"FLEXIBILITY: THE NEXT COMPETITIVE BATTLE"

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ABSTRACT

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For the fourth consecutive year a research team of Insead has administered a survey of large European manufacturers on their intentions concerning manufacturing strategies. Similar surveys have been conducted in Japan by Waseda University and in North America by Boston University. This paper compares the 1986 results obtained through this survey in the three regions. One of the most striking results of this year's survey is the emphasis some of the more advanced manufacturers put on trying to overcome the trade-off between flexibility and cost efficiency. Where the period 1975-1985 was the era where manufacturers discoverd that quality and cost efficiency were no opposite objectives, the period 1985-1995 seems to become the era of cost efficient flexibility. The results of the questionnaire indicate that the Japanese manufacturers are leading in this evolution., though they haven't solved yet all the problems related to it.

FLEXIBILITY : THE NEXT COMPETITIVE BATTLE

The Manufacturing Futures Survey
an international comparison

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1. Introduction

Over the last decade, interest in the use of manufacturing and manufacturing strategy as a competitive weapon has been gradually rising. Managers and management scholars have discovered that the company's technologies in general, and particularly those relating to manufacturing, are not neutral in the determination and implementation of a company's strategy. The earlier work of Skinner (1969), his more recent contributions (Skinner, 1985), the work by Hill (1985), and in particular the publications by Hayes and Wheelwright (1984), (1985) have greatly contributed to a better understanding of what the issues, questions and variables are when defining and implementing a manufacturing strategy.

Most of this work is based on experience and cases. As a consequence, the majority of the results demonstrate a deep insight, but can be challenged when generalisations are derived from them. To complement this type of work, since 1983, research teams at INSEAD (Fontainebleau, France), Boston University (Boston, U.S.A.) and Waseda University (Tokyo, Japan) have been carrying out a yearly survey on large manufacturers. The objective of this research effort is to understand the competitive environment in which the large manufacturers have to operate, and what type of manufacturing strategy and policies they develop in order to provide a response to this environment. The goal of the study is not only to examine the state of manufacturing strategy at one particular moment in time or in one particular region, but to collect comparable data over time and in different regions. In this paper the results of the 1986 survey will be discussed, and to some extent compared with the results of previous campaigns (Ferdows et.al., 1984)(De Meyer, 1986).

2. Method and sample description

In 1986, for the fourth year running, a survey on manufacturing strategies and policies was organised by research teams at INSEAD, Waseda University and Boston University. This survey was conducted amongst large manufacturing companies in Europe, Japan and North America. The typical respondents to the questionnaire were senior manufacturing managers or technical officers.

The questionnaire focuses on four broad categories of questions. The first group of questions determines the profile of the company or business unit for which the questionnaire is answered. The second group addresses the competitive priorities the respondents will pursue in manufacturing. In the third section the respondents are questioned on their concerns about manufacturing in their company or business unit. The fourth and largest group of questions probe the actions and efforts the respondents and their companies or business units firmly intend to invest in over the next two years.

The underlying logic of this structure is the following: Business unit profile, concerns about manufacturing and the environment and competitive priorities interact with each other. Out of this interaction a manufacturing strategy will be determined. This manufacturing strategy will be reflected in the actions and efforts to which the manufacturers have committed themselves. It is important to understand that the questionnaire does not focus on actions or objectives in the distant future, but attempts to measure the emphasis the respondents will place on certain efforts and actions over the next two years. Since efforts and investments in manufacturing have a pretty high inertia, probing what will go on in the next two years is in fact measuring firm commitments. The questionnaire does not try to indicate what the dream factory of the future will be, but rather what is already on the drawing boards.

The mechanics of the questionnaire are quite simple. In those cases where no exact response is requested, the respondents are invited to indicate their opinion or perception on a five point scale. In most of the cases the options on concerns or actions are presented as closed questions. In some questions the possibility is left to add 'other' concerns or actions, etc. In those cases a content analysis was performed to interpret these answers. The number of answers that went beyond the boundaries of the closed questions remains very limited.

TABLE 1 : DESCRIPTION OF THE SAMPLE

	EUROPE	NORTH AMERICA	JAPAN
AVERAGE SALES IN MILLION US$	689	1028	1037
AVERAGE NUMBER OF EMPLOYEES	2026	4452	1840
% OF SALES FOR R&D	4.0	4.3	3.0
TOTAL MANUFACTURING COSTS AS A % OF SALES	65.1	60.1	72.3
ALLOCATION OF MANUFACTURING COSTS in % of total manufacturing cost			
MATERIALS & COMPONENTS	52.5%	51.3%	58.2%
DIRECT LABOUR	18.1	14.9	14.5
ENERGY	8.6	4.9	4.2
MANUFACTURING OVERHEADS	22.0	28.9	16.4

In 1986, 174 European manufacturers, and a similar number of Japanese and American manufacturers responded to the questionnaire. Although the samples cannot be called truly representative of any of the three regions, none of them are biased towards a particular industry, or in the case of Europe towards a particular country.

As in previous years, the companies which replied to the questionnaire are large manufacturers (table 1). Although average sales figures are difficult to compare, due to the wide fluctuations of dollar, yen and European currencies, the numbers in table 1 indicate that on average the elements of the three samples are fairly comparable. The North American companies tend to be bigger and in particular have more employees, than their European and Japanese counterparts. This might suggest that the American companies in the sample are, on average, more integrated. The lower raw materials and components fraction of their manufacturing costs seem to confirm this hypothesis.

Moreover, the companies are not only large, but also important manufacturing companies. The total manufacturing costs amount to about one third of the total sales. This number is higher in Japan where it becomes almost three quarters of the total sales. It is slightly lower in North America.

The European companies have, in relative terms, a higher direct labour cost. The Japanese spend relatively more on materials and semi-finished goods and components. The high proportion of overhead costs (absorbing capital equipment, indirect labour and management systems) for the American respondents is striking. Where in a Japanese context only one sixth of the costs are manufacturing overheads, in the American case, almost one third of the manufacturing costs are allocated to manufacturing overheads. Without suggesting that this is the case for the whole of the American industry, one can argue that the average American company in the sample is more integrated and more heavily loaded with overheads than the average Japanese respondent. The Europeans are characterised by a higher direct labour cost and a higher energy cost. The structure of these manufacturing costs has remained fairly stable over the last four years.

3. Concerns

In order to map the concerns of the manufacturers, a list of thirty four items is offered to the respondents. As discussed, they can indicate on a five point scale whether this concern is unimportant or very significant.

The European top ten list of concerns (table 2) can be summarised around four dimensions. First of all, there is the concern about costs : high or rising overhead and materials costs and high or rising inventories. A second concern relates to the speed of the response to challenges in a turbulent environment: introducing new products on schedule, inability to deliver on time, poor sales forecasts, making new process technology work and the risk of falling behind in process technology. This is the fastest rising group of concerns. The technology related concerns are quite new in the European top concerns. This could either be a genuine concern about the importance of technology or a reflection of a fashion. It will be interesting to see how this concern will evolve in future questionnaires. A third dimension of concerns is related to people. The only real concern here is the availability of qualified supervisors. Given the European economic context, this cannot

TABLE 2: TEN MOST IMPORTANT CONCERNS

EUROPE	NORTH AMERICA	JAPAN
1. HIGH OR RISING OVERHEAD COSTS (1) (2) (1)	1. PRODUCING TO HIGH QUALITY STANDARDS (1) (1) (2)	1. PRODUCING TO HIGH QUALITY STANDARDS (1) (1) (1)
2. PRODUCING TO HIGH QUALITY STAMDARDS (2) (1) (1)	2. HIGH OR RISING OVERHEAD COSTS (7) (6) (1)	2. YIELD PROBLEMS, REJECTS (2) (2) (2)
3. INTRODUCING NEW PRODUCTS ON SCHEDULE (5) (4) (4)	3. INTRODUCING NEW PRODUCTS ON SCHEDULE (4) (2) (3)	3. INTRODUCING NEW PRODUCTS ON SCHEDULE (4) (3) (2)
4. HIGH OR RISING MATERIAL COSTS (4) (5) (3)	4. POOR SALES FORECASTS (8) (7) (4)	3. AVAILABILITY OF QUALIFIED LINE SUPERVISORS (3) (3) (4)
5. AVAILABILITY OF QUALIFIED SUPERVISORS ( ) ( ) (12)	5. YIELD PROBLEMS REJECTS (10) (5) (5)	3. FALLING BEHIND IN PROCESS TECHNOLOGY (4) (5) (4)
6. INABILITY TO DELIVER ON TIME (10) (17) (8)	6. IMPLEMENTING NEW TECHNOLOGIES ( ) ( ) ( )	3. AGING WORKFORCE (8) ( ) (6)
7. POOR SALES FORECASTS (6) (7) (5)	7. HIGH OR RISING MATERIAL COSTS ( ) ( ) (10)	7. INABILITY TO DELIVER ON TIME (7) (7) (6)
8. MAKING NEW PROCESS TECHNOLOGY WORK ( ) ( ) ( )	8. VENDOR LEAD TIMES ( ) ( ) ( )	7. AVAILABILITY OF QUALIFIED WORKERS (8) (5) (10)
9. FALLING BEHIND IN PROCESS TECHNOLOGY ( ) ( ) ( )	9. INDIRECT LABOUR PRODUCTIVITY (5) (4) (8)	7. HIGH OR RISING OVERHEAD COSTS (8) (9) (10)
10. HIGH OR RISING INVENTORIES (9) (8) (7)	10. HIGH OR RISING INVENTORIES ( ) ( ) (9)	10. HIGH OR RISING INVENTORIES ( ) (9) ( )
		10. TOO MANY ENGINEERING CHANGES ( ) ( ) (6)
		10. TOO BROAD A PRODUCT LINE ( ) ( ) (6)
		10. POOR SALES FORECASTS ( ) ( ) (10)

NB THE NUMBERS BETWEEN BRACKETS ARE THE RANKING OF THE 'CONCERNS' IN PREVIOUS YEARS AND THEY ARE RESPECTIVELY: 1983, 84 AND 85. WHERE PREVIOUS RANKING IS OMITTED BY THE USE OF EMPTY BRACKETS THAT CORRESPOND TO THE ABOVE SERIES OF YEARS THEN THE CONCERN LISTED THIS YEAR DID NOT OCCUR WITHIN THE FIRST FIFTEEN OF THE GIVEN YEAR.

indicate a lack of people, but must reflect the lack of qualifications. Is it true that the quality of the European educational system is not up to the level required by today's technologies ? The fourth dimension of concerns is related to quality. Producing to high quality standards has been a 'hit' over the last four years. But this concern is not translated in concrete concerns on defects, yield rates etc.

This last issue is quite different from the Japanese list of concerns, where producing to high quality standards is immediately followed by a concern about yield problems and rejects. This reflects the well spread conviction of the Japanese managers that quality and productivity (yield) are unseparable. Going through the rest of the top list of concerns one finds similar worries about qualifications, overheads, inventories and inability to deliver on time. The main differences are the concern about the aging workforce, but more important the concern about too many engineering changes and too broad a product line. Does this mean that Japanese production managers are worried about the fact that the need for a flexible response to the market needs has created a too complex production environment?

Typical for the North American list is the concern about indirect labour productivity. This does not seem to be irrelevant in the context of the high fraction of manufacturing resources spent on overheads. New in this top ten list is the concern about vendor lead times. In a world where more emphasis is placed on production linkages to shorten the response time to changing customer requests, this is certainly a growing concern.

The overall picture which emerges from these concerns shows considerable similarities among the regions. The average European, American and Japanese manufacturer is equally concerned about quality, high indirect and overhead costs and providing a shorter response time to the need for the introduction of new products. Indeed the respondents compete in the same global economy and have to try to match each others' strengths and to exploit each others' weaknesses. There are also a number of important concerns which have remained equally important over the last four years. This indicates that some manufacturing problems have no easy solution or are, as in the case of costs or quality, moving targets. It also shows that as one could see in previous surveys, though the measures taken to remedy the concerns are consistent and appropriate, results are not easily obtained

Having said this, there remain important differences between the different regions. The strong technology orientation and the worry about the reaction time to market demands are typically European. The increasing complexity of range of products and production processes seem to get more attention in Japan.

4. Competitive priorities

What kind of priorities do manufacturers pursue in the context of these concerns (table 3). The first conclusion one can reach is the remarkable stability of the pattern of competitive priorities in manufacturing over the last four years. If one needed a indication that manufacturing priorities are not that easily changed, then this list is a very good indirect indicator of that.

The second major conclusion is the strong similarity between the European and

TABLE 3: COMPETITIVE PRIORITIES

EUROPE	NORTH AMERICA	JAPAN
1. CONSISTENT QUALITY (1) (1) (1)	1. CONSISTENT QUALITY (1) (1) (1)	1. LOW PRICES (1) (1) (1)
2. HIGH PERFORMANCE PRODUCTS (3) (2) (2)	2. HIGH PERFORMANCE PRODUCTS (2) (2) (3)	2. RAPID DESIGN CHANGES (2) (2) (2)
3. DEPENDABLE DELIVERIES (2) (3) (3)	3. DEPENDABLE DELIVERIES (3) (3) (2)	2. CONSISTENT QUALITY (3) (3) (2)
4. FAST DELIVERY (6) (6) (5)	4. LOW PRICES (6) (5) (5)	4. DEPENDABLE DELIVERIES (4) (4) (5)
5. LOW PRICES (4) (4) (4)	5. FAST DELIVERIES (4) (4) (4)	4. RAPID VOLUME CHANGES (6) (6) (6)
6. RAPID DESIGN CHANGES (5) (5) (6)	6. RAPID DESIGN CHANGES (7) (5) (7)	6. HIGH PERFORMANCE PRODUCTS (4) (4) (4)
7. AFTER-SALES SERVICES (8) (8) (7)	7. AFTER-SALES SERVICES (5) (7) (6)	7. FAST DELIVERY (8) (7) (7)
8. RAPID VOLUME CHANGES (7) (7) (8)	8. RAPID VOLUME CHANGES (8) (8) (8)	8. AFTER SALES SERVICES (7) (8) (8)

NUMBERS WITHIN BRACKETS INDICATE THE RANKING OF THESE PRIORITIES FOR 1983, 84 AND 85 RESPECTIVELY

North American list of manufacturing priorities. Both have the same top three priorities : the ability to provide consistent quality, the ability to deliver high performance products and the ability to be a dependable supplier. Taken together with the ability to deliver fast, one can hypothesise that European manufacturers go first of all for a total quality of their product and their service vis-a-vis the customer. The next on the list is the ability to offer products at low prices. To a manufacturer this means of course the ability to produce at low cost. What one sees emerging here is a strategy incorporating the fact that quality and cost efficiency do not have to be contradictory. European and North American manufacturers have accepted the fact that the trade-off between quality and efficiency is a false one. Flexibility either in design or in volume remains at the bottom of the list.

The picture is quite different for the Japanese respondents. The ability to offer low prices, which in manufacturing really mean the ability to have a low cost production is Japanese objective number one. This is no recent phenomenon due to the increasing strength of the yen, but has been consistently so over the last four years. The capacity to deal with rapid design changes comes second. The ability to offer consistent quality comes third. Does this mean that the Japanese have given up on quality ? Competitive priorities do not have to be the reflection of existing strengths. It is more probable that their present performance on quality gives them enough lead time over American and European competitors to spend time on overcoming the trade-off between flexibility and cost efficiency. In previous reports this has been summarised such that " Americans and Europeans are trying to overcome what they perceive to be the relative deficiencies of their manufacturing compared with the Japanese, whereas the Japanese, having been successful in both quality and delivery management, are now aiming at developing a new competitive edge, which combines low cost manufacture with flexibility" (Ferdows et. al., 1985). One can argue that the decade '75-'85 can be labeled as an era where manufacturers discovered that there was no trade-off to be made between quality of product and service and the efficiency of the production system. The international comparison of the manufacturing futures survey suggests at this point that the decade '85-'95 has the potential of becoming the era where manufacturers will discover that flexibility in all its aspects is not necessarily contradictory with the pursuit of cost efficiency. If this hypothesis holds, the Japanese competitors seem to be further down the road in making this 'cost efficient flexibility' into a competitive priority and in turning this priority into the definition and solving of problems on the shop floor. The analysis of the concerns shows however that (1) the Europeans are not far behind them in discovering the need to use technology to react quicker to changing market demands; and (2) the Japanese encounter problems of production complexity in implementing this competitive priority.

5. Action plans

The combination of the company's profile, the competitive priorities and the internal and external concerns create a fertile soil for the definition of manufacturing policies. These manufacturing policies are translated in the questionnaire in a list of thirty seven action programmes and efforts, for which the respondents are asked to indicate which emphasis they will put on implementing them over the next two years. These two years are chosen, as is mentioned before, to avoid the respondents describing their dreams rather than their concrete action plans.

Looking at the 1986 list (table 4) one sees for Europe a pattern of action plans which is fairly consistent with the concerns. Overcoming the cost concerns will be done by automation of jobs, manufacturing reorganisation and improvement of

TABLE 4 : THE TEN MOST IMPORTANT ACTION PLANS

EUROPE	NORTH AMERICA	JAPAN
DIRECT LABOUR MOTIVATION (3)	STATISTICAL PROCESS CONTROL (7)	FLEXIBLE MANUFACTURING SYSTEMS(1)
PRODUCTION AND INVENTORY CONTROL(4)	ZERO DEFECTS ()	QUALITY CIRCLES (3)
AUTOMATING JOBS (2)	VENDOR QUALITY (2)	PRODUCTION AND INVENTORY CONTROL SYSTEMS(4)
INTEGRATING INFORMATIN SYSTEMS IN MANUFACTURING (1)	INTRODUCING NEW PRODUCTS ON SCHEDULE()	AUTOMATING JOBS (2)
SUPERVISOR TRAINING (6)	PRODUCTION AND INVENTORY CONTROL SYSTEMS (1)	LEAD-TIME REDUCTION (9)
MANUFACTURING REORGANISATION (10)	STATISTICAL PRODUCT CONTROL ()	INTRODUCTION OF NEW PROCESSES FOR NEW PRODUCTS(2)
INTEGRATING INFORMATION SYSTEMS ACROSS FUNCTIONS (7)	INTEGRATION OF MANUFACTURING INFORMATION SYSTEMS(1)	REDUCING SET-UP TIME (10)
DEFINING A MANUFACTURING STRATEGY (11)	DEVELOPING NEW PROCESSES FOR NEW PRODUCTS (10)	DIRECT LABOUR MOTIVATION (8)
LEAD TIME REDUCTION (12)	DIRECT LABOUR MOTIVATION(8)	WORKER SAFETY (6)
VENDOR QUALITY (5)	LEAD-TIME REDUCTION ()	GIVING WORKERS A BROADER RANGE OF TASKS ()

(*) Numbers between brackets indicate rank order in 1985. If no rank order is indicated, this means that in 1985 the rank order was higher than 12. For previous years these data were collected slightly different, and comparisons of rank orders are difficult to make

the production and inventory control systems. Of course one has to motivate the direct labour which is left after this reorganisation, and consistent with the lack of qualified supervisors, there is quite a lot of effort going on in

supervisor training. The need to decrease the reaction time to the market is supported by the investments in integration of information systems, in manufacturing as well across functions, the effort to reduce the lead time in production and eventually the intention to put some effort into redefining the manufacturing strategy. The concern about quality is reflected in the effort going into vendor quality. Though the consistency between concerns and action plans appears to exist, one can wonder about the limited consistency between priorities on quality and actions on quality. Is it that Europeans are quite satisfied with the ongoing quality improvement programmes, and see it more as a normal continuous activity, or is it that there still remains a gap between the slogans about quality and the actions ?

The North Americans developed a lot more consistency between priorities and action plans. The three top priorities are all three related to quality improvement, and this through improving the methods of statistical quality control, creating a different attitude through zero defects programmes as well as externally through improving the vendor quality. Each of these action plans has made a dramatic rise in importance. The integration of information systems in manufacturing as well as across functions has on the contrary dropped considerably in importance. They were on the top in previous years. Are the American manufacturers disappointed about the effects of this integration ? or about its technical or organisational feasibility ? It is strange to see these quite sudden and dramatic changes in the behaviour of American manufacturers, in particular at a time when one can notice such a lot of interest among Japanese companies in value added networks and integration of information systems. Is it that American manufacturers are more subject to fashion in management techniques and programmes ?

Lack of consistency is not something one can blame the Japanese respondents for. If cost efficient flexibility is their priority, then they are working on it. The introduction of flexible manufacturing systems, the reduction of the lead time in the own production, the development of new processes for new products, the reduction of set-up times and giving workers a broader range of tasks (and consequently make them more flexible), all point in the same direction. The concern about inventories is translated in investments in production and inventory control systems, and the traditional total quality approach is reflected in quality circles and worker safety.

6. Comparison of employee related action plans

The three regions pay attention to some extent to worker related action plans. Let us analyse some of the differences between the three groups. There is on the one hand the combination of reduction of the size of the labour force and the automation of jobs, on the other hand one finds the important action plan of direct labour motivation.
If the average manufacturer is going to automate jobs, in which part of the manufacturing is he going to do it ? (table 5) Materials handling and fabrication are the two areas where most manufacturers who will put more than moderate emphasis on automation of jobs, will invest in. Fabrication is the most important in Europe, materials handling is the most important in North America and Japan. Assembly comes third. Relatively more North American companies see this area as a focus of their automation attention.
Automation is not the only cause of the reduction of the size of the workforce, though it is the most important in Europe and in Japan. In this last region more than one third of the reduction of the labour force (if there is any) is due to automation. The only other important factor of workforce

reduction is the improvement of methods. This indicates that in the Japanese context the replacement of labour is really related to improving the manufacturing system. The situation is different when one looks at the North American data. Though improvement of methods is the second most important factor of the reduction of the workforce, consolidation and reorganisation is the most important one. The data is admittedly limited, but one gets the impression that in North America the reduction of the number of workers is more due to external business factors and large scale reorganisations rather than to improvements in manufacturing. The European numbers suggest a situation which is somewhat in between the North American and Japanese situation.

TABLE 5 : LOCUS OF THE AUTOMATION OF JOBS
(in % of the number of respondents putting more than moderate emphasis on automation of jobs

AUTOMATION OF	EUROPE	NORTH AMERICA	JAPAN
Materials handling	48.1%	58.3%	42.3%
Fabrication	59.4	51.7	32.1
assembly	34.0	43.3	32.1
inspection	23,6	36.7	28.6
clerical	34.0	23.3	25.6
other	1.9	6.7	0.0

TABLE 6 : CAUSE OF REDUCTION OF SIZE OF THE WORKFORCE
(In % of the respondents who planned a reduction of the workforce)

TYPE OF REDUCTION	EUROPE	NORTH AMERICA	JAPAN
Consolidation	20.3%	29.8%	9.2%
Automation	27.4	17.0	36.5
Reduced demand	10.3	17.9	7.7
Outside sourcing	12.1	8.5	7.1
improved methods	20.9	22.1	19.7
Other	2.4	4.0	2.1

Reduction of the workforce is only one aspect of people management. The employees one keeps have to be motivated. How does one do it. Which tools are deployed to motivate direct labour? (table 7) Education and providing more information is obviously the most important tool. Almost 80% of the Japanese

respondents have checked this possibility. But also in Europe (60%) and North America (50%) this is an important tool. European respondents seem to be the only ones who still believe in financial incentives to motivate direct labour. The Japanese respondents emphasize the strengthening of interpersonal relationships more than the other groups. Striking is also their emphasis on improving the physical working conditions. This fits very well the emphasis on the improvement of the manufacturing system as it became clear in previous paragraphs.

TABLE 7 : MOST IMPORTANT TOOLS USED FOR DIRECT LABOUR MOTIVATION
(In % of the people who put more than moderate emphasis on direct labour motivation)

TOOL	EUROPE	NORTH AMERICA	JAPAN
Through direct financial incentives	16.9%	11.5	2.4%
Improvement of the physical working conditions	8.5	3.4	26.8
Strengthening interpersonal relationships	17.8	25.3	29.2
Fringe benefits and job security	2.5	2.3	4.2
Educating and informing	58.5	51.7	79.8
Other	2.5	5.7	0.0

7. Vendor quality

Since improving the vendor quality came up as an important aspect of the quality improvement programmes, it is worth having a look at the ways manufacturers intend to do something about it. The European respondents appear to be the only ones who still believe in the quality 'policing' function. More than one sixth of them considers tightening the specifications to be an important means of improving the vendor quality. Stressing the importance of quality to the vendor is mentioned by half of the European respondents. This policing and communication policy is less popular among the North American and Japanese respondents. On the other hand working with vendors on the improvement of process controls is mentioned by more than 60% of the Japanese respondents. The relation of trust and collaboration between the manufacturer and his vendor seems to be very strong here. Between 12.5% (Japan) and 20% (Europe) of the respondents who see improvement of vendor quality as an important action plan, will go all the way and engage in joint development work.
The European data seems to indicate a bimodal approach. A large number of them limit their actions related to vendors to tightening specifications and communicating the importance of quality to their vendors. A second group is

willing to go all the way and team themselves up completely with their vendors. Such relations seem to exist already in the Japanese context.

TABLE 8 : WAYS TO IMPROVE VENDOR QUALITY
(In % of the respondents who put more than moderate emphasis on improving the vendor quality)

PLANNED IMPROVEMENTS	EUROPE	NORTH AMERICA	JAPAN
Tightening of specifications	17.4%	5.1%	2.4%
communicating the importance of quality to the vendor	48.8	32.6	26.8
working with vendor on process controls	25.6	33.1	61.9
joint work on process & product development	19.8	15.3	12.5
other	1.0	1.0	1.2

8. Conclusion

To summarise all this, one can argue that the average manufacturer in each of the three regions has a set of action plans which is consistent with concerns and the priorities. The Europeans seem to be less consistent between their stated priorities on the one hand, the concerns and the action plans on the other.

The Japanese respondents have chosen to try to overcome the traditional opposition between cost efficiency and flexibility. They seem to go full steam ahead, and this with the increase of their ability to introduce new products as a first priority, rather than to focus on volume flexibility. But pursuing an objective is no guarantee for having results. The concerns of the Japanese manufacturers indicate that they wrestle on the factory floor with the consequences of that choice : complexity in product range and production process.

The Europeans assert still that quality is objective number one, but seem to work in practice a lot more on their concerns about overhead costs and reaction time to market. Is this merely hypocrisy ? or is it that quality has become an integrated part of factory life which does not require additional investments ? In both cases one can wonder about the wisdom of it.

The North Americans bet everything on quality. Priorities and actions are very well in line with each other. However, it is amazing that their action plans sometimes give the impression of being action moods or action fashions. And finally one wonders whether they have given up in the fight against overhead costs. Or do they hope to reduce these costs by providing better quality ?

Manufacturers in the three regions each prepare in their own way the oncoming competitive battles. Though our empirical base is small, we would like to risk formulating the following hypothesis. Those manufacturers in the States and Europe who thought that they would be on a par with their world competitors, once they had overcome the unfavourable exchange rate with the yen and the quality advantage of the Japanese products, will come to a frightening discovery. The next competitive battle will be waged over the manufacturers' competence to overcome the age old trade off between efficiency and flexibility. Some of the world's best competitors have already moved considerably in that direction and as the results of the Manufacturing Futures Survey indicate, the average Japanese competitor seems to be farther down the road in discovering the problems related to this strategy.

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