Unintended consequences of smart manufacturing

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Navigating the security, data, and cultural shifts of smart manufacturing

Smart manufacturing is changing nearly every part of the industry, bringing enhanced efficiencies and new innovations. However, as companies begin to either integrate or expand their use of these advanced technologies, many face unintended and often overlooked consequences.

These include increased cybersecurity risks, an avalanche of data, and significant cultural shifts within their organisations. Managing these challenges effectively is crucial for businesses as they look to become more connected. We talked to industry experts who shared best practice advice on navigating this evolving landscape.

Cybersecurity risks in the age of smart manufacturing

As manufacturing becomes more connected, cybersecurity threats grow. The 2024 Verizon Data Breach Investigations Report[1] (DBIR) highlights that the manufacturing sector is a prime target for cyber threats. Henry Anson, Publisher of The Manufacturer, explains, "Manufacturing is now one of the most targeted sectors. A defence manufacturer said their state sponsored cyber hacks have gone up 100 times in the last two or three years."

As more businesses employ smart manufacturing systems, and the integration of digital twins and Industrial IoT devices becomes more mainstream, security measures become a lot more complicated and complex. As Anson points out, "Many manufacturers assume their current cybersecurity measures are sufficient, but this is often not the case." Philip Horn, Verizon's Head of Digital Transformation and Innovation EMEA, expresses further concern, "Digitising the shop floor introduces more digital elements into the environment, which increases potential entry points for cyberattacks...So if you have 100 machines on the shop floor and all are connected, then you have a hundred potential holes in your in your security shield. And the increased necessity of remote connectivity, from analysing problems to syncing with digital twins in the cloud, combined with the long lifespan of expensive shop floor systems, challenges their ability to stay updated and securely patched."

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>
> **Philip Horn**
> Head of Digital Transformation and Innovation EMEA, Verizon

1. Verizon 2024 Data Breach Report Summary for Manufacturing
   https://www.verizon.com/business/resources/Tc99/infographics/2024-dbir-manufacturing-snapshot.pdf

The importance of data management and standardisation

The shift to smart manufacturing generates vast amounts of data and to optimise operations, it's vital to manage this influx. As Sundeep Samra, Verizon's Manufacturing Client Partner, notes, "Sharing live data across factories allows intelligent decisions about production, demand and logistics." However, integrating data from various sources can be complex and requires sophisticated data management systems and a cultural understanding of data analytics. Ensuring data accuracy and reliability is crucial for effective decision-making, while standardising data management procedures across the business is vital to maintain consistency.

When it comes to business innovation any delay in investing in smarter infrastructure and technologies can mean a loss of competitive advantage, so there's always going to be an incentive for moving at speed. After all, history has taught us that agility and continuous improvement are critical to staying relevant and staying ahead.

However, this transformation is never easy, and attitudes toward change can make innovation difficult. The tech adage of "Moving fast and break things" has dire consequences with smart manufacturing. Poor visibility into how your manufacturing is running can have a dramatic impact on forecasting and analysis, and make new technologies difficult to integrate. Moreover, creating a solid bedrock in the form of a high-performance and secure connectivity layer is a prerequisite for the success of any digital transformation on the shop floor, essential for any use case or proof of concept.

> Sharing live data across factories allows intelligent decisions about production, demand and logistics.

Sundeep Samra
Verizon's Manufacturing Client Partner

The good news is that having reliable data can help make decisions about new technologies and provide insights into operations, facilitating continuous process improvements. Artificial intelligence (AI) and machine learning (ML) can help identify areas for transformation and improvement, providing clear benchmarks for return on investment (ROI) and impact measurement. They can also help reduce waste by reporting progress against sustainability and environmental, social, and governance (ESG) goals. Moreover, AI solutions and Industrial Internet of Things (IIoT) devices can help drive new product development and customer growth.

Robust data management enables companies to predict, model and forecast changes before they happen. By investing in technology, manufacturers can make future innovations easier by using ML, digital twins, and predictive analytics. The latter of which can be used to provide benchmarks and predictions, as well as to measure success and ROI. Using technology to get better analytics does help to know the exact impact new technologies will have on the business, satisfying even the most risk-averse stakeholders.

How manufacturers handle the data avalanche from automation and connectivity

As manufacturers adopt smarter, more connected factories and embrace smart manufacturing, the resulting data offers numerous benefits, including improved efficiency, better productivity, informed decision-making, and value creation. However, becoming data-driven also presents challenges. The National Association of Manufacturing's Leadership Council highlights the successes and opportunities in transforming operations with data, noting that security and privacy concerns are paramount. Over 90% of surveyed manufacturers have policies on data security and privacy, but only 15% fully follow them. [2]

This gap is concerning, especially given that data is vital for driving insights and decision-making. Despite the increasing volume of data – expected to triple by 2030 – many manufacturers still rely on manual data entry, with 70% using spreadsheets.[3] Less than half understand the dollar value of their data, and only about 25% have high confidence in data collection. Nevertheless, 95% of manufacturers believe data enables faster and higher-quality decision-making. [4]

An overwhelming majority (86%) believe effective use of manufacturing data is essential to competitiveness. [5] To realise data's potential, manufacturers must organise and analyse their data effectively, ensure data trustworthiness, and align business strategy with data strategy.

2, 3, 4, 5. Murphy, J. (2024, June 21). Manufacturing in 2030: The Opportunity and Challenge of Manufacturing data. NAM. https://nam.org/manufacturing-in-2030-the-opportunity-and-challenge-of-manufacturing-data-31423/?stream=business-operations

The future is data-driven

Using data effectively in manufacturing can make businesses more sustainable and profitable. However, only 39% of manufacturing executives report successfully scaling data-driven use cases beyond the production process of a single product. [6]

> Many manufacturers have started their journey towards data excellence, but capturing significant value remains a challenge.

To achieve hyperconnected value networks, manufacturers need to use data and analytics tools like predictive maintenance, advanced robotics and supply chain tracking. These tools can:

- Offer actionable insights by identifying patterns in data through reports and dashboards.
- Predict future outcomes using historical data analytics.
- Enable systems to self-optimise and take autonomous actions through self-learning algorithms.
- Discover hidden constraints in the production process.

Many manufacturers have started their journey towards data excellence, but capturing significant value remains a challenge.

6. The future of manufacturing is powered by data and analytics. Here's why. (2022, September 12). World Economic Forum. https://www.weforum.org/agenda/2022/09/manufacturing-data-advanced-analytics/

How company culture drives successful digital transformation

Adopting smart manufacturing requires a cultural shift within organisations. This involves breaking down silos between departments and fostering a culture of collaboration and continuous improvement. Horn remarks, “25% of the problem is technology, but 75% is mindset and culture. It’s absolutely imperative that everyone understands the basics of what to do with data, and how it works – the most successful CDOs and CTOs understand this challenge.”

Collaboration between IT and OT teams enables smooth implementation and operation of new technologies. This is essential for overcoming the technical and cultural barriers that often stand in the way of digital transformation. A typical example is a manufacturing company where the IT department traditionally focused on connectivity and data management, while the OT department managed production equipment. To implement smart manufacturing, a company might appoint a director of digital transformation to bridge the gap between these departments, which would facilitate better communication and collaboration, leading to successful digital transformation.

Promoting a culture of continuous improvement and openness to change is crucial. Employees should be encouraged to embrace new technologies and processes. Designating a dedicated change agent or director of digital transformation can drive these initiatives and promote alignment across the organisation.

Balancing benefits and challenges in smart manufacturing

Smart manufacturing offers significant benefits but also presents new challenges. Addressing cybersecurity threats, managing the avalanche of data, and building the right company culture are crucial in realising the full potential of digital transformation. And by understanding and tackling the inherent dangers, manufacturers can strive for a smoother transition and, with it, more sustainable growth.

> Getting the right cloud infrastructure in place allows them to leverage the latest machine learning, getting the right infrastructure in place.

Sundeep Samra
Client Partner, Verizon Business

Working with Verizon

Verizon is uniquely positioned to help manufacturers navigate these challenges. With expertise in digital infrastructure and smart manufacturing, Verizon offers end-to-end solutions to boost productivity, reduce waste and enhance profitability across the manufacturing ecosystem. Partnering with Verizon allows your business to effectively address the cybersecurity, data management, and cultural challenges of smart manufacturing.

The journey to smart manufacturing is fraught with challenges, but with the right strategies and partnerships, these can be effectively managed. High-quality, pervasive, secure industrial connectivity is critical for smart manufacturing, as is a strong cybersecurity framework. Data management and standardisation are essential to getting more out of the vast amounts of data generated. Lastly, fostering a collaborative and adaptive company culture will help realise the full potential of digital transformation. By working with Verizon, manufacturers can overcome these challenges and achieve their goals of smarter, more efficient, more resilient operations.

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