

**SWP 27/91 THE STRATEGIC MANAGEMENT OF MANUFACTURING:
FROM WASTE TO HASTE**

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THE STRATEGIC MANAGEMENT OF MANUFACTURING:

FROM WASTE TO HASTE

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Abstract

The strategic management of manufacturing requires more guidance than the established theory of linking the manufacturing capabilities of the firm to the critical success factors of the target market.

Evidence of the performance of UK manufacturing companies suggest that practitioners are still experiencing problems with managing manufacturing strategically. How can the complexity of this task be reduced?

The purpose of this paper is to present a unified theory of the strategic management of manufacturing. A strategic planning model is proposed that will simplify the task of selecting manufacturing capability priorities and help crystallise a vision of the development of the manufacturing function in the medium term. In addition, a transition management strategy is detailed to transform an uncompetitive manufacturing operation into one that will accomplish the internally supportive strategic role of manufacturing.

The paper is the result of research carried out in twelve UK manufacturing companies during the last three years.

The Strategic Management of Manufacturing: From Waste to Haste

Introduction

How can UK manufacturing companies outperform international competitors when the odds are so heavily stacked against them? The odds often quoted are inadequate investment in the past, the adversarial attitudes of both management and labour, the short-term expectations of the investors, and many others.

The question is not a rhetorical one because an answer must be found and indeed, it has been discovered by a number of companies in the UK. Therefore, how does a manufacturing business, which is not a sunset industry, transform its production performance to reverse declining market share and profitability? This paper presents an approach which is based upon the findings of a study of twelve manufacturing businesses in the UK that were faced with this dilemma. The paper also includes a description of a conceptual framework which has been used to help senior manufacturing management prepare a strategic plan for their company's manufacturing operations.

The source of the empirical data has been a number of strategic planning projects carried out by a consultancy business as well as work completed independently by the author. For those projects undertaken by the consultancy firm, a study visit was made to the factory where structured interviews were carried out with senior corporate and manufacturing management, cell leaders and industrial engineers. In all companies a manufacturing performance audit was performed. The study has shown that, in ten of the twelve businesses studied, only incremental improvements in manufacturing performance in the past have been possible because of senior manufacturing managements inadequate attention to the strategic role of manufacturing. This lack of vision had the effect of reinforcing manufacturing

management's perception of their role as the cost custodians of the business even though their consequential managerial behaviour was often counter-productive to the planned competitive strategy of the business. How to help manufacturing businesses overcome these barriers to strategic change is the subject of this paper.

Research Objectives and Method

Twelve companies collaborated in this case research project and the sample of firms included both those that manufacture using the time honoured method of batch production, i.e. with high levels of inventory in process, and those that use lean production methods.

There were two research objectives for the study.

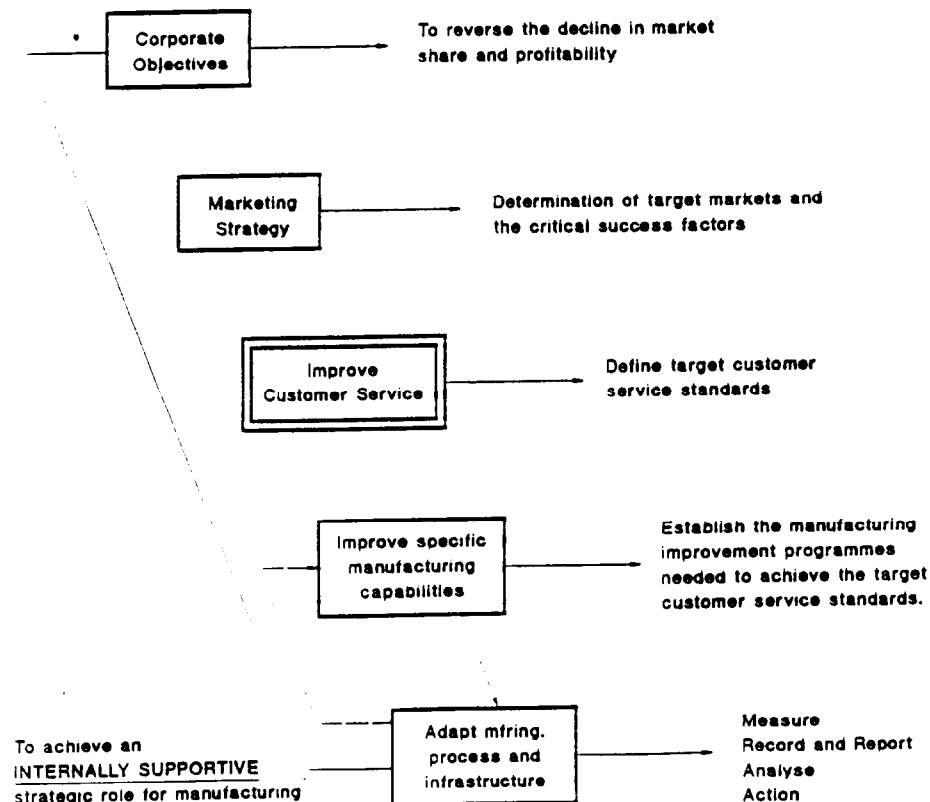
1. To seek common cause and effect reasons for the poor strategic management of manufacturing.
2. To examine manufacturing management methods used for lean production operations and propose a transition management strategy to transform the waste production system, that is one that relies upon the wasteful use of resources as its strategy for coping with uncertainty, into the haste production system, that is one designed to employ flexibility and speed of reaction as the solution to this problem.

Further research is currently being carried out to assess the degree that the methods recommended for implementing a change to the manufacturing capabilities of a firm accurately represent best practice.

The strategic management of manufacturing operations.

The single unifying theme that consistently appears in published books and articles on the strategic management of manufacturing is the need for the manufacturing strategy of a business to be compatible with the firm's competitive strategy. The marketing strategy of a business determines the target markets. The customer needs of those markets defines the competitive manufacturing capabilities that the firm must develop. How these capabilities are established is usually through a series of manufacturing improvement programmes designed to adapt the firm's process and/or its infrastructure to meet specified performance standards (Buffa 1984, Wheelwright 1978 and 1984, Hayes and Wheelwright 1984, De Meyer et al. 1989, Hill 1985). The key competitive manufacturing capabilities are required to support the competitive strategy of the business unit and therefore they define the key manufacturing tasks (Skinner 1969). This process is shown in Figure 1.

Figure 1. Determining a manufacturing strategy:



This approach to designing a manufacturing strategy has been well understood for some time but what is difficult to explain is the inability of many organisations to put this approach into practice.

One explanation may be a lack of a more detailed conceptual framework for the strategic management of manufacturing operations. The purpose of such a framework would be to provide a model which connects a group or combination of manufacturing capabilities, which firms are striving to develop or have developed to support their competitive strategies, with an appropriate generalised strategy for their development. An example of such a combination of manufacturing capabilities would be to produce a low cost, consistent quality product and to provide a reliable delivery service. It is the major changes to the design and management of both the manufacturing process and infrastructure, for each unique combination of manufacturing capabilities, that the model must clarify. With information of this type the complex task of determining a strategic plan for manufacturing could be simplified.

It is also essential that the selected combinations of manufacturing capabilities, used in the paradigm, are representative of generic manufacturing strategies. This is to ensure that the model is appropriate for general use and not just pertinent to the strategic management of manufacturing in a specific company or industry.

The choice of names given to the generic manufacturing strategies could also simplify the strategic planning of manufacturing. This could be accomplished by selecting names that describe the firm's expectations of manufacturing management. For example, a caretaker strategy could be used to describe a manufacturing management philosophy that concentrates on minimising production costs by

maximising capital or labour efficiency. The name reflects a particular type of management philosophy and it also communicates, albeit to a limited degree, a vision of how the resources of the manufacturing unit will be utilised. Such a vision is essential for the strategic management of any function of a business.

In the twelve firms that collaborated with this research, the vision of the competitive strategy was clear to all the firms' senior management. Two of the firms had commissioned outside organisations to prepare a business plan for them. However, the senior management of only two of these firms were able to articulate a vision of the manufacturing strategy needed to support the competitive strategy of their businesses and in only one firm was the manufacturing strategy understood by all in the production department. Severence and Passino (1988) suggest that there are three essential elements to implement a change in manufacturing competitiveness. These are:

1. A clear management vision
2. Organisational flexibility
3. An integrated plan

It is unlikely that planned change can be accomplished successfully without an initial vision of the desired outcome. All firms recognised the need to change. However, it is clear from this research that the lack of a clear vision of the strategic development of the firms' manufacturing capabilities was evident in most of the firms (ten in total) and that little attention to the strategic management of manufacturing had been given. The extent that manufacturing management was exercising a strategic or a tactical control over its operations was judged by comparing the manufacturing performance measures used with those needed to be successful in the firm's targeted markets. In addition, a financial performance analysis was carried out to compare each firm's performance with the best in their industry.

The search for generic manufacturing strategies

Some important research has been carried out in an attempt to develop a taxonomy of generic manufacturing strategies (Roth and Miller 1989, Stobaugh and Telesio 1983, De Meyer 1990). However, there is a difference between the range of the manufacturing strategy types that have been identified. In addition, their relationship to the Hayes and Wheelwright (1984) hypothesis for the evolution of manufacturing's strategic role for a company has not been examined in any detail.

The findings of this study have shown that a unified theory of manufacturing may exist which would reconcile these apparently different conclusions about a taxonomy of generic manufacturing strategies.

Roth and Miller (1989) and Stobaugh and Telesio (1983) have used both the dominant competitive priorities of a manufacturing unit and the emphasis placed on future action plans as the means for classifying a type of manufacturing strategy (as recommended by Cool and Schendel 1987). The objective of their research was to search for groups of manufacturers that possess homogeneous characteristics, i.e. those firms that are developing similar types of competitive capabilities. Both Roth and Miller and Stobaugh and Telesio discovered three types of manufacturing strategy which the former named caretaker, marketeer and innovator. The relationships between the type of manufacturing strategy, the industry and the key performance measures used to manage each strategy are shown in Table 1.

Table 1
Manufacturing Strategy Types
Comparison of Industry Mix and Performance Measures

Manufacturing Strategy Type	Industry Types	Key Performance Measures	
Caretaker	Industrial Goods Consumer Products	All Manufacturing Strategy types selected the top <u>four</u> performance measures as follows: 1. Outgoing Quality 2. Unit Cost 3. Total Mfg. Overhead cost 4. Inventory Information	5. FGS turns 6. Mfg lead times
Marketeer	Industrial Parts Industrial Components Industrial Intermediates Basic Goods - Paper Chemical Primary Metal Consumer Packaged Goods: Foods Cosmetics Pharmaceuticals		5. WIP turns 6. RM turns
Innovator	Electronics Computer Instrument Electronic Equipment Machine tools Transportation Equipment Machinery		5. Per cent of New Products on time 6. Mfg lead times

Source: Roth and Miller, "A Taxonomy of Manufacturing Strategies", 1989

The most revealing data that distinguishes the three types of manufacturing strategy are their priorities for future manufacturing improvement programmes. These were given the following priority rankings:

Table 2
Future Improvement Programmes

Caretaker	Marketeer	Innovator
1. Use of Statistical Process Control (SPC) for process Improvement	1. SPC Process Improvement	1. Manufacturing lead time reduction
2. Job Enlargement	2. Zero defects	2. Improving the number of new products introduced on time
3. Manufacturing lead time reduction	3. SPC Product Improvement	3. Zero defects
4. Vendor Lead time reduction	4. Manufacturing Lead time reduction	4. The Application of Computer Aided Design (CAD)

These two sets of data show the caretaker management philosophy to be one that primarily concerns itself with price and caretakers are often found in machine paced assembly line or continuous flow production environments. Future improvement programmes are concerned with reducing the costs of poor quality through both technological (processing industries) and infrastructural (assembly line methods) changes.

The marketer management philosophy concentrates primarily on the quality of the product. The degree of this emphasis is demonstrated by the range of quality improvement programmes these companies are planning to implement.

Finally, innovators are focused on programmes that will reduce manufacturing lead times and improve the management of new product introductions. Many of the firms that adopt the innovator manufacturing strategy are in technology-based industries and therefore, technological innovations to both product, process and infrastructure are more critical to their success.

The innovators display many of the characteristics of the time-based competitors that Stalk (1988) has identified in the Japanese world class manufacturers. These include the achievement of competitive advantage through time-based innovation, time-based product introduction, manufacture and distribution.

A similar search for generic manufacturing strategies was carried out by De Meyer (1990). Unfortunately there were differences between the research carried out by Roth and Miller and that performed by De Meyer although De Meyer adopted a similar method of analysis. The critical difference between the two research activities was the selection of the manufacturing capabilities used to define the strategy needed to gain competitive advantage.

The manufacturing capabilities used in both the studies were as follows:

1. The capability to compete on price
2. The capability to make rapid design changes and/or introduce new products quickly.
3. The capability to change volume rapidly
4. The capability to offer consistent quality
5. The capability to provide high performance products
6. The capability to deliver products quickly
7. The capability to deliver on time
8. The capability to deliver a broad product line

The differences between the two research designs was that Roth and Miller selected three additional customer service capabilities. Their objective was to gain some insight into the relationship between the eight manufacturing capabilities listed and the firm's marketing capabilities. The three marketing capabilities that Roth and Miller used were:

1. The capability to provide after sale service
2. The capability to advertise and promote the product
3. The capability to distribute the product broadly.

Another critical difference between the two research designs was De Meyer's decision to add an additional manufacturing capability for his analysis. This was the capability to change production plans quickly. As a consequence it is very difficult to identify any absolute consistency in the findings of the two research activities because the capability to change production plans quickly has featured prominently in the De Meyer findings.

Nevertheless there are similarities in the findings of the two research activities, as De Meyer (1990) has detailed. He identified two groups of strategies that were similar to the marketer and innovator strategies, as defined by Roth and Miller. However, De Meyer identified a type of manufacturing strategy which was specific to forty two of the two hundred and eleven firms studied and this strategy differed from the three types classified by Stobaugh and Telesio (1983) and Roth and Miller (1989). This strategy is unique because the key competitive capabilities desired were to be able to produce high performance products to a consistent standard of quality. Delivery speed was also highly ranked in the order of competitive capabilities.

De Meyer used two sets of research data and there are variances in the De Meyer rankings for the competitive capabilities data reported in 1987 and 1988, but only one which is difficult to interpret. For the unique product performance group, reliable delivery is given a very low ranking for 1987 but highly ranked (second) for 1988. All the remaining key competitive capabilities are present in the higher rankings for both years.

This author's research has, in the main, been carried out in firms that fit the De Meyer's classification of the "high performance products group". The majority of the firms, ten in total, have been developing a manufacturing strategy which will provide them with the capability to produce high quality, high performance products requiring a short manufacturing lead time. This strategy is defined as the "reorganiser" strategy because it usually requires a reorganisation to the layout of the existing manufacturing process. There are also some infrastructural changes required which are a consequence of the modified manufacturing systems used.

This research has therefore found evidence for the existence of four manufacturing strategies. The caretaker and marketer have been long established but the reorganiser and innovator are evolutionary steps towards the world class

manufacturer, which is the goal for all manufacturers competing in international markets.

Consequently, the convergence hypothesis may explain the difference between the Roth and Miller and De Meyer research findings. The convergence hypothesis suggests that management concepts, strategies and approaches in different industrial regions will evolve towards each other if the external conditions become more alike. The influx of Japanese businesses into Britain has already stimulated changed methods of manufacturing management and the first stage of these changes is the development of fast response and flexible manufacturing systems, i.e. the implementation of the reorganiser manufacturing strategy. The manufacturing strategies used up to the time that the firms decided a change to their manufacturing strategies was needed were caretaker and marketeer strategies (see table 3).

Table 3
Background to Cases used for Study

	MFR Context Type of Products Manufactured	Perceived Strategic Need The need to become Int. or Externally Neutral or Supportive	SNR Mgmt's Competitive Objectives (MFR Capabilities Req'd)	Mfr Mgmt's Strategy Practised (See Fig. 2)	Manufacturing Capability Required	Next Strategic Role for MFR
Case 1	Clothing (SL)	Internally Supp.	Price/Range/Del	Caretaker	Qual/Flexible	Reorganizer
Case 2	Textile (ST)	Internally Supp.	Design/Range/Del	Caretaker	Qual/Flexible	Reorganizer
Case 3	Electronic Components (NM)	Internally Supp.	Price/Qual/Del	Caretaker	Qual/Flexible	Reorganizer
Case 4	Earth Moving Equipment (J)	Ext. Supportive	Perf/Qual/Del	Reorganizer	Innov/Fast Resp	Innovator
Case 5	Computer (MD)	Ext. Supportive	Qual/Perf/Del	Reorganizer	Innov/Fast Resp	Innovator
Case 6	Fire Control Equipment (KG)	Int. Supportive	Qual/Range/Del	Marketeer	Qual/Flexible	Reorganizer
Case 7	Electrical Consumer Goods (CL)	Int. Supportive	Price/Range/Del	Marketeer	Price/Flexible	Reorganizer
Case 8	Industrial Parts (SV)	Int. Supportive	Price/Range/Del	Marketeer	Price/Flexible	Reorganizer
Case 9	Industrial Parts (CI)	Int. Supportive	Price/Range/Del	Marketeer	Perf./Flexible	Reorganizer
Case 10	Machine Tools (RE)	Int. Supportive	Perf/Qual/Del	Marketeer	Innov/Fast Resp	Reorganizer
Case 11	Primary Metals (AM)	Int. Supportive	Qual/Range/Del	Caretaker	Qual/Flexible	Reorganizer
Case 12	Environmental Control Equip (OS)	Int. Supportive	Price/Qual/Del	Caretaker	Qual/Flexible	Reorganizer

The reorganiser strategy was considered, by the senior management of all the firms that were implementing it, to be an intermediate but distinct objective for the development of their manufacturing operations. It is an objective which is to be achieved within a longer term plan leading to the goal of world class manufacturing. However, both strategies make different demands on a firm's manufacturing resources (Sweeney 1991).

The search for generic manufacturing strategies has been summarised in Table 4. The findings of this research suggest four generic strategies exist and how they relate to the Hayes and Wheelwright evolution of the strategic role of manufacturing is also shown on Table 4.

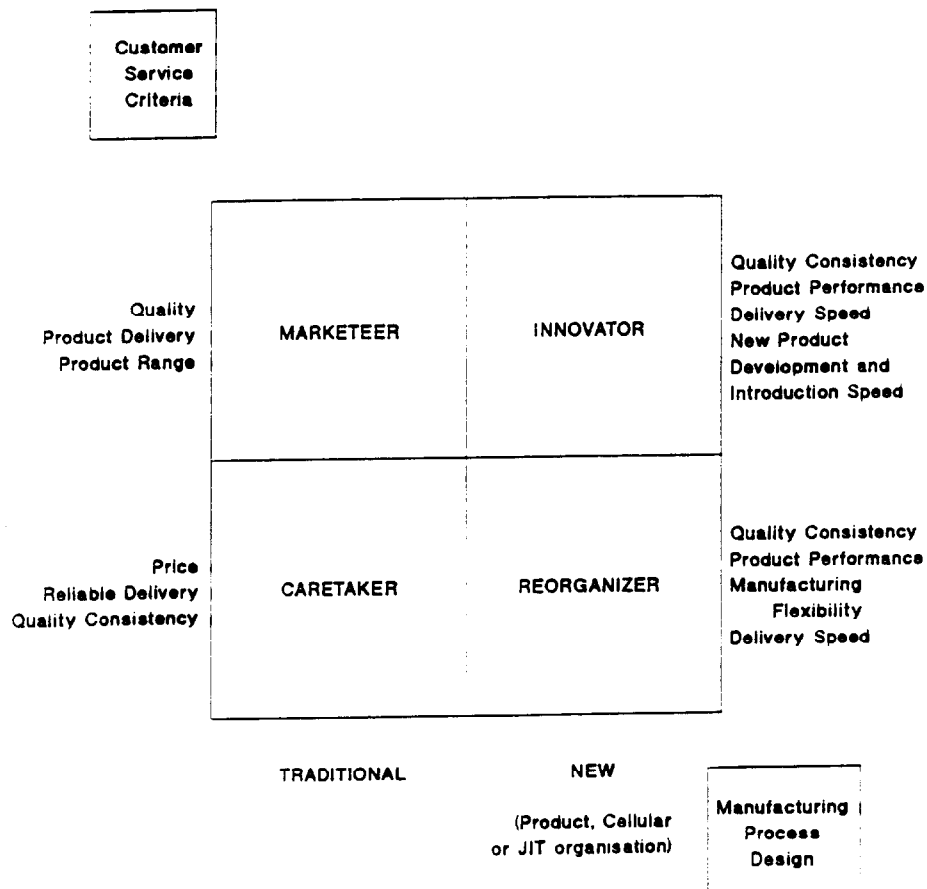
Table 4

Bibliography of Names given to Manufacturing Strategy Types by Researcher Name

Generic Manufacturing Strategy Name	Stobaugh and Telesio	Roth and Miller	De Meyer	Edmundson and Wheelwright	Sweeney	Hayes and Wheelwright
Caretaker	Cost Driven Strategy	Caretaker		The Quick relief mode of response to manufacturing challenges (1st Mode)	Quick Fix	Internally Neutral
Marketeer	Market Driven Strategy	Marketeer	Marketing Oriented Group		Stretch	Externally Neutral
Reorganizer			High Performance Product Group	(2nd Mode) The use of organizational tools mode of response	Catch up	Internally Supportive
Innovator	Technology Driven Strategy	Innovator	Manufacturing Innovators	To develop a Competitive Edge through manufacturing - (3rd Mode response)	Breakthrough	Externally Supportive

The relationship between the competitive capabilities of the four generic manufacturing strategies and the manufacturing processes used to achieve those capabilities is shown in Figure 2. A more detailed explanation of the manufacturing capabilities objective of each type of generic manufacturing strategy is given in Sweeney (1990 and 1991).

Figure 2. The Relationship between Generic Manufacturing Strategy Types and Competitive Strategy



The model, shown in Figure 2, may be judged to be an oversimplification of the strategic options that are available to many manufacturing businesses. Its use might also result in a superficial examination of the required competitive strategy needed by a business. Hambrick and Lei (1985) have warned against such behaviour. However, its use may be advantageous as an aid to simplify the complexity of strategic choice. Many conceptual frameworks have been created to aid strategic

decision-making and suffer from being reductionist but are useful as tools for stimulating an examination of how manufacturing should be managed strategically. As Severence and Passino (1988) suggest an integrated plan cannot be developed without a clear and commonly held vision of what needs to be done. The paradigm for the strategic planning of manufacturing has been found to be helpful for both the strategic planning and the vision communication processes of strategic change management.

The decline to waste manufacturing

The objective of this research project was to propose a strategy to transform an uncompetitive manufacturing operation into one that can at least equal the competitors' manufacturing performance in both flexibility and speed of response to customer demand. This is classified as the reorganiser strategy in figure 2. As Table 4 shows, ten of the twelve firms that collaborated with this case research were planning or implementing such a strategic change to their manufacturing operations. How these capabilities can be further developed to gain manufacturing-led competitive advantage is currently being researched.

The manufacturing performance of all these firms was poor when compared with the best in their industries. How their manufacturing performances had declined is typical of the way that many manufacturing companies in the UK have lost their distinctive competences, not only in export markets but also in their domestic markets. That such a decline is prevalent in the UK manufacturing industry is made obvious by the massive deficit in the UK balance of trade for manufactured goods. The evolutionary process follows the paths shown in Figure 3. This shows firstly, the caretakers that have traditionally adopted a least cost philosophy to managing their manufacturing operations. Many have continued to use production methods that were devised at the start of this century. Many have inevitably lost ground to

those firms that have improved the way that products flow through their production system. An example would be a menswear manufacturer that uses large batches for the manufacture of product components, to ensure low component unit cost, and assembly lines for the production of large batch quantities of finished products. The total manufacturing costs for this method of production are 10 per cent to 30 per cent greater than those incurred using the modular or cellular method of production (Chandler 1989). Typical results achieved from the use of the modular method of production for the manufacture of menswear are (Chandler 1989):

1. Manufacturing cycle time reduced by 80 - 90 per cent
2. Quality improvements of 20 - 90 per cent
3. Total cost improvements of 10 - 30 per cent
4. Space reduction of 20 - 50 per cent
5. Greater flexibility
6. Better attitudes to work
7. Less absenteeism and labour turnover

Thus the continuation of a caretaker manufacturing strategy, which uses a manufacturing system similar to the one described and cost performance measurement only, in a market that has changed from one which was price, delivery and quality sensitive but now also requires improved performance (design) and speed of delivery, will be a continuous decline to market exit. As a consequence the financial performance of the firm will also continue to decline until it reaches standards like these:

	Waste Strategy (Current)	Haste Strategy (vision) <u>Achieved by the best in the industry</u>
<u>Market share</u>	Half the size of the major share- holder and declining	Major shareholder target of 30 per cent
ROCE	17 per cent	30 per cent
Return on Sales	7 per cent	17 per cent
Stockturns	3.5	10
Sales per employee	£34,000	£60,000
Sales per sq. metre	£180	£450
Delivery lead times		
Cat A	12 weeks	8 weeks
Cat B	16 weeks	12 weeks
Cat C	20 weeks	16 weeks
Delivery Performance	60 per cent on time	90 per cent

To decline to such a poor competitive position is a consequence of both a lack of a strategic vision for the development of the company's manufacturing operations and an adherence to the use of the traditional manufacturing performance measures.

Many people (for example Kaplan 1984, Drucker 1990) have criticised the use of financial measures of performance that only report on the utilisation of direct labour because this cost element is a small percentage of total unit cost. Manufacturing management reports that provide information on direct labour utilisation and scrap/rework costs only are using measurement systems which are limited because they do not provide the data needed to facilitate the development of the manufacturing capabilities required in the 1990s. It is, for example, essential that delivery performance, stockturns and the cost of "nonproducing" activities, such as machine changeover and setup times, are also reported. Performance measurement systems represent the value system of the firm. If only costs are measured and these are the criteria used to assess manufacturing management performance, then these financial targets will become the goals that manufacturing management must strive to achieve. Such action can result in establishing and maintaining a cost minimisation

culture within the production function which can also lead to a massive difference in the quality of customer service provided by the best and the average domestic manufacturer, as the example given in this paper actually shows.

A decline in the congruence between a firm's manufacturing strategy and its business strategy, as previously detailed, can also take place through another evolutionary route. Some caretakers in the past, through necessity have elected to change to a marketing-led competitive strategy and therefore have stressed a need for improved quality and an expanded product range. Their requirement is a marketeer manufacturing strategy.

The expansion of the product range increases the complexity of production management and their strategy to resolve the quality and complexity problems has been traditionally to develop the manufacturing infrastructure. The tactics used have been quality improvement programmes and investment in manufacturing management information systems, such as material requirements planning systems.

However, very often no changes are made to the organisation of the manufacturing facilities that are to be used for the production of the increased range of products. Therefore the design of the manufacturing system remains as that used for the original caretaker manufacturing philosophy, i.e. with an emphasis on least cost production rather than on flexibility.

The outcome of this neglect to focus the organisation of the manufacturing facilities to satisfy the competitive needs of the business is a lengthening of the manufacturing cycle time. Companies fail continually to meet their delivery promises and very rarely measure actual delivery performance.

The result of this strategic manufacturing management approach is a waste production system. Low throughput efficiency, high levels of work in process, quality problems and poor customer service, both in delivery lead time and delivery performance. The financial performance of such companies will be the same as that previously shown and they will also fare badly when compared with the best in their industry.

The causes of the absence of customer service competitiveness are as before, the lack of a vision of the strategic development of manufacturing and the adherence to the traditional custom and practice methods of least cost management, which may be counter productive to the competitive strategy of the firm.

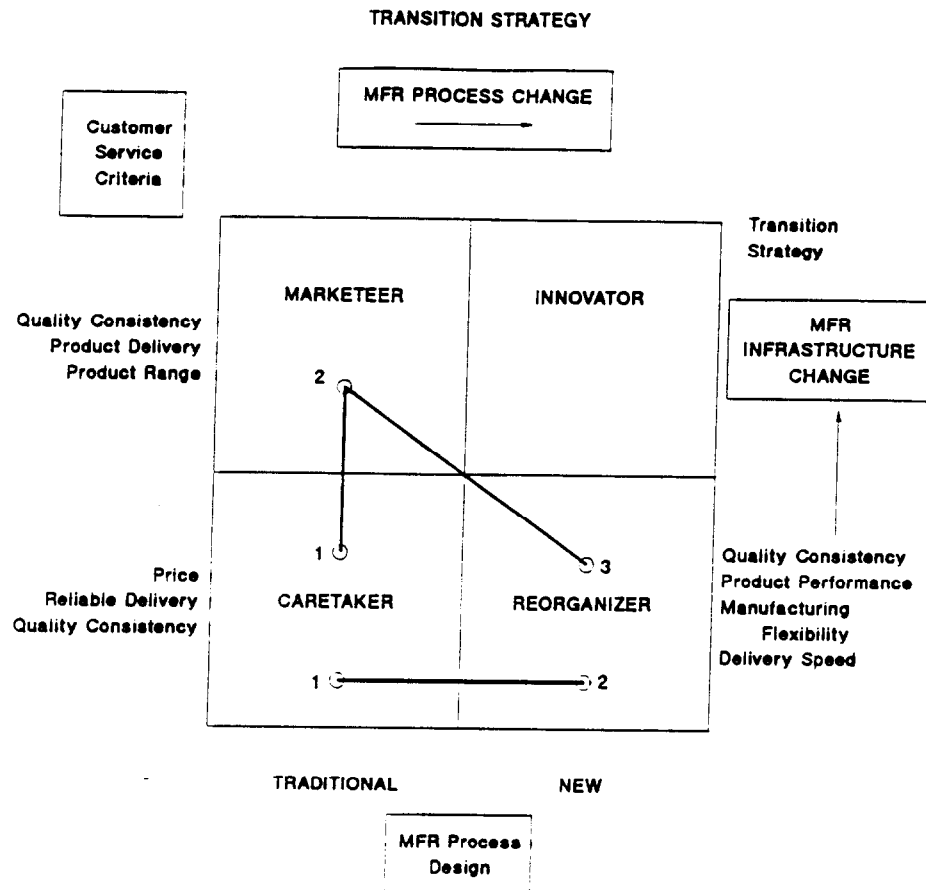
The one redeeming feature of the outcome of these strategic approaches to manufacturing management is the size of the financial resources that are hidden within the business. The release of these resources can provide the working capital needed to restructure the firm's manufacturing operations.

From waste to haste manufacturing

As Figure 3 shows that the route to world class manufacturing for many industries is to first develop quick response and flexible manufacturing systems. Such a plan would however be totally inappropriate for the high volume producer of a single product or for a manufacturer of a small family of similar products. Such firms usually use continuous processing systems for their production method and consequently, for them the ultimate manufacturing system design has been developed. The caretaker to innovator manufacturing strategy is how companies of this type develop the strategic role of their manufacturing.

Figure 3

The Route to World Class Manufacturing

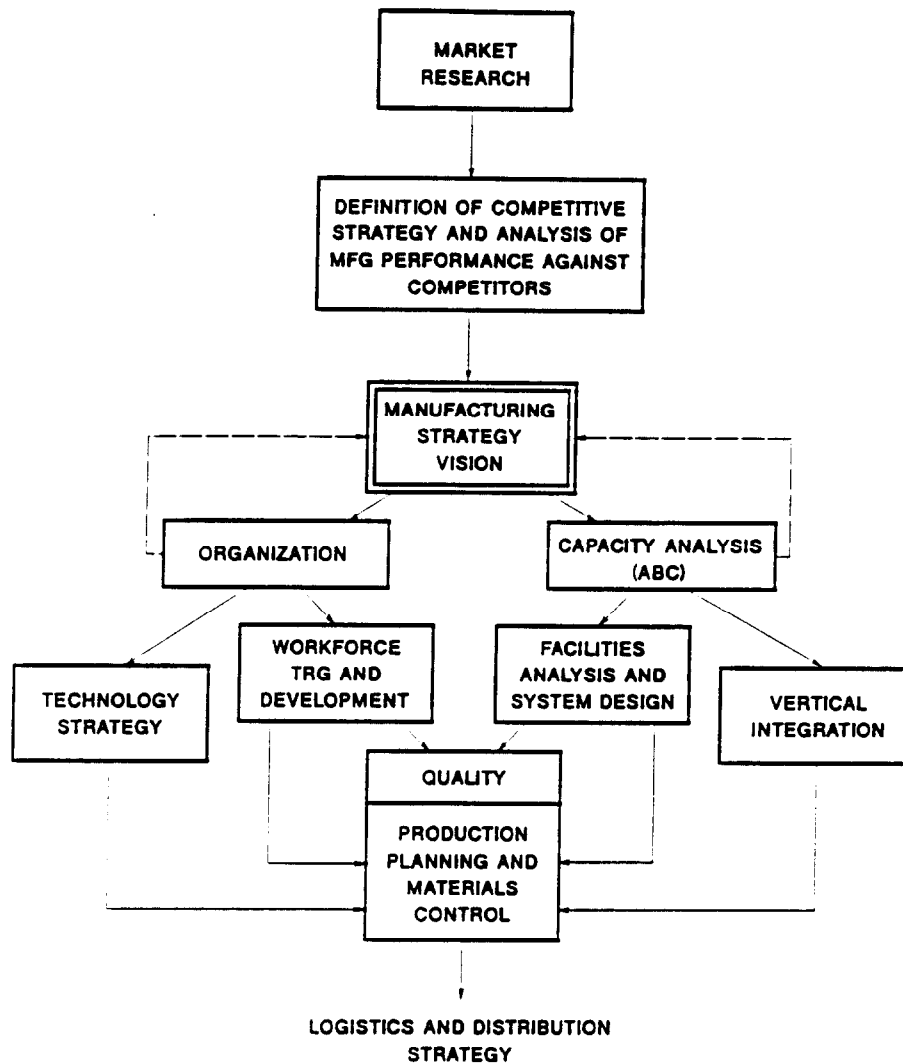


The manufacturing improvement programme detailed in this section of the paper is therefore only pertinent to high volume and low volume batch manufacturers. They are assumed to be uncompetitive in terms of their quality of customer service and are in a similar competitive position to that described previously in this paper.

Figure 4 provides an overview of the procedure to manage a transition from an uncompetitive caretaker or an uncompetitive marketeer strategy. The diagram shows the interactive relationship between the management vision of manufacturing in the firm and the organisation of its specialist human and physical resources.

Figure 4

An Implementation Programme for the Strategic
Management of Manufacturing



To effect a smooth and efficient change of manufacturing strategy will require a training programme for the development of the human resources of the firm. The reasons for the need to change and how such changes will effect management and labour must first be explained because it is the human resistance to change which has proved to be the main barrier to change. It is very rarely a financial problem to restructure the manufacturing function because the firms have huge amounts of working capital tied up in inventories. The release of this capital is the source of funds to finance the strategic change to manufacturing operations.

Figure 4 therefore shows a recommended sequence for managing the change, each element's relative vertical position to the others signifies the order in which the tasks should be carried out. Tables 5 and 6 detail a range of activities to be performed but of course these are not exhaustive lists. However, they are activities that have been performed in all projects and form a programme that could be used generally.

Task teams are required to manage the changes to be made in each of the manufacturing strategy decision categories. A Steering Committee should be established to oversee the performance of each task team and coordinate their activities (Sweeney 1989).

Table 5

Manufacturing Strategy Decision Categories - Process Design

Capacity	Facilities	Technology	Vertical Integration
<ol style="list-style-type: none"> 1. <u>ABC Analysis</u> by: <ol style="list-style-type: none"> a. Volume by Product Type b. Sales Value by Product type c. FGS analysis by Product d. WIP Analysis by Product Value and Volume 2. <u>Unproductive Time</u> by Process Centre: <ol style="list-style-type: none"> a. % of capacity lost by set up and changeover b. % of capacity lost by breakdown, maintenance 3. F/cast sales and future capacity requirements 4. Production throughput constraints 	<ol style="list-style-type: none"> 1. <u>Workflow Analysis</u> of Sample Products of different types 2. <u>Process Capabilities Analysis</u> To identify any constraints on scheduling operations because of: <ol style="list-style-type: none"> a. By size of plant b. By change over time c. Utilisation of Plant - Bottleneck Activities 3. Manufacturing facilities needed for greater flexibility or cellular production 4. Analyse f/cast sales volume by product family by process centres - std. hrs <u>workload analysis</u> 5. Design Product Cells or Process Cells 	<ol style="list-style-type: none"> 1. Quality Management Technology Required 2. Information Technology requirements for a <u>Minibusiness Environment</u> <ol style="list-style-type: none"> a. Local Network linking to stock control database b. Value of RM Stock and Despatches reports c. Local Master Production Scheduler to indicate "clear to build" when all parts needed are available 	<ol style="list-style-type: none"> 1. <u>Examination of Competitive Strategy</u> and the Value added in <u>Non Core Manufacturing Activities</u>. 2. <u>Lead Time</u> and Cost of out sourcing. 3. Monitor <u>Supplier Delivery</u> Performance and Define Quality of Supply Standards

Table 6

Manufacturing Strategy Decision Categories - Infrastructure

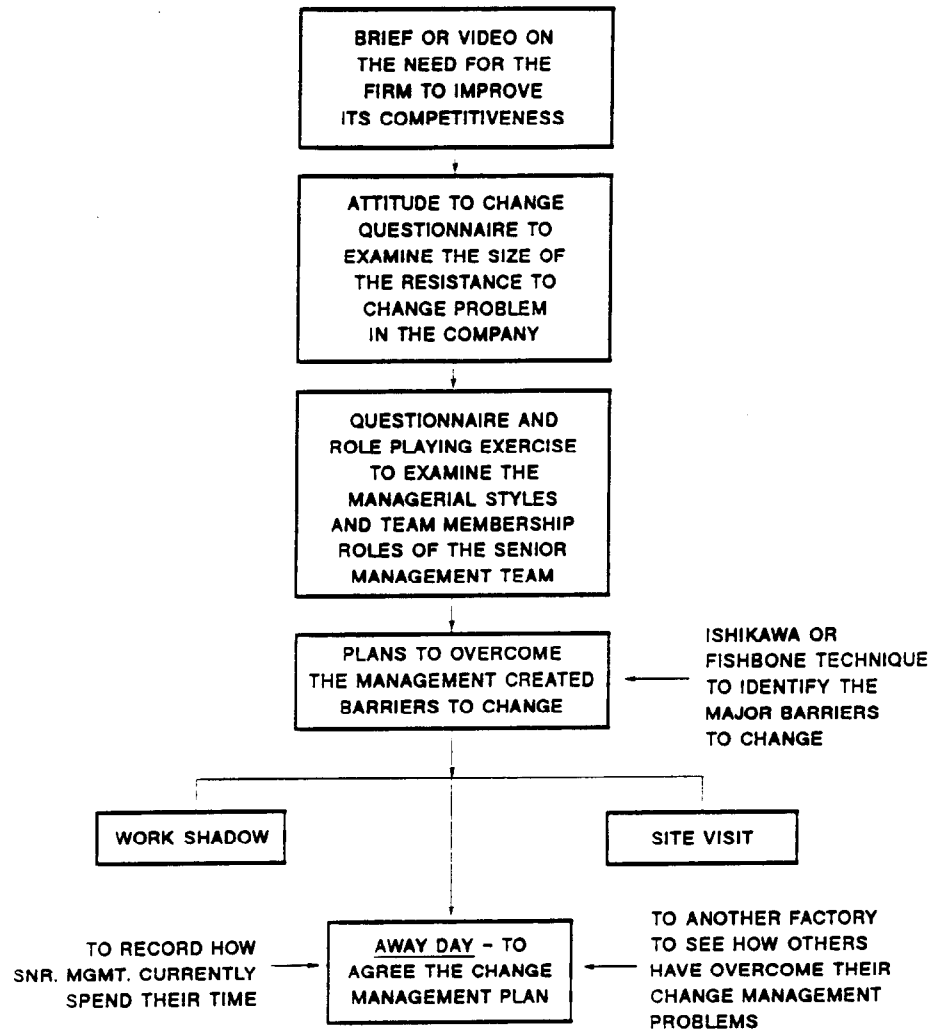
Workforce	Quality	Production Planning/Materials Control	Organisation
<ol style="list-style-type: none"> 1. <u>Initial Briefing</u> for total organisation on the need to change and the mgmt vision of how the manufacturing organisation will change 2. <u>Involvement</u> of production personnel with the design of the new manufacturing system 3. Transition management training for <u>senior management</u> 4. <u>JIT Philosophy</u> training for all 5. Develop continuous improvement philosophy 6. Training needs analysis for multi-skill workforce and train 	<ol style="list-style-type: none"> 1. <u>Define</u> quality performance standards 2. Install Quality Measurements methods 3. <u>Establish</u> supplier quality vetting procedures 4. Quality responsibility to be devolved to those responsible for providing it 	<ol style="list-style-type: none"> 1. <u>Define</u> performance measurements for operations 2. <u>Materials Requirements Planning system</u> used only to manage materials supply 3. <u>Pull System</u> based on actual orders rec'd or stock replenishment needs 4. <u>Production Scheduling</u> by the minimum change time sequence - <u>each cell responsible</u> for own production scheduling 	<ol style="list-style-type: none"> 1. <u>Marketing Led</u> organisation structure i.e. product managers 2. The creation of <u>minibusinesses</u> either product or process based 3. <u>Cell Managers</u> - reduced levels of management 4. <u>Transition Management Teams Structure</u>: <ol style="list-style-type: none"> a. MFR system design team b. Production Planning and Control team c. Information Technology Team d. Quality Team e. Human Resources Team

The most difficult problem is the transition management training of the senior manufacturing management. Most of the managers perform as tactical managers rather than developing their strategic planning skills. They rely on their expertise at resolving priority conflict problems instead of developing plans to establish manufacturing-led competitive advantage.

To achieve such a transformation in a company's manufacturing management team may require a part or a complete management development programme similar to that shown in Figure 5. It is crucial that ownership of the vision of the future strategic role of manufacturing is gained by all the manufacturing management team and that it is also communicated to the whole department. Therefore it is imperative that senior management are seen to delegate operations management decision-making to their subordinates and that they concentrate on the strategic management of the manufacturing unit. This is the purpose of the development programme shown in Figure 5, which is the minimum experiential learning programme needed to develop those managers who are judged to possess the potential to manage strategically.

Figure 5

A Tactical to Strategic Management Development Programme



Conclusions

The collaborative work carried out with the twelve UK manufacturing companies has provided the opportunity for case research on the strategic management of manufacturing. Previous research on the existence of generic manufacturing strategies have provided evidence of their existence. This research has confirmed the researchers' taxonomy of generic manufacturing strategies and a model for the strategic planning of manufacturing has been developed and tested.

The purpose of the paper is to propose a transition management plan for a specific type of change to the strategic management of manufacturing, i.e. to a reorganiser or internally supportive strategic role of manufacturing. The objective of the paper has been to provide an aid to simplify the strategic management of manufacturing and a guide to implementing a strategic change.

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