

## Just-In-Time: Some marketing issues raised by a popular concept in production and distribution

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### ABSTRACT

*The literature of the past 30 years is liberally sprinkled with contributions dedicated to the improvement of corporate efficiency: one of the key areas to have been addressed is that of costs, which has focused attention on, inter alia, the costs of inventory. Frequently it appears that the development of a logistical system which can eliminate or significantly reduce inventory is not only assumed to be universally practicable but ipso facto desirable. However, in much the same way as many companies appear not to appreciate the corporate implications of a marketing orientation, so also Just-In-Time (JIT) seems commonly to be regarded as a concept or as a practice which only has relevance to limited areas of a company's business.*

*In this article, the authors endeavour to create awareness of two key areas: the essential prerequisites for the implementation of a JIT programme, and the consequences that flow from such a decision. The 'internal' cost saving potential is discussed, and this is complemented by consideration of some of the potential effects on the product range and the ways in which the marketing mix may be affected. Recent experiences in the development of logistical bases in the United Kingdom and in the Federal Republic of Germany are discussed, in parallel with current practices in Japan.*

*The authors do not pretend to have formulated a definitive scenario, but offer their thoughts as a basis for deliberation by managers in the belief that the decision to implement a JIT programme should be subservient to the corporate strategic plan rather than to dominate the planning process.*

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## 1. THE BASIS OF THE JIT CONCEPT

Just-In-Time (JIT) is an idea commonly attributed to the Japanese but with acknowledged American parentage. It has often been asserted that JIT has helped to give industry in Japan a distinct edge in the competitive world market place [1]. Protagonists claim that the effective adoption of JIT by manufacturers could lead to changes in industrial practices which are supposed to be necessary in order to keep (or to reach) sufficient competitiveness, and which are frequently regarded as representing a novel approach to industrial practice.

The idea of the JIT concept is far from being revolutionary. The essential elements are

- goods should be bought or produced in exactly the quantities which are needed
- goods should be delivered to where they are needed precisely when they are needed

Following these principles, companies have succeeded in reaching the goal of a major or total elimination of waste. Since one cannot determine 'exactly what is needed' unless there is a consistent quality, the goal thus encompasses the concept of first-time quality and zero defects.

In this sense the JIT concept is more than the creation of accountants, supposedly aimed at reducing working capital by way of lower inventory costs. In fact, better adjustment of production and distribution to the market requirements has an impact on much more than quantity: an improvement in production flexibility with short throughput times and the development of rationalization potential contributes to this harmonization. This necessitates an optimization of the relationship of capital tied up between liquid assets and capital assets. "JIT is essentially a philosophy" John Mortimer [2] stresses, "of total pride in making the business lean, more simple and effective to operate, and with a higher degree of integration between the several stages of industrial production and sales activities". Basically, JIT is a concept to produce and distribute goods more effectively by introducing a new perspective of inter-company relationships along the entire supply network.

Impressive results have been reported as a consequence of implementing JIT-oriented structures

- Suzuki [3], Senior Manager of Mazda Motor Corporation, reports the figures given in Table 1 for Toyo Kogyo.
- Wildemann [4], an outstanding experienced JIT-protagonist in West Germany, presents the following data
  - improvement of production lead-time by 60-80%
  - reduction of stocks by 50%
  - reduction of costs caused by stockkeeping and transportation by 20%
  - improvement of the quality level close to 'zero fault production'
  - improvement of overall productivity by 25%
- As a third information source of JIT effects we can refer to Jewitt [5] who investigated results of JIT implementation programmes in the U.K.

TABLE 1. Productivity figures in terms of production volume per employee

	1975	1976	1977	1978	1979	1980
Annual production	642 614	716 672	800 003	850 155	1 034 155	1 194 576
Index	100	111.5	124.5	132.2	160.9	185.9
Production volume per employee	19.3	23.1	25.8	30.0	37.4	43.8
Index	100	119.7	133.7	155.4	193.8	226.9

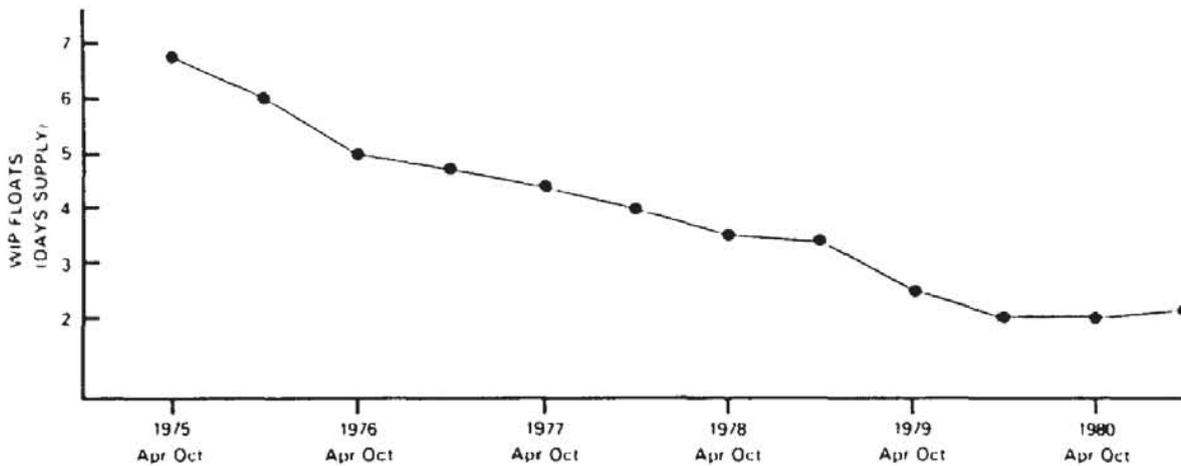


Fig. 1. Reduction of company-wide in-process floats (Toyo Kogyo).

- 90% reduction in inventory
- 15-40% reduction in cost of sales
- 90% reduction in production lead time
- 10-30% reduction in labour
- 75% or more reduction in set-up
- 50% reduction in manufacturing space requirements
- 75-90% improvement in quality

Even if these figures are only partly valid and somewhat generalized, the tendency seems obvious. In broad terms, the core of the JIT concept is the elimination of waste in all forms—production, materials, labour, time, energy, money and so on. Emphasis in the literature has been almost entirely focused on the benefits to the organizational customer, with little overt consideration of consequences for the supplier or for the ultimate customer. Perhaps competition is seen as an external stimulus to internal efficiency improvements: nevertheless it remains a matter for

speculation as to whether adoption of a JIT philosophy results in improved service for ultimate customers, and furthermore whether such improved short term offerings result in long term benefits or conversely result in barriers to flexibility.

In setting the historical context for this discussion, it should perhaps be pointed out that (despite its recent fashionability) the JIT concept is far from new. It seems probable that in informal ways, JIT has been practised for generations. Two disparate examples may be cited.

- The road building industry has long adopted the practice of receiving deliveries of surfacing materials from suppliers on site just when needed. It has been commonplace for orders to be placed, stipulating the product specification, total quantity, delivery point, date and time, so that contractors are not kept waiting for supplies and at the same time inventories are not accumulated on site (even if this were technically feasible). The onus has thus been accepted by the supplier that he must be prepared to handle orders at short notice (often only a few hours); he must thus be prepared to make rapid adjustments in his production rates, and thus to carry inventories in turn, or to implement JIT programmes with his suppliers.
- The farming industry has, almost from time immemorial, practised what may be regarded as a primitive JIT philosophy. Before the advent of cold storage or other preserving facilities, farmers would endeavour to send to market each day only those quantities of merchandise which they felt they could sell at acceptable prices. Timing of availability in both long and short terms became critical to economic advantage.

These two examples may well not be unique: they do, however, exhibit a distinct similarity to more modern or conventional examples although perhaps at different points in the distribution channel. All are concerned with the elimination (at least at one point) of inventories, and thus with the acquisition of cost advantages and operational simplicity. It is nevertheless evident that for such advantages to be gained entails organization changes and disciplines of major magnitude—especially if the result is to show a sustainable benefit or competitive advantage in the end market place.

## 2. THE ELEMENTS OF THE JIT CONCEPT

To avoid all kinds of waste mentioned above, JIT encourages a total view of companies' operations and all the factors influencing

- the management of total throughput time
- the ability to produce quality products without any faults
- the maximization of resource productivity

With respect to the complexity of the JIT concept Wildemann [4] structures the fields of activities to realize it (see Fig. 2). The single units are

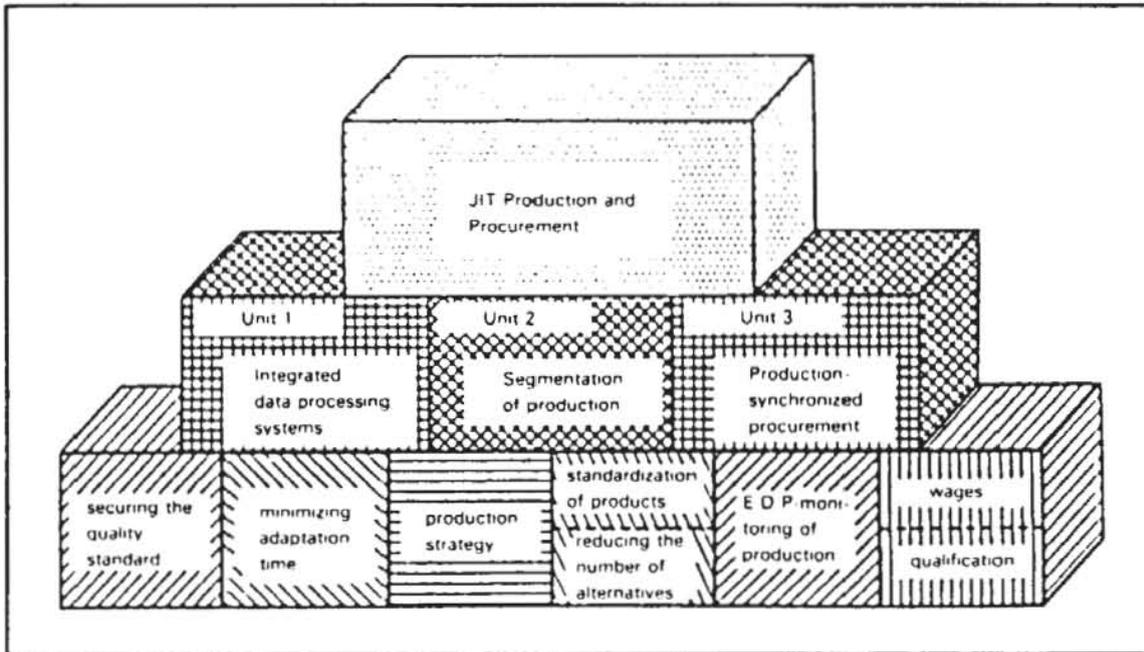


Fig. 2. Elements of JIT production and procurement.

- Integrated data processing for purposes of R&D, procurement, production planning, inventory control, marketing, meaning integrated and dialogue-oriented programs which provide reliable and complete data. This needs an extensive formalization of data collecting and data input and requires the ability to process large quantities of data daily, or more frequently. The routine processing of large amounts of data can be handled by introducing an action-oriented data processing system that is designed according to permanent decision necessities. In short, integrated data processing systems may normally be seen as the key elements and essential preconditions for managing the planning and coordination of activities within the logistical chain.
- Manufacturing segmentation. Extensive linking of segmentation manufacturing capacities; the capacity cross-sections have to be synchronized with respect to their output. This should make it possible to avoid non-productive periods between the segments. Efforts to reach a higher standard of automation are connected with the target of increased availability of machinery, of plant facilities and enhanced flexibility of personnel. Staff competence must be of a high order—this is central to the successful implementation of JIT. The most important layout principle in manufacturing segmentation is so-called flow optimization. In order to achieve flow optimization, plant facilities with
  - small capacity cross-section
  - highly flexible production means
 are preferable [4]. The company's marketing function may cause decisions necessitating provision of flexible machines and/or special equipment. The

adaptation to changing marketing tasks does not necessarily require completely new machinery with new functions but a variation of the plant size or utilization at equal costs per unit.

- Synchronization between materials demands in the production process and procurement activities: a production-synchronous supply system requires extremely high coordination between the internal sub-systems of manufacturers (or traders) and their suppliers. Demand estimation becomes much more important; interruptions in the materials flow immediately cause breakdowns ('standstills') in the production process. In addition to the aspect of materials quality or specification, the standard of delivery services provided by the supplier will be focused on: in extreme cases daily or even hour-by-hour deliveries are necessary, and the supplier or forwarder must be able to manage this, and to make rapid adjustments to quantity to meet unforeseen changes in demand. In fact, JIT delivery means that the materials needed for manufacturing or supplying a product are made available
  - at the right working place in the customer's premises
  - at the right moment of demand
  - in the appropriate quality and quantity

As Fig. 3 illustrates, the materials flow runs from supplier to customer. The information flow needed for coordination runs in the opposite direction from the customer to the supplier and comes into contact with the product flow at regular intervals. In order to produce benefits in the supply chain (reduction of throughput times and supply times), not only a new design of existing information and handling procedures but fundamental changes in their structures are necessary. Characteristics of these structures are

- establishment of flow principles
- self-controlled planning and disposition
- on-line data processing in the logistical chain
- linking of the planning and disposition systems installed at suppliers' and manufacturers' companies

The provision of such information as is necessary takes place on several planes, and may well do so concurrently. For example, there may well be

- Primary/policy communication—between end customer, and the producer's marketing function; and between the producer's procurement function and suppliers' marketing functions
- Internal communication—between the central policy decision units of the producer or trader and the various operating units, defining the basic programmes
- Tertiary/operational communication—between the functionaries, each with the immediate predecessor in the chain, regarding day-to-day administration of the agreed processes and schedules of requirements

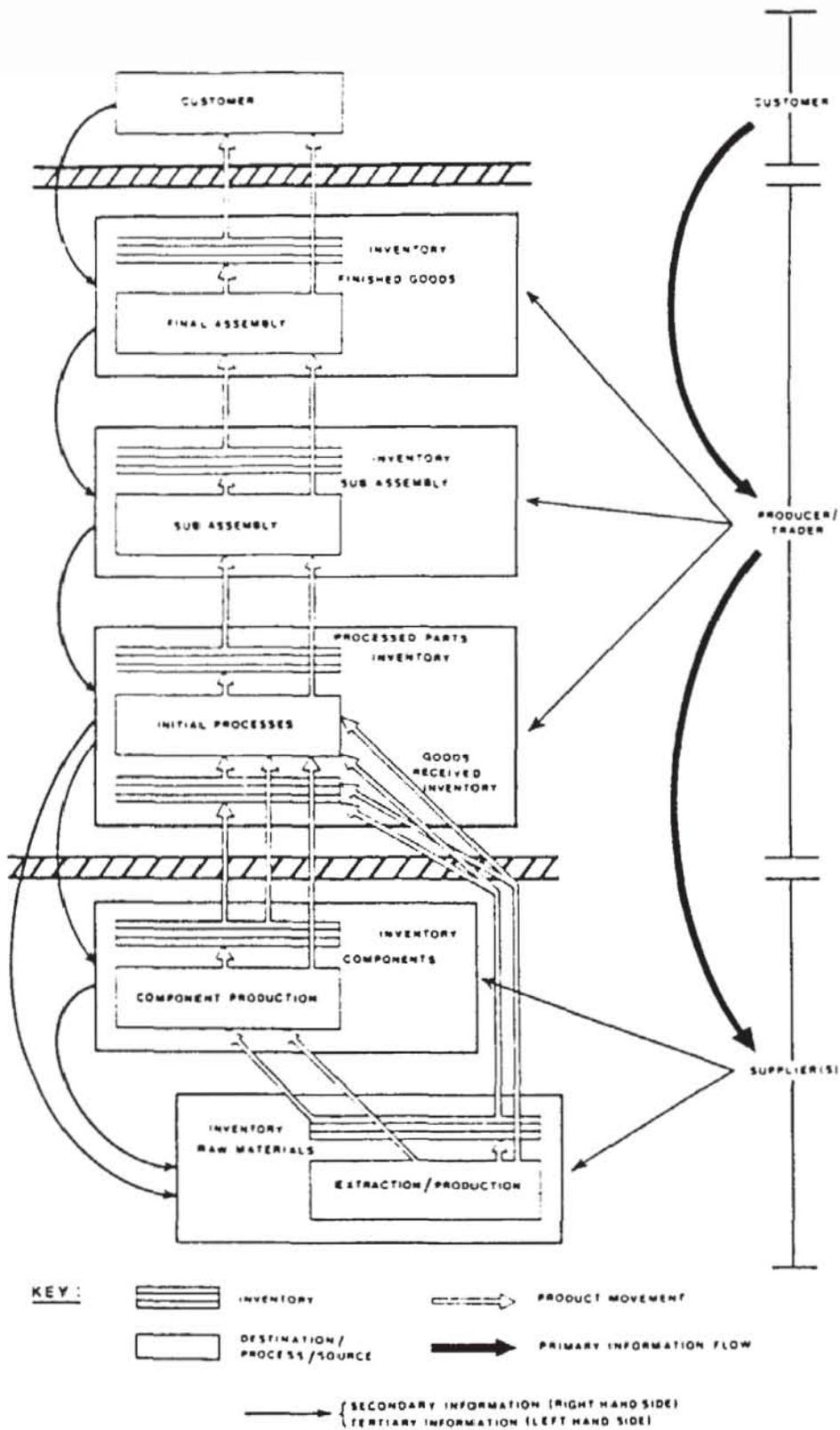


Fig. 3. Logistical chain between customer, producer, trader and supplier.

Regarding the flow of goods (vertically upwards) through Fig. 3, it will also be noted that supply to the next level 'above' in the chain may be either direct from 'production' or indirect, ex inventory. Flows of both goods and communication are at their maximum in terms of both number and complexity at the interface between 'producer' and 'supplier'. The more companies in the lineal chain, the more complex these relationships will tend to become, the further away from the end customer that interface is. A centralized control system with action-orientated data processing is illustrated by Fig. 4 which illustrates the major improvement in information control possible within the producer's domain, derived from an IDP system. Clearly such a system is capable of direct integration with compatible systems in both customers' and suppliers' organizations. In practical terms, proponents of all such systems (whether company-discrete or fully integrated), will be or become aware of the need to streamline or edit data publications to avoid 'information paralysis'.

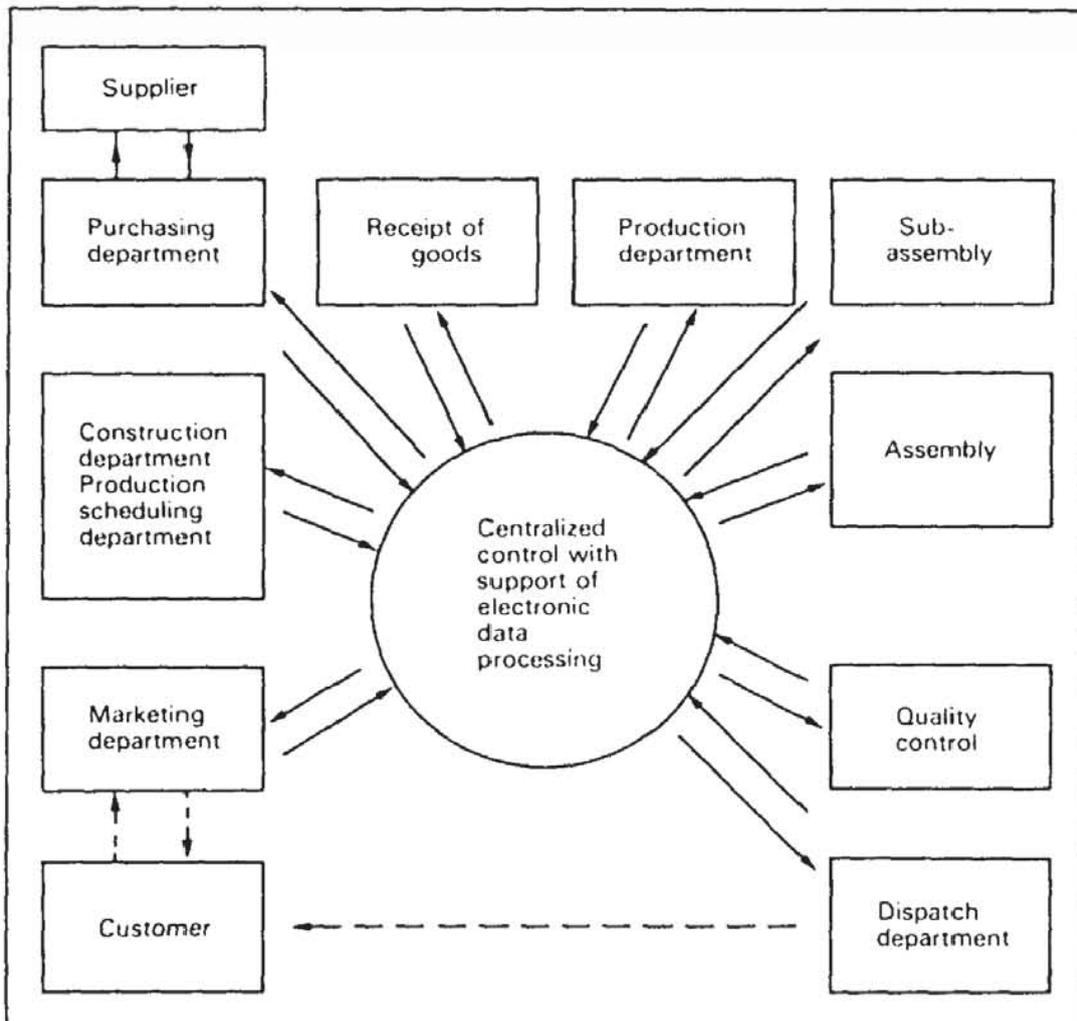


Fig. 4. Centralized control with action-orientated data processing.

Appendix II illustrates some of the inter-link options which, progressively, become feasible.

The first step in both the development and evaluation of JIT, however, starts in the producer's internal area, with efforts to detect and eliminate waste or duplication of effort in areas of machining and assembly processing, transportation, materials handling, thus bringing down wastage or defect rates to an absolute minimum. These efforts have to be reinforced by instilling into the minds of all employees—through training programmes and internal campaigns—the general idea: "All work is waste unless it creates added value" [3]. Therefore a basic concern of JIT is that inventories hide mistakes and management deficiencies. Inventories usually allow an uninterrupted production, prompt delivery, compensation for troubles, unbalanced capacities, insufficient flexibility, scrap and lack of accuracy with respect to delivery abilities. So it becomes easy to accept the advice:

*"Reduce inventories, and you can easily identify the sources of errors."*

Figure 5 shows diagrammatically how such a process can help to focus on points requiring attention. This is however not to suggest that the sole purpose of inventory reduction is as a contribution to problem identification! Reduction of inventory

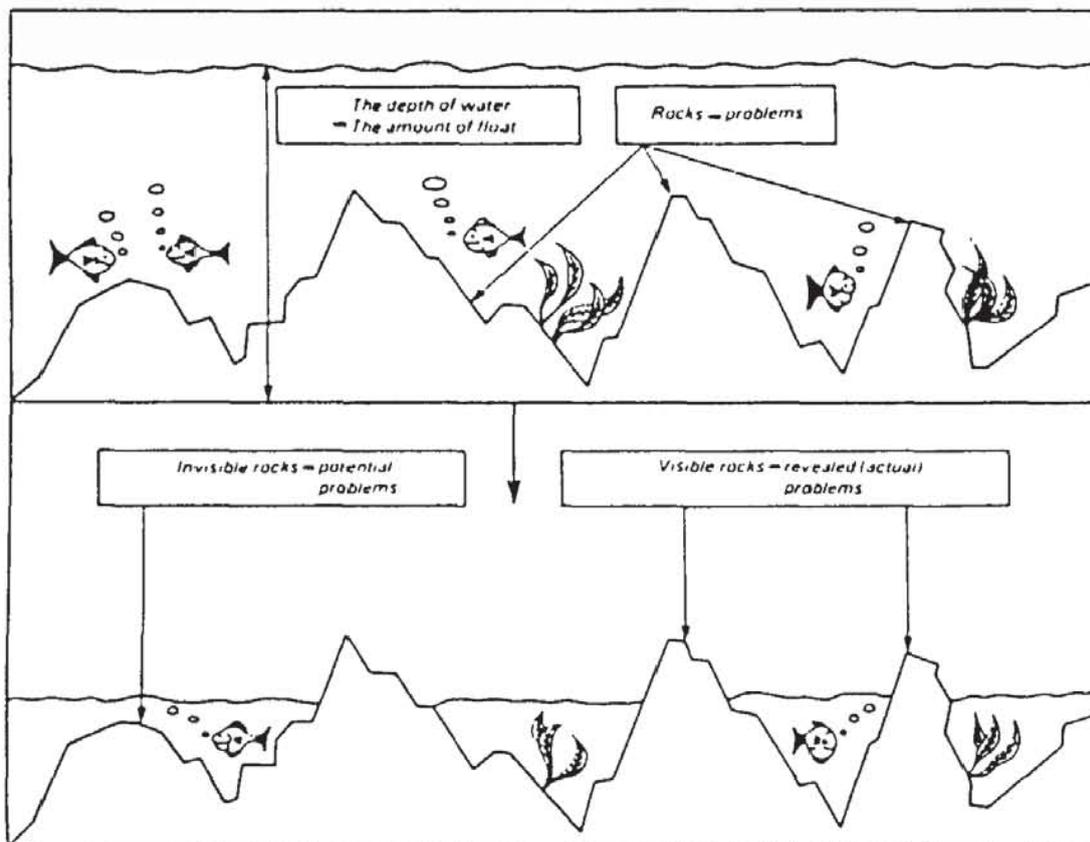


Fig. 5. How a reduction of floats or inventories can reveal actual problems [3].

levels (or even elimination of certain categories) has clear cost-saving implications in its own right—not restricted to the ‘operative’ company. This will be discussed further, later in this article.

### 3. CHANGES IN COMPETITION AS A MAIN FACTOR STIMULATING JIT DISCUSSION

The number of products available, in consumer as well as in industrial goods, is steadily increasing. Among the reasons for this are

- changes in demand structure. Consumer demands are becoming continually more differentiated and individualized
- convenience becomes more and more important as an influence on buying decisions. Consumers are less willing to accept any practical purchasing difficulties or even time lags between cognition and fulfilment of their wishes. In the case of impulse buying or fad products, immediate availability is the crucial competitive element
- stronger international competition (especially in the textile, automobile, household appliances, food sectors). Producers try to achieve a profile not only through creating merely psychological distinctions or ‘pseudo-innovations’ but by actual differentiation of products
- in saturated markets, especially in consumer goods markets, producers tend to employ the marketing instrument of price relatively aggressively and employ a variety of strategies designed to make a limited number of products attractive to a wide range of markets or segments
- product life spans are decreasing rapidly. This forces producers to adopt more dynamic product policies, with consequences for both investment recovery and risk evaluation, as well as causing time and secrecy pressures in the introductory phases

Porter [6] emphasizes that competitive advantage can be achieved either in the cost sector or by differentiation. The corresponding competitive strategies are outlined in Fig. 6.

		Competitive advantage through	
		Low costs	Differentiation
Domain of competition	Long-term goal	Cost leadership	Differentiation
	Short-term goal	Cost focus	Differentiation focus

Fig. 6. Competitive strategies (from ref. 6).

Traditional strategies no longer seem to be totally adequate: they focus mainly on economies of scale in production and distribution under the premises of a long-run non-dynamic environment. This is the foundation of the classical economists' view of the state and tendency towards equilibrium.

The market dilemma under conditions of increasing competition is obvious

- the cost leadership strategy requires more potential for flexibility as market induced changes in production occur more and more frequently, and potential price competition further increases pressure on margins
- the strategy of differentiation per se requires greater potential for flexibility of production, distribution and service. This potential causes cost levels which can impede competitiveness, particularly under conditions of international competition

The new information technologies, in combination with EDP-aided planning and disposition systems, automated control techniques, and automated production and transport systems, offer an opportunity to resolve the conflict between the goals of increased flexibility and economically sound cost levels.

As previously mentioned, integrated EDP-information systems are in practice integral units of the JIT concept; they constitute one of Wildemann's three basic units.

The JIT concept must be regarded as an important tool to improve competitive advantage. There can hardly be any doubt that better coordination of internal and external materials flows will achieve measurable cost savings and can simultaneously improve the delivery standards of producers and trading agents. Some of these economic effects should be analysed more deeply.

## **4. EFFECTS OF JIT-ORIENTATED MATERIALS MANAGEMENT**

### **4.1. Effects of the producer's choice of suppliers**

Implementation of JIT delivery needs coordination of material flows with respect to the actual requirements of the production process. The logistic chain between supplier and producer has to be adjusted to meet the demands at the various stages of production smoothly and precisely at the required intervals. The coordination and logistical efforts required will usually only be justified for goods with high usage value (A and B type materials). Normally, planning activities concentrate on about 10–15% of the number of items handled, which, on the other hand, often add up to a value of 80% of total materials costs. Some automobile producers, for instance, seem to give up their traditional purchasing strategy (employing several suppliers for one part; never use the full capacity of a single supplier) in favour of a strategy of 'single sourcing' in order to reduce the amount of capital and energy spent on coordination and logistics. Whilst this practice is often associated with adoption of JIT, the link is not a proven necessity.

The central features with respect to the choice of materials dispositions best suited for JIT are

- repetitiveness of orders/production lots
- precision and lead time estimations
- variety in production
- level of smoothness of production processes
- structure of supplier market

In addition, a number of other essential prerequisites for a successful JIT programme, not specific to materials or their scheduling, may be identified

- short lines of physical communication
- control over the transportation function
- high level of prominence and significance to the supplier, such that the customer's business will be accorded the priority necessary to insure against delays in delivery

It will thus be noted that a complementarity exists between suppliers' and customers' interests. As noted earlier, Class A and B inventory items suggest themselves as being most appropriate for this treatment: conversely the customer and his/her requirements must be high on the significance scale to the supplier.

The Japanese motor industry typifies the classic vision of JIT, where all the above criteria are met, but it is recognized that the ultimate facilitating elements are data processing integration and short links of physical communication [7].

#### **4.2. Cost effects of demand-synchronized delivery for the producer**

The profitability of a JIT supply system is determined by the cost effects for the companies involved. The rule applies that

- JIT is profitable if all participants can reduce costs
- JIT is profitable if only one participant can achieve a cost reduction
- JIT is always disadvantageous if higher overall costs result (unit costs increase for the supplier and are not at least balanced out by cost savings for the customer)

Evidently, conflict may arise if optimal order sizes are given up in favour of demand-synchronized supply lots.

If purchasing dispositions are standardized to a degree where the fixed order costs are negligible, shifting to JIT supply will be profitable in most cases, because inventories can be reduced to zero. This rests on the assumption that the quantities to be moved are not beyond the capacity of the transport facilities.

The data required for ordering are produced regularly and automatically as production and task structures are planned; presuming that the necessary hardware has already been installed. Only the processes of data transmission and software development require additional expenditure.

#### **4.3. Cost effects for the supplier**

If a customer introduces JIT, the supplier may be able to reduce his series unit costs as well—for instance, if the adoption of JIT leads the customer to shift to

single sourcing and thus increase substantially the total amount purchased from one supplier alone. The supplier may then achieve internal scale effects, enter long-term contracts and/or achieve synergy effects through organizational coordination. How these potential centres for cost reduction on the supplier's side are perceived and how they affect price negotiations between supplier and customer is of particular interest, and of varied significance, related to

- supplier competitiveness and development of the experience curve
- prior levels of competition and profitability
- customer competitiveness and importance of price as a negotiating weapon

More difficulties are encountered if a reduction of order lot size below the optimum point ((EOQ) leads to increased series unit costs for the supplier, owing to

- smaller production lots adapted to the customer's lot size, or
- higher inventory costs (if stocks are to compensate for variance between the supplier's and customer's demand schedules).

The general impact of cost effects may be best illustrated by calculation of examples. Appendix I gives a generalized view of cost savings available to buyers, on the premises that

- as order frequency increases the level of inventories held declines
- as order frequency increases, the cost of ordering declines.

On the supply side the computation is a little more complex. Consider for example the fixed series costs of a forge—in a medium size factory these might amount to DM1500 per batch or order, with an average order size of around 3000 units. As shown in Table 2

- reductions in equipment costs and start up costs might be achieved by rationalization of throughput, on optimal terms to supplier (EBQ) (net saving around 35%)
- adoption of JIT to key customers (without such a rationalization) brings about a sharp rise in costs both for equipment and tooling, as the result of repeated tool changes, damage, wear and tear, and a general decrease in output due to increased downtime. Administrative/distribution costs rise, and small order excess costs are incurred (net extra cost around 50%)
- adoption of JIT, but with rationalization of throughput may produce a compromise (column 5) of a net extra cost of just 15%. The buyer in turn would require to balance this cost increase against his own internal savings (see for example, Appendix I) in order to evaluate the overall effect of the JIT proposal

It can furthermore be hypothesized that series unit costs depend largely on lot size, as for example, is shown in Table 3 or graphically in Fig. 7.

Reducing lot size to half its original size, twice (from 2000 to 1000; from 1000 to 500 units) unit costs increase drastically from DM33.35 to DM49.63 (by 49%). Assuming that a reduction of this size is realistic if a customer switches over to JIT, he will hardly be able to compensate cost increases of this scale. The additional costs

TABLE 2.

	Fixed share of costs (%)			
	Actual	Achieved by rationalization	JIT without rationalization	JIT with rationalization
Equipment costs	50	25	50	25
Startup costs	25	15	25	15
Tools costs	10	10	25	25
Administration and distribution costs	15	15	20	20
Additional variable costs (extra charges)	-	-	30	30
Total (%)	100	65	150	115
Total costs (DM)	1500	975	2250	1725

TABLE 3.

Case	1	2	3	4	5
Lot size	100	500	1000	2000	3000
Actual costs (total/unit)	130.13	49.63	38.21	33.35	29.91

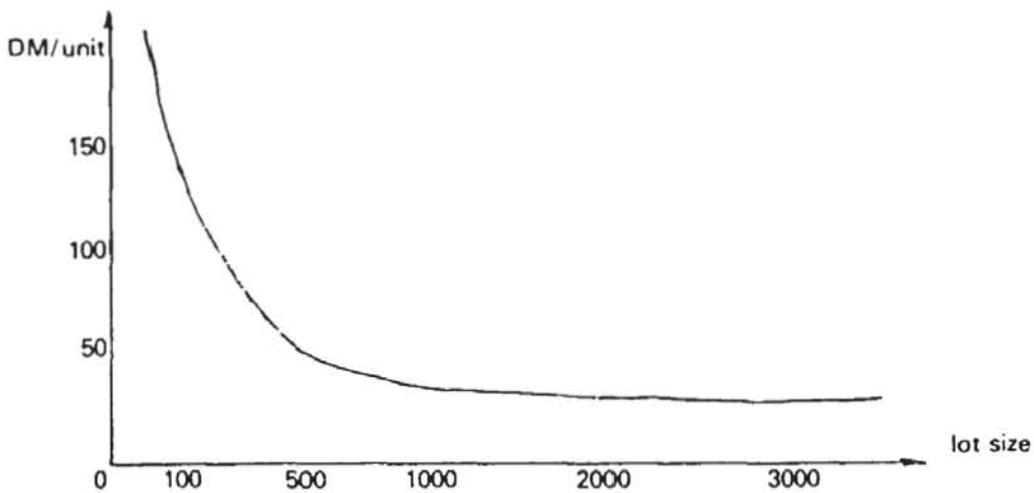


Fig. 7.

resulting from greater logistical efforts are not even considered! All in all, this would create an economic disadvantage.

#### **4.4. Overall cost effects in the logistical chain**

The question still has to be answered: "What is the overall effect on costs, taking into account the entire logistical chain?". This necessitates analysis, in detail, of suppliers' situations as well as of purchasing benefits.

As the customer prescribes the exact amounts and times to be delivered (whether or not through an automated order system), the supplier will usually not be able to optimize the relative series lot size—unless the capacity and process technology of his/her production are completely flexible and adapted to the customer's demand structure. Normally, only scheduling and lotsize/production frequency decisions will be left to the supplier. The major cost factors in this decision calculus are

- amount of fixed costs per lot
- inventory costs

To make more detailed conclusions (see again Appendix I), more specific knowledge of the individual case would be required. Synergy effects between different stages of production, cost effects for the supplier's own materials procurement; inventory facilities available would all have to be taken into consideration.

#### **4.5. Logistical requirements**

The advantages of an 'on-line' information link between supplier and customer can only be fully utilized if the physical flow of materials and parts is also adequately organized. The storing and transport requirements for demand-synchronized delivery have to be fulfilled

- with respect to internal company logistics
- with respect to external logistics

The task is characterized by a higher frequency ('more often') and smaller volumes ('less') than traditional routines. Materials transport is no longer organized like tramp shipping; distribution follows strict schedules like a regular service. The customer has to take in large numbers of vehicles, containers and inventory items each day: he has to see to it that the materials are conveyed to the points of demand by the requisite deadlines. In many cases, physical restrictions caused by remote plant location come into effect (e.g. at VW in Wolfsburg, or UKAEA at Dounreay).

The supplier is confronted with the problem of how to make best use of the transport facilities on their return journeys. This question acquires additional importance as the frequency of delivery increases. Organizational changes indicating a tendency to externalize the transport function can already be noted

- Customers may transfer all logistics including storage to independent enterprises. These are also responsible for assembly of orders and for the punctual delivery to

the points of demand (e.g. BMW/Schenker; Bertelsmann/Karstadt; Marks and Spencer/BOC Transshield among many others).

- Suppliers will have to decide whether it is economically advisable to maintain their own truck fleet under the conditions outlined above.

The transport industry and forwarding agencies have realized that their tasks have to be restructured (e.g. the concept of an area forwarding agent). However, there seems to be no clear idea as to how to integrate independent transport enterprises into the supplier's and customer's data communication network. The entire concept of 'middlemen's' activities is changing, and assuming a more proactive role on the part of the customer. (This is discussed further below.)

#### **4.6. Effects on the financial structure**

To develop that potential for flexibility in production and in the interaction with suppliers, substantial investments in hardware and software (programs and personnel) are required. Hardware investments cover mainly

- information and data processing technology
- flexible production systems
- automated product quality control
- regulation and control techniques (automated ordering etc.)
- transport and storing facilities

This leads to a major change in the proportions of invested and circulating capital. According to Wildemann [4, p.14], it is better to hold and fund capacity in 'invested capital' rather than in 'circulating capital'. This may require a reorganization of the balance-sheet structure—to increase the proportion of invested capital relative to the circulating capital in order to achieve low throughput time and high flexibility.

Wildemann states that there is always a demand for exactly the products that are out of stock at the moment. Therefore it seems reasonable to install additional capacities so the requested articles can be produced at the time of demand and the time lag between demand emergence and delivery can be reduced, but it must be remembered that the extent of production capacity and of inventory required to meet any demand, instantaneously, in full, is literally infinite. Evaluation of probabilities is therefore a matter of essential prudence.

The price to be paid for high flexibility is high capital investment—but expensive equipment may also lead to inflexibility. The term 'investment capital' is closely connected with the term 'fixed costs' and poses a classic problem in business theory. According to theory, capital-intensive enterprises are more sensitive to variation in capacity utilization. They become more vulnerable, more inertial and possibly even lethargic with respect to qualitative or quantitative changes in capacity, especially when a downturn is in prospect!

## **5. EFFECTS ON TRANSACTIONAL RELATIONSHIPS**

### **5.1. New tasks for the supplier**

The implementation of the JIT concept and realization of its benefits requires a perspicacious selection of suppliers in order to meet the goals of

- zero-error quality
- absolute reliability of delivery
- market-adequate cost level

It may be inevitable that the major buyer exerts pressure on the supplier's organizational structure whether deliberately or otherwise. This pressure might involve prescription of a standardized data exchange system and adjustment of information technologies or the transfer of functions previously performed by the customer to the supplier (e.g. quality control, acceptance procedures). These often turn out to be 'golden shackles'—factual or legal commitments like exclusive supply contracts, priorities of delivery, loans to the supplier, providing him with machinery, etc. The supplier thus inevitably loses some of his independence. If the strategy is pushed still further towards a minimal number of stages of production within the purchaser's plant, the supplier will degenerate into an external workbench. It is still not certain whether technology transferred from a large customer enables the supplier to participate actively in the customer's engineering and management progress, or to develop his/her skills for the benefit of his/her own business in more general terms.

### **5.2. Changes in strength of competition**

Over the years, concepts of purchasing efficiency, vendor appraisal, administrative record keeping, cost control and inventory management have all tended to promote a reduction in the numbers of suppliers favoured by most companies. Examples can even be found of companies who deal with a single supplier and on a JIT basis.

Participation in these transactional relations will increasingly be influenced by interactive coordination instead of market-induced competition. This also means that barriers to market entrance are erected; withdrawal from a market will require considerable time to break up the inter-organizational ties. Competitive relations will be static and governed by pure power and redistribution struggles. Whether it is indeed advisable for suppliers to practice more cooperation, as is often recommended (particularly by politicians), or if this is just an attempt at faith healing, can only be speculated about at the moment.

JIT suppliers tend to represent more than simply one element of a cooperative transaction relationship. Transaction theory (e.g. ref. 8) explains the relationship in terms of a 'reduction of transaction costs'; this objective can be reached by so-called 'internalization' of cost. On this view, suppliers are seen as part of one integrative system dominated by the buyer company.

The consequence of discussing the pressures of competition is to focus once again on the customer: what he requires and how his interests will or may be affected by fundamental changes in the supply side of the business. It must always be remembered that with the exception of the ultimate consumer, each organization or company has a dual role in the distribution or production chain—as customer and as supplier or marketer.

Three particular marketing-related topics have been identified in this discussion

- changes in the product line
  - channel relationships and management
  - identifiability of interest
- Changes in the product line—whether by introduction of new items or deletion of existing items—may be impeded by the existence of the close and complex inter-company relationships necessary for the successful functioning of a JIT system.

Similarly, changes of supplier become more problematic—even when the purposes of the ‘producer/trader’ are more than likely to be better served by the making of a change. It might thus seem paradoxical that companies, such as Ford, who have abandoned a ‘make everything’ policy, in favour of the flexibility of choice and freedom from capital tie-up that external sourcing can bring [9] should be prepared to risk immobility by entering long term JIT relationships with key components suppliers, as suggested elsewhere [10]. Indeed, it may not be without significance that the Japanese motor industry (long regarded as the concept’s high priests) is now showing signs of abandoning or modifying its practice of JIT [7], replacing it either by a freer association or by vertical corporate integration with the suppliers in parallel with the Mars/Horlicks model. The key decisions are thus likely to be related to the longevity expected from the relationship and the relative sizes of the purchasing and supplying organizations.

- Channel Relationships and Superiority. A process of vertical integration and supposed rationalization of channel outlets has been a key feature of the trading environment in the U.S.A., U.K. and Western Europe for over 30 years. The processes of evolution have been variously hampered or encouraged by legislation (e.g. the Robinson-Patman Act of Congress; the U.K. Restrictive Trade Practices Act 1956). Despite the various attempts to restrain the development of monopolies, there has been a seemingly inexorable drift towards concentration of both industrial manufacturing power and commercial trading activity into progressively fewer sets of hands.

The consequences have been dramatic. Taking the retail trades as an example, not only has there been a massive reduction in the number of businesses trading [11], but in greater than inverse proportion the power of the multiple traders has been perceived to increase. It is well documented that this shift in channel power has arisen in part from changes in merchandising policy, and in part from pricing strategies. The demands made upon their suppliers by these multiples are thus directly analogous to those of the ‘producers’ discussed above. Stockless

distribution; reduction of lines offered, rationalization of suppliers have all been seen; but there have recently been symptoms of unease in the retailers' camps, as they now compete with organizations of equivalent strength, and seek for bases of differentiation [12].

The consequences of such concentration (as has also been paralleled in the motor industry) have been felt far beyond the retailers' premises. Manufacturers of prospective new products face severely restricted opportunities: Silverman [13] estimated that it was, in practice, essential for a new food product to be adopted by at least one of the handful of major retail food groups in the U.K. if it was to stand any realistic chance of survival, let alone achieve long-term successful penetration of the market. On the assumption that effective penetration did take place, and the product was successful enough to become a 'best seller' much experience suggests that the original supplier would have progressively less influence over the subsequent presentation and marketing of the product to the consuming public, as retailers and other distributors seek to use the successful brands as a bargaining counter.

Investigation of the marketing of 'healthy food' products by Kelly [14] has already suggested that in reality the initial demand or market for this putative segment was not identified by manufacturers nor pushed for by consumers but was created by a small number of retailers who could be seen as

- dictating (as customer) to the manufacturers what they required or
- pressuring the consumer, by manipulating shelf space, into buying what was offered for sale.

This is but one example of the extent to which channel power can be seen to work (potentially at least) against at least one group of customers' wishes and desires, and which can thus be seen as encouraging the more strident elements of the consumerist lobby, which frequently appears to portray marketers as manipulative and unscrupulous.

Even in situations of less overt influence on consumer choice, pressures induced by producers' or traders' insistence on a JIT purchasing strategy may have dire consequences for individual suppliers, especially where they lack size or 'muscle' compared with their customer. Schreffler [7] notes that even although such suppliers may not be forced out of business, there is no guarantee that they will share in the overall or 'net' benefit subsumed by the producer or dominant partner in a JIT programme. Such suppliers not infrequently find that they are obliged to supply on a JIT basis but lack the purchasing significance to insist that their suppliers reciprocate: they thus find themselves obliged to hold inventory on behalf of their customers, and to facilitate their own production operations, without being able to negotiate an adequate price adjustment.

In this 'worst of both worlds' situation the alternatives are stark, and frequently unpalatable

- accept loss of effective profit and attempt to diversify to other markets—rarely simple or risk-free

- cease supplying—and perhaps risk liquidation
- admit to being a captive supplier and submerge identity—possibly to the extent of a corporate takeover

Such a choice is not fantasy—as many erstwhile suppliers to Marks and Spencer, for one, have found—except that in that case the third option was not available.

- Identifiability of interest is arguably the greatest problem of all. Whilst it is generally accepted that each company has the prerogative to define its own mission and strategic plans, that is not synonymous with any suggestion of possession of the right to dictate choice to its customers.

In the ultimate, the 'integrated system' approach to supply and marketing may be seen to imply the monopolistic right of the buyer to determine his suppliers' policies. Abuse of purchasing power—especially in an oligopolistic market, or as in the retail trades faced with diminishing numbers of competitors—leads to a significant reduction in the degree of choice available to the purchasing public. At the fringes this may not represent any loss of economic utility, but cumulative reduction can only lead to the Safeway (U.S.) situation of diminishing market appeal and diminishing profits, coupled with increased market opportunities for new, entrepreneurial competitors [12].

Such a sequence might run as follows:

Competitive pressure

- -->	Concentration of product lines
- - ->	Concentration of suppliers
- - ->	Purchasing pressure on trading terms
- - - ->	JIT
- - ->	Restriction of suppliers and of product choice
- - ->	Restriction of customer attractiveness

At the end of the day, the trader must ask himself whether his utility to his customer depends entirely or principally on price, or whether non-price variables can assume significant competitive roles in differentiating (if not actually fragmenting) the market [15].

## 6. JIT: SAVIOUR OR CURSE?

It is probably true to say that practised in isolation, without full appreciation of its pitfalls and implications, any business theory is likely to come to grief. This would certainly appear to be the case with the JIT concept. If carried to extremes, if insisted upon by customers without the active cooperation of suppliers, it is probable that not only would the adoption of JIT prove to be unworkable, but also, in the long run, it would induce an inflexibility which could be detrimental (if not fatal) to customer and supplier alike—whether the supplier be a raw materials organization or a consumer products manufacturer.

On the other hand, to treat JIT as if it represents an undesirable, alien intrusion into the world of management decision making is equally unrealistic: one cannot turn the clock back, nor can one deny the benefits of JIT—under certain circumstances. The optimum course to pursue is therefore to focus on the strengths of JIT and to circumvent its weaknesses, or the circumstances where it is inappropriate. Like the computer, the JIT concept has already found its way across the psychological divide between ‘remote’ manufacturing industry and the ‘immediate’ arena of trade and commerce. As with the computer, we have to learn the fallibilities and the opportunities of the concept. These may perhaps best be grouped under three headings:

- the environment
- applications, or objectives
- consequences

becoming somewhat more significant, and contentious, in turn.

### **6.1. The environment**

It is accepted without question that the commercial world of the late 20th century is inherently more competitive and more dynamic than any other preceding era: thus it is not surprising nor inappropriate for commercial organizations to do all in their power to protect their present positions and to secure further competitive advantage. Successive cyclical swings in business, of both long- and short-term types, have taught corporations that, as well as entrepreneurial flair, future success depends upon strategic foresight and achievement of present cost-efficiency. The importance attached to inventory management has long been appreciated, but it is only the rapid diffusion of computer application of the past 15–20 years that has opened up the true scope of this facet of business, and hence shown the benefits (in dramatically quantifiable terms) to be derived from JIT.

Before 1970, although enlightened companies appreciated the concepts linking profitability to shelf space, or floor area to sales exposures, few had the physical resources of, for example, Unilever or Allied Suppliers to carry out the mathematical analyses involved. Even such large organizations could not, at that time, contemplate monitoring such detail on a regular, ongoing basis [16].

The rapid development of computer technology, and the widespread diffusion of EPOS systems has not just produced data, it has encouraged businesses to explore and exploit new opportunities.

### **6.2. Applications and objectives**

In the ultimate, the aim of all inventory is to facilitate the provision of a service, and of successful competition the provision of the highest level among suppliers. Thus the concept of ‘level of service’ comes to assume practical significance, with the recognition that there is an inverse (although non-linear) relationship between

inventory levels and the ability to satisfy customers. The consequent need to classify inventory into degrees of significance thus spawned not only the relatively simple concepts of ABC analysis and JIT, but also focused management attention on the much more complex means of measuring progress towards implementation of these ideals.

### 6.3. Consequences

Although there has been for some time a general recognition of the benefits to be derived from a strict control of inventories, and an appreciation of the notional advantages offered by JIT, widespread adoption of the latter and lukewarm practice of the former has been attributed to a number of practical hurdles in many companies. Some of these barriers are technological in origin, for example

- lack of data or data processing expertise
- logistical impediments, like erratic or interruptible supplies or usage patterns
- wide choice of suppliers necessitating continual changes in point of purchase

Some of the reasons advanced amount to little more than inertia or internal empire-building, like unwillingness to enter into long-term commitments to suppliers because that might be interpreted as facilitating a reduction in the effort or resources required for the procurement function, or as implying a policy of product stability.

Perhaps the most difficult argument against JIT to answer is that companies' policies should be capable of change at the direction of companies themselves, and not be held hostage to long-term supply commitments. Competitive success appears to depend at least as much on entrepreneurial flair à la Peters and Waterman, as it does upon detailed strategic analysis and planning [17].

JIT is seen as encouraging stability not only of supplier but of product, whereas competitive strategies are perceived as requiring freedom of manoeuvre. Commercial success might logically be maximised if these two apparently conflicting philosophies could be managed in combination. Such a formula would entail

- identification of the right product line
- effective sourcing
- establishment of close control over the vendor and the supply contract

in other words marketing oriented purchasing.

The adoption of the JIT concept must therefore be based upon recognition of two essential points:

- JIT is a facilitating concept and not the ultimate goal of the firm. If market or environmental conditions alter, the firm must be prepared for reappraisal of its supply systems as well as of the products which it acquires and supplies.
- JIT is simply one management tool among others, but one which has entailed a great deal of adjustment among suppliers, and which has been a major element in

the perceived balance of control in the management of distribution channels. Even if a JIT proposal is considered and then declined, or if a change in the product mix eventually precludes the future expansion of the JIT principle, the concept cannot be 'unlearned' nor are the currently dominant members of the channels likely, voluntarily, to yield control of their businesses to others.

The third consequence of the JIT 'fashion' has been not only the evolution of specialist logistical sub-contractors, but a major revolution in the role of the wholesaler's function which traditionally was to act primarily—albeit not exclusively—as a distributor for the manufacturer's wares. In West Germany we now have the situation where having passed through a phase of non-acceptability for reasons of profit margin maximization, wholesalers find themselves back in favour with certain of the retail majors but in a different light—as acquirers, for the retailers' benefit [8].

This seemingly simple—though logical and apparently totally marketing oriented—transformation has not only required a fundamental reappraisal of commercial purchasing strategies, it has also tended to highlight alternative schemes of integration—e.g. Kaufhof/Hertie and Metro, and to shift into the area of corporate strategy decisions on the breadth of inventory range to be carried across the corporation as a whole. It remains to be seen whether by acquiring their own 'wholesaler', the retailers have gained an overall, as opposed to a merely segmental, advantage over other traders.

In the U.K., the general trend of the past 20 years shows little real change, and certainly not at the instigation of retailers. Major store groups and mail order houses continue to emphasise their direct purchases from manufacturers—to the extent of expanding their own overseas procurement operations. In effect (irrespective of terminology) they regard themselves as sole suppliers to their own outlets, and thus seek to retain overt and direct control over the entire distribution channel. The onus to supply on a JIT basis still exists but with the balance often being seen as dictated by the retailer rather than negotiated to the satisfaction of all parties. The concept of wholesaler as acquirer and consolidator of supplies has apparently yet to reach its full potential, despite the existence of numerous contract warehousing and distribution specialists. Such specialists require to become more than reactive logistical contractors: there is a potential role for them as proactive sourcers and supply consolidators—to the benefit of retail majors and of the smaller, perhaps shorter term suppliers who at present are unable to meet the demands of the dominant retailers.

## **7. WHO WAGS?—THE TAIL OR THE DOG?**

It is clearly beyond the scope of this article to prescribe formulae for individual traders or producers to follow. What should be clear however is that not only has the business world irrevocably changed, but that the changes are fundamental, complex and organic—not just involving adjustments of scale.

The fact that concepts such as marketing are seen to pervade the manufacturing and administration of companies is not accidental: in a similar manner the concepts of administration and 'good' management must have some impact upon the function

of marketing, without altering its basic concept. JIT as a concept is simple, but as discussed above, its practice is less so, and in turn raises wider issues of procurement policy, and hence of product policy and marketing strategy.

In the final analysis, the decision on whether or not to insist that suppliers adopt a JIT philosophy has to be taken in the full context of the business: the advantage to be gained, the administrative disciplines to be imposed, the distributive and acquisitive channel options and consequences which exist. Undoubtedly JIT offers many advantages. As with all aspects of business these have to be translated into valuable opportunities if they are to provide any benefit. At the very least, however, the evaluation of a JIT option (whether it is adopted) cannot be other than beneficial to the company, in that it forces the company to face and evaluate the validity of current policies and practices, and to be aware of the real costs of inventories. The decision on whether those policies should be changed rests however on the long- and short-term corporate benefits to be gained from a set of strategic decisions—and not just on the short-term administrative convenience to be acquired.

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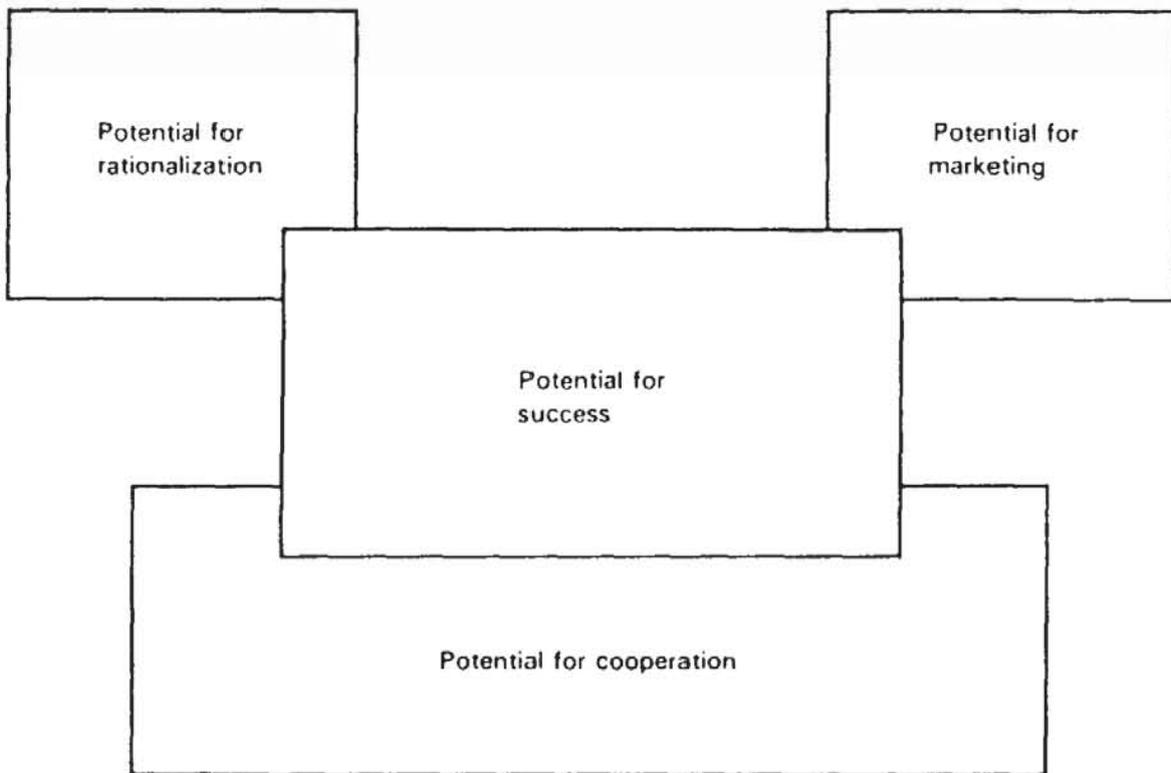
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### APPENDIX I BUYER'S COST REVISION SITUATION WHEN IMPLEMENTING JIT PROCUREMENT

This example is driven by specified or assumed increases in order frequency ( $h$ ), and actual or presumed corresponding reductions in fixed order costs ( $c$ ).

Items	1	2	3	...	$n$
Planning time $T$ (weeks)	16	16	16	...	16
Total need $x$ (units)	3200	3200	3200	...	3200
Fixed order costs $c$ (DM/order)	640	160	40	...	10/49
Unit stock-keeping costs $l$ (DM/unit per week)	0.10	0.10	0.10	...	0.10
Optimal order volume <sup>a</sup> $q$ (units) (EOQ)	1600	800	400	...	200/7
Order frequency $h$	2	4	8	...	112
Order costs $K_B = c \cdot h$	1280	640	320	...	22.86
Total stock-keeping costs $K_L = q/2 \cdot l \cdot T$	1280	640	320	...	22.86
Total cost situation $K = K_B + K_L$	1560	1280	640	...	45.72
Cost savings $K^B$	-	+ 1280	+ 1920	...	+ 2514.28

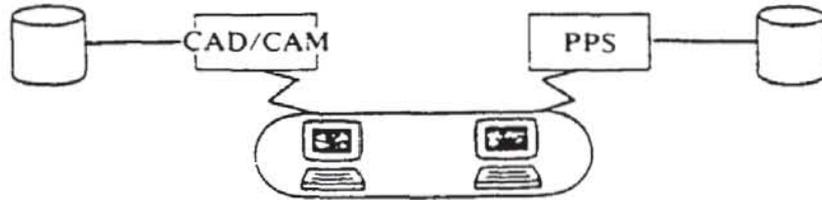
$${}^a q = \frac{\sqrt{2 \cdot c \cdot x}}{l \cdot T}$$



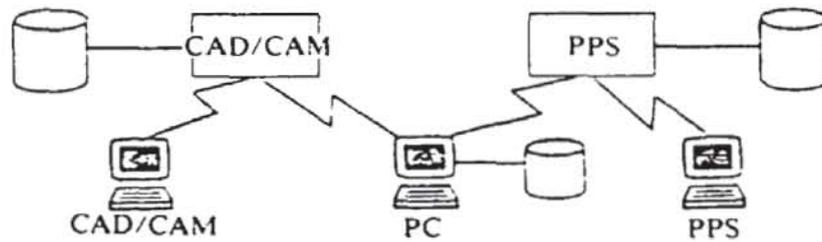
Potentials for success of integrated materials flow/commodity flow systems.

## APPENDIX II

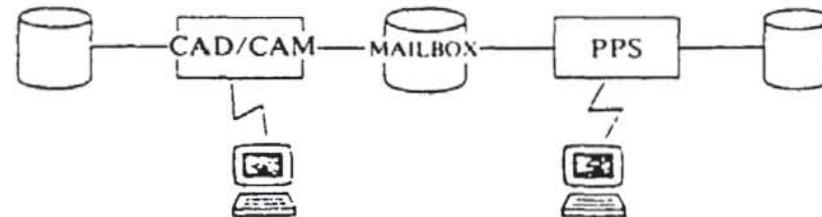
First stage: Organizational links between technically unconnected data-processing systems



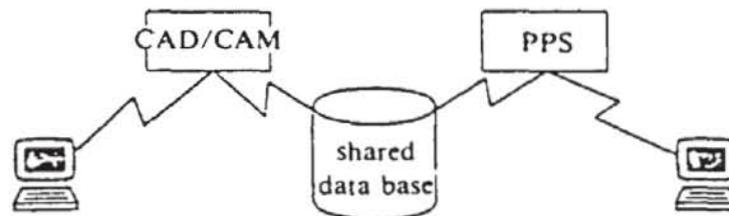
Second stage: Integration of unconnected systems through tools (PC, Query, Networks)



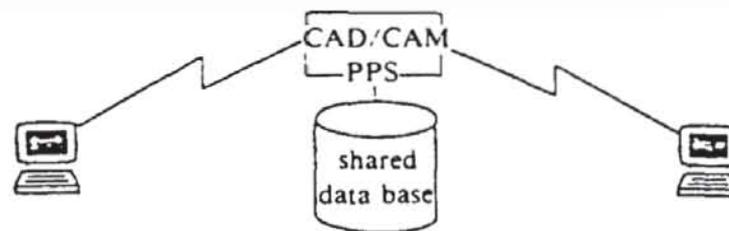
Third stage: Data transfer between two systems



Fourth stage: Data base shared by two systems

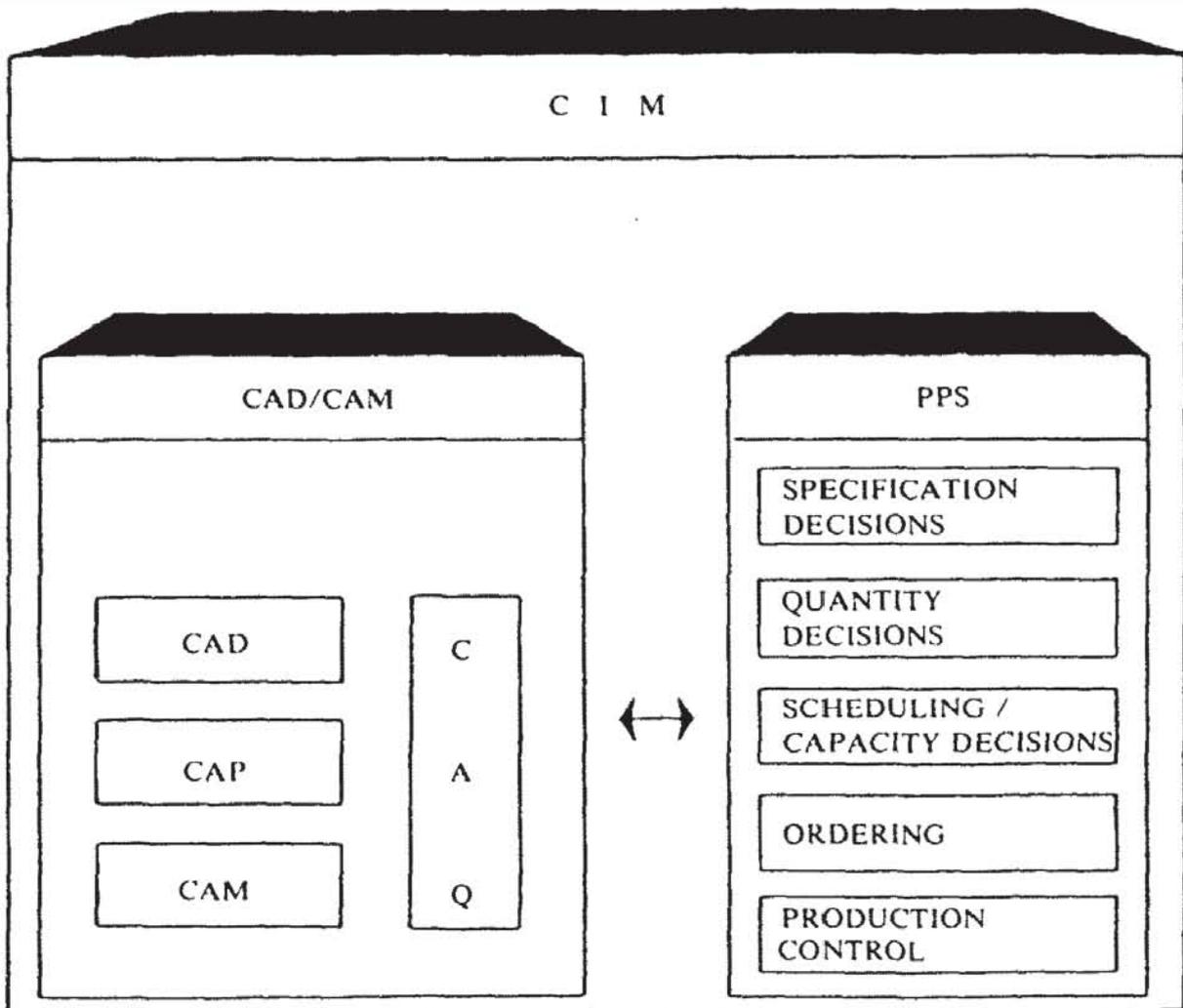


Fifth stage: User-user-relation through integrated programs



Degrees and options for integration

in: A. W. Scheer, *Strategie zur Entwicklung eines CIM-Konzeptes*, Springer, Berlin, 1987, p. 9.



Elements of CIM. From A.W. Scheer, *Strategie zur Entwicklung eines CIM-Konzeptes*, Springer, Berlin, 1987, p. 15.

## **Just-In-Time (Juste à Temps): Quelques questions de marketing qui ont été soulevées par un concept populaire dans la production et la distribution**

### RÉSUMÉ

La littérature des trente dernières années contient de nombreuses contributions consacrées à l'amélioration de l'efficacité des entreprises: un des secteurs clefs auxquels l'on s'est adressé est celui des dépenses, ce qui a attiré l'attention, entre autres, sur les coûts de stocks. Il apparaît fréquemment que le développement d'un système de logistique capable d'éliminer ou de réduire considérablement les stocks, est non seulement considéré comme universellement praticable, mais ipso facto, souhaitable. Cependant, exactement comme de nombreuses compagnies ne semblent pas apprécier la portée pour l'entreprise d'une orientation vers le marketing, "Just in Time" semble être généralement considéré en tant que concept ou pratique qui ne porte que sur des secteurs limités des affaires de la société.

Dans cet article, les auteurs essayent de créer une conscience de deux secteurs clefs: les conditions préalables nécessaires à l'exploitation d'un programme JIT, et les conséquences qui résultent d'une telle décision. Le potentiel 'interne' d'économies est discuté, et ceci est complété par la considération de certains effets potentiels sur la gamme de produits et les façons selon lesquelles le 'marketing mix' peut être affecté. Des expériences récentes dans le développement de bases logistiques en Grande Bretagne et en Allemagne Fédérale sont discutées en parallèle aux pratiques courantes au Japon.

Les auteurs ne prétendent pas avoir formulé un scénario définitif, mais ils proposent leurs points de vue en tant que base de délibération par les administrateurs, tout en étant convaincus que la décision d'exploiter un programme JIT devrait jouer un rôle subalterne au plan stratégique de l'entreprise, plutôt que de dominer le processus de la planification.

## **Just-In-Time: Marketing-Probleme eines populären Produktions- und Distributionskonzepts**

### ABRISS

In der Literatur der letzten 30 Jahre erscheinen immer wieder Beiträge zur Verbesserung der Unternehmenseffizienz, in denen natürlich Fragen der Kosten, darunter auch der Lagerkosten, besondere Beachtung finden. Dabei wird oft der Eindruck erweckt, daß die Entwicklung von Logistiksystemen, die Lager unnötig machen oder zumindest scharf reduzieren, nicht nur universell durchführbar sondern auch ipso facto erstrebenswert sei. Andererseits scheint "Just-in-Time" (JIT) generell als ein Begriff betrachtet zu werden, der nur für beschränkte Unternehmensbereiche Bedeutung hat.

In dieser Arbeit versuchen die Verfasser, Aufmerksamkeit auf zwei Kernfragen zu lenken: die notwendigen Vorbedingungen für die Einführung eines JIT-Programms

und die sich daraus ergebenden Folgen. Die Möglichkeiten der "internen" Kostenersparnis werden besprochen, und es werden weiterhin die möglichen Auswirkungen auf die Produktpalette und den Marketing-Mix untersucht. Erfahrungen mit der Entwicklung von Logistik-Basen in Großbritannien und der Bundesrepublik werden mit japanischen Praktiken verglichen.

Die Verfasser behaupten nicht, ein definitives Szenario entwickelt zu haben, sondern sie betrachten ihre Gedanken als eine Basis für die Überlegungen von Managern—in der Überzeugung, daß die Entscheidung, ein JIT-Programm einzuführen, der strategischen Unternehmensplanung untergeordnet werden muß anstatt den Planungsprozeß zu dominieren.

### **Just-In-Time (a tiempo): algunos problemas de marketing planteados por un concepto popular en producción y distribución**

#### RESUMEN

Todo lo publicado en los últimos 30 años está diseminado a propósito con contribuciones dedicadas a la mejora de la eficiencia corporativa: una de las áreas principales que han sido tratadas es la referente a costos, la cual ha centrado la atención, *inter alia*, los costos de inventario. Frecuentemente parece que el desarrollo de un sistema logístico, el cual puede eliminar o reducir significativamente el inventario, no sólo es asumido como posible universalmente sino también deseable *ipso facto*. Sin embargo muchas corporaciones la mayoría de las veces parecen no apreciar las implicaciones corporativas de una orientación de marketing, de igual forma A Tiempo parece que es visto normalmente como un concepto o como una práctica que sólo tiene relevancia en áreas limitadas de los negocios de una compañía.

En este artículo, los autores intentan crear conciencia de dos áreas principales: los prerequisites esenciales para la aplicación de un programa A Tiempo y las consecuencias que resultan de tal decisión. El potencial de ahorro del coste 'interino' es desarrollado y complementado por la consideración de alguno de los efectos potenciales en la gama de productos y las formas en las que la mezcla de marketing puede ser afectada. Se explican experiencias recientes sobre el desarrollo de bases logísticas en el Reino Unido y en la República Federal Alemana, de forma paralela con las prácticas actuales en Japón. Los autores no pretenden haber formulado un escenario definitivo aunque ofrecen sus ideas como una base para ser deliberadas por los directivos en la creencia de que la decisión de aplicar un programa A Tiempo debería estar subordinada al plan estratégico corporativo más que dominar el proceso de planificación.