TATA COMMUNICATIONS

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MANUFACTURING CXO TECH COUNCIL REPORT

# Hyper-Connected Network Infrastructure

## Pivotal for new-age manufacturing

In association with: CORE Centre of Recognition & Excellence

With digital technologies spreading their transformative powers across every industry, the manufacturing sector is no exception. Whether referred to as Industrial 4.0 or smart manufacturing, the approach is changing every aspect of manufacturing – design, fabrication, operations, post-sales service, and supply-chain management – making the global manufacturing landscape more dynamic.

The impact of digital transformation on manufacturing is so profound that this market is expected to reach USD 767.82 billion by 2026 growing at a CAGR of 19.48%. Now it's no surprise that the primary motivators for adopting digital technologies into this sector are a significant increase in production speed and cost-efficiency in addition to other crucial aspects, discussed in detail later in this report.

The report is a summary of the CXO TechCouncil on Manufacturing by CORE Media and powered by Tata Communications. The company provides high-speed wireline and wireless connectivity, security, and next-gen services through Tata Communications Transformation Services (TCTS), enabling manufacturers to make the most of their production capabilities. Offering solutions like end-to-end connectivity, managed security, SD-WAN security, automation, and new-age services like IoT, Cloud computing, SDN, and more, Tata Communications has become a one-stop solution for manufacturing companies looking for secure and accelerated connectivity solutions.

The Tech Council seeks to create a platform for CXOs to engage and share insights into the primary challenges of the manufacturing vertical. It also focuses on understanding the areas of scope and improvement for Tata Communications Limited to help organizations adopt a secure, flexible, agile, efficient, and futuristic manufacturing environment.

**The Tech Council members included top IT Leaders from the Manufacturing Sector in India**

**Mr. Rajesh Uppal**

Sr. Executive Director (HR & IT) at Maruti Suzuki India

**Mr. Dwaipayan Ghosh**

CIO, Welspun

**Mr. Anjani Kumar**

CIO, Stride Pharmaceuticals

**Mr. Prosenjit Sengupta**

Consulting Partner, EY and Former CDO, Thermax Limited

**Mr. Sreeji Gopinathan**

Global CIO and VP, Lupin Pharmaceuticals

The Tech Council promoted peer-to-peer sharing of views, industry best practices, and cautions necessary in the manufacturing sector and sought to highlight how digital technologies are molding the manufacturing sector and the innovative ways in which network modernisation and cybersecurity are vital in the process. The council members shared their views on individual digital transformation journeys including IT and OT integration, cybersecurity, modern technology adoption, and enhancing digital customer experience.

# Overview of digital transformation in the manufacturing sector

With the rapid adoption of technologies in the digital era, providing a digital customer experience has become pre-eminent for organisations. The pandemic further disrupted the entire notion of digital experience for every industry. With manufacturers facing unprecedented stock shortages and a warehouse management debacle, digitisation was high on the cards. Soon, the manufacturing sector was abuzz with cloud computing, data analytics, industrial robotics, digital twin, IoT, advanced sensor technology, machine learning, and wireless connectivity, to name a few. This resulted in a few manufacturers linking systems and processes spread across multiple areas of production to leverage an integrated approach to manufacturing, where from design to production to final product delivery – everything was digitised.

Yet questions remained in the minds of manufacturers about the widespread adoption of digital technology in their production units. On the top of the list was OT (Operational Technology) security. Before digitisation stepped foot in the manufacturing world, security was not in high demand, as machines were not connected to the internet. But it all changed with IT and OT Integration and the OT systems were exposed to external threats. Adopting a secure and stable cloud infrastructure to store big data for manufacturing as well as customer-facing applications became an ideal practice. This data was then combined in a data lake and utilised by ML algorithms to generate insights. Eventually, the industry experts introduced a host of best practices to avoid compromising sensitive information.

> “Manufacturing organisations need a next-gen, robust, high-paced, reliable and flexible network to deploy the modern use-cases.”
>
> **Rajesh Uppal,**
> Sr. Executive Director (HR & IT), Maruti Suzuki India

> “Managing the traffic between the IT and OT with the right throughput in a reliable, flexible, and secure way is crucial to maximising benefits out of data insights for the pharma sector, just as in many other sectors, and is making progress in the maturity curve.”
>
> **Sreeji Gopinathan,**
> Global CIO & Sr VP, Lupin Pharmaceuticals

## 01. Vital digital services revolutionising the manufacturing sector

A common point of concern for CIOs is establishing a robust, secure, and high-speed connectivity infrastructure for the manufacturing sector. As rightly pointed out by a senior council member, multiple heavy machinery and industrial units run simultaneously on factory floors, and as a result, setting up a high-speed network connection is a challenge, making deployments a time-consuming process. The council agreed upon this as a common challenge faced by every manufacturing unit and expressed a need for an end-to-end network service, which can offer high flexibility, productivity, and excellent quality of service.

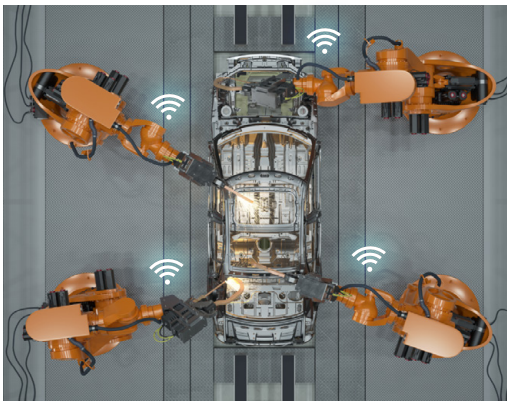

To address this challenge raised by the council, Industry Expert Mr. Hari Nair, Vice President Head Solution Engineering India & Global Solution Center at Tata Communications explained how leveraging the end-to-end network services can help the network provider ensure complete visibility of the entire service to mitigate any potential anomalies that may occur in between. He further elaborated by citing an example of a service offered by Tata Communications. The company collaborates with a peer telecom company to fill any connectivity gaps in the network. Here’s how it works - The end-to-end network runs from points 1 to 10. If the fiber optic network laid by Tata Communications reaches points 1 to 5, the peer company provides connectivity from points 6 to 8, and the final 2 points are fulfilled by Tata Communications. This approach allows the company to monitor the complete connectivity lifecycle and prevent any hindrances in the service.

The council emphasised that effective demand forecasting and improved customer service are critical for success. Traditional forecasting methods are outdated and fail to provide timely data about supplies and demand, thereby resulting in erroneous inventory management. It can seriously affect labor and production schedules, stock maintenance, and supply chain management. On the other hand, IoT solutions collect data on specific buying patterns and usage and offer manufacturers clear insights and advanced analytics based on real-time data. They can gain visibility into stock levels, gather data from consumers to predict an increase in sudden demand, and improve collaboration between different departments to achieve optimised production planning. The results are evident – improved customer experience and better sales.

> “The two main factors limiting the digital transformation journey in manufacturing are - a lack of internal skills and capabilities, and perceived cyber security risks/threats.”
>
> **Anjani Kumar,**
> CIO, Strides Pharmaceuticals

## 02. Roadblocks in the digital transformation journey

Digital transformation in the manufacturing sector can get complicated as it demands a systematic integration of IT and OT. Although the council specified that 50% of their overall business processes are digitised, they still face obstacles toward complete digitisation. Some of the difficulties facing CIOs within the manufacturing industry include the following -



Having a centralised application increases the risk of shutting down the whole factory if the network is facing downtime. To avoid such situations, organisations use edge solutions or on-premise infrastructure to ensure that sensitive data is always secure, which ultimately requires secure and reliable connectivity within the factory setting.

Even as network providers ensure good connectivity in remote locations, these networks are not designed to provide intelligent services. These may include providing insights on where bandwidth has to be high or low to regulate connectivity flow.

While network modernisation has become an industry standard, stakeholders are still unclear about the value derived from the process. Moreover, determining the right skills and abilities to seek while hiring employees to work toward network modernisation is equally distressing.

Reiterating the significance of security and mitigating cyber threats, the CIOs also pointed out that a network should make IT and OT integration as smooth as possible. It should be designed to provide measurable and analysable insights and drive change management as a straightforward process.

Mr. Nair from Tata Communications recommended integrating customised use cases that can empower manufacturers to deal with anomalies in real-time. Consequently, it improves the visibility of the entire network depending on the needs of the industry.

> “Operational Intelligence will be extremely important to build a performing and sustainable business. But the process has to be measurable and analysable for manufacturers to make decisions based on facts and insights.”
>
> **Prosenjit Sengupta,**
> Consulting Partner, EY and Former CDO, Thermax Limited

> “Ambiguity around new technologies, precise ROI estimation, and a clear value of modernisation.- 3 common challenges in digitising the manufacturing sector ”
>
> **Dwaipayan Ghosh,**
> CIO, Welspun

## 03. Technologies shaping the future of the manufacturing industry

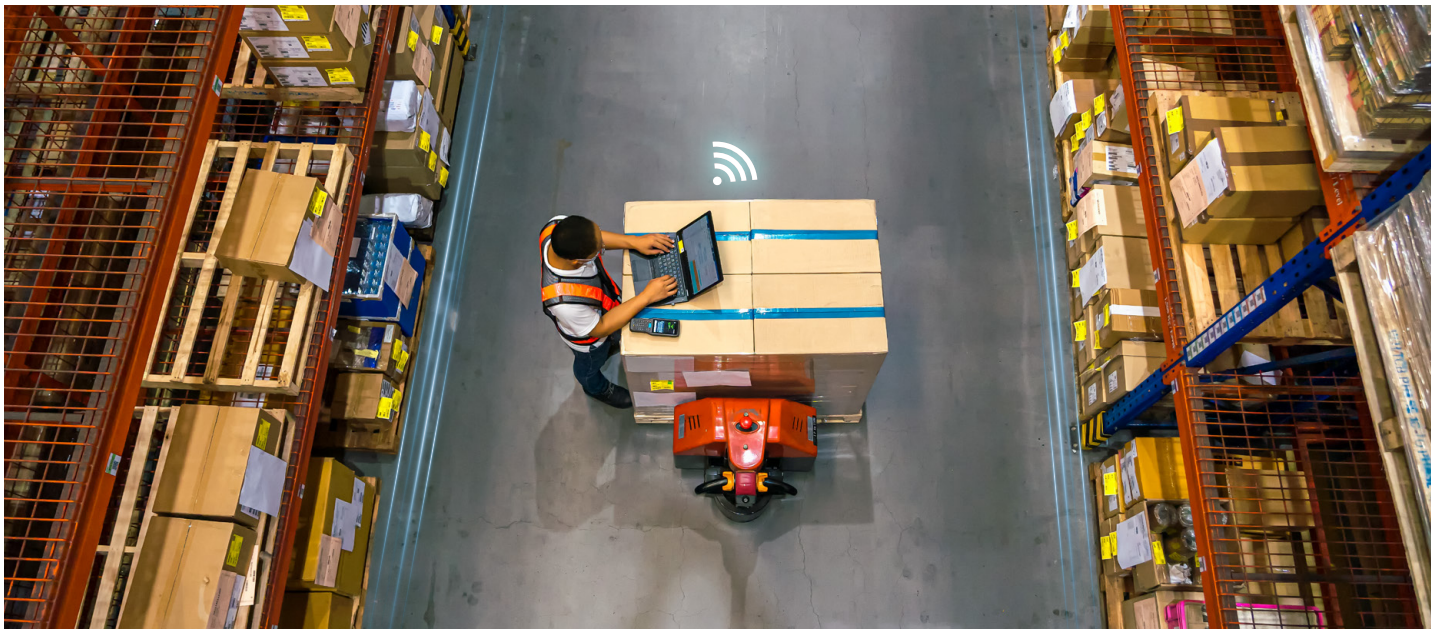
The most important angle in the manufacturing sector is ensuring the accuracy of the product and technology can play a decisive role in its success. CIOs unanimously agreed on the need for integration of video capture and analytics devices, IoT platforms supported by edge solutions, Vision API, remote product monitoring, and 5G connectivity to increase the overall throughput of the manufacturing industry. A council member pointed out that most pharmaceutical companies still maintain decentralised systems due to data sensitivity and are skeptical about adopting digital technologies in their entirety. Also, these companies have reliability issues with bandwidth and latency in the network.

Another council member added that although implementation of Vision API along with edge solutions for machines helps ensure uniform quality of every tablet produced by a pharmaceutical company, the bandwidth issues were the major hurdle in the digital transformation and required at least 2-3 iterations to complete the process which was a tiring ordeal.

> “Integrating OT systems with security built-in is the need of the hour. We need to make the decision-making process fast and secure to maintain consistently high production quality.”
>
> **Hari Nair,**
> Vice President, Head Solution Engineering India & Global Solution Center, Tata Communications

Regarding adopting new-age technologies in the production setup, the council was enthusiastic about adopting initiatives like digital twin shop floors and AI/ML-driven predictive maintenance systems. The digital twin technology provides a virtual model reflecting a physical object for ease of monitoring its overall performance. In a typical manufacturing scenario, this technology can bring process efficiency within various co-functioning machine systems, and study a machine’s entire lifecycle for timely wear and tear. The automotive industry is one of the biggest beneficiaries of digital twin shop floor technology as it mirrors every complex and co-functioning system used in the production process. Similarly, with the help of AI/ML manufacturers can achieve better error detection, real-time quality monitoring, and optimised supply chain management. More importantly, the technology can cleanse, aggregate, and generate data insights from multiple and scattered ERP and CRM to create a unified solution for users.

The council also placed great importance on achieving success with digital ‘connected devices’ and personalised digital customer experience as part of their transformation journey. With the help of managed Wifi solutions, managed security services, IoT solutions, and a host of other skilled services Mr. Nair stressed that Tata Communications is well-placed to become the ideal network partner for the manufacturing industry as a whole.



# Conclusion

The council members unanimously agreed upon the need for digitising key manufacturing processes across different industry verticals to achieve new heights of success and drive innovation at scale. As they shared their insights and experiences on challenges faced by businesses, potential solutions, and the technologies bringing about digital transformation in the manufacturing sector, here are the following key takeaways for manufacturing tech leaders to pursue their digital journey with more confidence –

### End-to-end network transformation helps achieve digitisation at a faster pace.

Digital leaders in the manufacturing sector are keen on providing a better customer experience and achieving improved Time to Market. By leveraging an end-to-end network, businesses can have access to valuable insights in terms of demand forecasting, customer service, and core areas of manufacturing such as production, logistics, and procurement, making their decision-making process more efficient and quicker.

### Ensuring overall data and network security is the biggest challenge.

From securing sensitive data from remote users to adding security with authentication, access control, and secure communication channels, and establishing reliable connectivity between remote users and cloud applications, CXOs in the manufacturing sector must be cautious about every touchpoint.

### Intelligent solutions and smart analytics enable personalised digital customer experience.

By adopting futuristic digital technologies such as digital twin shop floors, digital connected platforms, integrated supply chains, IoT instrumentation & control systems, etc., CXOs can optimise smart manufacturing processes. Furthermore, by leveraging AI/ML-driven predictive maintenance systems and data analytics for targeted offerings, manufacturing businesses can enhance their customer service.

### Increased speed, flexibility, and efficiency in processes with new-age digital solutions.

By modernising the manufacturing network and IT infrastructure, manufacturing businesses can enable consistent network performance, better disaster recovery provisions, accelerated time to market, and exceptional digital customer experience to help them gain a competitive advantage in the industry.