

---

Production and logistics

# apropos Just-in-time production

The concept  
The beginnings  
Objectives  
JIT production modules  
Advantages and dangers of JIT production  
Branches of industry  
Tips for the underwriter

1.4

AssTech  
D-80526 München  
Germany

The concept	<p>The principle of “just-in-time” production comes from Japan. In essence it means that labour and materials are steered at the right time to where they are needed. This is why JIT can also be described as demand-oriented production.</p> <p>JIT programmes call for requirements planning that gets materials to the right place at the right time in the right quality and quantity. Such programmes cover the flow not only of materials but also of information and aim at gearing the value-added process to the stringent conditions prevailing in the marketplace.</p> <p>Today JIT is a production strategy featuring modern resourcing methods which is suitable for all types of industrial plants.</p>
The beginnings	<p>Technical innovations in design and production, changing customer demands and increasing pressure from both foreign and domestic competitors led to a dramatic change in the market conditions for many branches of industry. In Europe it was the motor industry that was affected most and where the earliest moves were made to adapt production to market needs by using the JIT approach. The prime objective is to eliminate organisational slack.</p> <p>The introduction of JIT is not something that can be restricted to a handful of departments, it is rather an ongoing concept affecting all company divisions and may even lead to complete reengineering.</p>
Objectives	<p>The main objective of JIT programmes is to reduce as far as possible both processing times and inventories. This is complemented on the incoming supplies side by measures to ensure that reorders arrive on schedule and without unnecessarily long waiting times.</p> <p>Faster order-processing times are designed to cut both production and delivery times and to minimise inventories as well as reduce the space required for production and storage. According to some estimates, a 30–70% saving in time can be achieved, while logistical costs can be cut by between 25% and 50%.</p> <p>The time savings also make themselves felt in the balance sheet: the length of time that capital is tied up in stocks can be reduced; the same resourcing, production and turnover volumes can be achieved with less capital investment.</p> <p>The customer, too, is said to profit from the JIT philosophy since the gains made in performance make it easier for the manufacturer to supply the goods the customers want when they want them.</p> <p>Further goals of JIT applications include:</p> <ul style="list-style-type: none"> <li>○ faster processing of different orders thanks to enhanced versatility in production;</li> <li>○ the introduction of new technologies and organisational forms can speed up the communication process (rationalisation through reorganisation);</li> <li>○ targeted training measures can help staff assume more responsibility within the production process (enhanced profitability through motivation of personnel);</li> <li>○ improved quality by transferring quality control down to the level of individual production segments.</li> </ul>
Traditional production methods	<p>The introduction of JIT principles presupposes a restructuring of both production and logistics. Conventional methods are characterised by large stocks, long processing times, poor information flows and hidden costs.</p>

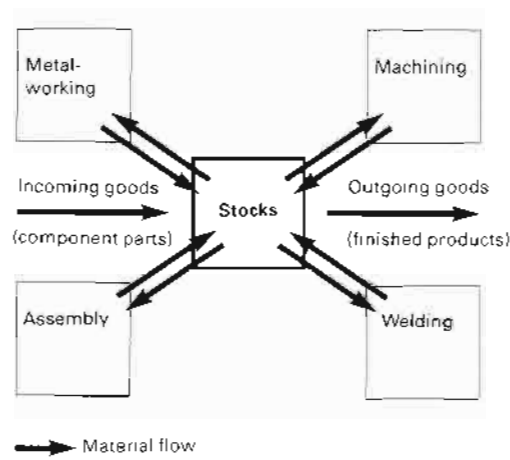


Diagram 1: Traditional production with low information and poorly coordinated logistics

Just-in-time production

Time-reduction strategies to “slim down” the company aim at integrating material and information flows along the whole logistic chain. This results in centrally coordinated order-processing, low inventory levels, short throughput times and optimized costs through rationalisation.

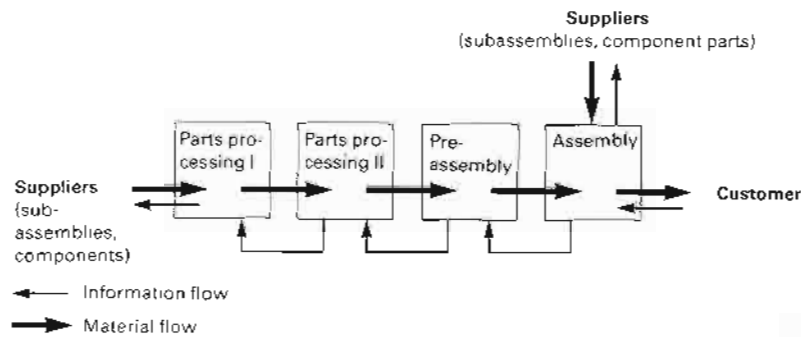


Diagram 2: Just-in-time production with integrated material and information flows

JIT production modules

JIT applications require integrated information processing, which can be achieved by deploying production planning and control systems (PPS), computer-integrated manufacturing (CIM), bottleneck management, quality assurance and system modules.

The production sequence, too, is a sphere of action: the means employed in this area include close contact with clients via strategic business units, enhanced personnel productivity (production islands), simplified organisational structures (small task units), integrated feedback loops and quality circles.

At the incoming supplies end these measures are supplemented by production-synchronous resourcing. This can be achieved by the following means: choice of suppliers (as few suppliers as possible per component), framework agreements between manufacturer and supplier, state-of-the-art resourcing logistics, delegation of responsibility for quality assurance, constant value engineering, and products that are both economically and functionally optimised.

JIT modules interlock like a control loop and demand homogenisation of the product range, minimisation of setup times, and the optimisation of production data capture, the production strategy, the quality-assurance strategy and staff training.

---

## Advantages of just-in-time production

The advantages of JIT production for the manufacturer and client alike are to be found in:

- increased productivity;
- higher-quality finished products;
- reduction of inventories;
- less space required for storage and production;
- enhanced flexibility because of ability to adapt more quickly to customer demands;
- fewer bottlenecks owing to creation of redundancies;
- lowering of the storage risk and number of rejects.

Suppliers, too, can profit from JIT applications. They can specialise in particular components and can secure a long-term partnership by means of framework agreements. Suppliers can also cut their stocks, raise their standards of quality, adopt the latest technology, optimise their costs and make the most of their market opportunities.

## Dangers of just-in-time production

On the downside, manufacturers and buyers have to accept a higher degree of dependence on their suppliers. In extreme cases, for example, production may have to be halted if there are supply problems, thereby for the most part negating the rationalisation gains brought about in the first place by the JIT programme. The frequency of production stoppages can be exacerbated even further by the high level of process integration (e.g. centralised control, CIM, and networks, particularly those for logistics).

Planning systems that have been inadequately adapted to the JIT application can give rise to prognostic errors. In this context precise strategic planning is crucial since existing structures often have to be changed from the ground up. The implementation of JIT programmes also calls for highly qualified staff (= dependence on personnel) and can also lead to complicated product-liability problems.

By adopting JIT principles, the manufacturer shifts the risk from his company to the supplier. This is true not only for stock-keeping but also for the danger of errors in availability control and deliveries. Pressure to meet deadlines may have a negative effect on quality, while reworking and additional deliveries increase both production and transport costs (= overtime).

The ever-increasing intensity of traffic means that suppliers must allow for delays in delivery, otherwise their reputation for prompt delivery will be endangered. In general, dependence on the manufacturer/buyer grows, weakening the supplier's hand when negotiating contracts.

Industrial applications of JIT methods also harbour problems for the insurer. Risk is transferred from the manufacturer to the supplier; the storage risk becomes a transport risk (large numbers of minor losses, accumulation risk). Claims arising out of delivery problems – i.e. the resourcing risk – are difficult to insure. It is also hard to clearly delimit liability risks (product liability, general liability, etc.). Furthermore, the insurer must take account of the fact that property damage will increasingly be the cause of production stoppages.

---

## Branches of industry

JIT programmes minimise storage and logistic costs, which is why they are most frequently used in industrial enterprises with broad product ranges. The motor industry and its component suppliers provide the best example of this.

A mid-range car consists of some 5000 component parts. If all details such as colour, equipment and accessories are taken into account, it is possible to have up to 400,000 variants of a single end-product. It would take huge warehouses and complex logistic systems, all at an enormous cost, to store this myriad of component parts and distribute them to the production line.

It is for this reason that the penetration of JIT solutions is particularly high in the motor industry (see table below).

JIT applications in Europe In contrast to Japan and the USA, the first JIT applications were not introduced in Europe until the 1980s. Market research has shown that within the European Community JIT programmes are now used by 46% of all companies in key industries. The highest figures are to be found in Belgium (65%) and Italy (57%). In the next few years the EC average should rise to around 70%.

JIT applications in Germany The following large enterprises were among the first to introduce JIT production in Germany:

Company	Introduction date	Product
BMW	1980	Motor vehicles
Avon	1982	Cosmetics
Optyl	1984	Glasses
Bosch	1984	Electric motors
3 M	1984	Packaging
Audi	1985	Motor vehicles

JIT programmes have found growing acceptance in many key industries and with their suppliers.

Industry	JIT penetration
o Motor vehicles	about 67%
o Electrical/electronic goods	about 35%
o Household appliances	about 21%
o Chemicals/pharmaceuticals .	about 15%
o Consumer goods	about 12%
o Mechanical engineering	about 10%

Tips for the underwriter

Property insurance/  
loss of profits (LOP)

The prime danger is that of production being interrupted as a result of damage of a general nature, errors in planning and execution, illness of specialist staff and breakdowns in delivery. The failure of a single supplier can be detrimental to the buyer's overall production especially when the buyer's company structure exhibits a high degree of interpenetration. And companies with only a small number of suppliers have an aggravated LOP risk.

The implementation of JIT methods demands multifunctional machines and devices of high technical quality. This leads to high concentrations of valuable property and equipment. Production becomes more and more dependent on logistics; the high degree of networking between individual areas of production aggravates the risk of a complete production stoppage. Disturbances in the control and feedback loop assume greater significance.

What is more, process-oriented material flows make it difficult to implement risk-management measures (e.g. separation of working areas for fire-prevention purposes). A small fire can consequently have large repercussions. Finally, the increasing demand for energy also heightens a company's dependence on outside power suppliers.

Goods-in-transit insurance

As already mentioned, the storage risk becomes a transport risk. When suppliers cannot deliver because of disturbances or damage (e.g. traffic problems, driving bans, accidents, illness, and political dangers such as strikes or protesters disrupting traffic), the risk of a production stoppage is heightened.

Disturbances of this kind threaten one of the supplier's logistic cornerstones, namely his ability to deliver on schedule; time thus becomes more and more a risk factor. In addition, the danger of the cargo being damaged increases if there is a breakdown, operating error, robbery or accident during transport.

**Third party liability insurance**

Problems of quality and third party liability are transferred to the supplier. It is the supplier, for example, who has to replace defective assemblies, components and subproducts. The manufacturer, however, is liable for product liability claims due to the use and installation of any faulty parts supplied.

Contracts must be carefully worded so as to clearly assign liability for the quality and punctuality of deliveries. But the insurance of a company's resourcing risk is a problem and it is no easy matter to clearly delimit this risk under the EC's product liability legislation. Moreover, it is necessary to assess the insurability of ancillary risks such as product recall costs and the cost of remedial work under guarantees.

**Environmental problems**

Moving the storage risk onto the roads ("warehouses on wheels") also heightens the intensity of traffic, thus contributing to air and noise pollution. In turn, environmental problems can hamper JIT production: a smog alarm, for example, can lead to driving bans and thus delays in delivery.

Postal address:  
AssTech  
Assekuranz und Technik  
Risk Management Service GmbH  
D-80526 München  
Germany

Office address:  
AssTech  
Assekuranz und Technik  
Risk Management Service GmbH  
Sederanger 4-6  
D-80538 München  
Germany

Telephone: ++ 49-89-3844-585  
Telefax: ++ 49-89-3844-586  
Telex: 52 152 47 bav d

Spanish subsidiary:

BEER & AssTech, S.A.  
RISK MANAGEMENT SERVICE, S.A.  
Monarquía Empresarial de La Moraleja

Telephone: (+ + 1) 65091 42  
Telefax: (+ + 1) 65095 14