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The Connected Supply Chain as a Strategic Imperative

Smart, New-Age Technologies and the
Evolving Supply Chain



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Executive Summary

The challenges facing Supply Chains have been around for as long as the supply chain function itself has existed – challenges such as cost control, customer service, planning & risk management, supplier & partner relationship management, etc. With supply chains getting increasingly globalised and more complex, these challenges have only magnified in recent times. At the same time, however, technological progress and the emergence of new-age solutions such as IoT, AI, blockchain, and others, hold new promise for a better future by tackling the problems of the past and the present. This paper looks at some of the emerging trends and how an end-to-end connected supply chain could help solve existing supply chain problems and simplify its complexities for manufacturing companies looking to transform themselves technologically with more efficient, profitable, and sustainable supply chain practices.

New Century – Old Problems

The third decade of the 21st century is within sight, but as with many industry legacies that refuse to fade away, so do the problems that manufacturers face when it comes to their supply chain. Compounding the existing problems is the fact that supply chains are now globalised and getting more complex. Raw materials, parts, and products move across the globe, across geographies, passing through many suppliers, vendors, and providers, that it is often the case with many manufacturers that their supply chain is simply unaware of how many parts and partners are actually involved, or where a specific product is. Across the world, while the segment or industry sector may be different, manufacturers typically face the same challenges when it comes to their supply chain (Fig. 1).

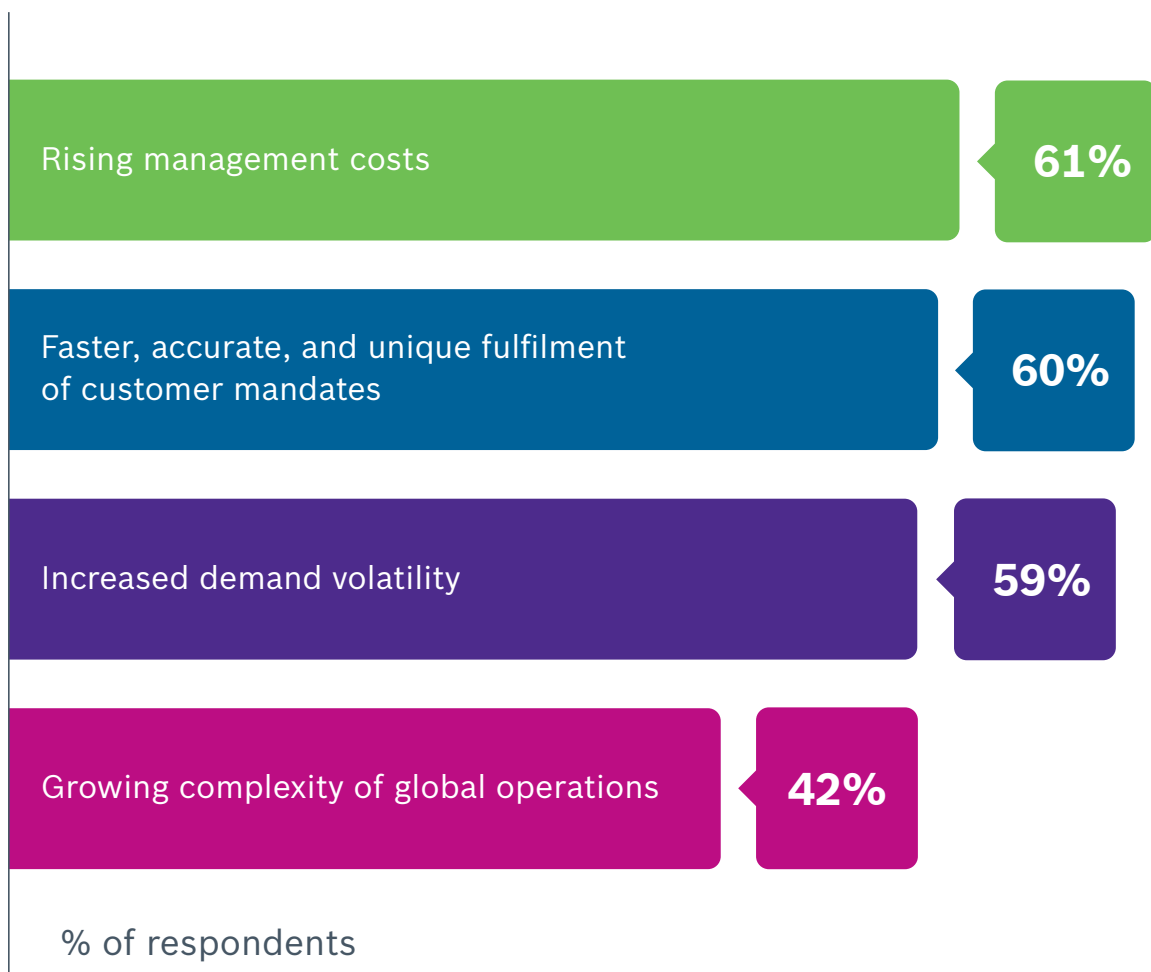


Fig. 1: Supply chain challenges



You Can't Solve What You Can't See

At the heart of all these problems and challenges that manufacturers face lies the lack of visibility with regard to their supply chain. This lack of visibility amplifies issues which can be categorised under four broad heads:

1 Delivery of wrong parts and goods: Supply chains with little or no digitisation can lead to the wrong parts or goods being produced and delivered. Conversely, parts can be mislabelled or confused with similar parts, resulting in customers receiving incomplete or incorrect products.

2 Manual entry of data: Relying on manual entry of data which is known to be error-prone or having to refer to information in multiple, disparate systems can dramatically increase the probability of errors. A simple transposition error when pallets are loaded onto trucks at the factory can cascade through the system and not be caught until a customer receives the wrong order.

3 Skewed inventory levels: To compensate for the potential of missing or incorrect parts, businesses sometimes rely on high inventory buffers which further increases costs and inefficiencies.

4 Incomplete transparency: When freight arrives at a warehouse, distribution centre, or customer site, it can be challenging to immediately discern what goods have arrived, their condition, treatment during shipment, extent of the journey, and provenance.



The Renaissance in Manufacturing: A Connected Supply Chain

It is facile to say that as with any sphere of human life and activity, technology today is transforming the way business is conducted and manufacturing activities are carried out. Some aspects of manufacturing activity, however, could be more fully digitised. While the technologies and solutions exist, they have not yet been adopted by a vast majority of manufacturing companies in contrast to digital-native, new-age product companies. For an organisation to survive and thrive in today's dynamic, hyper-competitive global business landscape, the need of the hour is to adapt with the changing times, think like a digital-native organisation, and act as such by adopting new technologies in the quest for increased efficiencies, higher productivity, better customer satisfaction, and needless to say, sustained profitability.

It is here that a manufacturing organisation's supply chain can contribute immensely if it is transformed into a Connected Supply Chain by using new-age technologies that don't just solve age-old problems, but also open up new avenues for growth and opportunities in terms of the business capabilities (and models) that they can support. And to this extent, the supply chain can go from being a cost centre to being leveraged as an opportunity centre.

Shaping the Supply Chain of Tomorrow

As per a recent Gartner report¹, there are a few top strategic supply chain technology trends that it has identified, which have a broad industry impact, and that are experiencing significant changes or reaching critical tipping points in capability or maturity.

Some of these include:



Artificial Intelligence

AI supports an organisation's vision for broader supply chain automation. The level of automation could be semi-automated, fully automated, or a mix, depending on the circumstances. Through self-learning and natural language, AI solutions can help automate various supply chain processes such as demand forecasting, production planning, or predictive maintenance.



Advanced Analytics

The impact of advanced analytics on supply chain is significant. Advanced analytics are increasingly being deployed in real time or near-real time in areas such as dynamic pricing, product quality testing, and dynamic replenishment. The availability of supply chain data — such as Internet of Things (IoT) data, dynamic sales data, and weather patterns — provides the ability to extrapolate the current environment to better understand future scenarios and make profitable recommendations.



IoT

IoT adoption is growing in select supply chain domains, but rarely as part of a complete end-to-end supply chain process. IoT could have a broad and profound impact on the supply chain in areas such as improved asset utilisation and higher uptime, improved customer service, improved end-to-end supply chain performance, or improved supply availability, supply chain visibility, and reliability.



Blockchain

Blockchain is aligned to potentially fulfil critical and long-standing challenges presented across dynamic and complex global supply chains that traditionally have held centralised governance models. Blockchain is also increasingly being offered as a service or development option across supply chain solutions that target closely aligned objectives such as automation, traceability, and security.

1. 'The 2019 Top Supply Chain Technology Trends You Can't Ignore,' by Christian Titze, et al.

Digitisation: The Way Ahead for the Supply Chain of Tomorrow

A McKinsey study² found that the average supply chain has a digitisation level of 43%, the lowest of five business areas that were examined. Just 2% of the surveyed executives said the supply chain is the focus of their digital strategies. Are their priorities misplaced? Perhaps. The same McKinsey research suggests that, on average, companies that aggressively digitise their supply chains can expect to boost annual growth of earnings before interest and taxes by 3.2% – the largest increase from digitising any business area – and annual revenue growth by 2.3%. This is primarily driven by the efficiencies that a digitised supply chain brings to the organisation (Fig. 2), because digital supply chain levers can unlock significant improvements across multiple performance dimensions.

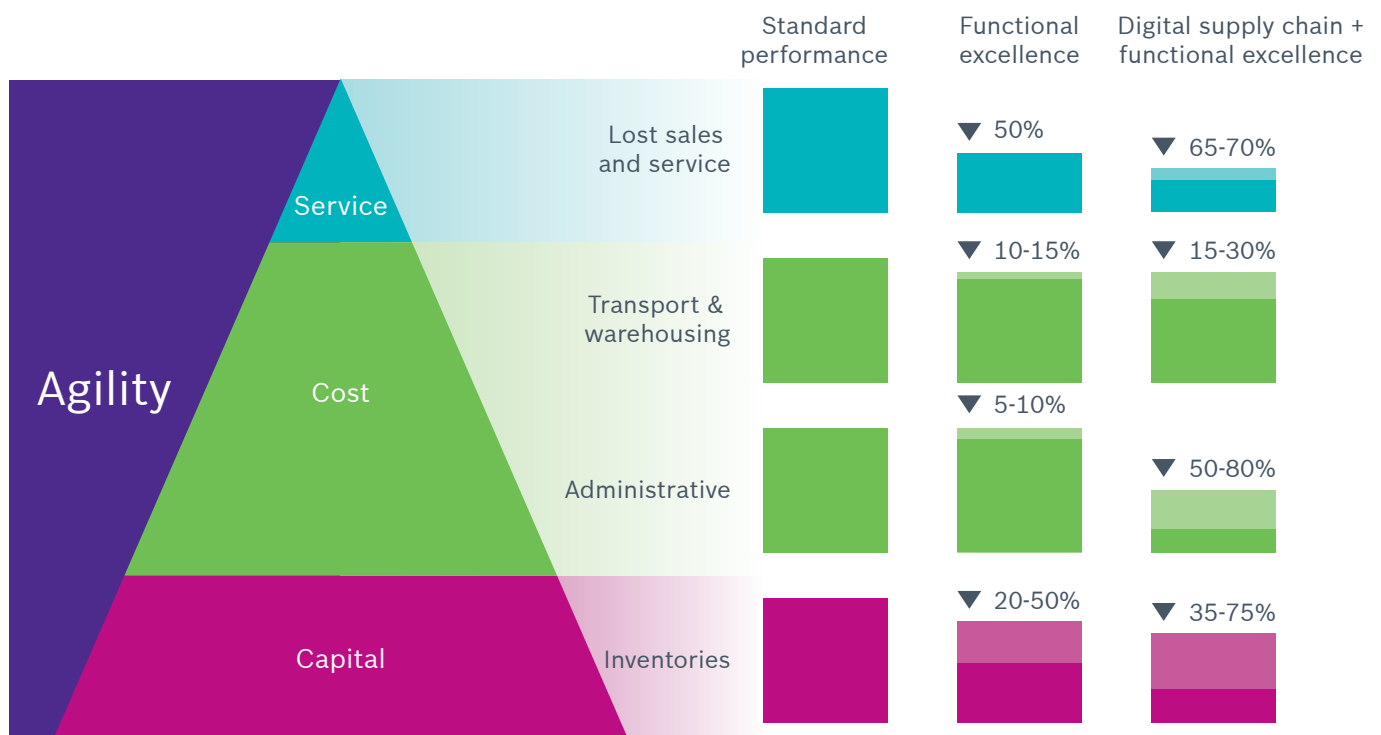


Fig 2: Digital supply chain levers can unlock significant improvements across multiple dimensions.

Agility for any business is attained through utilisation of the optimal combination of available resources. In the graph above, the first column represents standard performance for a business. When functional excellence is introduced, there is a reduction in almost all parameters. Lost sales and service reduces by up to 50%, costs of transport & warehousing by up to 15%, administrative costs by up to 10%, and so on.

In addition to this, if we introduce Digital Supply Chain, there will be a further decrease in all of these parameters resulting in a substantial benefit to the business.

A transformed supply chain can fulfil a company's performance goals, which can be defined in terms of agility, service, capital, and cost measurements. For instance, an organisation that aims to reduce lost sales by a specific amount would need corresponding supply-chain performance goals—for example, improving the speed and reliability of shipments to customers.

Source: McKinsey Analysis | ©McKinsey & Company



Connected Supply Chain: The Future of Manufacturing

Bosch Trac360 is a Connected Supply Chain that has been digitised and modernised with IoT technologies and AI. Integrated with emerging technologies such as blockchain, this revolutionary Bosch platform uses Big Data and Analytics to improve supply chain planning, automate processes, enable predictive decision-making, and exponentially increase the supply chain visibility. This is done by enabling manufacturers to track and smartly manage the shipment of their parts and products in real-time (Fig. 3).

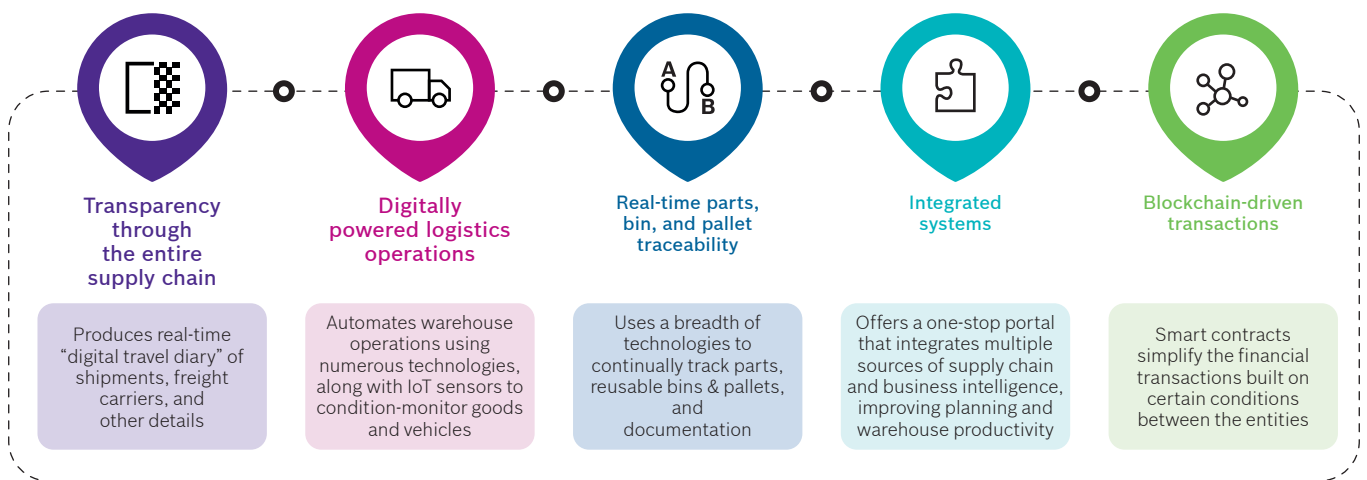


Fig. 3: Elements of an end-to-end connected supply chain

Source: Bosch Trac360



Some of the aspects that an end-to-end Connected Supply Chain – made possible by a solution such as Bosch Trac360 – addresses, and the benefits that it provides, include:



Container Management: Using IoT devices – such as RFID tags, barcodes, and other tracking devices – a Connected Supply Chain enables a manufacturer to continuously pinpoint the location of its products, reusable bins, containers, or pallets, that have these tracking devices. This can also be used to enable the timely return of reusable bins and pallets to reduce the cost of having to replace them.



Blockchain Technology: Especially important in industries where customers want to know the source of components or ingredients – such as packaged & perishable foods, pharmaceuticals, gemstones, and appliances, an ideal Connected Supply Chain should be integrated with blockchain to track and verify transactions, transfer or receipt of bins, pallets, or other containers, or delivery of finished products to customers.



Analytics: Uses the wealth of data generated to gain actionable insights that enable a manufacturer to predict and plan while also helping with risk management initiatives and even predictive maintenance.



Product Traceability: Uses GPS to create a ‘digital travel diary’ of products and load carriers, which continuously tracks and logs each stop, and then communicates location and status in-transit within a geofence or static at a manufacturing facility, warehouse, distribution centre, or delivery to a customer. Additionally, communicates stock levels, invoices generated, route deviations, discrepancies in part levels, and estimated time of arrival (ETA) of shipments.



Assisted User Experience: Provides a one-stop portal for integrating multiple sources of information, including enterprise resource planning (ERP) and manufacturing execution systems (MES), GPS, and RFID used for tracking, cloud and mobile apps, business intelligence (BI), and chatbots. The ability to simultaneously access information from multiple systems via integrated dashboards provides unprecedented visibility into what's being ordered, produced, shipped, inventoried, and eventually delivered to customers.



Transparency: Provides granular inventory view with connected global IDs, automating warehouse operations from kitting and de-kitting to validating what's being loaded (bins, pallets) onto carriers (trucks, trains, ships). Enables logistics planners to coordinate the flow of activities based on customer demand versus fulfilment, and to provide shipment status in real time. Additionally, it supports using augmented reality such as Hololens, to 'instant see' what's inside arriving trucks. The application visualises the condition of goods inside, based on sensor readings, and correlates with smart contract conditions.



Condition Monitoring: Uses sensors to monitor and relay data on environmental factors, such as temperature, humidity, vibration, and exposure to light. Thresholds can be assigned to these factors, and alerts triggered when exceeded, such as an increase in temperature when shipping frozen foods, or if sensitive components were excessively shaken during a turbulent voyage on a cargo ship. Sensors can also be placed on the doors of containers or cargo doors of trucks to ascertain whether they were opened prior to their arrival at a destination.



Real-Time Tracking: Uses GPS and RFID to continuously track status and location of orders to validate proof-of-delivery, predict delivery windows, quickly identify & respond to route deviations, and receive notifications when stock enters or exits a geofenced area such as a port, freight yard, warehouse, or distribution centre.



Fleet Management: Uses data from sensors to gauge the performance of freight vehicles and predict issues before they become major problems, such as a truck using too much fuel because a spark plug is misfiring. In addition, these sensors can determine if the cargo hold or semi-trailer is working properly, such as a failing fan or air-conditioning unit.



Supply Chain Will Never Be the Same

The technologies exist, the solutions are available; what is just required now is for manufacturers to take a concrete step to digitise their supply chain to make it a Connected Supply Chain, the features of which have been listed above. The benefits that a right cutting-edge solution, such as Bosch Trac360, offers a manufacturer are immense, not just from an efficiency and operational point of view, but also at a broader level.

Some of these key benefits are:

Comprehensive Visibility across the Supply Chain

Enables end-to-end situational awareness by labelling and tracking shipments and associated carriers from manufacturing through delivery to end-customers

Warehouse and Process Productivity

Optimises warehouse efficiencies by reducing necessary inventory levels, improving stock visibility & retrieval, and increasing reusable container turnover

IoT, Blockchain, and Enterprise Integration

Provides an integrated, cloud-based dashboard that aggregates data from multiple disparate systems to improve real-time insights and decision-making

Digitise Today to Prepare for Tomorrow

As many forward-looking and future-focussed manufacturers have found, a Connected Supply Chain could just be the silver bullet for challenges that have plagued supply chains for ages. But going beyond just eliminating old issues in the supply chain, with the right transformational partner and the apt solution, manufacturers could also leverage their Connected Supply Chain to introduce new efficiencies into their supply chain process. And if that is what your organisation would like to benefit from, the time to begin the journey is today.

About the Authors



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