

**THE SHIFTING PARADIGMS OF MANUFACTURING :
INVENTORY, QUALITY AND NOW VERSATILITY**

by

Kasra FERDOWS

N° 85 / 06

Director of Publication :

Kasra FERDOWS

Associate Professor of Production
and Operations Management, INSEAD

Printed by INSEAD,
Fontainebleau, France

**This is a working draft, for your private use only.
Please do not quote or duplicate.**

**Kasra Ferdows
March 1985**

**THE SHIFTING PARADIGMS OF MANUFACTURING:
Inventory, Quality, and now Versatility**

Since the late 1970's, three fundamental paradigms in the management of manufacturing have been questioned and are being almost reversed: The first is the paradigm on the role of inventories in the production flow, the second the paradigm on the cost of quality, and the third the paradigm on the versatility of production. Together they call for a fresh perspective which recognizes that a) inventories can amplify--instead of smoothen--the fluctuations in the production load, and hide the problems, b) improvement of quality can reduce--instead of increase--the costs, and c) automation can broaden--instead of narrow down--the range of products and services economically produced in a production system.

It is intriguing to see so many of these long-held views being questioned in such a relatively short period. The signals indicating the need for rethinking in almost all these areas were given in the literature decades ago. But somehow mere modelling and logical arguments do not seem to have been sufficient for convincing the practitioners of this field. The recent emergence of some consensus, it seems, has been essentially due to a small number of leading-edge manufacturers who appear to achieve superior performance by, among other things, deliberately ignoring the conventional wisdom and rules of thumb on inventory, quality and versatility.

In this article, after explaining how the shifts in thinking in each of these three areas have come about, we focus on their combined effect on some of the key elements of manufacturing management. We believe the fresh perspective which results from appreciating these shifts in thinking opens exciting prospects for the role of manufacturing function in the company. We build our argument on the research reported in the literature, our own clinical studies of over twenty leading manufacturers world-wide, and the results of a recent survey of about one thousand manufacturers in Western Europe, North America, and Japan (1).

THE SIGNS ON INVENTORY

One of the first signs pointing out the need for reexamination of the role of inventories in smoothing the fluctuations in the production flow dates back to the 1950's. Through simulation, Forrester (2) showed how the existence of inventories could aggravate, and not smoothen, the fluctuations of the production load. The reason, as was also pointed out then, is that inventories, by blocking the flow of information, prevent the upstream operations from monitoring the movements in the downstream operations. Furthermore, many otherwise reasonable rules for inventory management (such as economic lot sizing, reorder point, "min-max") seem to accumulate the small fluctuations and release them to upstream operations in big waves.

The wide spread recognition of this phenomenon had to wait until the late 1970's when the excellent results achieved in a small number of mostly Japanese companies were publicized. Any manager who would hear that, for example the turnover ratio of inventory assets (annual sales : average inventories) at Toyota Motor Company in 1980 was 87--i.e., their investment in inventories was on average equivalent to only 4 days of sales (3)-- could not help but become very curious.

How could that be achieved? Behind the simplicity (hence, the elegance) of the just-in-time and the Kanban systems lies a sophisticated philosophy: The managerial and technical talents should be channelled towards removal of the reasons for building and carrying inventories rather than on devising clever and sophisticated models for optimising the stocks. No reason is regarded as sacred in the long run: Set up times can be reduced, machine breakdowns can be prevented, operators can become multi-skilled, schedules can be stabilized over a longer planning horizon, relationship with the suppliers can be substantially changed, etc.

The researchers have tried to keep up with the sudden surge of interest. In the last five years, the number of works in this area reported in the literature has increased consistently (4). However, it seems to us that it would take several more years before this new perspective on inventories is widely accepted by the operating (and senior) managers of the manufacturing companies in the west. Earnest attempts are under way in a number of large companies, particularly in the electromechanical, textiles, and electronics industries on both sides of the Atlantic(5). But, this being a slow and gradual process, successes are not yet reported widely.

THE SIGNS ON QUALITY

No one has really questioned the importance of quality as a source of competitive advantage. However, the assumption has always been that better quality comes at a cost. Much attention--both in the literature and the management circles-- has therefore been paid to finding an "optimum" point in the trade-off between gains from better quality and losses due to additional costs.

The messages of the early prophets such as Deming and Juran--again dating back to the 50's (6)-- were regarded mostly as that the full market value of a better quality product needed a better appreciation, and that there were more intelligent ways to reduce the costs associated with ensuring that only such quality products would reach the market. Powerful tools and techniques--from statistics, marketing research, strategic planning and other fields-- have since been effectively employed to measure, analyze, model, and optimize these costs and benefits.

But in the late 70's serious doubts about the nature of the trade-off between cost and quality started to be reported in the literature (7): If the issue was to find the most "economic" point in this trade-off, then why did some (successful) companies continue their efforts to reduce rejects past what was normally considered economic? How can one justify striving for "zero defects"? Why are so many companies relentlessly improving the quality of the product they put in the market?(8)

We share the views of the few who believe that the real answer to these questions is that better quality is not just a noble end in itself, but also a means for higher total productivity. In other words, while it is currently true that a) the importance of quality as a competitive factor is more widely and keenly recognized, b) the total cost of rejects and poor quality is more accurately measured and considered, and c) more efficient ways for control and upgrading of quality are continuously discovered (9), still all together, they do not fully explain the rationale for aiming for perfect quality.

A full explanation is possible only if we discard the existing quality paradigm. If we accept that quality is not costly-- or better, that it is "free" (10)--and that the rejects and the poor quality products are valuable sources of information for diagnosis of the specific problems which hinder the company at any given time, then the endless pursuit of perfection in quality makes sense. It means that rejects and poor quality, instead of being hidden, would be brought into the limelight; that quality would concern the whole organisation.

THE SIGNS ON VERSATILITY

Automation of a production system, while improving its productivity, has also hindered its versatility. The landmark study of Abernathy (11) and Abernathy and Utterbeck (12) provides an excellent historical perspective on how this has happened in several industries, most notably in the automotive industry.

They show that the productive units in any industry normally go through certain "natural" phases which are marked by the degree of automation employed, the layout and pattern of product flow through the unit, the dedication of equipment to specific products, the range of tasks performed by the labor, and generally the planning and control systems used for managing the unit. In pursuit of better efficiency, these (and other) elements of production are modified to reduce waste and underemployment of men and machines, as well as to increase process reliability, consistency and predictability; however, these objectives are achieved at the expense of flexibility, for example customisation, introduction of new product designs, changes in product mix, varying delivery dates, and capacity utilisation. Briefly, the natural competitive drive towards cost efficiency tends to transform a productive unit from a state of "fluidity" to a state of "rigidity"--in fact so rigid that after a point it resists even efficiency improvement innovations.

In the literature, the early warnings about the existence of a whole range of trade-offs in manufacturing, including the above, dates back to the late 60's (13). Later works, which number many (14), have delved into the subject much further and elaborated on how to make deliberate decisions about each of these trade-offs. The product-process matrix, for example, is a good model for portraying the position of a factory in relation to some of these tradeoffs (15).

In the early 80's, however, we are witnessing major challenges to the very nature of some of these trade-offs. There is talk of "economy of scope" instead of "economy of scale" (16), "mass production" of very small batch sizes (17), and the ability to custom-make each product with a very short lead time. The basic issue being challenged is essentially: Is it necessary to sacrifice versatility when efficiency, dependability, and consistency are pursued?

The answer, until recently, has been yes. Production technology dictated it. The means for achieving efficiency, dependability, and consistency have been essentially standardisation and inflexible mechanisation. These technically limit versatility. Moreover, the ensuing manufacturing organisation and production management system generally limit it further.

But the new production technologies--driven by the computer and the microprocessor--are creating viable alternatives to standardisation and mechanisation. Flexible automation combined with computer integrated design, engineering, scheduling, procurement, material handling, manufacture, distribution, and eventually cost accounting, sales and billing can change the answer. They require enormous financial and managerial investments; but most experts believe that the technological reasons for sacrificing the production versatility are being gradually removed. The current issues, they argue, are:

- a) How to assess the versatility offered by these new production technologies? and
- b) How to put an appropriate management system in place so that once these technologies are acquired, they are used to their full potential?

The empirical evidence that supports the views of these experts has started to surface in the literature in the last four years (18), and more recently in at least two major surveys--one done in the United States (19), and another one (which we referred to earlier) done in Europe, Japan, and North America. Based on the evidence so far, one can strongly suggest that the conventional view on the factors determining the versatility of manufacture needs a fundamental reexamination.

We are thus witnessing major shifts in three important paradigms in manufacturing. What are the implications of these shifts for the management of manufacturing?

* * *

NEW PERSPECTIVE--NEW PROSPECTS

Adjustment to the new thinking about any one of the above factors--inventory, quality, and versatility-- would be difficult for all but exceptional managers, and even more difficult for the organisations. At best it would require months or years before the old paradigm is abandoned and the new one is fully accepted. Having to cope with the three simultaneously risks havoc. That is why managing this challenge successfully can be a very rewarding and profitable experience.

The first implication of this change of perspective is that the boundaries of what is currently achievable in manufacturing become blurred. Even a few years ago, who would have really believed that one could rely on multitude of suppliers to deliver parts of practically perfect quality several times a day? That the yield of certain production processes could be improved by an order of magnitude? That the information flow from design to engineering, costing, raw materials ordering, and actual fabrication can in fact be only electronic signals? And many other seemingly impossible tasks which are now proven to be practical.

These achievements are difficult to explain unless we break out of the existing moulds. For the last thirty years we have assumed that manufacturing is a function where the capabilities are known, measurable, and stable. The new perspective implies that manufacturing capabilities are unstable, not easily measurable, and not accurately predictable.

If we view the reduction of inventories and improvement of quality not just as valuable ends (as we have been), but also as valuable means for diagnosis and removal of obstacles anywhere in the company, then we would expect the outcome of such programmes to be not a point capability, but a continuum. The resulting cost-benefits, therefore, would be constantly evolving. These results would be more difficult to measure since a major part of them occur in areas other than those normally considered to be affected. Combined with the new frontiers of versatility opening up at an accelerated pace nowadays, prediction of potential manufacturing capability has become indeed difficult.

Full acceptance of this point would call for a fresh examination of many systems, procedures, and policies in the management of manufacturing. We shall limit ourselves here to four key areas where we see a need for major changes:

1. Internal Control of Operations
2. Manufacturing Investment Decisions
3. Manufacturing Strategy
4. Skills for Manufacturing Management

The changes we propose in all these areas are long-term. In fact what we are suggesting is a direction for change, not specific systems, procedures, or policies. We believe persistent work in these directions will go a long way towards putting the organisation on the right course for excellence in manufacturing.

1. Internal Control of Operations

The challenge here is to promote--not just recognize--continuous improvement efforts. Most of our existing manufacturing control systems assume stability of time standards, lead times, line balancing and routing procedures, methods, staffing, wage and incentive systems, inspection methods, product mix-- just to mention a few parameters. These systems can of course adjust to changes in any one of these parameters; but each time they assume a new set of stable conditions until the next time another change has made the system inefficient or inappropriate.

The goal is to move towards a control system which assumes constant changes in these (and other) parameters. Such a system would allow localised changes in, for example methods, standards, lot sizes, yield rates, and lead times before communicating them to some centralised location. It would maximise the freedom for the direct supervisors and operators to initiate changes (through "quality circles" or any other mechanism which puts forward their ideas) and implement them, while ensuring (perhaps through ingenious ways) that the day to day operations upstream or downstream would continue unhindered.

Such ideal systems are yet to be devised. But some of the "subsystems" already observed provide glimpses of how such systems might work. Combination of "Management by Objectives" and "Quality Circles", for example, seems to have yielded good results in some companies(20). More "auto control", be it done at a group or individual level, also seems to help (21).

One area needing innovation is scheduling. Scheduling algorithms which self adjust to improvements (without needing to reshuffle everything or carrying a lot of inventories) would be needed.

Let us use an example to clarify this. Consider, for example one of the peculiarities of the "Kanban" and "MRP" systems: Among other things, each system also provides a production schedule for various work stations in the shop. In Kanban, production order for each work station is given by the subsequent work station; in MRP, all production orders are given by a central unit. For the MRP schedule to remain efficient, actual day-to-day results must be routinely collected in the central location and processed. In Kanban there is really no need to do so. Improvements can go on without affecting the day to day operations. The control system allows continuous minor local adjustments (by removing or adding cards) without needing to specify exactly how the schedule for any work station should be changed.(22)

2. Manufacturing Investment Decisions

If the investments in manufacturing are viewed as commitments to a continuous improvement programme--and not just a step-wise change of conditions--new attitudes towards uncertainty, planning horizon, and post-investment audit would have to be developed.

First, there must be more tolerance for ambiguity. As mentioned earlier, it is difficult to measure and assess the results of a continuous improvement program, especially since some of the benefits (and costs) occur in remote and unfamiliar areas. This does not necessarily mean taking more risks. It means relying more on the (yet) non-quantifiable factors.(23) It means treating the uncertainty in manufacturing decisions more and more as that in marketing, research and development, and human resource development.

Second, longer and more flexible planning horizons should be considered. Current practice in many companies is to consider the effects of the investment in question essentially during its payback period, or where a "hurdle" rate of return is specified, to follow some rule of thumb for determining the planning horizon (e.g., five years for investments in major machinery...). Investments to achieve greater versatility, better quality, and lower inventories require a rather lengthy start-up period (24). The planning horizon, therefore, should be long enough to allow full consideration of their long-term benefits. Moreover, when each investment is viewed as a part of a portfolio of investments in a larger programme, the planning horizon should be flexible enough to allow for the particulars of the larger programme.(25)

What is needed is more explicit attention to the rate of improvement (and not just the improvement itself) resulting from the investment. Concepts and models developed for the "Learning Curve" would be useful here. The challenge is to expand them beyond their existing limited scope to cover quality, versatility, and service in addition to costs.

Third, in post investment audit, too, the emphasis should be on monitoring the rate of improvement. Reports should highlight the rate of progress in productivity, quality, versatility and service, compare the actual with planned, give projections, etc. The evaluation criteria should reflect and enforce the commitment to a continuous improvement programme.

3. Manufacturing Strategy

The new perspective demands a major initiative in increased use and application of manufacturing strategy. Manufacturing strategy is simply a long-term plan for developing consistent operations policies and structures that provide facilities focused to achieve limited but key corporate strategic objectives. There are three reasons why development of such long-term plans becomes even more important.

First, without a long-term vision of the key operating tasks in support of the chosen competitive priority, encouraging the various subgroups and subprofessions which comprise the manufacturing function to seek and initiate continuous improvements in what they do could lead to conflicting production subsystems. There are simply so many types of versatility one can aim for: versatility for customisation, load fluctuations, demand uncertainty, delivery variation, product design changes, process innovations, product mix variation, to mention a few major ones. The grass root efforts to reduce inventories and improve quality can consciously or unconsciously enhance or hinder versatility along any one of these dimensions. The unleashed technical, managerial, and personal talents of the professionals in this function must be channelled in a direction which is clear to everybody (26).

Second, other functions in the company would be quickly and significantly affected by these improvement programmes initiated in manufacturing. If these programmes are successful, there would be questions and suggestions from manufacturing about procurement, cost accounting, distribution, sales and marketing, engineering, research and development, industrial relations, and human resource planning. Without their help, the prospects for these programmes would be very limited. Furthermore, there must be a mechanism for ensuring that the other functions continuously utilise the latest capability developed in manufacturing. We have seen many situations where, for example, the flexibility of a new machine is almost never utilised because orders from the sales department have not changed. Agreeing on a manufacturing strategy and understanding its full implications for each function in the company would therefore become more important (27).

Third, as already mentioned, capabilities hitherto unknown are being unravelled in manufacturing. This means that in an increasing number of industries manufacturing is going to become a more important source of competitive advantage. But to get there, the company has to embark on a long programme which enhances manufacturing capability gradually and consistently. We do not believe that strategic coup d'etats would work here. Even if one could buy the (elusive) "Automated Factory", it would take a lot of work to run it appropriately. Long-term plans have to be laid to prepare for that.

4. Skills for Manufacturing Management

The trends in the three areas described above have direct implications for the managerial tasks in manufacturing. For the middle management in this function these trends would tend to increase the proportion of the project-type work; and for the senior management, they would increase the importance of the ability to launch and monitor long-term improvement programmes.

This may call for substantial changes in the operating styles, managerial foci, and career profiles of the managers we currently find in these positions. Consider, for example the plant manager: The stereotyped "disturbance handler", "crisis manager", "take-charger", would have to be gradually replaced with (equally stereotyped) "disturbance anticipator", "crisis-avoider", and "team worker". (With apologies for exaggerating in order to make our point.) Routine work, operating problems, and incremental improvements are trusted to systems and operators. Collection of the real-time and detailed information about the situation in the shop (be it through plant tours, verbal reporting, open-door policy, or electronic information systems) would therefore become a less significant prerequisite for effective day-to-day management.

This should allow more time for dealing with people other than one's own subordinates. They could be managers in other functions, material suppliers, machinery suppliers, customers, competitors, systems analysts, etc. Ideally, all manufacturing managers--middle as well as top--should be encouraged and allowed to be reasonably exposed to such "outsiders" on a continuous basis. More innovative solutions may result than if they had to go through a "communication gate-keeper". Programmes for reduction of inventories, improvement of quality, and development of manufacturing versatility provide the vision for the innovations; working in project teams charged with moving along any or all of these programmes provides a practical mechanism for engaging the managers in these programmes.

Do these trends suggest that new kinds of managers would be coming through manufacturing? We think yes. In our clinical research of twenty leading manufacturing companies in the United States and Europe, we found that the managers who were considered as high potential and candidates for important positions in manufacturing were rather different from the oldtimers (which was not just a question of age). The oldtimers were basically engineering oriented, had come out of first-line supervision or the more professional end of operations management, and had climbed slowly to the top. They were especially strong on productivity, on standards and on mass production. They loved stability--in labor, schedules, product designs, and any other element which could potentially disrupt an otherwise smooth production flow.

The new ones are moving up faster. They are coming from much more varied career paths--from sales, from engineering, from marketing, from research and development; they are coming from personnel departments, computer programming; they are coming out of product management experience and programme management experience. They seem to be especially effective in dealing with ambiguity and change. They become bored if there is not enough change. So we see a new breed emerging.

* * *

FOOTNOTES

SHIFTING PARADIGMS OF MANUFACTURING

1. Global Manufacturing Futures Survey. Through a questionnaire, data on how large manufacturers in Europe, North America, and Japan are improving the effectiveness of their operations. INSEAD (Fontainebleau, France), Boston University (Boston, USA), and Waseda University (Tokyo, Japan) conduct this annual survey. For more information see:

a) THE STATE OF LARGE MANUFACTURERS IN EUROPE: Results of the 1984 European Manufacturing Futures Survey, by K. Ferdows and A. DeMeyer, INSEAD,

b) THE 1984 MANUFACTURING FUTURES PROJECT: Summary of North American Survey Responses, by J.G. Miller and T.E. Vollmann, Boston University, and

c) THE 1984 MANUFACTURING FUTURES PROJECT, SUMMARY OF JAPAN, by J. Nakane, Waseda University.

2. J.W. Forrester, "Industrial Dynamics," **Harvard Business Review**, July-August 1958.

3. Yasuhiro Monden, **Toyota Production System**, Industrial Engineering and Management Press, Atlanta, 1983.(p.iv)

4. See for example J. Nakane and R. Hall, "Management Specs for Stockless Production," **Harvard Business Review**, May-June, 1983, R.J. Schonberger, "Some Observations on the Advantages and Implementation Issues of Just-In-Time Production Systems" (**Journal of Operations Management**, November 1982), Masanori Moritani, **Japanese Technology** (Simul Press, Tokyo, 1982), and R.W. Hall, **Zero Inventories** (Dow Jones-Irwin, Homewood, Illinois, 1983).

5. Examples: Hewlett Packard in the US and in Europe, Renault in France, Philips Electronics in Europe, Ford Motor Company and General Motors in North America and Europe, Volvo in Europe, and many more manufacturers of all sizes.

6. J.M. Juran, **Quality Control Handbook** (McGraw Hill, New York, 1951), W.E. Deming, **Quality, Productivity, and Competitive Position** (Cambridge: Massachusetts Institute of Technology, 1982).

7. For an excellent sample, see F. Leonard and E. Sasser, "The Incline of Quality" (**Harvard Business Review**, September-October 1982), R.H. Hayes and S.C. Wheelwright, **Restoring Our Competitive Edge: Competing Through Manufacturing** (John Wiley and Sons, New York, 1984, Chapters 12 and 13), and Moritani (op.cit.).

8. One of the most striking findings in the Global Manufacturing Futures Survey (mentioned in Footnote 1) is the critical emphasis the manufacturers in all three regions are placing on quality. Consistently, in the 1983 and the 1984 surveys, these major manufacturers have ranked quality as the most important competitive factor for the following five years. For more details see the reports listed in Footnote 1.
9. See **Business Week's** Special Report on Quality, November 1, 1982 for more details.
10. P.B. Crosby, **Quality Is Free**, McGraw Hill, New York, 1979.
11. W.J. Abernathy, **The Productivity Dilemma**, The Johns Hopkins University Press, Baltimore, 1978.
12. J.M. Utterback and W.J. Abernathy, "A Dynamic Model of Process and Product Innovations by Firms," **Omega** 3, no. 6 (1975).
13. W. Skinner, "Manufacturing--Missing Link in Corporate Strategy," **Harvard Business Review**, May-June 1969.
14. See for example: W. Skinner, "The Focused Factory" (**Harvard Business Review**, May-June 1974), and **Manufacturing in the Corporate Strategy** (John Wiley and Sons, New York, 1978), S.C. Wheelwright, "Reflecting Corporate Strategy in Manufacturing Decisions" (**Business Horizons**, February 1978), and R.H. Hayes and R.W. Schmenner, "How Should you Organize Manufacturing" (**Harvard Business Review**, January-February 1978)
15. R.H. Hayes and S.C. Wheelwright, "Link Manufacturing Process and Product Life Cycles," **Harvard Business Review**, January-February 1979.
16. J. Goldhar and M. Jelinek, **Harvard Business Review**, November-December 1983.
17. See for example, "Manufacturing Technology: Tomorrow Comes to the Plant," **Dun's Business Monthly**, October 1984.
18. See **American Machinist's** Special Report on "Computers: Tool for Today" (June 1982), B. Gold, "CAM Sets New Rules for Production" (**Harvard Business Review**, November-December 1982), and T.G. Gunn, **Computer Applications in Manufacturing** (Industrial Press Inc.
19. S.R. Rosenthal, "A Survey of Factory Automation," **Operations Management Review**, Winter 1984.
20. One leading company in this area is Hewlett-Packard.
21. Good results are reported by Volvo, Philips, Siemens, Mercedes Benz, and many others.

22. Kanban and MRP systems have many other characteristics which make them suitable (or conversely, unsuitable) in different situations. Our purpose here is merely illustration of a difference between two scheduling mechanisms.
23. R.S. Kaplan, "Yesterday's Accounting Undermines Production," **Harvard Business Review**, July-August 1984.
24. W. Skinner, "Operations Technology: Blind Spot in Strategic Management," Working Paper no; HBS 83-85, Harvard University (1983), and Rosenthal (op.cit.)
25. This approach is also suggested by Gold (op.cit.)
26. W. Skinner, "Operations Strategy: Past Perspectives, Seven New Initiatives, and Future Opportunities," **Operations Management Review**, Summer 1983.
27. K. Ferdows, "Technology-Push Strategies for Manufacturing," **Tijdschrift voor Economie en Management**, xxviii, no. 2 (1983).

LIST OF INSEAD RESEARCH WORKING PAPERS

- 80/01 "Identifying cognitive style determinants of retail patronage, by Christian PINSON, Arun K. JAIN and Naresh K. MALHOTRA, January 1980.
- 80/02 "Dimensions culturelles des conceptions de management - une analyse comparative internationale", par André LAURENT Février 1980.
- 80/03 "Cognitive style and effective communication", by Arun K. JAIN, Naresh K. MALHOTRA and Christian PINSON, Dec. 1979.
- 80/04 "Accomodative cognitive style differences in consumer reduction of alternatives", by Naresh K. MALHOTRA, Christian PINSON and Arun K. JAIN, October 1979.
- 80/05 "Stability and reliability of Part-Worth utility in conjoint analysis : a longitudinal investigation", by Arun K. JAIN, Naresh K. MALHOTRA and Christian PINSON, September 1979.
- 80/06 "The expected future spot exchange rate, the forward rate, and the trade balance", by Charles A. WYPLOSZ, March 1980.
- 80/07 "Decline and adjustment: Public intervention strategies in the European clothing industries", by José de la TORRE, July 1980.
- 80/08 "The uncommon market: European policies towards a crisis industry - clothing in the 1970's", by José de la TORRE and Michel BACCHETTA, May 1980.
- 80/09 "Stratport: a decision support system for strategic planning", by Jean-Claude LARRECHE and V. SRINIVASAN, April 1980, Revised October 1980.
- 80/10 "A new approach to market segmentation strategy: a banking application", by Arun K. JAIN, Christian PINSON and Naresh K. MALHOTRA, March 1980.

- 80/11 "The exchange and interest rate term structure under risk aversion and rational expectations", by Charles A. WYPLOSZ, Revised Version, September 1980.
- 80/12 "Individual cognitive differences in MDS analysis of perceptions", by Arun K. JAIN, Naresh K. MALHOTRA and Christian PINSON, July 6-12, 1980.
- 80/13 "STRATPORT: A Model for the evaluation and formulation of Business Portfolio Strategies", by Jean-Claude LARRECHE and V. SRINIVASAN, April 1980, Revised November 1980.
- 80/14 "Les styles cognitifs : une nouvelle approche de la segmentation des marchés, by Christian PINSON, Naresh K. MALHOTRA and Arun K. JAIN, Septembre 1980.
- 80/15 "Cognitive styles: A new approach to market segmentation", by Christian PINSON, Naresh K. MALHOTRA and Arun K. JAIN, March 1980.
- 81/01 "Eurobanking, open market operations and the monetary base" by Herwig LANGOHR, August 1980.
- 81/02 "Alternative approaches to the theory of the banking firm: a note" by Herwig LANGOHR, September 1980.
- 81/03 "Why does beta shift when the length of securities returns varies?" by Gabriel HAWAWINI, December 1980.
- 81/04 "Forward market and the cooperative firm" by Gabriel HAWAWINI, January 1981.
- 81/05 "On some propositions regarding the behavior of the labor-managed firm under uncertainty" by Gabriel HAWAWINI, Jan. 1981.
- 81/06 "Impact of the investment horizon on the association between securities' risk and return: theory and tests" by Gabriel HAWAWINI and Ashok VORA, February 1981.
- 81/07 "New evidence on beta stationarity and forecast for Belgian common stocks" by Gabriel A. HAWAWINI and Pierre A. MICHEL, February 1981.

- 81/08 "Industrial policy in the European economic community : Crisis and change", by Kenneth S. COURTIS, June 1980.
- 81/09 "Dogmatism as a moderator of banking behavior and attitudes", by Arun K. JAIN, Christian PINSON and Naresh K. MALHOTRA, March 1981.
- 81/10 "Investment horizon, diversification, and the efficiency of alternative beta forecasts", by Gabriel A. HAWAWINI and Ashok VORA, March 1981.
- 81/11 "Organizational Development & Change", by Claude FAUCHEUX, Gilles AMADO and André LAURENT, April 1981.
- 81/12 "The Pricing of Risky Assets on the Belgian Stock Market" by Gabriel HAWAWINI and Pierre A. MICHEL, May 1981.
- 81/13 "A Test of the Generalized Capital Asset Pricing Model" by Gabriel HAWAWINI and Ashok VORA, May 1981.
- 81/14 "On the History of Yield Approximations" by Gabriel HAWAWINI and Ashok VORA, May 1981.
- 81/15 "Pitfalls of the Global Product Structure" by William H. DAVIDSON and Philippe C. HASPELAGH, May 1981.
- 81/16 "Adjusting Beta Estimates: Real Gains or Illusions?" by Gabriel A. HAWAWINI and Ashok VORA, June 1981.
- 81/17 "Do European Industrial Marketers Budget Differently? an International Comparison via the Advisor Model" by David WEINSTEIN and Gary L. LILIEN, June 1981.
- 81/18 "The Internationalisation of Manufacturing in the Automobile Industry - Some Recent Trends" by Yves L. DOZ, April 1981.
- 81/19 "Portfolio Planning: Use and Usefulness" by Philippe HASPELAGH, May 1981.
- 81/20 "Production Decisions in the Mixed Firm" by Claude VIALLET, Octobre 1981.

- 81/21 "Foreign Investment and Economic Development: Conflict and Negotiation", by José de la TORRE, April 1981.
- 81/22 "Forecasting Country Political Risk" by José de la TORRE and David H. NECKAR, March 1981.
- 81/23 "The Impact of Inflation on Real Variables: A General Equilibrium Approach", by Antonio M. BORGES, November 1981.
- 81/24 "An Assessment of the Risk and Return of French Common Stocks", by Gabriel A. HAWAWINI, Pierre A. MICHEL and Claude J. VIALLET, November 1981.
- 81/25 "Mode de vie et style de vie : Quatre observations sur le fonctionnement des termes" par Jean-François BERNARD-BECHARIES et Christian PINSON.
- 81/26 "Simulating an Oil Shock with Sticky Prices" by Francesco GIAVAZZI, Mehmet ODEKON and Charles WYPLOSZ, November 1981.
- 81/27 "Decomposing the Impact of Higher Energy Prices on Long-Term Growth" by Antonio M. BORGES and Lawrence H. Goulder.
- 81/28 "Forecasting for Industrial Products" by David WEINSTEIN.
- 82/01 "Estimating and Adjusting for the Intervalling-Effect Bias in Beta" by Kalman J. COHEN, Gabriel A. HAWAWINI, Steven F. MAIER, Robert A. SCHWARTZ and David K. WHITCOMB. February 1980, Revised October 1981.
- 82/02 "Friction in the Trading Process and the Estimation of Systematic Risk" by Kalman J. COHEN, Gabriel A. HAWAWINI, Steven F. MAIER, Robert A. SCHWARTZ and David K. WHITCOMB. November 1981.
- 82/03 "On the Mathematics of Macaulay's Duration: A Note" by Gabriel A. HAWAWINI. December 1981.
- 82/04 "Systematic Risk, the Investment Horizon, and the Market Index: an Analytical Examination" by Gabriel A. HAWAWINI and Ashok VORA, December 1981.
- 82/05 "Why Beta Estimates Depend upon the Measurement Interval" by Gabriel A. HAWAWINI. January 1982.

- 82/06 "Nationalization, Compensation and Wealth Transfer: an Empirical note about the French Experience" by Herwig LANGOHR and Claude VIALLET, 1981/1982.
- 82/07 "The Keynesian and Classical Determination of the Exchange Rate" by Emil-Maria CLAASSEN, May 1982.
- 82/08 "The Real Exchange Rate, the Current Account and the Speed of Adjustment" by Francesco GIAVAZZI and Charles WYPLOSZ, April 1982.
- 82/09 "Simulation: A Complementary Method for Research on Strategic Decision Making Processes" by Danielle NEES, May 1982.
- 82/10 "The Zero-Root Problem: Dynamic Determination of the Stationary Equilibrium in Linear Models" by Francesco GIAVAZZI and Charles WYPLOSZ, August 1982.
- 82/11 "The Theory of Risk Aversion and Liquidity Preference: A Geometric Exposition" by Gabriel A. HAWAWINI.
- 82/12 "The Effect of Production Uncertainty on the Labor-Managed Firm" by Gabriel A. HAWAWINI and Pierre A. MICHEL.
- 82/13 "On the Independence Between Deposit and Credit Rates" by Jean DERMINE, September 1982.
- 82/14 "Entrepreneurial Activities of INSEAD MBA Graduates" by Lister VICKERY, October 1982.
- 82/15 "Proportional VS. Logarithmic Models of Asset Pricing" by Gabriel A. HAWAWINI, July 1982.
- 82/16 "Capital Controls: Some Principles and the French Experience" by Emil-Maria CLAASSEN and Charles WYPLOSZ, October 1982.
- 82/17 "The Third World's Campaign for a new International Economic Order" by Jan MURRAY, October 1982.
- 82/18 "Extremity of Judgment and Personality Variables: Two Empirical Investigations" by Naresh K. MALHOTRA, Arun K. JAIN and Christian PINSON, April 1982. Revised July 1982.

- 82/19 "Managerial Judgment in Marketing: The Concept of Expertise" by Jean-Claude LARRECHE and Reza MOINPOUR, revised September and December 1982.
- 82/20 "Uncertainty and the Production Decisions of Owner-managed and Labor-managed Firms" by Gabriel HAWAWINI, September 1982.
- 82/21 "Inflation, Taxes and Banks' market Values" by Jean DERMINE, Janvier 1983.
- 82/22 "Bank Regulation and Deposit Insurance: Adequacy and Feasibility" by Jean DERMINE, February 1983 (second draft).
- 82/23 "Pour une étude critique du différentiel sémantique" par Christian PINSON, Avril 1982.
- 83/01 "Comparative Financial Structures: The Impact of Equity in Bank Portfolios" by Herwig LANGOHR, September 1983.
- 84/01 "A Technological Life-Cycle to the Organisational Factors Determining Gatekeeper Activities" by Arnoud DE MEYER, November 1983.
- 84/02 "La Politique Budgétaire et le Taux de Change Reel" par Jeffrey SACHS et Charles WYPLOSZ, Novembre 1983.
- 84/03 "Real Exchange Rate Effects of Fiscal Policy" by Jeffrey SACHS and Charles WYPLOSZ, December 1983.
- 84/04 "European Equity Markets: A Review of the Evidence on Price Behavior and Efficiency" by Gabriel HAWAWINI, February 1984
- 84/05 "Capital Controls and Balance of Payments Crises" by Charles WYPLOSZ, February 1984.
- 84/06 "An Uncertainty Model of the Professional Partnership" by Gabriel HAWAWINI, November 1983.

- 84/07 "The Geometry of Risk Aversion" by Gabriel HAWAWINI, October 1983.
- 84/08 "Risk, Return and Equilibrium of the Nyse: Update, Robustness of Results and Extensions" by Gabriel HAWAWINI, Pierre MICHEL and Claude VIALLET, December 1983.
- 84/09 "Industry Influence on Firm's Investment in Working Capital: Theory and Evidence" by Gabriel HAWAWINI, Claude VIALLET and Ashok VORA, January 1984.
- 84/10 "Impact of The Belgian Financial Reporting Act of 1976 on the Systematic Risk of Common Stocks" by Gabriel HAWAWINI and Pierre MICHEL, January 1984.
- 84/11 "On the Measurement of the Market Value of a Bank" by Jean DERMINE, April 1984.
- 84/12 "Tax Reform in Portugal: a General Equilibrium Analysis of the Introduction of a Value Added Tax" by Antonio M. BORGES December 1984.
- 84/13 "Integration of Information Systems in Manufacturing" by Arnoud DE MEYER and Kasra FERDOWS, December 1984.
- 85/01 "The Measurement of Interest Rate Risk by Financial Intermediaries" by Jean DERMINE, December 1983, revised December 1984.
- 85/02 "Diffusion Model for New Product Introduction in Existing Markets" by Philippe Naert and Els Gijbrecchts.
- 85/03 "Towards a Decision Support System for Hierarchically Allocating Marketing Resources Accross and Within Product Groups" by Philippe Naert and Els Gijbrecchts.
- 85/04 "Market Share Specification, Estimation and Validation: Towards reconciling seemingly divergent views" by Philippe NAERT and Marcel WEVERBERGH.
- 85/05 "Estimation uncertainty and Optimal Advertising Decisions" by A. AYKAC, M. CORSTJENS, D. GAUTSCHI and I. HOROWITZ. Second Draft, April 1985.

EURO-ASIA CENTRE

INSEAD

Institut Européen d'Administration des Affaires
European Institute of Business Administration
Europäisches Institut für Unternehmensführung

Institut Privé d'Enseignement Supérieur

Boulevard de Constance
77305 Fontainebleau Cedex, France
Telephone (6) 422 48 27 Telex 690389F

EAC Publications List
Update September 1982

E A C BRIEFING PAPERS

- N°1. Strategies and Practices of Transfer of Technology from European to Asean Enterprises.
Philippe LASSERRE and Max BOISOT. April 1980. 30 p.
- N°2. The Partners of Foreign Investors in Indonesia : the Tip of the Ethnic Iceberg. (working draft)
Stephen C. HEADLEY. December 1980. 21 p.
- N°3. Foreword to Government-Business Relations in Indonesia. (working draft)
Stephen C. HEADLEY. December 1980. 17 p.
- N°4. Personnel Management in Indonesia : How ? (working draft)
Stephen C. HEADLEY. December 1980. iv, 16 p.
- N°5. Can you work for Honda and remain yourself ? The Cultural Dimensions of Indonesian Management. (working draft)
Stephen C. HEADLEY. December 1980. 17 p.
- N°6. The Context of Management Development in Malaysia.
Bryony CONWAY. December 1980. 17 p.
- N°7. Racial Balance in Management in Malaysia.
Bryony CONWAY. December 1980. 13 p.

N°8. Appropriate Education for Management in Malaysia.

Bryony CONWAY. December 1981. 10 p.

N°9. Foreign Enterprise and Management Development in Malaysia.

Bryony CONWAY. November 1981. 8 p.

N°10 The Chinese Malaysian Enterprise.

Bryony CONWAY. June 1982. 12p.

E A C RESEARCH PAPERS

N°1. A Contribution to the Study of Entrepreneurship Development in Indonesia.

Philippe LASSERRE. April 1979 (corrected version 1980).
72, 7 p. (limited distribution)

N°2. The Transfer of Technology from European to Asean Enterprises : Strategies and Practices in the Chemical and Pharmaceutical Sectors.

Philippe LASSERRE and Max BOISOT. February 1980. 109, VI p.

N°3. Possibilité d'un transfert à l'étranger des techniques japonaises de gestion : le cas français.

Tetsuo AMAKO. July 1982. 145 p.

E A C REPRINTS

N°1. Japanese Organizational Behaviour : A Psychocultural Approach.

Henri-Claude de BETTIGNIES. February 1981.

Reproduced from : Management Research: A Cross-Cultural Perspective.

Edited by Desmond Graves. Amsterdam, London, New York: Elsevier Scientific Publishing Company, 1973. pp. 75-93.

N°2. The Transfer of Management Know-How in Asia : An Unlearning Process.

Henri-Claude de BETTIGNIES. February 1981.

Reproduced from : Breaking down Barriers: Practice and Priorities for International Management Education.

Edited by Bob Garratt and John Stopford. London: Gower for the Association of Teachers of Management, 1980. pp. 293-310.

N°3. Korean Management in the 1980's : The International Challenge.

Henri-Claude de BETTIGNIES. February 1981.

Reproduced from : The Korean Journal of International Business. Vol. 1. International Management Institute, Korea University, Seoul, July 1980. pp. 119-125.

N°4. La Sociologie des organisations : Le cas du Japon

Henri-Claude de BETTIGNIES. February 1981.

Reproduced from : Les Etudes Japonaises en France. Colloque, oct. 1979.

Paris : Association pour l'Etude de la Langue et la Civilisation Japonaise, 1980. pp. 118-130.

N°5. Analyse des craintes françaises.

Henri-Claude de BETTIGNIES. February 1981.
Reproduced from : Revue Française de Gestion. N° 27-28,
sept-oct. 1980.
Numéro spécial : Le Japon Mode ou Modèle ? pp. 16-23.

N°6. L'Indonésie et ses Potentiels

Philippe LASSERRE. May 1981.
Reproduced from : Marchés Internationaux N° 51, mai 1981.
pp. 83-98.

N°7. Transferts de Technologie : des mariages difficiles.

Philippe LASSERRE. May 1981.
Reproduced from : Revue Française de Gestion, N° 30
mars-avril 1981. pp. 97-103

N°8. The Industrialising Countries of Asia : Perspectives and Opportunities.

Philippe LASSERRE. July 1981.
Reproduced from : Long Range Planning Vol 14 N° 3, June 1981.
pp. 36-43.

N°9. Le Japon prépare ses managers de demain à l'école de l'Occident.

Jacques de RUGY. July 1981.
Reproduced from : France Japon éco N°9, automne 1981, pp.
10-21.

N° 10. Quand les entreprises japonaises intègrent la gestion américaine.

Tetsuo AMAKO. July 1982.
Reproduced from : Revue Française de Gestion N° 35,
mars-avril 1982, pp 59-63 + 10 p. annexes.

N° 11. Training : key to technological transfer.

Philippe LASSERRE. July 1982.
Reproduced from : Long Range Planning, vol 15 N° 3,
June 1982. pp. 51-60

EURO-ASIA CENTRE

INSEAD

Institut Européen d'Administration des Affaires
European Institute of Business Administration
Europäisches Institut für Unternehmensführung
Institut Privé d'Enseignement Supérieur

Boulevard de Constance
77305 Fontainebleau Cedex, France
Telephone (6) 422 48 27 Telex 690389F

Update September 1982

EAC DOCUMENTATION SERIES

- N°1. A bibliography on Japan: holding list of the Euro-Asia Centre and INSEAD library. May 1980.- 55 p.-
- N°1 bis. A bibliography on Japan: resources of the Euro-Asia Centre and INSEAD library: new additions.- July 1981.- 28 p.-
- N°2. A bibliography on ASEAN countries: holding list of the Euro-Asia Centre and INSEAD library. July 1980.- 79 p.-
- N°3. A bibliography on East and Northeast Asia: holding list of the Euro-Asia Centre and INSEAD library. July 1980.- 30 p.-
- N°4. A bibliography on the People's Republic of China: Resources of the Euro-Asia Centre and INSEAD library. October 1981.- 15 p.-
- N°5. A bibliography on ASEAN and ASEAN countries : Resources of the Euro-Asia Centre and INSEAD Library. October 1981.- 77 p.-
- N°6. A bibliography on South Korea, Hong Kong and Taiwan : Resources of the Euro-Asia Centre and INSEAD Library. January 1982.- 22 p.-
- N°7. A bibliography on Asia : Resources of the Euro-Asia Centre and INSEAD Library. February 1982.- 25 p.-
- N°8. A bibliography on Japan : Resources of the Euro-Asia Centre and INSEAD Library. July 1982.- 108 p.-
- N°9. A bibliography on the People's Republic of China : Resources of the Euro-Asia Centre and INSEAD Library. August 1982.- 18 p.