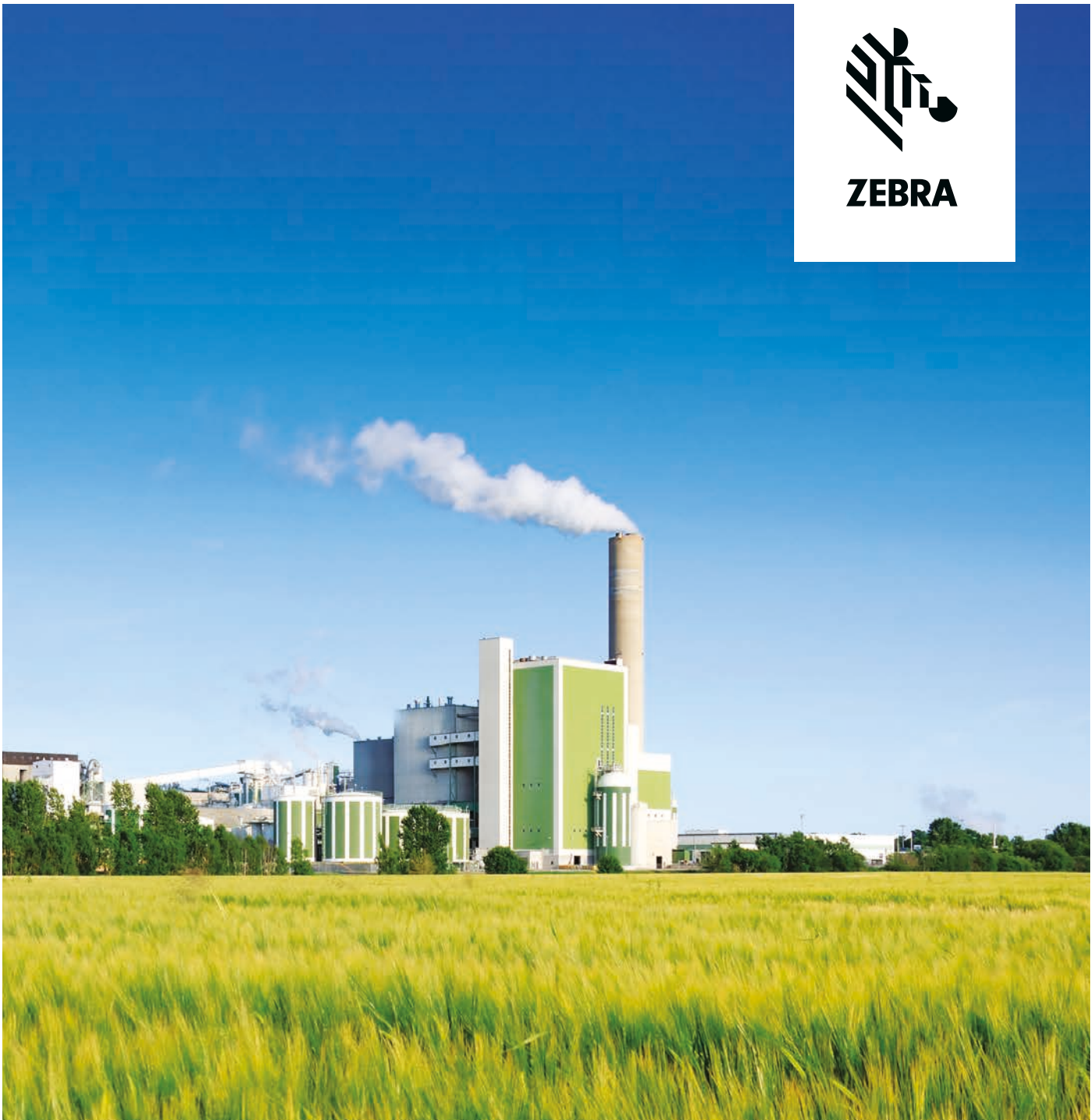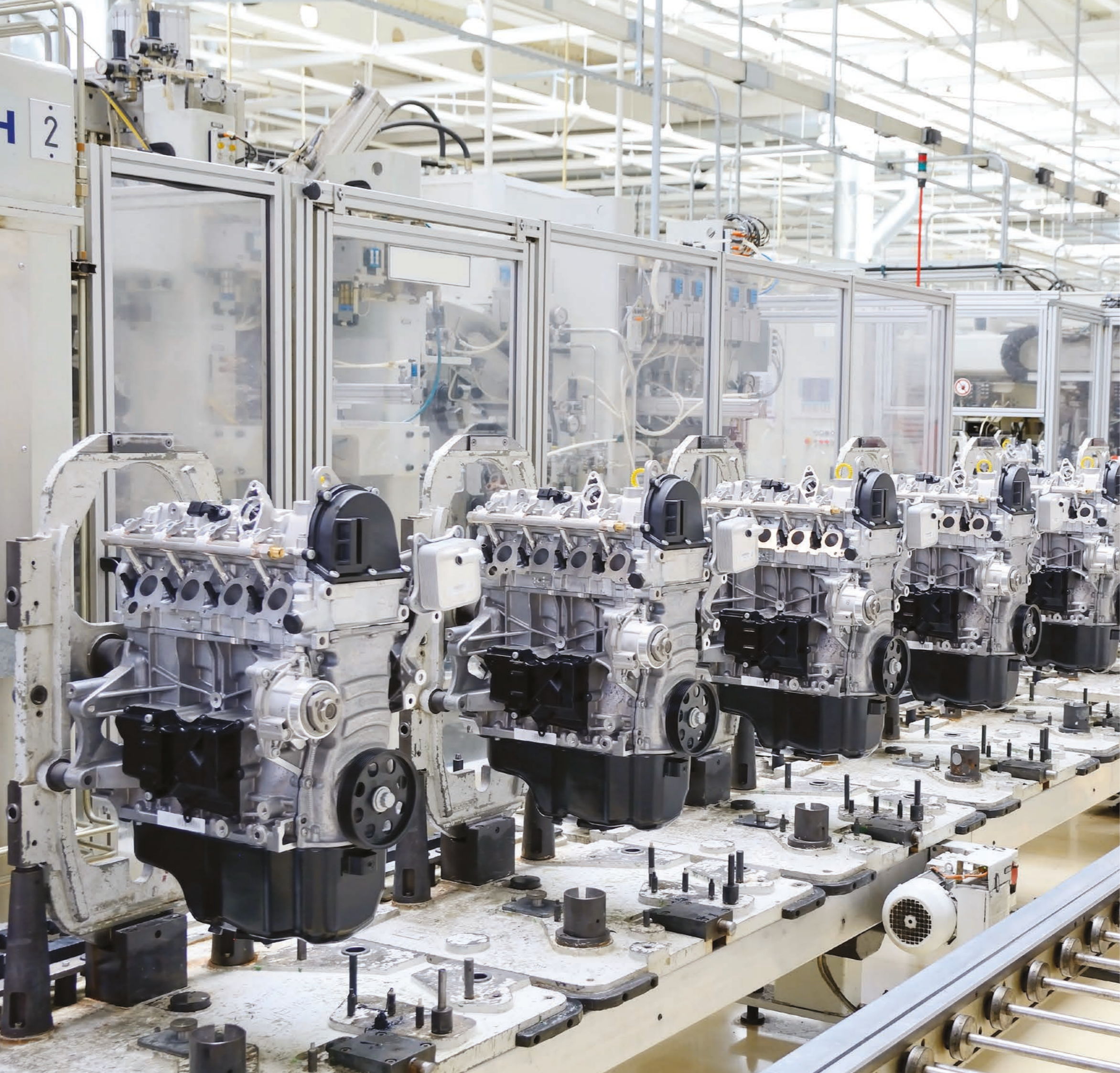# Track and Trace Visibility in Smart Manufacturing

REALISING THE FACTORY OF THE FUTURE

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Factory of the Future

As a modern manufacturer, you might be finding that, in order to meet changing customer demands and the growing complexity of the supply chain, you need to adopt more efficient and agile ways of working. To do this, you need to address challenges such as a lack of operational visibility, poor productivity, high costs and data overload.

Fortunately, a wealth of dynamic and innovative new technologies are available to help. These technologies provide a foundation for organisations to converge physical manufacturing with digital manufacturing, enabling them to better see and manage the entire ecosystem of their production facilities, and make smarter manufacturing a reality.

WORK IN PROGRESS (WIP)

Work in Progress (WIP) visibility helps to drive better decisions and ensures critical resources are available to meet production schedules. This includes consumption of parts, efficiency of manufacturing cells and compliance with Manufacturing Standard Operating Procedures (SOPs).
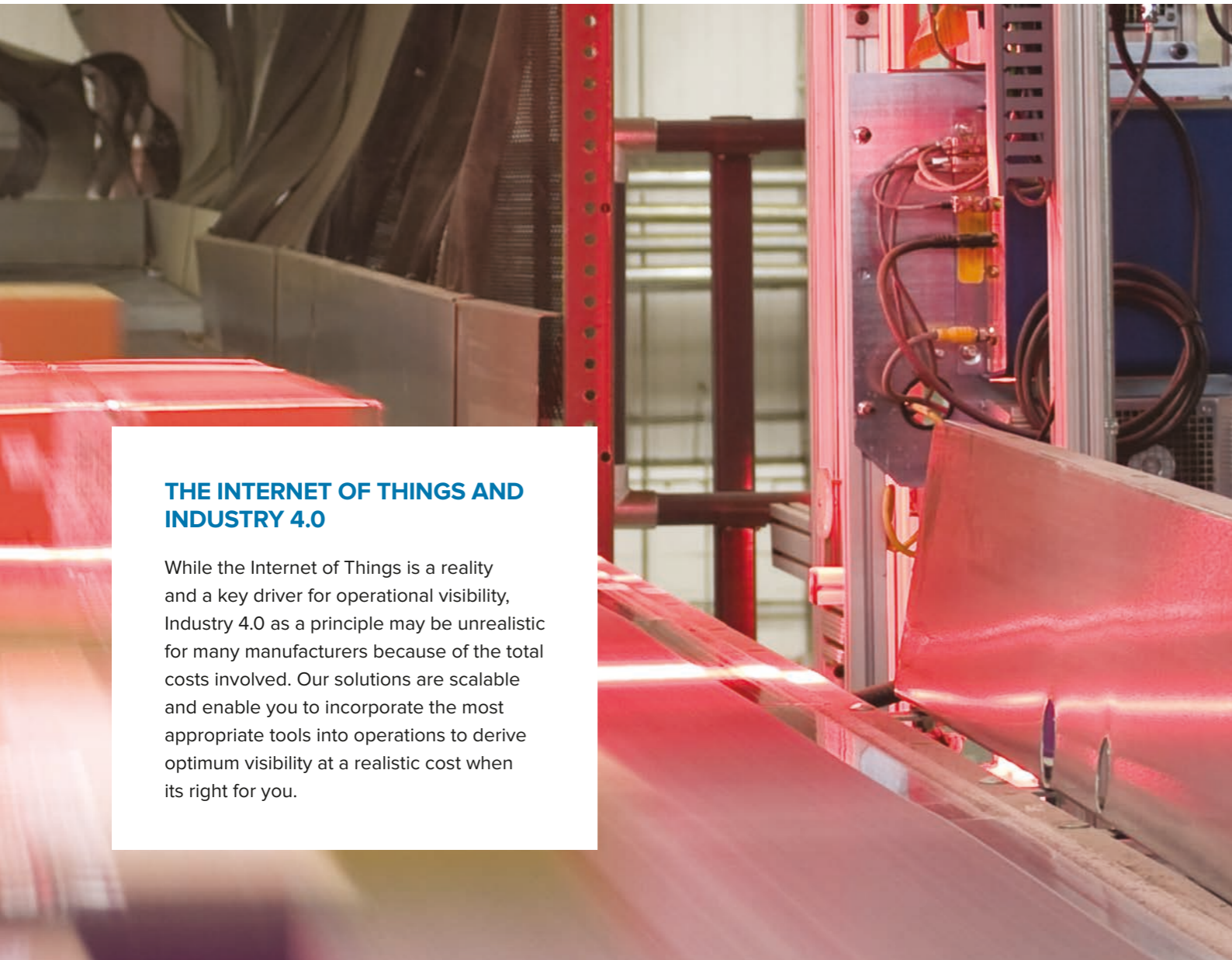
THE INTERNET OF THINGS AND INDUSTRY 4.0

While the Internet of Things is a reality and a key driver for operational visibility, Industry 4.0 as a principle may be unrealistic for many manufacturers because of the total costs involved. Our solutions are scalable and enable you to incorporate the most appropriate tools into operations to derive optimum visibility at a realistic cost when its right for you.

The Challenges You Face

Lack of Supply Chain Visibility
A 2014 report from Forbes and KPMG International found that supply chain visibility remains a key challenge for manufacturers, with 40%* of respondents citing lack of visibility across the extended supply chain.

* KPMG International Global Manufacturing Outlook: Performance in the crosshairs

Increased supply chain complexity and the lack of real-time, shared, actionable data causes inefficiencies and errors, does nothing to mitigate bottlenecks, inhibits optimal performance and damages profitability. Hence top of many manufacturers agendas is turning a supply chain into a demand chain. Implementing JIT (Just in Time) and eKanban are just two methodologies that technology can help enable in this regard.

Competitive, Regulated Environment
The global manufacturing marketplace is defined by aggressive competition and driven at pace by advancements in technology and connectivity. Bespoke instead of customised products need to be manufactured fast, yet with fewer defects.

At the same time, Service Level Agreements and regulatory requirements are increasingly stringent, but creating an end-to-end pedigree for your products can be costly and time-consuming. The ability to validate that the necessary processes or assembly steps have been completed according to specifications and the SOP, as well as quickly isolating any materials or products that are out of specification, are critical to your quality programme and prevent costly production stoppages.

Managing Product Assortment on the Production Line
One production line producing multiple products to varying specifications is now the norm, with Henry Ford's view of consumer choice, 'Any colour you want as long as it's black', long gone. Manufacturers typically have to manage colour and product specification assortment along a single manufacturing line. Build manifests, material scheduling, check and balances of plan versus actual are paramount to ensure that what is built is what has been ordered.
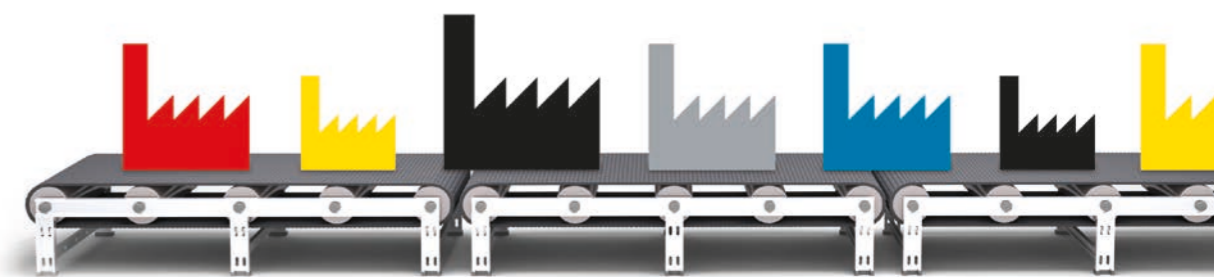
Exacting Consumer Demand

Consumer demands are changing, with high expectations and instant availability at a premium.

These pressures impact on the retailers meeting customer needs, and back through the value chain to the suppliers and manufacturers delivering the finished goods. Production lines must have the agility to meet the customised requirements of specific markets. If manufacturing lines can't incorporate this agility, the storage of finished goods becomes an issue and a cost that no-one in the demand chain wants to own.

Data Overload

Complete visibility means having useful, real-time data on materials, people and machines. The irony is that there can be too much data or data not being collected at the right points. Manufacturers are unsure where to look for the right data, and how to access and use it effectively to overcome their challenges.

What the Solution Looks Like

In a 2014 survey we commissioned from Forrester, over 80% of firms indicated that IoT (Internet of Things) solutions will be the most strategic technology initiative for their organisation in a decade.

IoT and mobile capabilities provide operational and actionable data on the location and condition of assets. This gives you better control of processes and costs and helps to mitigate risk, while enabling more functionality and increased collaboration.

Today's technologies can help to create a smarter, more connected business that incorporates complete visibility, enabling you to take a holistic view of operations and know what's going on across your demand chain.

By capturing the data available, and turning it into actionable information, you can streamline processes and make positive steps towards optimal production.

KANBAN AND JUST-IN-TIME MANUFACTURING

Our solutions enable manufacturers to see what's happening with all their operational events – assets, transactions and people – in real-time. When this visibility is aligned to single network connectivity, it creates an integrated production environment with data excellence at its heart, where eKanban principles and the benefits of Just-in-Time material flow can be realised.

STAGE AND GATE

The more gates there are, the better the visibility. Best practice track and trace embeds the right technologies into every element of the stage and gate process, giving every physical asset a digital profile, and every action a measurable and manageable value.

What Defines Smarter Manufacturing?

Lean Production

The established principles of lean production are being fulfilled with the technological advances that connect business processes and systems. Smarter manufacturing is about identifying how lean you are against how lean you want to be, and taking appropriate action to make it happen. Refining SOPs and adjusting planned versus actual dwell times in an operation drives Takt times and ultimately waste/cost out of production. Accurate monitoring of activities can also flag the need for maintenance intervention to get the times back on track.

Using data capture, mobile, IoT and cloud technologies, you can adapt existing processes and work with greater precision without having to make unrealistic investment. Increasing efficiency, especially where work cell operations, materials handling, energy and labour costs are concerned, is far easier with visibility not only into individual processes, but also to a network of connected devices across the entire business ecosystem. Every point in the manufacturing chain where visibility is less than complete can potentially harbour inefficiencies. Conversely, every visible asset or event that can be identified and placed in context can be potentially improved.

Visibility Throughout the Demand Chain

To work smarter, best-in-class manufacturers are giving their physical assets a digital profile that enables them to know the real-time location and condition of those assets. This gives them awareness of the timing and accuracy of the events occurring throughout the value chain, whether related to materials, people or machines.

Operational Integration

Where, historically, a diverse, disparate mix of fixed and mobile systems and devices have operated in siloes, bringing together corporate and personal technology into a manageable whole creates efficiencies and delivers new value.

Connectivity and consistent visibility lead to tighter processes that mean accurate on cost, on plan resource allocation. Eliminating waste and improving asset tracking can boost product quality while reducing operating and capital expenditure.

Not only can you see where everything is, and what it's doing, but you can also see everything relative to everything else. Business decisions are made in full awareness, with no surprises, leading to greater efficiencies and better ability to fulfil customer needs accurately while meeting your own business goals.

Connection and Compliance:
Digital Track and Trace is the Key

From the moment raw materials or components are received to the moment finished goods are shipped, you need to track and trace parts or ingredients to safeguard quality and compliance. Ensure that finished goods match specifications and obtain line-of-sight to the origin of all ingredient or component materials. Knowing when defects are present, identifying what caused them and which batches are affected by them is crucial to minimising risk, protecting your customer relationships, and driving accountability with suppliers.

Quality and traceability solutions automate the capture of data to ensure your customer always receives the right product, manufactured the right way, resulting in improved customer satisfaction and loyalty. Using a combination of mobile computers, advanced barcode printers and scanners, RFID readers, WLAN, and an electronic record of materials used, provides efficient and error-proof track and trace for parts or components at every point in the manufacturing process, or even after delivery to the customer.

Quality production processes (SOPs) are standardised on mobile computers, and inspection results are instantly visible throughout your operation. In the event of faulty or contaminated materials, this real-time information makes it easier to identify non conforming processes and quarantine defective products and materials, protecting you from the financial and negative brand impact associated with a large-scale product recall.

Key Benefits

- Provide better control over the quality of your products
- Prevent costly rework due to process or material non-compliance
- Staff can be retrained in new processes and technology
- Protect consumer safety and customer satisfaction
- Enable cost-efficient regulatory compliance
- Reduce financial and brand risks
- Enhance vendor and supplier accountability

KAIZEN

Having operational visibility and actionable information is central to delivering the continual cycle of small improvements and standardisation that yield significant results in terms of overall improvements in productivity. Also supporting the elimination of waste, which is entirely consistent with kaizen principles and practices.

TAKT TIME

Takt time, or the cost of time to produce a product, offers a notional opportunity to address process improvement. What fails first if you change the speed of the production line, and how do you fix it? There are points at which the cost of improvement outweighs the production gain, but knowing where the pinch points are can focus process improvement initiatives. To do this you need lineside visibility of every stage and gate.

IT'S ALL ABOUT VISIBILITY

WHERE

WHEN

BARCODE

BARCODE

WHAT

WHY
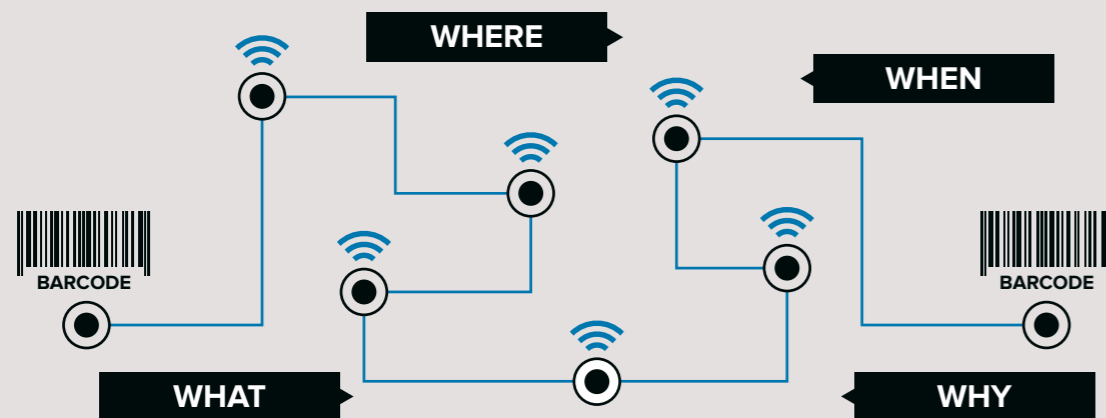
Enterprise Asset Intelligence and How it Helps

At Zebra, we have looked at the challenges you face, and come up with a solution in the form of Enterprise Asset Intelligence, a full cycle of visibility for the manufacturing sector.

Enterprise Asset Intelligence is about delivering visibility solutions to help manufacturers both improve productivity and deliver better experiences for their customers through sensing, analysing, and driving business actions. Using tools and technologies that give you real-time operational visibility into people and things, you get a full sense of what is happening in your enterprise, helping you to simplify and improve operations.

Where it is all-pervasive and potentially overwhelming, we help you to extract and analyse the most appropriate data and formulate actionable information to drive smarter business decisions and enhanced profitability.

Sense – Analyse – Act

- A unique portfolio addressing every point in the plant manufacturing lifecycle, from supply in, to build, to supply out
- Ensures adherence to operational KPIs – on cost, on plan, on specification
- Extracts the maximum value from IoT
- Developed to optimise efficiency, productivity and asset utilisation

SCALABILITY

Machine to machine, machine to human, and human to human interactions can be combined to deliver whatever is needed. Because the adoption of the technology is scalable, manufacturers of all sizes and market segments can benefit.

Take your next step towards smarter manufacturing.

OUR TRACK AND TRACE SOLUTIONS ARE PART OF A COMPREHENSIVE PORTFOLIO OF TECHNOLOGY PRODUCTS AND SERVICES THAT CONNECT YOUR PEOPLE, PROCESSES AND EQUIPMENT AND ENABLE YOU TO MAKE PROFITABLE, SUSTAINABLE BUSINESS IMPROVEMENTS. TO LEARN MORE, VISIT: **WWW.ZEBRA.COM/TRACK-AND-TRACE**

Connected Visibility

ZEBRA

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