

WHITEPAPER

Future proofing Just-In-Time operations

*A guide for CFOs to risk-assess and
recalculate lean inventory strategies*



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Rethinking supply chain strategies

Exponential growth in trade over the past few decades means today's global supply chains are incredibly complex.

Recent regional and global issues like Brexit and coronavirus are two prime examples of disruption to legacy supply chains. As a result, businesses have found themselves in one of two scenarios: the market for their product has diminished, or a new one has flourished.

For some industries, acceleration of digital transformation supporting Just-in-Time (JIT) manufacturing strategies has helped them to pivot accordingly – be it to minimise inventory they cannot sell or to maximise it to meet unexpected market demand.

In the UK, the automotive industry is well known for using JIT manufacturing – it allows businesses like Honda and Nissan to retain few parts at their assembly plants, with components regularly shipped from Europe.

On a smaller scale, drop shipping is a JIT strategy used by distributors and retailers whereby they don't keep goods in stock but instead transfer customer orders and shipment details to either the manufacturer, another retailer, or a wholesaler, who then ships the goods directly to the customer.

Whatever the JIT method, it is through modern technology solutions that businesses are increasingly diversifying suppliers and rethinking supply chain strategies in response to unpredictable scenarios.

In this guide, we aim to provide valuable insight to help CFOs risk-assess their inventory strategy to implement a coordinated and dynamic approach that relies on data and technology to better expect-the-unexpected.



What are the benefits of Just-In-Time (JIT) manufacturing?

In manufacturing, speed-to-market and the cost of production can make or break a business.

The philosophy of JIT manufacturing is to create goods that meet customer demand by only producing what is needed, when it is ordered, and only in the quantity desired. It is all about managing an exact amount of inventory that can be made available at precisely the right time.

British supermarkets have used JIT strategies since the 1980s. It means that they do not have to hold large amounts of stock in-store and pay costly overheads – this allows them to keep prices low and is highly beneficial for customers.

Suppliers run efficient systems where supplies are replenished each day based on sales and forecast demand, meaning supermarkets can maximise food shelf life. When coronavirus hit, supermarkets

responded by harnessing JIT strategies to build a robust supply chain – increasing manufacturing, employing extra workers and boosting delivery vehicles where necessary.

The system was developed in Japan in the 1970s when [Toyota sought to reduce inventory levels](#) to the absolute minimum. Toyota's technique was to replenish stock only when they shipped the last of their products from warehouse shelves.

As identified by Taiichi Ohno, the founder of Toyota's production system, JIT operations aim to minimise the following wasteful by-products of traditional manufacturing:

1. **Over-production** - manufacturing more product than is needed.
2. **Waiting** - delays in the supply chain, whether related to people, machinery, or product.
3. **Transportation** - unnecessary movement of resources, components, and products.
4. **Over-processing** - processing that exceeds customer needs and provides no extra value.
5. **Inventory** - storing too many raw materials, components, and goods.
6. **Motion** - unnecessary movement of people or information along the supply chain.
7. **Defects** - mistakes that force products to be reworked and rebuilt.

JIT manufacturing is about removing these sources of waste, and through the last few decades, these methodologies have helped manufacturers to:

- control costs
- improve efficiency
- produce products only when they are needed

The success of JIT manufacturing depends on precise coordination between manufacturer and supplier to ensure prompt delivery. Because there is minimal inventory buffer, businesses must plan what they would do in the event of a delay in any raw material required for production.

The four 'M's'

According to the manufacturing and business performance specialists known as the SMMT Industry Forum, the critical domains for building a successful JIT manufacturing strategy are the four 'M's': Man (or Woman), Machine, Material, and Method. Capturing data for all four and removing waste from the process is far more straightforward.

Man (or Woman)

This refers to the worker in the factory or plant. Data can be collected based on the personnel assigned, skill, seniority, and manufacturing record. More extended trend analysis can also yield data on work hours, worker fatigue, staff productivity, and future production planning.

Machine (or Equipment)

The status of the machinery (and its components) such as quantity, quality of production output, and time consumed, is essential data to improve operations. The availability of spare parts is also vital in maintaining equipment. Faults and failures are critical events in affecting a process and must be logged and analysed, too.

Materials

This includes data on raw materials, work in progress (WIP) parts, and finished products. Raw material data looking at location and quantity can provide useful information for inventory replenishment. Status updates can also expose production bottlenecks and help make changes to ensure positive progress. Data on finished products also helps to ensure the manufacturing process meets its planned capacity.

Method (or Processes)

The Method is possibly the most critical contribution, as it defines the process of converting the Material by the Man (or woman) using the Machine, into the finished product. The Method is most likely to be the unique contribution from a manufacturer, as the other three M's tend to be commoditised in modern manufacturing.





Reducing the cash burden on manufacturers

JIT operations ease the heavy burden of stock holding dramatically, which historically has tied up many manufacturers. In the past, for example, food retailers had to carry their stock in store, creating costly overheads. As soon as businesses like Tesco started delivering products from distribution centres, the whole industry changed.

JIT releases cash that could otherwise be tied up in inventory and allows more investment in the business itself. Financially, companies are far less constrained by holding materials and stock.

Chris Billinge is group business development director for TFC, a business specialising in Vendor Managed Inventory (VMI) solutions for manufacturing industries in a range of markets. He says that JIT facilitates a focus on efficient processing and innovation in leading-edge manufacturing businesses, and effectively shifts the stock burden to different parts of the supply chain, reducing cash pressures.

“In some ways,” he says, “you’re not getting rid of inventory. You are just moving it. But, if you are bringing a much more focused and communicative supply chain, you are also, overall, reducing the amount of stock that’s needed to support the changing dynamic of business.”

In other words, a JIT mindset is not only useful in delaying or breaking up the ordering of large reserves of expensive stock that gather dust in a warehouse but serves to streamline operations in ways that such volumes might be unnecessary altogether. It is about moving from a ‘Just-In-Case’ model to a Just-In-Time dynamic. This approach is sharp, fresh, and keeps the business on its toes.

However, a tailor-made, risk-averse system is crucial, says Billinge: “While JIT is an extremely positive initiative that is applied in many businesses and is hugely beneficial, it has to be carefully managed. Your supply base must be appropriately tuned into your needs and tuned in to the system that’s making JIT work.”

What are the challenges to mitigate?

Of course, there may be times when supply must be maximised – and fast. This is only achievable when JIT is well-coordinated, synchronised, and in tune with fluctuating factors.

JIT systems must prepare for 'supply shock'

JIT manufacturing can leave a business especially vulnerable to supply chain disruptions that lead to an unexpected halt in production or a sudden surge of demand.

While low inventory is beneficial to the bottom line and assists businesses with intense margin pressures, it requires a great deal of coordination. From obtaining the raw materials needed for manufacturing to ensuring timely delivery, every aspect of JIT production must be synchronised so that any scenario can be dealt with.

Because JIT production is typically based entirely on existing orders, it is not the most efficient system for dealing with a supply chain issue or a sudden surge in demand. The last thing a business wants to be known for is extended delays, dissatisfied customers, and the potential forfeit of an order. So companies must have a strategy in place to deal with the ebb and flow of events beyond their control, and map out the knock-on effect to their JIT operation.

Moreover, JIT systems work on the assumption prices remain constant. A small cardboard box merchant operating on a JIT system, for example, would find their profit margin primarily determined by fluctuations in the cost of cardboard.

Simon Carr, general manager at the SMMT Industry Forum, makes it clear that coronavirus forced JIT manufacturers to ask hard questions about the reliability and resilience of their supply chain.

"The toilet roll shortages we saw in March this year are a great example of the potential pitfalls of JIT", he says. "Despite efficient processes being in place, the supply was not there when needed. The continuity of supply needs to be the new priority."

Carr reflects that while no business wants to have its cash reserves tied up, they need material to be able to make their product. "You need to understand customer demand – every business goes through fluctuating demand, as well as peaks and troughs."

"If you do not get your JIT system right, or if you don't actively manage your JIT system, it can cause a problem."

JIT manufacturing is advantageous for bigger suppliers

Jeremy Goodwin, founder and CEO of manufacturing blockchain platform SyncFab, says manufacturers tend to consolidate their supply through tier-one suppliers (the bigger suppliers that work with them directly), as it's easier and more cost-effective than dealing with multiple suppliers at lower tiers.

"This has had various degrees of success, giving tier-one suppliers more bargaining and economic power. What has happened is a lot of these tier-one suppliers have relocated to lower labour cost regions to try and compensate and mitigate for their more significant production budgets," he says.

"With disruptions occurring, whether it is the pandemic, changes in labour force demographics, changes in material prices, and even changes in the weather, it has greatly increased the supply chain risk for manufacturers. They have all their eggs in one basket, as well as regularly having their production schedule at odds with the long-tail supply chain."

What occurs is friction between the production cycles of suppliers and the assembly needs (or cut-off times) of manufacturers, which leads to a clunky process and unreliable delivery cycle.

Operations, supply chain and lean expert Andy Dobson says that businesses need to be more collaborative with their supply chains. He says, "Manufacturers need to understand how suppliers run their business and vice-versa. The keyword is collaboration – I understand your business, you understand mine."

Ultimately, all manufacturers need to have more visibility of the supply chain to exert influence and control it proactively. This is achieved by using better technology, and good old-fashioned collaboration with suppliers.





Supply chains must supply capacity to manage a crisis

In Onho's book 'Toyota Production System: Beyond Large-Scale Production', he makes it clear that a company cannot merely ask a supplier to adopt JIT, because adopting JIT means completely overhauling the existing production system.

When it came to coronavirus, offshoring to China and JIT manufacturing were given as reasons that so many businesses suffered supply shocks once the pandemic hit. However, the issue, particularly in an industry like healthcare where vital products were in short supply, was that there was a poorly maintained stockpile strategy.

Billinge says, "I think all systems, JIT or not, have to have some capacity to manage a crisis. And so you have to have the flexibility, and you have to have options. And I think the best JIT systems have options or alternatives so that you can move to different channels of supply.

"The goal can be to maintain the JIT philosophy for the core manufacturing business that it's serving. But you need to safeguard supply through the management of the supply base. The careful positioning of stock at various stages in the supply chain can mitigate as much as possible, certain disasters. That's the only way around it.

"There are things that you cannot mitigate. Some situations present a disaster in a crisis and have to be recovered. But if careful management of a supply base is there, if strong communication throughout the supply chain is there, and if there are options that are available to switch supply wherever possible, then that can bring an advantage during difficult times."

It's a balancing act – building a JIT strategy

Holding excess inventory increases overhead costs while reducing liquidity. But having insufficient stock prevents manufacturers from satisfying customer needs. It is a delicate, balancing act. How well businesses can strike this balance will heavily influence profitability.

So, what are the options for a business looking to...

- A** reduce the capital costs of retaining inventory... while
- B** ensuring the stock is there to maximise sales opportunities?

First, it is useful to look back at the seven sources of waste in the supply chain, focusing on how to remove them.



Minimise **over-production** by giving manufacturers visibility and control to align production, purchasing, and logistics.



Prevent **over-processing** and steer manufacturers to actions that only create value – such as the creation of a bill of materials.



Avoid **inventory** with demand planning and modelling tools to support Just-In-Time production.



Stop **unnecessary motion** by providing data that ensures your machinery is working in the most efficient, productive, and effective way.



Eliminate **waiting** by providing people with the access they need to streamline decisions and approvals with automation.



Wipeout **defects** by providing manufacturers with the control to see where the deviations are and stop them at the source.



Solve **transport** problems by timing production and logistics, so businesses do not have to move goods from one place to another needlessly.

Continuity of supply

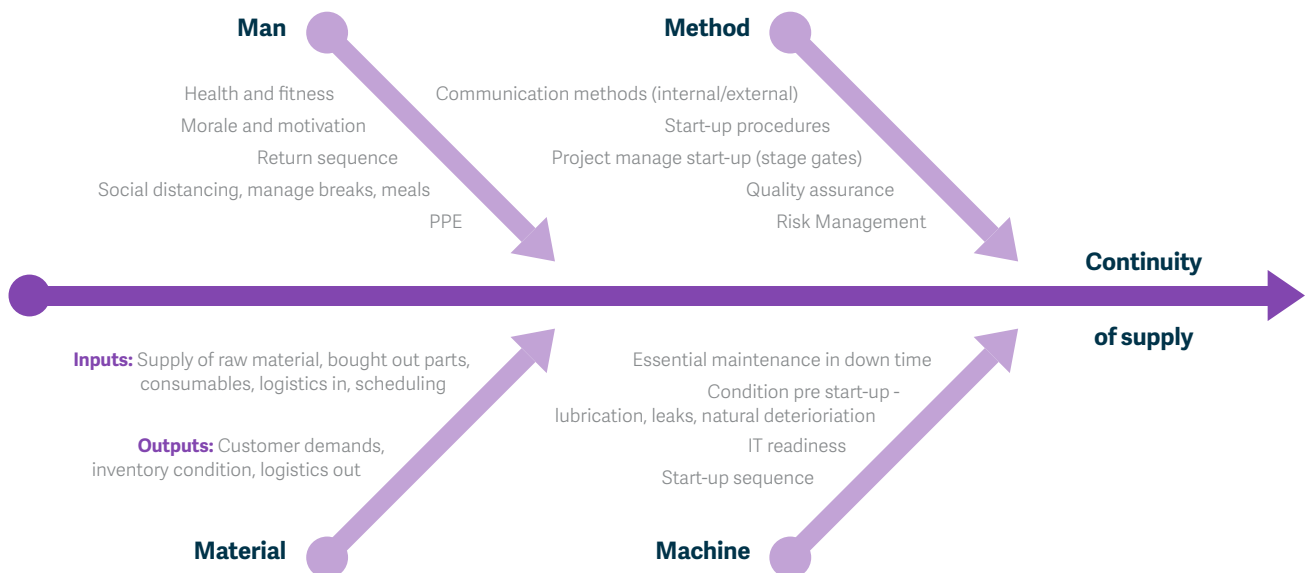
Because of coronavirus, some manufacturers are currently facing a massive increase in demand with a disrupted supply chain and reduced workforce. However, amid the losses, there are some reasons to be hopeful.

Businesses that do survive this situation are likely to emerge from it operationally more reliable, with more robust and agile supply chains and ways of working.

For businesses looking to ensure the continuity of supply, the SMMT Industry Forum provides a simple tool in the form of a 'reverse fishbone.' The four bone branches cover the four key elements you need to consider: Man (or Woman), Method, Machine, and Material. Each item on each branch requires an owner. Items can be either actions you already know need to happen, or they can be questions that you must answer to define the next steps.

The reverse fishbone helps you identify everything necessary to create a plan of action when restarting after a supply chain shock. Furthermore, it is a helpful tool for enabling multiple stakeholders to participate in managing the supply chain process, which supports the aim of sharing accountability for success.

Reverse Fishbone - Continuity of supply



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Supply chain visibility

Manufacturers should also look at using digital technology, which supports them in ramping up production to coincide with customer demands. Using production floor data, managers can identify trends and make decisions to keep the manufacturing workflow moving at the right speed.

Supply chain risk assessment applications that have advanced analytics and AI can help organisations determine weak spots in the supply chain and often suggest actions to mitigate the issues. However, they are far from being widely adopted in manufacturing. Companies should look at best-case and worst-case scenarios to guide decisions. And firms should be ready to invest in assessment and planning tools to mitigate future risk.

Fixing over-production issues through Just-In-Time production will mean less inventory needs to be stored. To ensure businesses do not waste material, they could also look at improvements in product design, process, and quality control.

With real-time data, forecasting, and production planning, employees can analyse what is happening in the manufacturing cycle and whether it matches the planning. Armed with this information, they can modify production levels where necessary.

Businesses can also make use of data analytics to track the productivity and efficiency of employees and equipment closely. With business management solutions, manufacturers can draw out the insight and information needed to access one version of the truth without having to wait unduly.

With real-time data, all employees can use up-to-date displays to reflect changes in the information, such as when a work order is started and finished. Armed with this technology, they do not have to wait around or spend time collecting data and producing reports.



Risk reduction

Technology can play a risk reduction role – building in a ‘just-in-case’ capability. Investing in applications that can model the unique variables in your demand and supply can help companies plan. It may even help determine if there are products that you should be manufacturing to forecast, versus waiting for order. These applications can be useful in providing a degree of supply chain visibility and can serve as early warning systems.

Businesses must eliminate the possible causes of inventory waste, such as ineffective forecasting, production, planning, or distribution.

Technology, as part of a business management solution, can help manufacturers avoid over-production wastage through planning and modelling tools. With 3D printing (additive manufacturing), businesses can manufacture products ‘as needed.’

Manufacturers can also use logistical data to control inventory and transport products in an automated way. With real-time data, logistics workers can communicate and identify trends and issues in real-time.

The digital supply chain

Digital transformation in the supply chain is the critical stepping stone in getting better production visibility into the production lead times of your leading suppliers. It will also better mitigate Just-In-Time production needs when you need to rely on a more diverse range of suppliers if de-risking your supply chain in case of disruption.

Currently, many manufacturers can only derive a certain amount of value from legacy or historical data sets when designing manufactured parts through a better understanding of the people, processes, materials, or equipment. For cutting-edge JIT production, you will need more timely access to supplier data when it comes to availability.

Goodwin refers to a multi-step approach in achieving visibility – the ABCs of Industry 4.0.

Jeremy Goodwin says, “A is the AI or improved, the automated matching of conditions. B is blockchain, or what we view as the secure middleware or the secure plumbing sending out that data on time. And C being that kind of last-mile connectivity with increasingly capable equipment coming online.

“To achieve that, it is a three-pronged process, but we need to incentivise suppliers to want to be a part of this change. Up until this point, there has not been much incentive for suppliers to do so beyond just winning an additional purchase order.

“But we see new labour force recruitment, increased competitiveness, and new technology as being the way to achieve increased visibility. It is about bringing legacy suppliers and new suppliers into these evolving JIT production schedules of original equipment manufacturers.”

Inventory management systems

Inventory solutions help because they offer an easy, accurate means of closely tracking inventory levels as they fluctuate. Medium sized businesses can make this more straightforward with the right inventory management technique.

The Economic Order of Quantity (EOQ) can help determine how to mitigate inventory costs by knowing precisely how many units needed in stock. A periodic review system could involve the inspection of stock at some regular interval. If taken into account the likely demand between the times of the review, this system can lead to better informed decisions about necessary levels of inventory.

For any medium business with a significant inventory component, look to technology to increase productivity and efficiency by automating purchase orders, which replenish inventory when it reaches a predetermined level. Look for software to create inventory profitability reports that show which items are selling, and which have the highest and lowest profit margins. For manufacturers, software can also help develop assemblies that define precisely how many parts, components, or materials are needed to complete a product.

Regardless of the inventory management system the business uses, the right technology can help cut inventory costs by eliminating errors and automating purchasing orders.

The right inventory management tool is the one that best helps a business meet customer demands. Different businesses have different requirements concerning warehouse, product, order, and inventory management.

Having the appropriate tool can help integrate stock information into a more cohesive picture, make better projections about the future, and more efficiently manage scale.

Conclusion

Many businesses in the UK have thrived using JIT strategies. But it was not because they were following steps in a playbook – it was because they had built robust supply chains that could handle the process and flow that JIT manufacturing needs.

Without a robust supply chain, the communication between manufacturer and supplier degrades, causing problems that will affect profit margins and put the business in trouble. This is why manufacturers are putting new management strategies and the right innovation in place to make sure supply chains are future-proof when it comes to visibility, efficiency and effectiveness.

Remember, there is no shame in asking for help. There is an advantage to employing supply chain specialists and expert help to help dig into what the challenges are and the technology needed to meet requirements.

The goal is to modernise operations, make the best of capacity, reduce waste and fulfil demand. The right people and solutions may be able to take that burden away.





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