FALLING BEHIND IN INNOVATION
The 1996 Report on the European Manufacturing Futures Survey

by

A. DE MEYER*
and
B. PYCKE**

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* Professor of Technology Management at INSEAD, Boulevard de Constance, Fontainebleau 77305 Cedex, France.

* Research Associate at INSEAD-EAC, Boulevard de Constance, Fontainebleau 77305 Cedex, France.

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The 1996 report on the European Manufacturing Futures Survey

Arnoud De Meyer and Bart Pycke*
INSEAD, Fontainebleau, France

INSEAD
Bd de Constance
77305 Fontainebleau Cedex

Tel : 33-1-60 72 40 40
Fax : 33-1-60 72 40 49

We are grateful to the 145 respondents who returned the questionnaire

* Arnoud De Meyer is Professor of Technology Management at INSEAD
Bart Pycke is Research Associate of the INSEAD Euro-Asia Centre

Abstract

Since 1983 we have carried out at INSEAD, the biannual Manufacturing Futures Survey. More than 10 years of empirical studies in manufacturing strategies in Europe have proven a valuable basis to analyse the manufacturing capabilities of the average European manufacturer and the action programmes which are implemented. Analyzing trends from previous surveys from 1986 till 1994, the results of the 1996 survey come as no surprise to us. The ability to compete on price and to introduce new products quickly remain the Achilles heel for European manufacturers. Europe's traditional strength in producing high performance products and the skills it acquired in quality management over the last decade may not be enough to fend off new, indigenous competitors from the Asia Pacific region. Although market pressures have prompted European firms to roll out new products more quickly, half of them made no improvement over the last two years in the timely completion of new product development projects or in decreasing the number of avoidable engineering changes. Manufacturing delivers but interface management, be it cross-departmental (e.g. in new product development projects) or inter-company (e.g. in the sourcing process), remains weak.

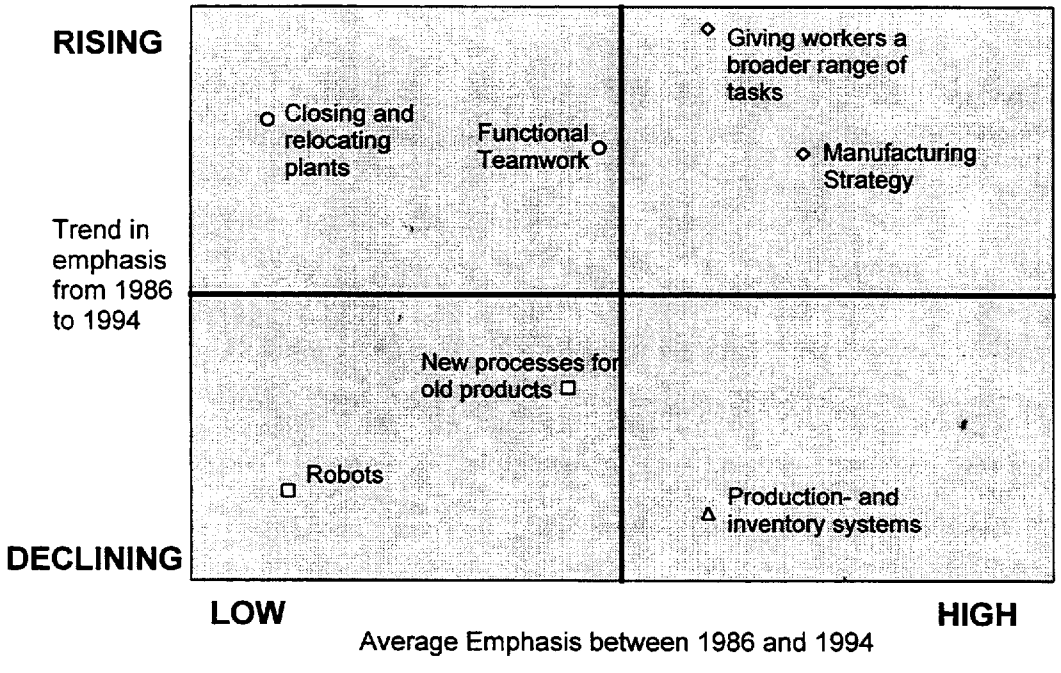
Key words : manufacturing strategy, international manufacturing, delivery systems

1. Introduction

For more than a decade now we have been empirically studying the manufacturing practices and strategies in Europe by using the Manufacturing Futures Survey[1]. Over this period we have seen some important shifts in the competitive priorities and the manufacturing action programmes of the average European manufacturer[2]. The competitive ability to offer a high quality product with low defects increasingly becomes an entry ticket in market which favours dependable deliveries and low prices. We have witnessed a trend towards people oriented action programmes and a drop in interest in technology driven solutions such as CIM and robotic systems. Despite this apparent disappointment with technology, we see a continuous investment in information technology, now driven by the company-wide deployment of holistic information systems .

In our longitudinal analysis we classified more than 20 manufacturing action programmes along two dimensions : average emphasis over the last decade and the trend in emphasis (rising or declining) over the same period (Figure 1).

Figure 1



Giving workers a broader range of tasks and the development of a manufacturing strategy had a high average emphasis and have continued to rise in emphasis over the last 10 years. While the implementation of improved production- and inventory

[1] The Manufacturing Futures Survey was first organised in 1981 at Boston University. In 1983, INSEAD (Fontainebleau) and Waseda University (Tokyo) joined the project. The survey is currently administred in 11 regions around the world.

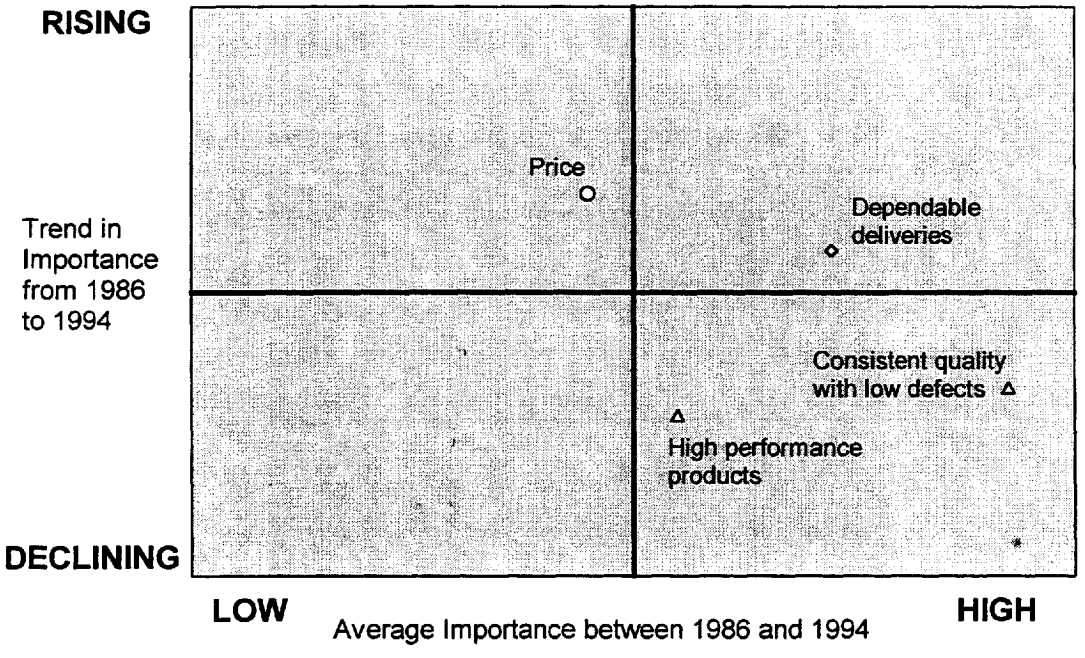
[2] For a detailed analysis of these trends, see "Separating the Fads from the Facts : Trends in Manufacturing Action Programmes and Competitive Priorities from 1986 till 1994", INSEAD EAC Working Paper 96/21/TM by Arnoud De Meyer and Bart Pycke

systems was high in emphasis, we witnessed a decline in emphasis over the last years. It may well be that the implementation of systems like MRP I and II has reached its limit as a tool for obtaining competitive advantage or that these systems have been replaced by different approaches like JIT. Functional teamwork and the closing and relocating of plants had a low average emphasis, but underwent a continuous rise over the last years. Robots and the introduction of new processes for old products were and become even more unattractive to the average European manufacturer.

Looking at these trends from a generic perspective we noticed that the most emphasized action programmes were in the field of integrative information technology and we witnessed a trend from "hardware-driven" automation to strategic human resources programmes.

Figure 2 classifies trends in competitive priorities along the same dimensions (average importance versus the trends over the last decade).

Figure 2



While the ability to deliver a consistent quality with low defects was the single most important competitive ability, its importance has been declining over the years. This confirms what most of us already observed : quality shifted from an "order winner" to a "qualifier" in the European market. The ability to offer goods dependably had in the past already a high average importance and has continued to rise. Low in average importance, but rising over the years was the ability to offer a low price.

With these shifts in mind, let us now analyse the findings of the 1996 European Manufacturing Futures Survey[3].

[3] For a description of the sample see Appendix A.

We begin our study by exploring the international context in which our firms are operating (chapter 2). Europe's response to the increased globalisation can be identified by looking at its competitive priorities which are reported in chapter 3. Competitive strength and weakenesses also are identified in chapter 4 by ranking performance improvements over the last two years. In chapter 5, we report on the past pay-off and future emphasis of 44 action programmes and improvement initiatives. Finally we analyse two area's in which European companies seem to have major difficulties to improve : innovation (chapter 6) and supply chain management (chapter 7). Our conclusions are summarised in chapter 8.

2. The international context

Table 1 shows the extent to which the average European firm has globalised its sales, manufacturing and purchasing activities in the year 1995. Even more important than the 1995 status, is the expected increase in international activities over the next three years (Table 2). The trend is clear : less activities at home and in Europe and this not only in manufacturing but also in sales and purchasing.

Table 1

International sales, production and purchasing (in % of the total)

	Sales 1995	Production 1995*	Purchasing 1995
Domestic	43.07	75.86	51.26
Europe	35.91	16.42	31.71
Rest of the world	21.02	7.72	17.03
Total	100.00	100.00	100.00

*Note : The high proportion of domestic production is a consequence of the fact that some respondents filled out the questionnaire for a European plant or a business unit focusing on Europe.

Table 2

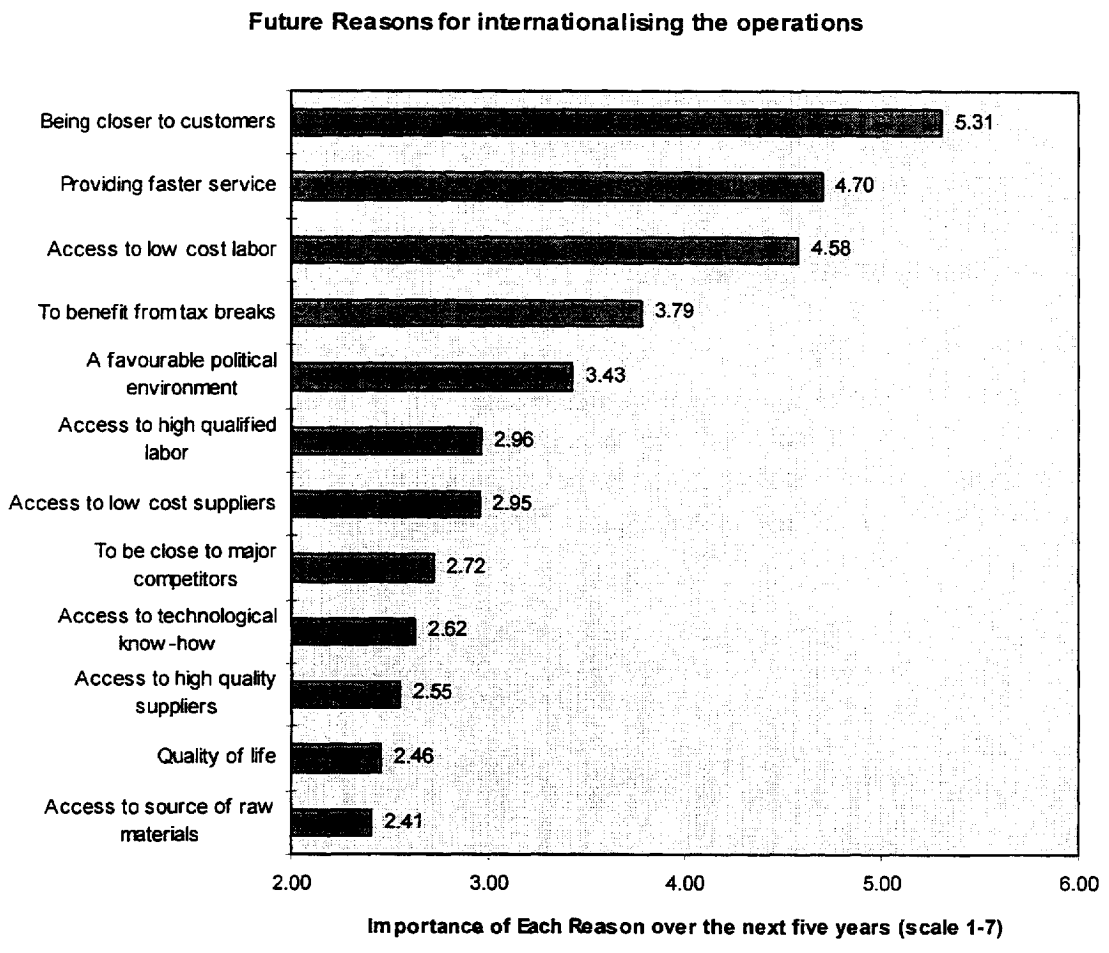
The expected increase in internationalisation

	SALES Expected change from 1993 to 1996**	SALES Expected change from 1995 to 1998***	MANUF. Expected change from 1993 to 1996**	MANUF. Expected change from 1995 to 1998***	PURCH. Expected change from 1993 to 1996**	PURCH. Expected change from 1995 to 1998***
Domestic and Europe	- 3.0 %	-3.4 %	-3.8 %	-3.6 %	-4.8 %	-4.8 %

** 1994 EMFS
*** 1996 EMFS

Surprisingly it is not the search for low cost labor which is the main driver to go abroad (Figure 3). Proximity to customers and the ability to provide a fast service are more important reasons to internationalise. What we witness is the globalisation of the business as a whole and not just manufacturing looking for a cheaper production basis.

Figure 3



3. Price and New Product Development remain the Achilles heel of the European manufacturing companies

How do European manufacturers cope with this increased internationalisation ? Table 3 lists the future importance and the strength vis-à-vis the best competitor of a number of distinct competitive priorities in manufacturing. The right column (competitive strengths) clearly indicates that Europe still considers its ability to provide a superior quality product as its core competence. While quality remains to occupy the top two spots in the left column (future importance), that same column shows that other factors have to be taken into account : dependable deliveries, price and the quick introduction of new products. While dependability is favoured more than speed in delivery, the strength of the average European manufacturer is the reverse.

More alarming, however, is the gap between the importance and strength of the ability to compete on price and to introduce new products quickly. Europe's weakness to compete on price will pose a huge challenge as increased internationalisation will confront our firms more and more with new indigenous competitors specifically from the Asia Pacific region, whose competitive mode is often based on price. We can

expect the importance of price as a competitive prioritiy to continue to rise in the future.

The quick introduction of new products poses another challenge. Although the speed of new product development has increased, the current quality of the development process remains doubtful[4].

Table 3

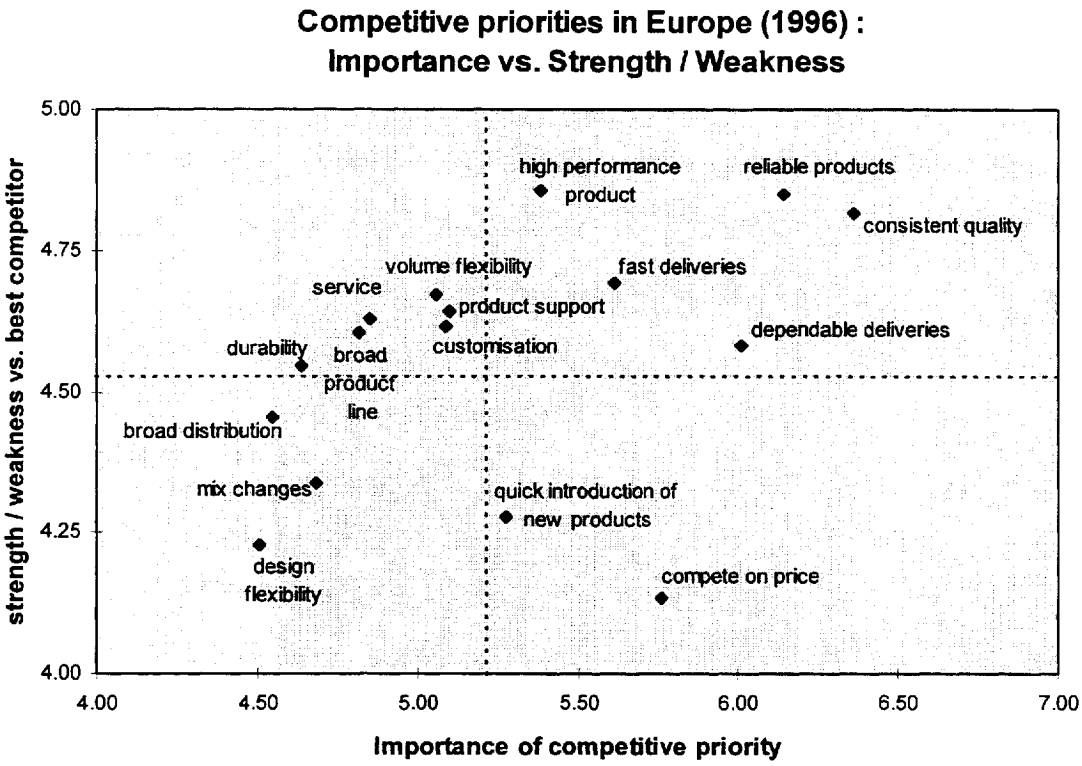
COMPETITIVE PRIORITIES AND STRENGTHS
in decreasing order of importance

Importance of the priority (ability to provide)	**Strength vs. best competitor (ability to provide)**
Consistent Quality with Low defects	High Performance Products
Reliable Products	Reliable Products
Dependable Deliveries	Consistent Quality with Low defects
Competition based on Price	Fast Deliveries
Fast Deliveries	Rapid Volume Changes
High Performance Products	Product Support
Quick Introduction of New Products	Effective After Sales Service
Product Support	Customize Products
Customize Products	Offer Broad Product Line
Rapid Volume Changes	Dependable Deliveries
Effective After Sales Service	Durable Products
Offer Broad Product Line	Easy Availability of Products
Rapid Mix Changes	Rapid Mix Changes
Durable Products	Quick Introduction of New Prod.
Easy Availability of Products	Design Flexibility
Design Flexibility	Competition based on Price

The results are summarised in Figure 4 in which we plot future importance versus strength vis-à-vis best competitor. The quadrant in which importance and strength are high, groups Europe's core competence : quality and delivery. However, our trend analysis signalled that quality has increasingly lost its ability to function as a competitive differentiator. Priorities in the 4th quadrant with a high importance but which are currently a weakness identify the Achilles heel in European Manufacturing : the competition based on price and the quick introduction of new products.

[4] see also the section on the performance improvements

Figure 4



4. Impressive performance improvements

In what areas have European manufacturers made the most progress over the last two years ? We asked our respondents to construct mentally an improvement index for a list of manufacturing performance indicators. The index measures the percent improvement of the last two years. The end of 1993 is the baseline so the value of the index in 1993 is 100. Since we asked for perceptions, the numbers in Table 4 should not be taken literally but rather seen as a trend of what areas have been characterized by a noticeable improvement and in which areas European manufacturers are struggling to get their performance up. We observe an important increase in profitability with an average profit improvement of 27% over the last two years. Significant progress also has been made in the physical manufacturing process (indicators 2,4,6,9) and the delivery process (indicators 5,8,10). As noted previously in the report on the 1994 Manufacturing Futures Survey : manufacturing delivers ![5]

Performance improvements in the product development process have been mixed. On the one hand, the speed of new product development ranks in the top three for the first time (up from rank 8 in 1994) and the extent to which products meet customer needs has improved. But on the other hand, half of the companies that participated in our survey made no improvement in the on-time completion of new product development projects nor in reducing the number of avoidable engineering changes over the last

[5] See also "Manufacturing delivers ! But will this be enough", INSEAD Working Paper 1994 by Arnoud De Meyer

two years. Although the speed of the product development process improved due to market pressures, the quality of the new product development processes has made far less improvement.

European manufacturers struggle with the relationship with their suppliers. (cfr. indicator 20,21). Despite all the talk (or hype ?) about supplier partnerships, it is surprising that half of the companies were not able to reduce the procurement lead time and procurement defect rates over a two year period. While the downstream delivery process is making steady progress, the upstream sourcing process remains the weak link in the overall supply chain.

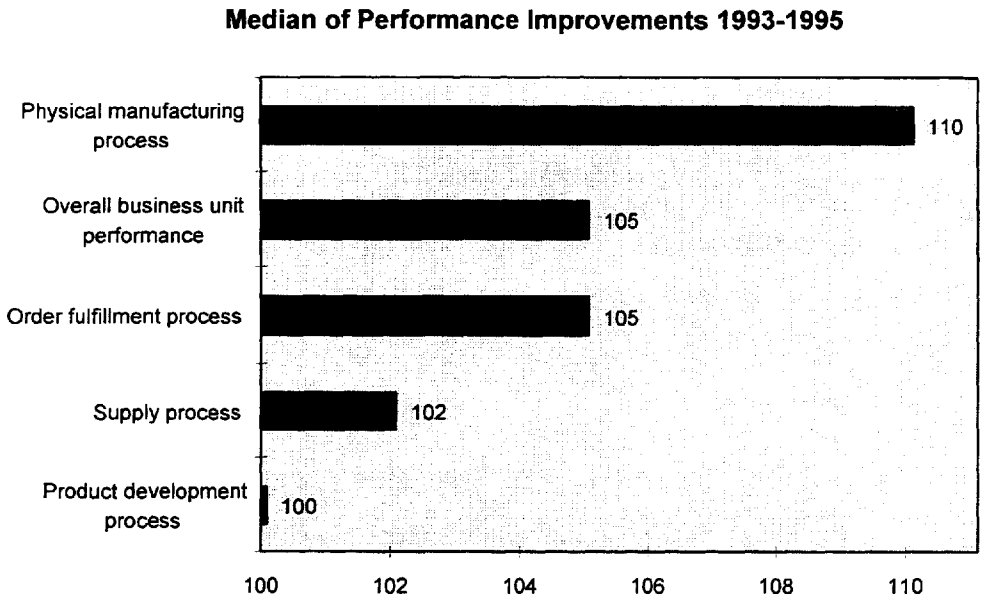
Table 4

PERFORMANCE IMPROVEMENTS 1993-95

	Indicator	**Average**	**Median**
		Improvement in % (100 = base in 1993)	
1	Profitability	127.51	110
2	Manufacturing cycle time	124.68	110
3	Speed of new product development	115.94	105
4	Productivity of direct production workers	115.85	110
5	Delivery lead time	114.74	110
6	Work-in-process inventory turnover	114.62	105
7	Extent to which products meet customer needs	113.15	110
8	On-time delivery to customers	113.15	105
9	Defect rates at end of manufacturing	111.77	110
10	Finished goods inventory turnover	111.57	105
...	.....	...	...
18	On-time completion of new product development projects	107.62	100
19	Defect rates in customer's hands	107.49	105
20	Defect rates of procured materials	107.25	100
21	Procurement lead time	106.77	100
22	Setup time	106.20	105
23	Number of avoidable engineering change orders	102.90	100

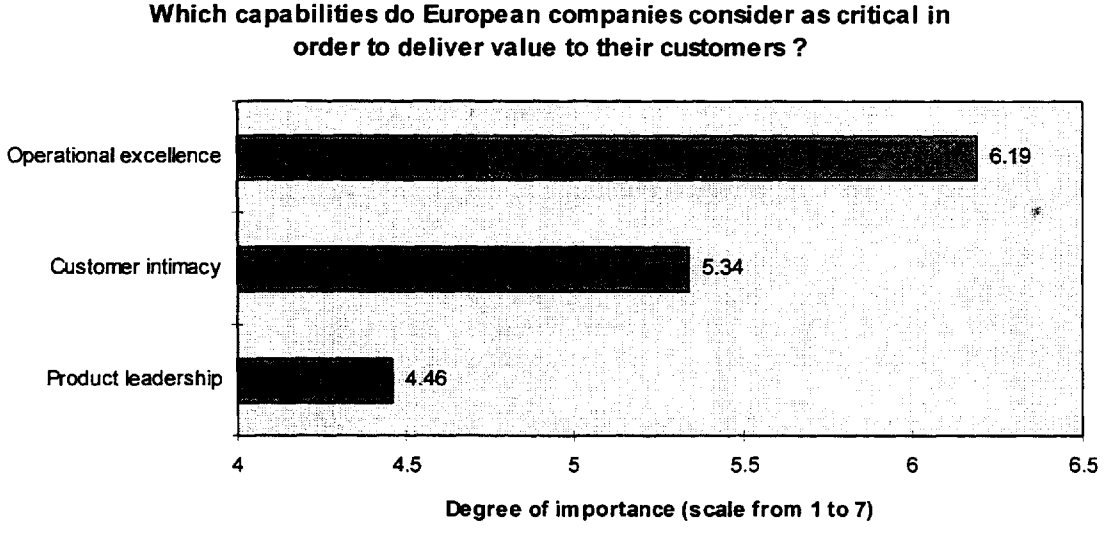
Figure 5 groups all performance indices into 5 categories : The physical manufacturing process, the overall business unit performance, the order fulfilment process, the supply process and the product development process. The results confirm our analysis : areas which are internal to the manufacturing function underwent the biggest improvement. Meanwhile the supply process and the product development process are falling behind. European manufacturers seem to have difficulties managing outside their boundries and do not make significant improvements in areas where interface management is important, be it with R&D (in the case of new product development) or with outside suppliers (in the case of the supply process).

Figure 5



Considering the above conclusions, it comes as no surprise to us that European firms view 'operating excellence' as the critical in order to deliver value to their customers as opposed to customer intimacy or product leadership (Figure 6). We wonder if this strategic mode was chosen intentionally or the default consequence of weak capabilities in product development.

Figure 6



While the average European firm does not see customer intimacy as their core strategy, it cites closeness to its customers as the primary reason for globalisation (see the paragraph on the international context). Does that entail that the competitive mode of the our firms is different when they operate in Europe than in the rest of the world ? For a company competing on operational excellence, we would except reasons such as the possibility to deliver a fast service and the access to low cost labour and low cost suppliers to be more important than the proximity to its clients.

We hope that this discrepancy does not signify that the decision to move into Asia has been taken by opportunism.

Competing on 'Operational Excellence' might seem an obvious choice in view of Europe's capabilities in quality and delivery, but this strategy might hit Europe as a boomerang, once all players in the international competition attain the operational capabilities required by the customer and competition will be based on price.

5. Improvements through quality management and people

Table 5 reveals the past popularity and perceived pay-off of various manufacturing initiatives. In the list we see that the action programmes with the highest popularity are centred around people and quality. 'Soft' activities prevail over 'hard' technology driven solutions. The past emphasis of most programmes is in line with their pay-off. ISO 9000 is perceived as the action programme having the highest payoff. Action programmes with the highest emphasis are those 'without beginning, nor end' : continuous improvement, cross-functional teams, employee training[6]. For the first time in Europe, activities to protect the environment have ranked in the top 10 of the most popular programmes. One time investments in technology are regarded as having a low pay-off.

Table 5

POPULARITY AND PAY OFF OF ACTION PROGRAMMES EUROPE 1994-1996 (44 actions were proposed)

Popularity (most to least)	**Perceived Pay off (highest to lowest)**
Continuous improvement	ISO 9000
Worker training	Continuous improvement
Improving the quality of work life	Cross-functional teams
Developing new performance measures	Worker training
Supervisor training	Supervisor training
Management training	Management training
Total quality management (TQM)	Reorganizing plant networks
Developing a manufacturing strategy	Developing a manufacturing strategy
Improving manufacturing processes to protect the environment	Customer partnerships
Empowerment	Reconfiguring plant layouts
...	...
Design for manufacture	Integrating IT with suppliers and distributors
Closing or relocating plants	Increased use of recyclable materials
CIM	Simple pick & place robots
Simple pick & place robots	Complex robotic systems
Complex robotic systems	Reverse Logistics

6 A similar observation is made in "Operations Capabilities and Strategic Competencies: Transform and Leverage", INSEAD Working Paper 1996 by Arnoud De Meyer and Jay Kim.

The future (Table 6) builds on the past experience : a continued emphasis on people and quality. Yet we note two areas in which future action is not in line with past pay-off.

European firms keep investing in IT without reporting a pay-off. Why ? We kept posing ourselves this question in every survey since 1990. We can only speculate on the origin of this inconsistency. Maybe productivity gains in IT are extremely difficult to measure, so that many respondents don't perceive a pay-off. The situation is comparable with that in the banking industry where large investments in IT are considered inevitable but do not seem to lead to competitive advantage.

Supplier partnerships are also on high on the agenda, while absent in top of the pay-off table. This focus on partnerships is not a bit too late considering the slow progress Europe has made in improving supplier relations.

Table 6

FUTURE EMPHASIS ON ACTION PROGRAMMES IN DECREASING ORDER OF EMPHASIS

Continuous improvement
Cross-functional teams
Developing a manufacturing strategy
Worker training
Customer partnerships
Supervisor training
Empowerment
Integrating IT across the BU
Management training
Total quality management (TQM)
Integrating IT within manufacturing
Supplier partnerships
Benchmarking
....
CAD and/or CAE
Design for manufacture
Closing or relocating plants
Reconditioning physical plants
FMC or FMS
CAM
CIM
Taking back products from customers
Simple pick & place robots
Complex robotic systems

Europe 1996

6. Innovation as a vehicle to increase or maintain market share

Although European manufacturers are still struggling to improve their product development skills, they are well aware of the benefits that new products must bring in the future. On average 29 % of sales were generated by products introduced within the past three years.

Innovations are mainly regarded as a tool to the increase market share, improve product quality and develop or expand foreign markets (Table 7). Despite Europe's weakness in competing on price, reducing costs through innovation is only seen as secondary.

From the list of action programmes, we infer that Europe intends to implement its manufacturing innovation mostly through people with activities such as cross-functional teams and training. Investments in tools like CAM, CIM, CAD, robotic systems are not emphasized.

We wonder if Europe's passive approach to technology, and information technology in particular, will not hamper future improvements in product development and supply chain management, activities which span different functions in different companies and in which a transparent information exchange is critical.

Table 7

BENEFITS THAT FUTURE PRODUCT OR PROCESS INNOVATIONS MUST BRING
(decreasing order of importance)

Maintain or increase market share
Improve product quality
Develop or expand foreign markets
Reduce product costs by lowering materials costs
Reduce product costs by lowering overhead costs
Extend product offerings within the main product line
Reduce product costs by shortening production cycle time
Replace products being phased out
Reduce product costs by lowering labor cost
Reduce environmental damage
Meet government regulations
Extend product offerings beyond the main product line
Improve working conditions and safety
Create new domestic markets

7. Improving supply chain management through information exchange

Integrated Supply Chain Management (ISCM) is an approach adopted by leading manufacturers in order to achieve a more direct and simple flow of information and materials from suppliers to producers to end-users. We asked all respondents to characterise their current level of inter-organisational integration and the initiatives which they use to achieve an effective ISCM.

Figure 7 shows that European firms have no difficulty exchanging product specifications but rather do not want to share information on demand forecasting. They are more willing to share current inventory levels than forecasts .

Mapping the current status of implementation of 9 ISCM initiatives against their future importance, we reach the following conclusions (see Figure 8) : ISCM initiatives which relate to the exchange of information between the different partners in the supply chain are well implemented and are considered of strategic importance for the future. The reduction of the number of suppliers, although currently well implemented, is not seen as an area of future importance to enhance supply chain competitiveness. Perhaps this supplier reduction has been already achieved in a sufficient way. European companies have no plans to reduce the number of distributors. We observe that companies are hesitant to set up more sophisticated initiatives to share risks or rewards, an area traditionally considered as one of the key benefits of ISCM.

The conclusion is that European companies want to improve their supply chain performance by exchanging more information with partners without necessarily reducing the number of partners in the chain. We believe that this may not be ambitious enough in the current world competition.

Figure 7

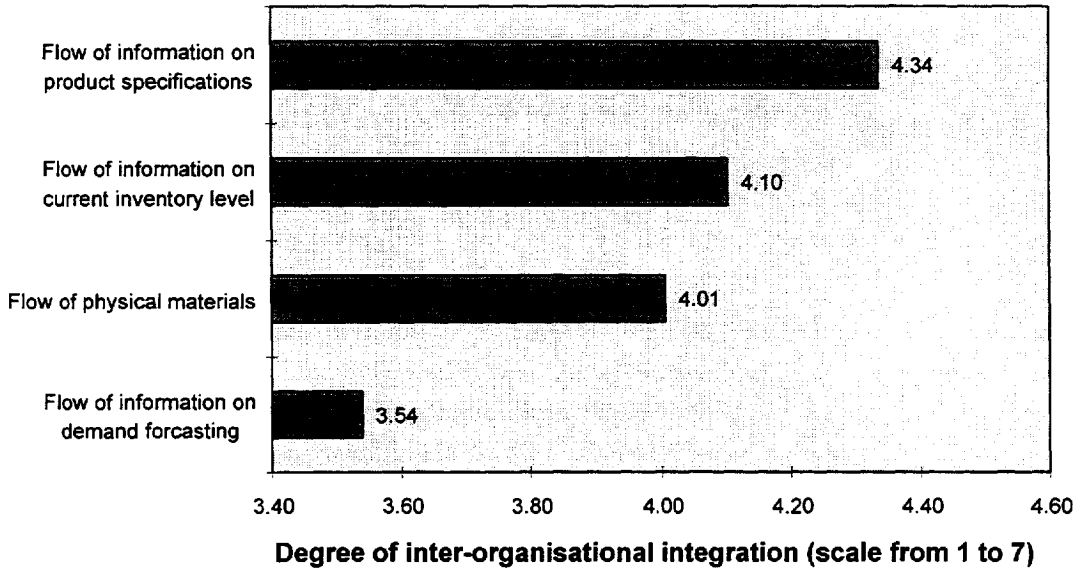
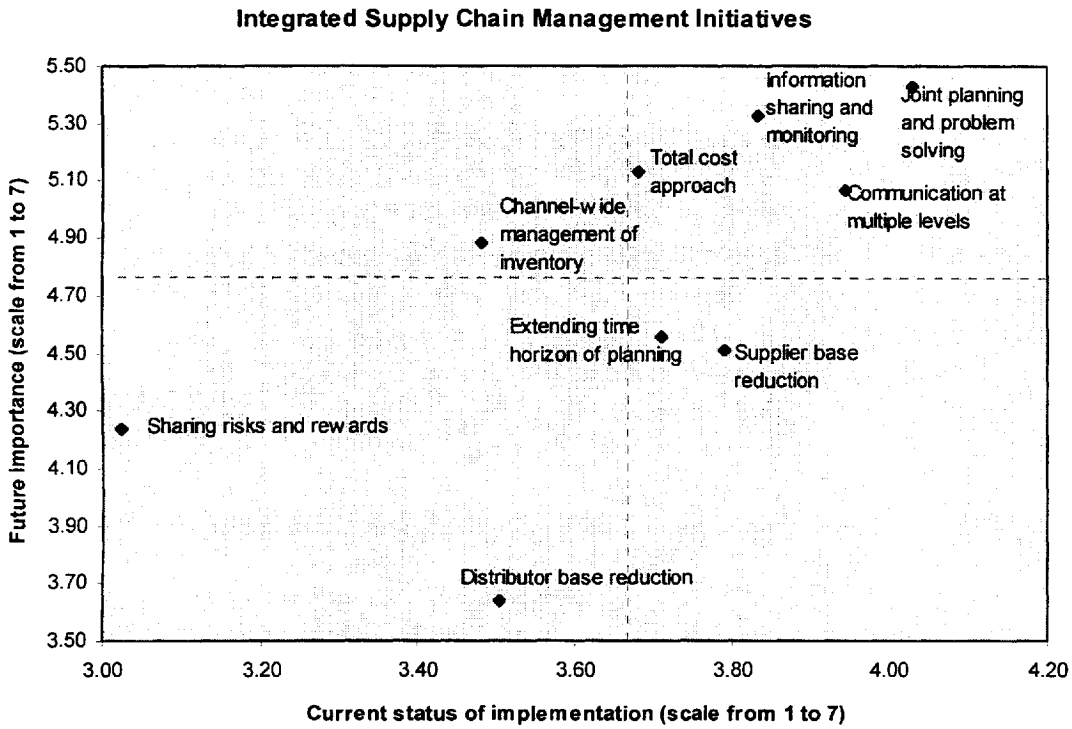


Figure 8



8. Conclusion

Our conclusions on the results of the 1996 European Manufacturing Futures Survey can only be mixed. We observe that European manufacturers have increased their profitability and made significant improvements in the performance of their manufacturing systems. Future action programmes, centred around people and quality, should provide our manufacturing companies with a solid competitive base for the increased international competition.

In a time of rapid technological change, we find it discomforting that companies are frustrated with technology. But we do understand them : computer systems have been oversold, promises not kept. However, with the increased availability of real-time data, we will not only have to rethink our manufacturing and supply chain systems, but we will also need to consider what impact this evolution will have on the way we collaborate and compete. We need to be more ambitious in integrated supply chain management. Technology can help us share information more effectively with our supply chain partners, but only vision and courage can help us decide how to position in the value chain.

Manufacturing still matters but its seems that in order to extract value from it, we may need to emphasize other aspects of the manufacturing function, like its links with R&D and suppliers.

In an international competition there is little change that Europe will win on price competition. So we will have to innovate more. Sadly enough new product development is the area in which we observed the least progress over the last two years. New products are launched more quickly but this is perhaps due to market presssures and not to improved skills in innovation management. Half of the companies report no progress in reducing the number of avoidable engineeering changes, nor in the on-time completion of new product development projects. With 29 % of our sales coming from products introduced within the last 3 years we cannot neglect innovation any longer. Improving our ability to innovate will require a balance of people-orientated programmes and technology deployment. While we observe a willingness to invest in people, we fear that Europe's passive approach to technology will be a major barrier to improve its innovation capability .

APPENDIX A

This year we received 145 responses to the survey (from 1500 questionnaire which were sent out). The answers came from 17 different countries and represent a wide variety of different industries (on a three digit SIC level).
27 % of the respondents answer for a company, 37 % for a division and 27 % for a plant. The rest is non specified or other.
Consumer goods producers represent 29.7 % of the sample. 22 % of the sample describes its production process as a process production flow, while 78 % describes it as a discrete production flow.

The survey is biased towards the more successful manufacturing organisations: the respondents had on average a growth rate in unit sales of 10.3 %, and made a net pre-tax profit of 8.14%.

Some salient characteristics of the respondents are :

• sales of primary product as % of total sales	75.29 %
• market share of primary product	27.85 %
• percentage of sales generated by products introduced within the last three years	28.69 %
• capacity utilisation	81.07 %
• average lead time for conversion	37.33 days
• first pass yield	90.93 %
• inventory turnover	10.75
• % of on-time deliveries	88.76 %
• cash-to-cash cycle time	74.28 days
• existing backorders as percentage of sales	15.14 %
• outstanding accounts receivable as percentage of sales	12.11 %
• manufacturing cost as % of sales	51.2 %
• materials as a % of manufacturing cost	54.14 %
• direct labour as a % of manufacturing cost	21.11 %
• cost of physical distribution as % of sales	6.15 %
• lead time for new product development	24.5 months