44 3)
Practicing companywide outside of accounting system		20 (5 7)	24 (6 9)	22 (6 4)	30 (6 7)	18 (6 2)	25 (6 7)
	Practicing partly outside of accounting system	61 (17 3)	50 (14 5)	44 (12 8)	59 (13 2)	42 (14 4)	54 (14 4)
Practicing outside of accounting system		81 (22 9)	74 (21 4)	66 (19 1)	89 (20 0)	60 (20 5)	79 (21 1)
Practicing		173 (49 0)	184 (53 2)	201 (58 3)	251 (56 3)	179 (61 3)	245 (65 3)
Not practicing		162 (45 9)	139 (40 2)	135 (39 1)	173 (38 8)	105 (36 0)	120 (32 0)
Not filled in		18 (5 1)	23 (6 6)	9 (2 6)	22 (4 9)	10 (3 4)	14 (3 7)
Total		353 (100 0)	346 (100 0)	345 (100 0)	446 (100 0)	294 (100 7)	379 (101 1)
Total respondents		"	"	"	"	292 (100 0)	375 (100 0)

The present situation of cost accounting from the standpoint of product costing can be seen on the right side of Table-31-2. The shares of job order costing, process costing and the combined use of these two are about one-fourth, half and one-fourth of the total respectively. The progress to the present situation is shown in Tables-32-1~3. Methods of product costing show a trend of a slightly increasing share of job order costing since the 1960's, though this trend seems to have stopped in the latter half of the 1970's (disregarding the anomalous data in 1985). However, it must be stressed that the trend toward an increasing share of job order costing has been renewed since 1985. That may be a valid conclusion, as time-serial data is not enough, but it will be true that the trend toward the subdivision of production operations since the 1980's or earlier encour-

Table-28-3 Trends of practicing forms of standard costing

Practicing forms	Year	1970	1971	1974	1978	1986	1990
Practicing companywide inside of accounting system		73	87	56	41	264	186
		(23.1)	(26.2)	(25.2)	(28.1)	(36.7)	(44.6)
Practicing partly inside of accounting system		67	70	57	29	98	43
		(21.2)	(21.1)	(25.7)	(19.9)	(13.6)	(10.3)
Practicing inside of accounting system		140	157	113	70	362	226
		(44.3)	(47.3)	(50.9)	(47.9)	(50.3)	(54.2)
Practicing companywide outside of accounting system		19	24	19	7	63	49
		(6.0)	(7.2)	(8.6)	(4.8)	(8.8)	(11.8)
Practicing partly outside of accounting system		34	44	23	16	71	47
		(10.8)	(13.3)	(10.4)	(11.0)	(9.9)	(11.3)
Practicing outside of accounting system		53	68	42	23	134	91
		(16.8)	(20.5)	(18.9)	(15.8)	(18.6)	(21.8)
Practicing		193	225	155	93	496	263
		(61.1)	(67.8)	(69.8)	(63.7)	(68.9)	(63.1)
Not practicing		117	101	64	46	46	6
		(37.0)	(30.4)	(28.8)	(31.5)	(6.4)	(1.4)
Not filled in		11	11	3	8	178	148
		(3.5)	(3.3)	(1.4)	(5.5)	(24.7)	(35.5)
Total		321	337	222	147	720	479
		(101.6)	(101.5)	(100.0)	(100.7)	(100.0)	(114.9)
Total respondents		316	332	"	146	"	417
		(100.0)	(100.0)	"	(100.0)	"	(100.0)

aged the change of cost accounting methods since the latter half of the 1980's. As a matter of fact, the correlation between production costing methods and the subdivision of operations is shown in Tables-31-1 and 31-2. With these tables, the truth may be as a whole that the more subdivided the production is, the more subdivided the product costing. The recent trend toward the subdivision of operations may also have influenced product costing still more toward job order costing.

(2) The details of product costing

When a variety of products is divided in the process of doing costing, how are the products subdivided?, therefore, how precisely is a product cost report provided?

Table-29-1 Trends of practicing forms of direct costing

Practicing forms	Year	1959	1961	1962	1963	1964
Practicing companywide inside of accounting system		--	--	34 (10.1)	43 (10.5)	33 (9.3)
	Practicing partly inside of accounting system	--	--	16 (4.8)	21 (5.1)	20 (5.7)
Practicing inside of accounting system		32 (17.6)	32 (13.8)	50 (14.9)	64 (15.6)	53 (15.0)
Practicing companywide outside of accounting system		30 (16.5)	42 (18.1)	33 (9.8)	48 (11.7)	47 (13.3)
	Practicing partly outside of accounting system	43 (23.6)	48 (20.7)	79 (23.5)	105 (25.6)	112 (31.7)
Practicing outside of accounting system		73 (40.1)	90 (38.8)	112 (33.3)	153 (37.3)	159 (45.0)
Practicing		105 (57.7)	122 (52.6)	162 (48.2)	217 (52.9)	212 (60.1)
Not practicing		70 (38.5)	110 (47.4)	157 (46.7)	152 (37.1)	119 (33.7)
Not filled in		7 (3.8)	0	17 (5.1)	41 (10.0)	22 (6.2)
Total		182 (100.0)	232 (100.0)	336 (100.0)	410 (100.0)	353 (100.0)
Total respondents		"	"	"	"	"

Note: The data in 1959~1986 is quoted from Tanaka, Yoshiho. "The Situation and Trends of Cost Accounting in Japan(1): Based on the Survey in 1986." op. cit. : 28, 29.

Table-33 shows the number of kinds of products which are used in cost accounting when manufacturing costs are calculated for each product. The author would like reminded the reader that this data does not necessarily reflect the companywide situation because types of business organizations surveyed were different. The organizations surveyed are shown in Table-34. The number of kinds of products on a companywide scale would be larger than that of Table-33.

Even so, the average number of kinds of products is as many as 759 kinds, but this figure is not the typical situation. In Table-33, it will be seen that, because some companies (17.7%) deal with 201 kinds or more, even extraordinary 60,000

Table-29-2 Trends of practicing forms of direct costing

Practicing forms	Year	1965	1966	1967	1968	1969
Practicing companywide inside of accounting system		35 (10 1)	51 (14.8)	57 (12.8)	38 (13.0)	59 (15.7)
	Practicing partly inside of accounting system	18 (5 2)	33 (9 6)	35 (7 8)	21 (7 2)	31 (8 3)
Practicing inside of accounting system		53 (15 3)	84 (24 3)	92 (20 6)	59 (20 2)	90 (24 0)
Practicing companywide outside of accounting system		43 (12 4)	42 (12 2)	52 (11.7)	41 (14.0)	46 (12.3)
	Practicing partly outside of accounting system	116 (33 5)	116 (33 6)	132 (29 6)	91 (31.2)	116 (30.9)
Practicing outside of accounting system		159 (46 0)	158 (45 8)	184 (41 3)	132 (45 2)	162 (43 2)
Practicing		212 (61 3)	242 (70 1)	276 (61 9)	191 (65 4)	252 (67 2)
Not practicing		101 (29 2)	95 (27 5)	134 (30 0)	90 (30 8)	109 (29 1)
Not filled in		33 (9 5)	8 (2 3)	36 (8 1)	18 (6 2)	19 (5 1)
Total		346 (100 0)	345 (100 0)	446 (100 0)	299 (102.4)	380 (101.3)
Total respondents		"	"	"	292 (100 0)	375 (100 0)

kinds, the average number became much larger than the most frequent figure. Some companies didn't respond to this item, but, in general, more than 80% of the companies seem to calculate their product costs for 200 or fewer kinds, and most of them seem to have 40 or fewer kinds. It may be concluded that there was a wide range of varieties applied to cost accounting.

Then, what could this situation be, as compared to the number of kinds of products actually made each month? The number of kinds of products by both large and small classifications is shown on the right sides of Tables-35 and 36. Regarding the large classification, the companies has a wide range of 1~15,000 kinds. So, a variety of products were diverse, depending on each company's production method and its policy on product kinds. The average number is 71

Table-29-3 Trends of practicing forms of direct costing

Practicing forms	Year	1970	1971	1974	1978	1986	1990
Practicing companywide inside of accounting system		48	55	28	22	163	103
		(15.2)	(16.6)	(12.6)	(15.1)	(22.6)	(24.7)
Practicing partly inside of accounting system		35	32	20	14	45	24
		(11.1)	(9.6)	(9.0)	(9.6)	(6.3)	(5.8)
Practicing inside of accounting system		83	87	48	36	208	120
		(26.3)	(26.2)	(21.6)	(24.7)	(28.9)	(28.8)
Practicing companywide outside of accounting system		28	41	27	16	85	50
		(8.9)	(12.3)	(12.2)	(11.0)	(11.8)	(12.0)
Practicing partly outside of accounting system		107	107	80	48	133	72
		(33.9)	(32.2)	(36.0)	(32.9)	(18.5)	(17.3)
Practicing outside of accounting system		135	148	107	64	218	118
		(42.7)	(44.6)	(48.2)	(43.8)	(30.3)	(28.3)
Practicing		218	235	155	100	426	222
		(69.0)	(70.8)	(69.8)	(68.5)	(59.2)	(53.2)
Not practicing		85	77	52	41	58	5
		(26.9)	(23.2)	(23.4)	(28.1)	(8.1)	(1.2)
Not filled in		20	20	15	9	236	190
		(6.3)	(6.0)	(6.8)	(6.2)	(32.8)	(45.6)
Total		323	332	222	150	720	444
		(102.2)	(100.0)	(100.0)	(102.7)	(100.0)	(106.5)
Total respondents		316	"	"	146	"	417
		(100.0)			(100.0)		(100.0)

Table-30-1 Practicing forms of cost accounting(Q 3)

Methods of costing	1990			
	Absorption costing		Direct costing	
	Actual costing	Standard costing	Actual costing	Standard costing
Practicing forms				
Practicing companywide inside of accounting system	243(58.3)	151(36.2)	71(17.0)	55(13.2)
Practicing partly inside of accounting system	29(7.0)	36(8.6)	17(4.1)	12(2.9)
Practicing companywide outside of accounting system	17(4.1)	21(5.0)	24(5.8)	33(7.9)
Practicing partly outside of accounting system	10(2.4)	12(2.9)	50(12.0)	38(9.1)
Total	299(71.7)	220(52.8)	162(38.8)	138(33.1)
Under consideration at present	2(0.5)	12(2.9)	10(2.4)	16(3.8)
Not filled in	134(32.1)	198(47.5)	252(60.4)	271(65.0)
	62(14.9)		180(43.2)	
Total respondents	417(100.0)			

Table-30-2 Practicing forms of cost accounting(Q 3)

Year	1990	
	Total	Total respondents
Methods of costing		
Practicing forms		
Practicing companywide inside of accounting system	520(124 7)	388(93 0)
Practicing partly inside of accounting system	94(22 5)	73(17 5)
Practicing companywide outside of accounting system	95(22 8)	76(18 2)
Practicing partly outside of accounting system	110(26 4)	83(19 9)
Total	819(196 4)	
Under consideration at present		0
Not filled in		4(1 0)
Total respondents	417(100. 0)	

Table-31-1 Methods of cost accounting(Q 2 & 6)

Year	1990		
	Subdivided-product type	Lot-size-divided type	Variety-divided type
Basic types of the subdivision			
Product costing methods			
Job order costing	61(43 3)	25(25 8)	11(14 9)
Combined use of process costing & job order costing	43(30 5)	38(39 2)	17(23 0)
Process costing	65(46 1)	56(57 7)	45(60 8)
Lot cost system	49(34 8)	46(47 4)	37(50 0)
Class costing, co-product costing	9(6 4)	6(6 2)	7(9 5)
Simple process costing	16(11 3)	12(12 4)	5(6 8)
Others	4(2 8)	1(1 0)	8(10 8)
Total	173(122 7)	120(123 7)	81(109 5)
Not filled in	0	0	0
Total respondents	141(100 0)	97(100 0)	74(100 0)

kinds and 80% of the respondents produced 20 or fewer kinds. Following the small classification as shown in Table-36, the average is 3,785 kinds, and 80% of the respondents produce approximately 1,300 or fewer kinds.

In addition to this, in order to take a look at the number of average small

Table-31-2 Methods of cost accounting(Q 2 & 6)

Year	1990		
	Basic types of the subdivision	Mass-product type	Total Respondents
Product costing methods			
Job order costing		10(18 9)	113(27 1)
Combined use of process costing & job order costing	14(26 4)		117(28 1)
Process costing	33(62 3)		227(54 4)
Lot cost system	19(35 8)		161(38 6)
Class costing, co-product costing	10(18 9)		37(8 9)
Simple process costing	14(26 4)		58(13 9)
Others	6(11 3)		26(6 2)
Total		63(118.9)	483(115.8)
Not filled in		0	0
Total respondents		53(100.0)	417(100.0)

Table-32-1 Methods of cost accounting applied to main products

Year	1959	1960	1963	1964	1965
Job order costing	26 (14.3)	22 (13.7)	66 (16.1)	73 (20.7)	71 (20.5)
Combined use of process costing & job order costing	25 (13.7)	25 (15.7)	83 (20.2)	67 (19.0)	67 (19.4)
Process costing	130 (71.4)	113 (70.6)	254 (62.0)	204 (57.8)	196 (56.6)
Lot cost system	—	—	—	—	—
Class costing, co-product costing	—	—	—	—	—
Simple process costing	—	—	—	—	—
Others	—	—	—	—	—
Not filled in	1 (0.6)	—	7 (1.7)	9 (2.5)	12 (3.5)
Total	182 (100.0)	160 (100.0)	410 (100.0)	353 (100.0)	346 (100.0)
Total respondents	"	"	"	"	"

Note: The data in 1959~1986 is quoted from Ianaka, Yoshiho "The Situation and Trends of Cost Accounting in Japan(3): Based on the Survey in 1986." The Kagawa University Economics Review 61 3(1988): 23, 24. In the surveys of 1960, 1964 and 1990, companies were requested to respond about the general condition of methods of cost accounting without regard to main products

Table-32-2 Methods of cost accounting applied to main products

Year	1966	1967	1968	1969	1970	1971
Job order costing	65 (18.8)	80 (17.9)	53 (18.2)	63 (16.8)	67 (21.2)	74 (22.3)
Combined use of process costing & job order costing	77 (22.3)	105 (23.6)	80 (27.4)	89 (23.7)	73 (23.1)	69 (20.8)
Process costing	192 (55.7)	252 (56.5)	157 (53.8)	217 (57.9)	169 (53.5)	182 (54.8)
Lot cost system	-	-	-	-	-	-
Class costing, co-product costing	-	-	-	-	-	-
Simple process costing	-	-	-	-	-	-
Others	-	-	-	-	-	-
Not filled in	11 (3.2)	9 (2.0)	2 (0.6)	6 (1.6)	7 (2.2)	7 (2.1)
Total	345 (100.0)	446 (100.0)	292 (100.0)	375 (100.0)	316 (100.0)	332 (100.0)
Total respondents	"	"	"	"	"	"

Table-32-3 Methods of cost accounting applied to main products

Year	1974	1978	1982	1985	1986	1990
Job order costing	51 (23.0)	51 (34.9)	142 (23.4)	48 (17.3)	151 (21.0)	113 (27.1)
Combined use of process & job order costing	62 (27.9)	-	85 (14.0)	47 (17.0)	122 (16.9)	117 (28.1)
Process costing	107 (48.2)	96 (65.8)	355 (58.4)	192 (69.3)	397 (55.1)	227 (54.4)
Lot cost system	-	-	261 (42.9)	109 (39.4)	256 (35.6)	161 (38.6)
Class costing, co-product costing	-	-	18 (3.0)	34 (12.3)	50 (6.9)	37 (8.9)
Simple process costing	-	-	76 (12.5)	49 (17.7)	91 (12.6)	58 (13.9)
Others	-	9 (6.2)	-	8 (2.9)	29 (4.0)	26 (6.2)
Not filled in	2 (0.9)	0	26 (4.3)	-	21 (2.9)	0
Total	222 (100.0)	156 (106.8)	608 (100.0)	295 (106.5)	720 (100.0)	483 (115.8)
Total respondents	"	146 (100.0)	"	277 (100.0)	"	417 (100.0)

Table-33 Variety of products used in cost accounting(Q 12)

Year	1990
201 kinds and more	74(17.7)
181~200 kinds	14(3.4)
161~180 "	3(0.7)
141~160 "	5(1.2)
121~140 "	6(1.4)
101~120 "	3(0.7)
81~100 "	11(2.6)
61~ 80 "	13(3.1)
41~ 60 "	23(5.5)
21~ 40 "	49(11.8)
11~ 20 "	46(11.0)
1~ 10 "	112(26.9)
Not filled in	58(13.9)
Total	417(100.0)
Average of respondents	759 kinds
Maximum	60,000 "
Minimum	1 "

Table-34 Business organization surveyed(Q 4)

Year	1990
Company on the whole	267(64.0)
Business unit with plural factories	78(18.7)
Single factory	69(16.5)
Others	2(0.5)
Not filled in	1(0.2)
Total	417(100.0)

kinds per each large kind, Table-37 was compiled. According to the data on the right side, 80% of the respondents had less than 200 kinds per each large kind, and most of them offered the width of product-choice within 60 kinds.

These situations might not be exact due to the vague definition of classifications of products. However, if it is true that about 80% of the respondents produced less than 20 large kinds and less than 1,300 small kinds, and also about 80% of the cost accountings classified less than 200 kinds of products in their product costing, then many cost accountings seem to have established the product-groups which were composed of some similar kinds of small classification, in order to calculate product costs. If so, since every product cost is not necessarily calculated precisely, the diversification of products and the product-kinds in cost accounting will not necessarily have correlate so closely. However, the special classification of products seems to be applied to cost accounting, different from the real variety of products on a shop floor.

For reference, Tables-35~37 show the correlation of the number of kinds of

Table-35 Variety of products dealt with during each month
(large classification)(Q 5)

Year	1990					
	Variety of products Number of large kinds	Large variety	Medium variety	Small variety	Other	Total respondents
101 kinds and more		20(7 0)	2(3 4)	0	0	22(5 3)
81~100 kinds		3(1 0)	1(1 7)	0	0	4(1 0)
61~ 80 "		2(0 7)	3(5 2)	0	0	5(1 2)
41~ 60 "		10(3 5)	1(1 7)	0	0	11(2 6)
21~ 40 "		22(7 7)	5(8 6)	2(3 8)	1(50 0)	30(7 2)
16~ 20 "		18(6 3)	3(5 2)	1(1 9)	0	22(5 3)
11~ 15 "		20(7 0)	4(6 9)	5(9 4)	0	27(6 5)
6~ 10 "		76(26 6)	10(17 2)	9(17 0)	0	94(22 5)
1~ 5 "		115(40 2)	29(50 0)	35(66 0)	1(50 0)	180(43 2)
Not filled in		20	0	1	0	22(5 3)
Total		306(100.0)	58(100.0)	53(100.0)	2(100.0)	417(100.0)
Average of respondents		86 kinds	52 kinds	6 kinds	16 kinds	71 kinds
Maximum		15,000 "	2,000 "	25 "	30 "	15,000 "
Minimum		1 "	1 "	1 "	2 "	1 "

Table-36 Variety of products dealt with during each month
(small classification)(Q 5)

Year	1990					
	Variety of products Number of small kinds	Large variety	Medium variety	Small variety	Other	Total respondents
1,201 kinds and more		87(28.4)	6(10 3)	2(3 8)	0	92(22 1)
1,001~1,200 kinds		3(1 0)	0	0	0	3(0 7)
801~ 1,000 "		10(3 3)	1(1 7)	0	0	11(2 6)
601~ 800 "		8(2 6)	4(6 9)	0	0	12(2 9)
401~ 600 "		20(6 5)	2(3 4)	1(1 9)	0	23(5 5)
201~ 400 "		17(5 6)	7(12 1)	0	0	24(5 8)
151~ 200 "		11(3 6)	3(5 2)	1(1 9)	0	15(3 6)
101~ 150 "		13(4 2)	3(5 2)	1(1 9)	1(50 0)	18(4 3)
51~ 100 "		32(10 5)	7(12 1)	5(9 4)	0	44(10 6)
1~ 50 "		73(23.9)	21(36.2)	39(73.6)	1(50 0)	134(32 1)
Not filled in		32(10 5)	4(6 9)	4(7 5)	0	41(9 8)
Total		306(100.0)	58(100.0)	53(100.0)	2(100.0)	417(100.0)
Average of respondents		4,962kinds	1,513kinds	4,527kinds	56 kinds	3,785 kinds
Maximum		200,000 "	40,000 "	200,000 "	110 "	200,000 "
Minimum		4 "	2 "	2 "	2 "	2 "

Table-37 Number of average small kinds per one large kind of product(Q 5)

Year	1990					
	Variety of products Number of kinds	Large variety	Medium variety	Small variety	Other	Total respondents
500 kinds and more		42(13 7)	2(3 4)	2(3 8)	0	43(10 3)
400~less than 500 kinds		4(1 3)	1(1 7)	0	0	5(1 2)
300~ " 400 "		5(1 6)	1(1 7)	0	0	5(1 2)
200~ " 300 "		14(4 6)	7(12 1)	0	0	15(3 6)
100~ " 200 "		21(6 9)	1(1 7)	0	0	28(6 7)
80~ " 100 "		2(0 7)	1(1 7)	0	0	3(0 7)
60~ " 80 "		7(2 3)	2(3 4)	1(1 9)	0	9(2 2)
40~ " 60 "		13(4 2)	5(8 6)	3(5 7)	0	15(3 6)
20~ " 40 "		33(10 8)		0	0	41(9 8)
1~ " 20 "		130(42 5)	34(58 6)	43(81 1)	2(100 0)	209(50 1)
Not filled in		35(11 4)	4(6 9)	4(7 5)	0	44(10 6)
Total		306(100 0)	58(100 0)	53(100 0)	2(100 0)	417(100 0)
Average of respondents		531 kinds	77 kinds	546 kinds	2 kinds	394 kinds
Maximum		25,000 "	1,429 "	25,000 "	4 "	25,000 "
Minimum		1 "	2 "	1 "	1 "	1 "

products and the degree of variety of products. So it will be possible to tell the actual number of kinds of products, for example, in a company which produced a large variety of products.

(3) The details of department costing

In this section, the outline of cost centers used in cost accounting is discussed.

The number of cost centers in each company is shown in Table-38. It should be noted that this data concerns the business organizations surveyed, and does not necessarily show companywide data. The number of departments used in costing is as large a range as 1~2,500, and the average is 52. 80% of the respondents establish less than 50 centers, and most of them establish less than 20.

When these figures are compared to the numbers of departments actually set up in each management level, what can be found? The number of departments in middle management, depending on the companies' own judgment about management level, is shown in Table-39. Though some companies did not respond to

Table-38 Number of cost centers used in cost accounting(Q 12)

Year	1990
121 centers and more	31(7 4)
101~120 centers	7(1 7)
81~100 "	12(2 9)
61~ 80 "	16(3 8)
41~ 60 "	19(4 6)
21~ 40 "	46(11 0)
16~ 20 "	28(6 7)
11~ 15 "	31(7 4)
6~ 10 "	67(16 1)
1~ 5 "	123(29 5)
Not filled in	37(8 9)
Total	417(100.0)
Average of respondents	52 centers
Maximum	2,500 "
Minimum	1 "

Table-39 Number of departments in the middle management(Q 5)

Year	1990
51 departments and more	14(3 4)
41~50 departments	2(0 5)
31~40 "	6(1 4)
21~30 "	30(7 2)
16~20 "	24(5 8)
11~15 "	35(8 4)
6~10 "	93(22 3)
1~ 5 "	152(36 5)
Not filled in	61(14 6)
Total	417(100.0)
Average of respondents	14 departments
Maximum	400 "
Minimum	1 "

this item, probably because the survey did not have any indication concerning whether staff and/or sales personnel should be included or not, the average number of departments is 14. With reference to the number of factories in Table -7, it may be said that 80% of the respondents might have established less than 15 departments, including line and staff.

In addition to this, the number of departments in lower management is shown in Table-40. Generally speaking, the average number of departments in lower management was 38, and 80% of the respondents set up less than 40.

For reference, the average number of persons in each department in lower management is 29, and 80% of the companies have 30 persons of fewer, as shown in Table-41.

In this situation, the general condition of cost centers are closer to that of lower management than that of middle management. Departmental costs are allocated to even smaller sections than those of lower management in some companies. Table-42 was prepared in order to compare cost centers with sec-

Table-40 Number of departments in the lower management(Q 5)

Year	1990
101 departments and more	23(5 5)
81~100 departments	8(1 9)
61~ 80 "	14(3 4)
41~ 60 "	26(6 2)
31~ 40 "	29(7 0)
21~ 30 "	50(12 0)
11~ 20 "	80(19 2)
1~ 10 "	124(29 7)
Not filled in	63(15 1)
Total	417(100 0)
Average of respondents	38 departments
Maximum	1,000 "
Minimum	1 "

Table-41 Average number of members of each department in the lower management(Q 5)

Year	1990
101 persons and more	11(2 6)
81~100 persons	7(1 7)
61~ 80 "	11(2 6)
41~ 60 "	21(5 0)
31~ 40 "	15(3 6)
21~ 30 "	55(13 2)
11~ 20 "	111(26 6)
1~ 10 "	120(28 8)
Not filled in	66(15 8)
Total	417(100 0)
Average of respondents	29 persons
Maximum	700 "
Minimum	2 "

Table-42 Cost centers as compared to departments in the lower management in terms of their sizes(Q 13)

Year	1990
Generally, larger than departments in the lower management	108(25 9)
Generally, correspond to departments in the lower management	134(32 1)
Generally, smaller than departments in the lower management	87(20 9)
Established without regard to departments in the lower management	57(13 7)
Other	6(1 4)
Not filled in	25(6 0)
Total	417(100 0)

tions in lower management by size. In one-third of the responses, the cost centers approximately corresponded to the real sections in their lower management. In other companies, cost centers are mostly larger or smaller than the sections in their lower management, or set up disregarding the sections in the lower management. Only 20% set up mostly smaller cost centers than the sections in the lower level. On the whole, it can be said that cost centers in cost accounting seem to be established by using mainly the sections in lower management and supplementarily other sections above or below lower management.

Therefore, departmental cost information is intended to be used for mostly middle management to make certain of and to lead the subordinates' cost performance in accordance with their original plans.

To summarize this chapter, cost accounting and the real manufacturing operations are closely related to each other in many cases, but they are not identical. Cost information often needs to be summarized. So the kinds of products used in cost accounting, for example, are not necessarily the same as the product-kinds actually manufactured. Departments used for costing are not necessarily the same as sections set up at the worker's level. Product kinds and cost centers used in a cost accounting would be the fruit of comprehensive study regarding accurate projection of the real operations, requirements from information users and economy permitted for cost accounting practice. From the standpoint of a trend, cost information will tend to be steadily detailed as production becomes gradually subdivided. The new balance between cost accounting and the change of production seems to be always reconsidered.

6. The situation of cost management and its evaluation

With those current production operations as one can see, and the cost information compiled from those current cost accounting as one can see, how is cost management conducted? What problems underlie there?

(1) The management cycle in cost management

Cost management is not necessarily on a cycle with a certain period of time. In order to see an outline of this, the management cycle in cost management is shown in Table-43 supposing that cost management is conducted cyclically with three steps of planning process (establishing standards and budgets), controlling process (monitoring the course of doing), and evaluating process (examining and evaluating the performance).

A small number of companies which do not have clear cycles but most of them

Table-43 Management cycle in cost management(Q 16)

Year	1990
A few days	3(0 7)
1 week	6(1 4)
10 days	4(1 0)
Half a month	5(1 2)
3 weeks	0
1 month	362(86 8)
A quarter of the year	19(4 6)
Others	22(5 3)
Total	421(101 0)
Not filled in	5(1 2)
Total respondents	417(100 0)

aim at a certain management cycle, mostly monthly. A small number of smaller interval cycles than quarterly or monthly are also seen, but the monthly cycle is the typical one, regardless of many kinds of industries and different sizes of companies.

Then, how is each step of cost management conducted in each company?

(2) The use of information in planning process

Table-44 shows how standards for the use of planning process are indicated in standards reports. Standards prepared for the new cycle in advance are often provided in the form of a combined use of cost standards and physical standards. The combined use of these standards seem to be adopted regardless of different

Table-44 Indication of standards used for planning process(Q 17)

Year	1990				
	In cost standards	In combined use of the other two	In physical standards	Not filled in	Total respondents
Top management	126 (30.2)	202 (48.4)	29 (7.0)	67 (16.1)	417 (100.0)
Middle management	68 (16.3)	245 (58.8)	53 (12.7)	58 (13.9)	417 (100.0)
Lower management	42 (10.1)	178 (42.7)	139 (33.3)	68 (16.3)	417 (100.0)

levels of management, in this author's views, in order to hold the knowledge of events in common among those different levels, and in order to provide different levels with sufficiently persuasive information for different people. However, it could also be said that there are more suitable indications of standards for each level. Roughly, the higher the management level is, the more cost standards are used rather than physical standards, and conversely, the lower the level of management, the more physical standards are used in stead of cost standards. Details pertinent to each level of management are adjusted accordingly.

It is the belief of this author that though various standards are compiled based on a certain set of conditions of operations, those conditions are frequently reformed due to successive improvements of an ordinary nature on the shop floor. Then, how frequently are standards established or revised? and, therefore, how faithfully do they reflect the real changeable operations? According to Table-45, standards are usually revised semiannually or annually. In a minority of companies, standards are more frequently revised in order to meet improved operations. When such wide intervals as semiannual or annual are adopted, monthly cost reports commonly used must usually have contained some deviation from the real state of operations. Whether this deviation is accepted or not probably

Table-45 Frequency of cost standards revised
(Q 19)

Year	1990
Monthly	13(3.1)
Quarterly	7(1.7)
Semiannually	205(49.2)
Annually	105(25.2)
At the time of reform of operations	33(7.9)
Others	9(2.2)
No use of cost standards	55(13.2)
Total	372(89.2)
Not filled in	7(1.7)
Total respondents	417(100.0)

depends on the aims of the cost standards used. When cost management puts the stress on the controlling process where operations are monitored and necessary instructions are given so often as daily, weekly, every ten days, etc., cost standards to be used has to be close to the real conditions. However, when cost management puts the stress on managing operations in such way that the goals for cost reduction are communicated to managers semiannually or annually, and controlled monthly by leading performances to these goals ; cost standards do not necessarily correspond to the current conditions, even though valid grounds for standards should be clearly established as long as they are possibly established. In this latter context, cost standards are supposed to provide the goals for cost reduction to be attained during the next half a year or the next year. The situation in Table-45 seems to suggest that this latter scenario is more suitable for the cost management in Japan. It is possible that one of our primary aims of Japan's cost management has been to attain the semiannual or annual goals for cost reduction rather than to monitor or control operations frequently on the site.

Further, in Table-46 the situation is shown regarding how many days earlier their final production orders are usually issued before the start of production. About 80% of the respondents completed final production schedules within one

Table-46 Timing to issue final production orders (Period from the issue of production orders to the start of production)(Q 18)

Year	1990
On the day of production	14(3.4)
1~3 days before	47(11.3)
4 days~one week before	79(18.9)
1~2 weeks before	96(23.0)
2~3 "	30(7.2)
3~4 "	66(15.8)
4~6 "	44(10.6)
more than 6 weeks before	42(10.1)
Total	418(100.2)
Not filled in	11(2.6)
Total respondents	417(100.0)

month before the start of production. Production control conducted close to a shop floor is usually made on a shorter cycle than one month, such as daily, weekly, every ten days, etc.

(3) The use of information in controlling process

The outline of information used for monitoring the course of operations is shown in Table-47. The situation of whether information for monitoring is indicated with cost measures or physical measures is nearly the same, as compared with the situation of standards. The combined use of cost measures and physical measures are also applied to any management levels as a leading indication. Further, the higher the management level is, the more cost measures are used than physical ones, and vice versa. However, it is noted that the physical measures are a little more stressed instead of cost measures on the whole than in the case of planning process.

Table-47 Indication of information used in controlling process(Q 20)

Year	1990				
	In cost indication	In combined use of the other two	In physical indication	Not filled in	Total respondents
Top management	108 (25.9)	230 (55.2)	36 (8.6)	50 (12.0)	417 (100.0)
Middle management	61 (14.6)	253 (60.7)	70 (16.8)	39 (9.4)	417 (100.0)
Lower management	27 (6.5)	165 (39.6)	165 (39.6)	62 (14.9)	417 (100.0)

Table-48 was prepared to show how often cost information for monitoring operations are reported. Many cost reports (59.5%) are compiled monthly, even though these reports are expected to be made as frequently as possible. A minority of companies submitted reports based on such shorter cycles as daily, weekly, every ten days, etc. Current cost information for monitoring current operations is adopted in a relatively fewer number of companies.

Table-48 Frequency of cost reports produced in the course of controlling process(Q 21)

Year	1990
Daily	87(20 9)
Every 2~3 days	2(0 5)
Every 4 days~1 week	17(4 1)
Every 1~2 weeks	19(4 6)
Every 2~3 weeks	3(0 7)
Approximately every month	248(59 5)
More than 1 month apart	15(3 6)
At product completion	16(3 8)
As necessary	39(9 4)
No feedback of cost reports	9(2 2)
Not filled in	11(2 6)
Total	417(100 0)

In other words, cost information, gained from any systematic cost accountings, for the greater part, appears to have functioned as a contributor to planning process or evaluating process, primarily on a monthly cycle. Only one-fourth of the respondents at most use current cost information for monitoring operations at less than one month intervals such as daily, weekly, every ten days, etc. It can be expected that a greater number of companies have developed their information for monitoring based on physical data or more detailed cost data, separately from their comprehensive cost accounting systems. One should not fail to notice that there may be a vast amount of information source for controlling daily operations on a shop floor.

(4) The use of information in evaluating process

How is cost performance indicated evaluating process? According to Table -49, the situation was nearly the same as that of planning process. However, it is noted that the stress is put a little more on cost indication than on physical indication. The frequency of this report is shown in Table-50. Monthly reports are more common (92%) in evaluating process than in other processes probably because these reports are often compiled from cost accounting regularly practiced.

Table-49 Indication of cost reports used for evaluating process(Q 22)

Year	1990				
	In cost indication	In combined use of the other two	In physical indication	Not filled in	Total respondents
Top management	132 (31.7)	234 (56.1)	13 (3.1)	40 (9.6)	417 (100.0)
Middle management	90 (21.6)	259 (62.1)	32 (7.7)	43 (10.3)	417 (100.0)
Lower management	54 (12.9)	186 (44.6)	114 (27.3)	67 (16.1)	417 (100.0)

Table-50 Frequency of cost reports produced in evaluating process(Q 23)

Year	1990
A few days apart	3(0.7)
Weekly	0
Every ten days	5(1.2)
Twice a month	2(0.5)
Monthly	385(92.3)
Quarterly	5(1.2)
At product completion	13(3.1)
As necessary	23(5.5)
Other	6(1.4)
No cost report	0
Total	442(106.0)
Not filled in	4(1.0)
Total respondents	417(100.0)

The trend of contents of these performance reports up to now is shown in Tables-51-1 and 51-2. The trend for approximately 30 years appears to have progressed mostly on the same levels. However, during the latter half of the 1980's, performance reports solely by cost indication started to decline, and conversely, reports by combined use of both cost and physical units or reports solely by physical indication started to rise. It may be that performance tended to be reported more minutely in order to know more subdivided operations.

The relatively different contents were reported in performance reports, depending on different management levels, that is the same manner as in planning

Table-51-1 Trend of indication of cost reports by management level

Year		1963	1964	1965	1966	1967	1968	1969
Top management	Cost indication	160 (39.0)	161 (45.6)	152 (43.9)	164 (47.5)	203 (45.5)	140 (47.9)	181 (48.3)
	Combined use of the other two	207 (50.5)	168 (47.6)	169 (48.8)	165 (47.8)	223 (50.0)	144 (49.3)	138 (36.8)
	Physical indication	6 (1.5)	7 (2.0)	5 (1.4)	3 (0.9)	5 (1.1)	4 (1.4)	41 (10.9)
	Not filled in	37 (9.0)	17 (4.8)	20 (5.8)	13 (3.8)	15 (3.4)	7 (2.4)	15 (4.0)
	Total	410 (100.0)	353 (100.0)	346 (100.0)	345 (100.0)	446 (100.0)	295 (101.0)	375 (100.0)
Total respondents	"	"	"	"	"	292 (100.0)	"	
Middle management	Cost indication	76 (18.5)	79 (22.4)	75 (21.7)	89 (25.8)	97 (21.7)	81 (27.7)	103 (27.5)
	Combined use of the other two	267 (65.1)	230 (65.2)	226 (65.3)	223 (64.6)	301 (67.5)	182 (62.3)	224 (59.7)
	Physical indication	18 (4.4)	7 (2.0)	13 (3.8)	16 (4.6)	20 (4.5)	20 (6.8)	29 (7.7)
	Not filled in	49 (12.0)	37 (10.5)	32 (9.2)	17 (4.9)	28 (6.3)	16 (5.5)	19 (5.1)
	Total	410 (100.0)	353 (100.0)	346 (100.0)	345 (100.0)	446 (100.0)	299 (102.4)	375 (100.0)
Total respondents	"	"	"	"	"	292 (100.0)	"	
Lower management	Cost indication	51 (12.4)	44 (12.5)	54 (15.6)	68 (19.7)	75 (16.8)	55 (18.8)	62 (16.5)
	Combined use of the other two	200 (48.8)	159 (45.0)	170 (49.1)	169 (49.0)	200 (44.8)	143 (49.0)	187 (49.9)
	Physical indication	65 (15.9)	73 (20.7)	53 (15.3)	60 (17.4)	86 (19.3)	52 (17.8)	73 (19.5)
	Not filled in	94 (22.9)	77 (21.8)	69 (19.9)	48 (13.9)	85 (19.1)	45 (15.4)	53 (14.1)
	Total	410 (100.0)	353 (100.0)	346 (100.0)	345 (100.0)	446 (100.0)	295 (101.0)	375 (100.0)
Total respondents	"	"	"	"	"	292 (100.0)	"	

Note: The data in 1963~1986 is quoted from Miura, Kazuo, Shin-ichi Inoue, and Yoshiho Tanaka. "Recent Development of Production Methods and Cost Management in Japanese Manufacturing Corporations." op cit : 61.

process. The reason why these adjustments are made is shown on the right side of Table-52-2. Since only about half of the respondents reported the same details (regardless of different management levels), the situation should not be under-

Table-51-2 Trend of indication of cost reports by management level

Year		1970	1971	1974	1978	1986	1990
Top management	Cost indication	136 (43.0)	147 (44.3)	105 (47.3)	69 (47.3)	328 (45.6)	132 (31.7)
	Combined use of the other two	163 (51.6)	171 (51.5)	107 (48.2)	71 (48.6)	348 (48.3)	234 (56.1)
	Physical indication	8 (2.5)	6 (1.8)	1 (0.5)	0	8 (1.1)	13 (3.1)
	Not filled in	9 (2.8)	8 (2.4)	9 (4.1)	6 (4.1)	36 (5.0)	40 (9.6)
	Total	316 (100.0)	332 (100.0)	222 (100.0)	146 (100.0)	720 (100.0)	419 (100.5)
Total respondents	"	"	"	"	"	417 (100.0)	
Middle management	Cost indication	78 (24.7)	86 (25.9)	56 (25.2)	46 (31.5)	196 (27.2)	90 (21.6)
	Combined use of the other two	203 (64.2)	218 (65.7)	146 (65.8)	87 (59.6)	457 (63.5)	259 (62.1)
	Physical indication	18 (5.7)	19 (5.7)	6 (2.7)	4 (2.7)	32 (4.4)	32 (7.7)
	Not filled in	17 (5.4)	9 (2.7)	14 (6.3)	9 (6.2)	35 (4.9)	43 (10.3)
	Total	316 (100.0)	332 (100.0)	222 (100.0)	146 (100.0)	720 (100.0)	424 (101.7)
Total respondents	"	"	"	"	"	417 (100.0)	
Lower management	Cost indication	52 (16.5)	60 (18.1)	44 (19.8)	43 (29.5)	139 (19.3)	54 (12.9)
	Combined use of the other two	172 (54.4)	172 (51.8)	120 (54.1)	75 (51.4)	349 (48.5)	186 (44.6)
	Physical indication	48 (15.2)	64 (19.3)	33 (14.9)	12 (8.2)	159 (22.1)	114 (27.3)
	Not filled in	44 (13.9)	36 (10.8)	25 (11.3)	16 (11.0)	73 (10.1)	67 (16.1)
	Total	316 (100.0)	332 (100.0)	222 (100.0)	146 (100.0)	720 (100.0)	421 (101.0)
Total respondents	"	"	"	"	"	417 (100.0)	

stood unanimously. When the business scale goes over 2,000 employees for example, different details seem to have been needed for different levels, and a greater number of companies summarized accordingly the reports concerning operations, in which decision-making authority and performance responsibilities

Table-52-1 Different cost reports depending on management levels(Q 24)

Year	1990				
	Less than 500 persons	500~less than 1,000 persons	1,000~less than 1,500 per	1,500~less than 2,000 per	2,000~less than 4,000 per
Whether or not reports vary by management levels					
The same report is used as a rule	50 (60.2)	52 (51.5)	34 (59.6)	18 (58.1)	25 (37.9)
The reports are more summarized as levels rise	22 (26.5)	39 (38.6)	22 (38.6)	12 (38.7)	38 (57.6)
The reports are made in more detail as levels rise	2 (2.4)	5 (5.0)	0	1 (3.2)	2 (3.0)
Other	2 (2.4)	1 (1.0)	1 (1.8)	0	1 (1.5)
Not filled in	7 (8.4)	4 (4.0)	0	0	0
Total	83 (100.0)	101 (100.0)	57 (100.0)	31 (100.0)	66 (100.0)

Table-52-2 Different cost reports depending on management levels(Q 24)

Year	1990				
	4,000~less than 6,000 per	6,000~less than 8,000 per	8,000~less than 10,000per	10,000 persons or more	Total respondents
Whether or not reports vary by management levels					
The same report is used as a rule	13 (38.2)	4 (23.5)	0	5 (20.0)	203 (48.7)
The reports are more summarized as levels rise	20 (58.8)	13 (76.5)	3 (100.0)	20 (80.0)	192 (46.0)
The reports are made in more detail as levels rise	1 (2.9)	0	0	0	11 (2.6)
Other	0	0	0	0	5 (1.2)
Not filled in	0	0	0	0	6 (1.4)
Total	34 (100.0)	17 (100.0)	3 (100.0)	25 (100.0)	417 (100.0)

are delegated to subordinates, and these larger companies focus their attention on areas where superiors have authority and hold responsibilities directly.

In order to see whether performance are actually reported in a timely manner to be used in monthly cyclical management, Table-53 was compiled. It will be

Table-53 Days needed to prepare cost reports after account period(Q 25)

Year	1990
1~ 5 days	62(14.9)
6~10 "	120(28.8)
11~15 "	125(30.0)
16~20 "	59(14.1)
21~30 "	41(9.8)
1 month or more	8(1.9)
Total	415(99.5)
Not filled in	3(0.7)
Total respondents	417(100.0)

true that performance has been reported more quickly according to the strong necessity. About three-quarters of the respondents reported their performance within half a month after the end of the calculation period, and, moreover, nearly half of the respondents reported within ten days. Nevertheless, there seems to have been a problem left unsolved to make the monthly cycle of management sufficiently effective.

In order to see the aims of the entire cost management based on a monthly cycle, how effectively cost variances are reported and analyzed is shown in Table -54. It appears that there are two aims in terms of reporting cost variances and their analysis. One was to have the employees understand the reasons for cost variances so that they are able to propose necessary improvements of operations. Another is to derive the grounds to be established as the semiannual or annual goals for cost reduction from cost variance Performance. Cost variance will suggest how original goals of operations are attained in efforts to do during this period. Both aims will be primary and inseparable ones for reporting variances, because the semiannual or annual goals for cost reduction may be attained only by encouraging various improvements on a monthly basis. What sort of cost variances will be estimated and reported depends on the functions on which cost management lays the stress, that is, the function of monitoring operations to be in

Table-54 Effectiveness of cost variance reports(Q 26)

Year	1990
Cost variances are not reported	27(6.5)
Useful for making proposals to improve operations in order to prevent possible cost variances	83(19.9)
Not so useful directly for making proposals of improvements, but useful for valuable clues using other information too	191(45.8)
Useful for establishing priority policy for improvements, rather than for making specific proposals	56(13.4)
Useful for profit planning and budgeting for the next period by grasping past trends of performance	187(44.8)
Other	4(1.0)
Total	548(131.4)
Not filled in	7(1.7)
Total respondents	417(100.0)

progress; the function of gaining necessary clues for improvements; or the function of groping for the grounds to be used for setting up the semiannual or annual goals for cost reduction. The cost management in Japan apparently has been searching for the correct way to go. Cost accounting, however, seems not to have put a stress on reducing costs merely by monitoring operations.

(5) The stress in cost management

The question of which aspect the present cost management is going to address from now on, and its future direction will be discussed, here in this chapter.

On the right side of Table-55, it is seen whether the present cost management utilizes financial data or physical data more seriously in order to manage costs. Since it is not easy to evaluate the situation with the data from a single year, it will be desirable to compare with the data in the past years to understand the complexion of today. In Table-55, the latter half of the 1980's seems to have put more stress on financial data as compared to the 1960's, even if time serial data are not enough. Since cost data and physical data have been combined very often, the situation is not clear enough to be able to say that simply either of them has been preferred. However, cost control in the lower level close to the workshop

Table-55 Stress to be placed on cost data or physical data in cost management(Q 29)

Year	1960	1961	1986	1990
Stress is placed on cost data management	33	31	247	150
on the whole	(20 6)	(13.4)	(34.3)	(36 0)
Stress is placed on physical data mgt. in cost centers, on cost data mgt in general mgt.	-	173	314	160
Stress is different depending on items	70	-	-	-
	(43.8)			
Stress is placed on physical data management	38	19	25	23
on the whole	(23 8)	(8 2)	(3 5)	(5 5)
Combined use of the above	10	-	-	-
	(6 3)			
Different stress is not placed between physical data mgt and cost data mgt.	-	-	122	80
Other	-	1	-	-
		(0.4)		
Not filled in	9	8	12	4
	(5 6)	(3.4)	(1 7)	(1 0)
Total	160	232	720	417
	(100 0)	(100 0)	(100.0)	(100.0)

Note: The data in 1960, 1961 and 1986 is quoted from Miura, Kazuo, Shin-ichi Inoue, and Yoshiho Tanaka "Recent Development of Production Methods and Cost Management in Japanese Manufacturing Corporations" op cit. : 43, 44.

has been gradually reorganized, as mechanization and automation of operations advance. Thus, as the control issues in this level have been settled more and more, it may be said that the priority of concern in cost management has shifted from this area to the other, where each department is encouraged to make necessary improvements in operations in order to reduce costs, by leading performance with cost or profit goals. It will be true that this progress has resulted in the complexion of today in cost management.

Tables-56 and 57 show on which process in a management cycle the stress is placed in this situation. In 1986 and 1990, the smooth rotation of management cycle are stressed more than any particular process of the cycle. This tendency is considered more seriously in the top and middle levels than in the lower level. Further, though the data may not be enough, top and middle managements took not only planning process, but also evaluating process seriously, and lower management took not only performance review, but also planning process serious-

Table-56 Stress placed on cyclical process of cost management in 1986

Year		1986			
Mgt cycle	Planning & controlling process (Mgt before & during the course of operations)	Evaluating process (Mgt after operations)	Stress placed on both	Not filled in	Total respondents
Mgt level					
Top management	150 (20.8)	73 (10.1)	465 (64.6)	32 (4.4)	720 (100.0)
Middle management	132 (18.3)	99 (13.8)	465 (64.6)	24 (3.3)	720 (100.0)
Lower management	136 (18.9)	233 (32.4)	289 (40.1)	62 (8.6)	720 (100.0)

Note: See Miura, Kazuo, Shin-ichi Inoue, and Yoshiho Tanaka "Recent Development of Production Methods and Cost Management in Japanese Manufacturing Corporations" op cit : 35

Figure-57 Stress placed on cyclical process of cost management in 1990(Q 28)

Year		1990				
Mgt cycle	Planning process	Control-ling process	Evaluating process	Stress placed on all these	Not filled in	Total respondents
Mgt level						
Top management	77 (18.5)	34 (8.2)	89 (21.3)	232 (55.6)	24 (5.8)	417 (100.0)
Middle management	63 (15.1)	89 (21.3)	83 (19.9)	209 (50.1)	30 (7.2)	417 (100.0)
Lower management	76 (18.2)	70 (16.8)	109 (26.1)	160 (38.4)	43 (10.3)	417 (100.0)

ly Authority and responsibilities delegated to each management level seem to have been accomplished through working together.

(6) Evaluating practices in cost management

How is the situation described above evaluated? Across the top of Table-58 is shown the extent to which aims of cost management are accomplished, and down the column listed whether or not cost management has some difficulties in terms of its actual practice. 70% of the respondents satisfactorily or mostly accomplished their aims. Nevertheless, as many as 93% become aware of difficulties to be solved.

Table-58 Problems on cost management(Q 27 & Q 30)

Year	1990				
	Objects achieved	Satisfactorily achieved	Achieved on the whole	Not achieved	Other
No problem	5(26.3)	18(6.6)	2(1.7)	0	25(6.0)
Some problems	14(73.7)	252(92.6)	115(97.5)	2(100.0)	386(92.6)
Not filled in	0	2(0.7)	1(0.8)	0	6(1.4)
Total	19(100.0)	272(100.0)	118(100.0)	2(100.0)	417(100.0)

In order to see a trend of this situation, time serial data is shown in Tables-59-1 and 59-2. Throughout the period, only a few companies did not have any difficulties, and cost management was consistently grappled with to be improved

Table-59-1 Whether or not there are any problems in cost management practices

Year	1960	1961	1962	1963	1964	1965	1966	1967
No problem	10 (6.3)	5 (2.2)	53 (15.8)	37 (9.0)	25 (7.1)	21 (6.1)	22 (6.4)	24 (5.4)
Some problems	143 (89.4)	223 (96.1)	278 (82.8)	360 (87.8)	316 (89.5)	313 (90.5)	319 (92.5)	417 (93.5)
Not filled in	7 (4.4)	4 (1.7)	5 (1.5)	13 (3.2)	12 (3.4)	12 (3.5)	4 (1.2)	5 (1.1)
Total respondents	160 (100.0)	232 (100.0)	336 (100.0)	410 (100.0)	353 (100.0)	346 (100.0)	345 (100.0)	446 (100.0)

Note: See Tanaka, Yoshiho "The Situation and Trends of Cost Accounting in Japan(3)
: Based on the Survey in 1986" op cit. : 121 for the data in 1960~1978.

Table-59-2 Whether or not there is any problem in cost management practices

Year	1968	1969	1970	1971	1974	1978	1986	1990
No problem	26 (8.9)	38 (10.1)	23 (7.3)	37 (11.1)	39 (17.6)	27 (18.5)	88 (12.2)	25 (6.0)
Some problems	262 (89.7)	332 (88.5)	288 (91.1)	290 (87.3)	182 (82.0)	113 (77.4)	620 (86.1)	386 (92.6)
Not filled in	4 (1.4)	5 (1.3)	5 (1.6)	5 (1.5)	1 (0.5)	6 (4.1)	12 (1.7)	6 (1.4)
Total respondents	292 (100.0)	375 (100.0)	316 (100.0)	332 (100.0)	222 (100.0)	146 (100.0)	720 (100.0)	417 (100.0)

positively by most of the companies. As to a trend, in the 1970's the situation developed in such a way as cost management structure became gradually established. However, in the 1980's cost management seems to have turned its way toward more companies becoming aware of difficulties.

Table-60 shows what sort of difficulties are recognized by each company. Though the choices of problems were not sufficiently systematic, a rough understanding of the current state can be gained. The difficulties such as support toward cost management by top management, and constant reforms of line management organization, have already been sufficiently solved in general. Both of these problems are structural premises for cost management. There seem to have been some difficulties that were not settled enough in the area of give-and-take cooperation between line managers and cost management staff. In this

Table-60 Problems on cost management(Q 30)

Year	1990
There are not any specific problems	25(6 0)
There are some specific problems	388(92 6)
[Support from top management]	
Importance of cost management not understood by top management	37(8 9)
Manpower shortage in cost management	61(14 6)
[Reforms of management organization]	
Delegation of authority & clearer responsibilities	75(18 0)
[Correlation between staff in charge & relevant sections]	
Communicating cost awareness to production managers	174(41 7)
Close contact with production control on a shop floor	143(34 3)
Cooperation between cost management staff & line sections	68(16 3)
Rapid preparation of cost data & reports	205(49 2)
Reorganization of reporting system	76(18 2)
[Reorganizations of data base & processing system]	
Validity of cost standards	103(24 7)
Reorganization of cost estimates	109(26 1)
Production methods changed and surrounding areas revamped	
from the inside out	67(16 1)
Reorganization of processing system for cost management	119(28 5)
Reorganization of relationship between cost management and budgetary control system	144(34 5)
[Suggested ways for cost management to go]	
Optimizing management of overhead costs	134(32 1)
Not filled in	6(1 4)
Total	417(100 0)

area, services offered to managers and workers by cost management staff, and cooperative attitudes offered to cost management staff by line sections (in order to provide necessary information), were traded to each other. Cost management staff appears to have had a hard time providing cost reports more quickly to line sections, and offering persuasive information and educational aids concerning cost awareness. They needed to get cooperation from managers and workers regarding updated information of changeable operations. Furthermore, since cost management was expected to be closely connected to profit planning and apparently tended toward increased minuteness on the whole, it was consistently needed to reorganize the systemic connection with budgetary control and the basic data/processing system. On the background of this constant reorganization of accounting system, there may have been a search for a new way to proceed from the state where cost management was mostly based on monitoring operations in progress on the performance reports.

7. Conclusion—Problems to be solved in cost management

In this article, the author has tried to understand the real state of cost management at present by means of statistical observation, though he felt like peeling an apple by the name of a company with a rusty knife. Nevertheless, some problems to be solved could be conjectured as follows

- 1) It is clear that cost management in Japan tends to be managed on a monthly basis for the most part. However, the management cycle will be often needed to be conducted less or more frequently, such as annually or semiannually, daily or weekly, etc. Budgetary management will be usually carried on annually or semiannually but monitoring operations in progress will be done at a shorter interval than a month.

When cost standards are set up as annual or semiannual goals to reduce costs during a year or half a year, they can also be used in budgetary manage-

ment, because budgetary costs will become goals to be attained during the next budget period. Both costs, cost standards and budgetary costs are set up as yearly goals for example, which will be the same in terms of tightness level. They will be used consistently in order to plan, control and evaluate operations on a yearly basis

However, cost standards are also used on a monthly basis in cost management. Since monthly goals to be attained in each month will be needed in cost management, yearly goals may have to be converted into monthly goals. Yearly goals will have to be closely related to monthly goals but both will not be the same. In order to manage costs monthly, monthly goals will be consistently needed to be used.

For example, it is said that cost standards are often used in annual or semiannual budgeting as basic data. If these cost standards are used in budgeting, whether adjusted or not prior to be used, these will become goals for cost reduction to be attained during the next budgeting period. It is clear that the meaning of these goals and how to compile them have to be reconsidered in terms of tightness level to be attained. We have to ask whether the aims of cost accounting and budgeting are different in terms of tightness level. Making the particular aim of budgeting clearer, more valid goals have to be established. In addition to this, it will be asked how annual or semiannual goals could be converted into monthly goals, what sort of variances should be measured and how they should be used in order to manage the course of operations monthly.

Besides this reorganization in advance management, at the next step or cost control, the connection between monthly management cycle and more frequent management cycle would become an important matter. Probably because frequent management based on a shorter cycle could be urged to get more complex and in more detail, performance measures used for this management also need to be in more detail. It is necessary to select important

measures to be used for monthly management from detailed performance measures (usually stocked in a data base) used on a daily, weekly basis for example. Some consistent performance measures might be used as tactically important measures in order to compare monthly performance with more frequent performance on a daily, weekly, etc. basis.

At the last step of post management, it would be needed to make cost reports more quickly. Besides this, it would also be needed to encourage to derive more improvements of operations from various possibilities, by connecting more closely post management or a fact-finding and problem-finding process, with advance management or a problem-solving process in the next cycle, as long as it is executed.

- 2) As a matter of fact, cost management mostly based on a monthly cycle appears to play a fundamental role to encourage necessary improvements of operations on the shop floor, in order to attain annual or semiannual goals for cost reduction. So, cost management staff is more required to get close to line management and workers to understand the truth of affairs suggested by cost reports. Adequate proposals corresponding to the real operations have to be made regarding tactical aspects, for example location of equipment and workers, flows and setups of operations, various steps of each operation, occurrence of inventory risk, etc.
- 3) The more vivid cost management would make its standpoint to rely on, the more important it would be how relevant cost information could be gained. Up to now, many companies have reorganized their cost accounting as a part of their accounting systems in order to be more serviceable for their management uses. However, as cost-related data bases would be reorganized, more separate cost accounting systems might be developed to meet their own management uses, besides cost accounting systems at least used for financial statements.
- 4) In each cost accounting system, the definite subdivision of product groups and

cost centers is used to manage subdivided production operations monthly. These products and cost centers used in cost accounting might be needed to be tactically adjusted as necessary. As kinds of products are more subdivided and production is more automated, product groups to be used as a tactical aspect of selling activity and cost centers to be used as a tactical aspect of production might be readjusted before long to realize tactical or strategical goals.

- 5) Diversification of kinds of products and automation of production operations might gradually raise distribution percentage of overhead cost or fixed cost toward manufacturing cost. It might be true that there will be incremental operations, that is, designing of this variety of products, handling of these products, manipulating of automatic machines or equipments, arrangement and maintenance for operation of these equipments, etc. Up to now some of these operations would have been improved by cost management. However, it is hoped to establish more slim production system and production management through monthly cyclical management by managing overhead cost or fixed cost supporting direct operations.

Cost information and cost accounting have to be helpful for cost management staff who are surrounded by these requirements.