How far is manufacturing from becoming a smart, connected industry?

verizon business

The manufacturing industry is experiencing a dramatic resurgence and reinvestment.

After years of offshoring and outsourcing, the focus is shifting back to domestic production and innovation, particularly within Europe.

To understand this revival, we've spoken with industry experts who emphasise the crucial role of smart manufacturing. They highlight how strategic investments and a renewed focus on cutting-edge innovation are steering the manufacturing industry back to the centre stage.

A rethink on reinvestment

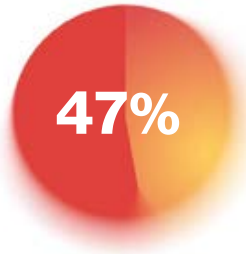
> It wasn't just COVID, obviously the situation in Ukraine and in the Middle East demonstrated quite how fragile these extended global supply chains are. It is on everyone's agenda.

Henry Anson
Publisher of The Manufacturer

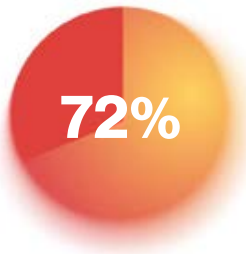
To many of us, the COVID-19 pandemic is starting to feel like a distant memory, but for those in the manufacturing industry it's still very much top of mind. Other than the obvious impact on lives, it really exposed the fragility of extended global supply chains, a perfect example being the microchip shortage in 2021. Coupled with that, you have the geopolitical tensions in the Middle East, war between Russia and Ukraine and disruptions in the Red Sea shipping lanes. These crises have not only prompted a reassessment of priorities, they have highlighted the need for more robust and adaptable production networks.

Now, manufacturers and governments are rethinking their strategies, embracing domestic production and the transformative power of technology. Some may call it a trend but it's much bigger than that. With investments in manufacturing technology reaching critical mass, the industry is pivoting towards "reindustrialisation."

Capgemini reports:



47% of large European and US organisations have already invested in reshoring their manufacturing production



72% of large European and US organisations are currently developing a strategy for reindustrialisation or already have one in place.[1]

This strategic rethink, driven by a renewed focus on European value chains and collaboration, is helping secure the continent as a manufacturing hub.

1. Large European and US organizations are planning to invest $3.4 trillion over the next three years for reindustrialization - Capgemini. (2024, April 18). Capgemini. https://www.capgemini.com/news/press-releases/large-european-and-us-organizations-are-planning-to-invest-3-4-trillion-over-the-next-three-years-for-reindustrialization/

Smart manufacturing, powered by intelligent networks

> The goal is to be smarter, more effective.
>
> **Philip Horn**
> Verizon's Head of Digital Transformation and Innovation EMEA

Smart. Effective. That really is what "smart manufacturing" is all about.

You might know it as Industry 4.0 or smart manufacturing, but whatever you call it, there's a reason why digitalisation is at the core of this industry makeover. Smart manufacturing is about bringing together advanced technologies – such as robotics, artificial intelligence (AI), machine learning (ML) – and tying them all together with the Internet of Things (IoT).

From planning to production, the benefits for the manufacturers are undeniable: unprecedented levels of efficiency, productivity and flexibility. Automation can take over repetitive tasks, data analytics provide real-time insights, while digital twins allow for virtual testing and optimisation.[2] This convergence of technologies creates a connected, data-driven ecosystem where machines, systems and humans promise for a seamless collaboration.

But as much promise as there is in these technologies, the reality is there's still a way to go before we see the true benefits. As Henry Anson puts it, "Manufacturers have dropped Industry 4.0 as a sort of tag, but they've embraced the concept so virtually every manufacturer we speak to is on a journey. They're all at very different stages on that journey, but they are committed to it."

2. Digital manufacturing | Siemens Software. (n.d.). Siemens Digital Industries Software. https://www.sw.siemens.com/en-US/technology/digital-manufacturing/

Productivity – where to from here?

> Productivity gains from digitalisation remain confined to a few highly innovative and productive firms.
>
> **Isabel Schnabel**
> ECB

Isabel Schnabel, Member of the European Central Bank (ECB)'s Executive Board, highlighted the issue of missing productivity gains, referring to it as "Europe's lost IT revolution." The only way forward in terms of productivity is to look back and see the bigger picture. It was the early adoption of offshore manufacturing that created a knock-on effect of reduced investment for local industry. Diane Coyle from the University of Cambridge wrote an interesting paper called "Why isn't digitalisation improving productivity growth?", in which she made a similar point to Isabel Schnabel's around how only a select few firms have reaped the reward through the early and extensive implementation of digitalisation.[3] So, the only way to 'restack' these fallen dominoes is to get more companies investing in the right manufacturing infrastructure, closer to their shores.

3. Why isn't digitalisation improving productivity growth? (2023). In Productivity Insights Paper (Report No. 022). The Productivity Institute. https://www.productivity.ac.uk/wp-content/uploads/2023/11/PIP022-Why-isnt-digitalisation-improving-productivity-growth-FINAL-Nov-2023.pdf

Creating a more connected industry

> The challenge is the silos of authority within organisations.

Philip Horn
Verizon Business

To effectively tackle the inherent challenges in manufacturing, a unified approach is crucial. Historically, industry silos have fragmented efforts – business strategy, IT, 'Cloud', 'Network', industrial operations technology and performance often operate in isolation, hindering the widespread adoption of digital transformation. These silos can then be mirrored on the vendor side.

The push for intelligent network connectivity has grown, especially post-COVID, as companies recognise the need for resilient and interconnected systems. This isn't just about linking machines but ensuring continuous data flow across all aspects of the business. Such connectivity is not only pivotal but transformative, enabling the full utilisation of machine learning and AI to drive efficiency and innovation in manufacturing.

"After Covid, people began to realise that everything needs to be more connected and more resilient," observes Henry Anson. Connection isn't just 'important', it literally holds businesses together.

From digital factories to connected enterprises

If silos are broken then the scope of smart manufacturing can expand beyond isolated factories to encompass entire manufacturing ecosystems. By integrating operations across all levels – from individual production sites to company-wide networks including supply chains, customer relations and service streams – manufacturers are engineering a cohesive environment that enhances efficiency, resilience and data-driven decision-making.

As just one example of success in this effort, Lufthansa has embraced this transformative approach by not only digitalising passenger services on their aircraft but also connecting various operational facets such as flight operations, maintenance and customer service into a unified digital framework. This comprehensive integration exemplifies the broader objectives of a connected enterprise, making not only a connected airplane but a connected airline.

Sundeep Samra, Client Partner at Verizon Business, notes the progression in the industry: “Lots of automation is already in place. Now, companies are trying to standardise across their global footprint.” His comments reflect a shift towards more ambitious, widespread implementation of smart manufacturing practices, using pilot projects like ‘lighthouse’ or ‘pathfinder’ projects to refine and extend successful strategies throughout the entire enterprise.

Is a full digital representation of the manufacturer on the horizon?

As the manufacturing industry evolves towards a connected enterprise, innovative technologies like AI and ML are playing an increasingly critical role. These technologies are driving efficiencies in manufacturing automation, using their ability to process vast amounts of data from machines and production lines to improve output, detect anomalies and streamline operations.

BMW's use of ML in their painting process is a prime example. Cameras and machine vision systems compare each newly painted body against an ideal model, significantly improving the efficiency and accuracy of quality control. Similarly, Bosch has integrated AI into their robotics systems, allowing robots to learn and adapt over time, enhancing their performance and capabilities.

Digital twins are also gaining traction, being introduced across a wider range of operations. As a virtual replica, including inputs and outputs of a physical product, process, or system, a digital twin can be used for testing, analysis and optimisation. Rolls-Royce, for instance, has long used digital twins for predictive maintenance on aero engines, allowing them to anticipate and address issues before they impact efficient performance.

"The idea is really to work with a digital representation of the cyber-physical systems, to allow them to do all kinds of simulations", explains Philip Horn, Verizon Business' Head of Digital Transformation and Innovation EMEA, based in Germany.

With the convergence of AI, ML and digital twin technology, there's a reason why people feel we're moving towards a point where manufacturers will have extensive digital models and representations of their systems to test innovations and improvements.

Empowering SMEs

The benefits of smart manufacturing and automation are not exclusive to large corporations. In fact, these innovations are increasingly accessible to smaller businesses, including small and medium-sized enterprises (SMEs).

In Kim Povlsen's article for the Harvard Business Review, she points out that smaller, flexible, collaborative robots (cobots) can be used across a wide range of applications, from machine tending and welding to packaging, palletising and screw-driving.[4] It's this adaptability that will allow SMEs to leverage the benefits of automation without significant capital expenditure.

Furthermore, the rise of "Everything as a Service" (EaaS) models is making robotics and other advanced technologies more affordable for SMEs. Under an EaaS model, companies can access the latest technologies on a subscription basis, eliminating the need for upfront investments in owning and maintaining the equipment. This approach reduces capital outlay and allows companies to scale their use of technology based on their needs.

"The perception is usually that such projects will require an enormous capital expenditure and that benefits won't be realised for years," says Henry Anson, acknowledging the challenges SMEs face in justifying smart factory investments. "However, the reality is that with modest investment and the right approach, companies can start realising the benefits of smart manufacturing in a matter of weeks or months."

4. Povlsen, K. (2023, November 21). A new generation of robots can help small manufacturers. Harvard Business Review. https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers#:~:text=Robots%20improve%20quality%20and%20operational,to%20meet%20shifting%20market%20demands.

The return of optimism

> We are now seeing far greater levels of cautious optimism in the sector than I've seen for at least eight, nine years.
>
> **Henry Anson**
> Publisher of The Manufacturer

Rockwell Automation 9th Annual State of Smart Manufacturing reflects this with technology investments up 30% over last year Cloud/ SaaS delivering the most ROI.[5]

This inflection point marks a critical juncture in the evolution of the manufacturing industry. It represents a time of opportunity, where lessons learned from past challenges can be used to shape a more resilient, connected and prosperous future.

5. State of Smart Manufacturing Report | Rockwell Automation | UK. (n.d.). Rockwell Automation. https://www.rockwellautomation.com/en-gb/capabilities/digital-transformation/state-of-smart-manufacturing.html

Working with Verizon

Building the right connected infrastructure: partnership and co-creation.

As the manufacturing industry transforms towards a connected enterprise, building the right infrastructure and architecture is paramount to building a digital thread throughout the process. However, this is not just a technical challenge; it also requires a new approach to collaboration and partnership.

“If you want to have a true transformation, the best possible solution requires co-creation,” emphasises Horn.

A good digital implementation can help to protect vital industrial operational assets. As OT technology becomes increasingly connected as part of a smart manufacturing infrastructure, ensuring it’s properly linked to a secure, connected network can help to protect it from cyberthreats. Digital transformation can also help to improve productivity, cutting cost per unit, while improving safety, reducing waste and helping you track sustainable criteria.

This perspective underscores the fact that digital connectivity is not just the domain of IT. For smart manufacturing to be successful, IT and Operations Technology need to work together with a partnership of suppliers. This collaborative approach enables the implemented solutions are fit for purpose and deliver the desired benefits.

“We can show this value with our demonstration model in the London Hub. This offers ways to see how different KPIs are impacted by digital transformation in areas like process training, health and safety, quality control, predictive maintenance, automated vehicles and asset track,” says Sundeep Samra. This can be quite revelatory and really brings the possibilities to life for customers.

“A more collaborative approach from the people looking to service and sell products and software into manufacturing would help,” adds Henry Anson. “Having partners working together in a more collaborative fashion presents the manufacturing industry with an end-to-end solution rather than a simple bit part.”

Learn more about how Verizon can help you explore and adopt the technology that’s making manufacturing smarter at **verizon.com/gb/manufacturing**