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# How AI is Revolutionising Manufacturing

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**Synopsis**

**AI in manufacturing goes beyond automation as it enables better decision making. While globally, large enterprises are currently leading the adoption curve, India's real test lies in how well it can democratise AI for MSMEs, says Kanishk Maheshwari, Co-Founder & MD, Primus Partners.**

For decades, manufacturing has been synonymous with procedures set in stone, that translate into volume, scale, and linear efficiencies. Today, however, artificial intelligence (AI) is reprograming that DNA of the industry, by injecting adaptability and specific intelligence into traditionally operating systems. This transition is not only limited to transforming traditional factory operations into smart factories but is also reimagining the idea of sustainability and competitiveness which will define the future of how we produce and consume. Furthermore, AI in manufacturing goes beyond automation, it will enable better decision making.

**Manufacturing meets machine learning**

Industrial revolution has witnessed several upgradations over the years, but what sets AI apart from previous upgrades is its cognitive edge — the ability to learn, adapt, and optimise in real-time. AI goes a step beyond mere automation that only repetitively performs predefined tasks, but instead learns from data patterns, simulates outcomes, and improves all processes over time.

For example, in automotive assembly lines, AI-powered systems are now enabling the reduction in quality related defects by over 30 per cent, where predictive models are helping identify the possible deviations even before they occur.

This transformation is also reflected in market behaviour as well. An industry analysis estimates that AI could add up to $3.8 trillion in annual value to global manufacturing. It is needless to say, the early adopters are already gaining a significant competitive edge in terms of speed, quality, and cost, and the rest will have to catch up, or perish.

**Enabling enhanced operational efficiencies**

Predictive maintenance is widely becoming the most deployed application of AI, and its impact is most visible on the shop floor of any factory. Instead of routine, time-bound servicing, AI sensors and algorithms are now being deployed to predict when a machine is likely to fail and trigger pre-emptive maintenance. This is drastically reducing unplanned downtime, which is not only a massive cost but a reliability bottleneck for operations.

In textiles industry, AI-integrated looms are dynamically adjusting tension based on thread properties, reducing fabric defects by up to 18 per cent.

Computer vision and deep learning are also being used in quality control to inspect thousands of parts per minute, far exceeding human accuracy. It's interesting to see that multiple startups are helping mid-sized manufacturers deploy such vision-based quality control systems without major capital expenditure.

**Smart supply chains: From reactive to proactive**

Prevention is better than cure and industries are realising this with the help of AI. While quality control focuses on error detection and rectification, quality assurance takes a broader and proactive approach. This is where AI is emerging as a most powerful enabler.

AI doesn't just transform what happens inside the factory but reshapes the entire supply chain. Dynamic inventory management, demand sensing, logistics routing - all are being reengineered by AI.

This matters particularly for Indian manufacturers looking to find their place in the global value chains. AI enables them to become more predictable, reliable partners which are critical traits in the evolving trade landscape.

**From compliance to ESG strategy**

Sustainability is another area where AI is no longer an accessory, but a central pillar. By monitoring emissions, optimising energy use, and managing waste, AI is helping manufacturers shift from compliance-driven ESG to performance-driven ESG.

A leading cement company in India used AI to reduce CO2 emissions by 8 per cent, without compromising output. In another example, AI-enabled water management at a bottling plant of a beverage giant, is already saving over 1 billion litres of water annually. These impacts are not mere CSR footnotes, but results that are core to cost and brand.

Global investors, too, are rewarding this shift. Green bonds and ESG-linked financing are increasingly tied to measurable, tech-enabled sustainability outcomes.

**The way forward for India**

While globally, large enterprises are currently leading the adoption curve, India's real test lies in how well it can democratise AI for MSMEs.

India's manufacturing backbone is built on small and medium firms that often lack the capacity to invest in in-house data science teams or high-end infrastructure. These small and medium enterprises contribute nearly 30 per cent to India's GDP, and employ over 110 million people. However, they suffer from constraints of low digital maturity, scarce capital, etc.

This is where low-code/no-code platforms, AI-as-a-Service models, and public-private partnership models become crucial. For instance, in Tamil Nadu, a pilot programme helped a cluster of textile MSMEs use cloud-based predictive maintenance tools, reducing breakdowns by 22 per cent. These were firms that had neither data science teams nor expensive servers, but just a shared service model, some basic training, and a cooperative framework.

What this shows is that with the right delivery models, AI can scale horizontally and not just vertically with large corporations. Similar cluster-based models are emerging in hubs like Pune and Coimbatore, where industries are collaborating with State Innovation Missions to integrate AI in quality control, inventory management, maintenance, ESG compliance, etc.

If India can tap into this massive opportunity by institutionalising such models that combine affordability and usability, the future of Indian manufacturing along with its 63 million MSMEs is highly promising.

**Policy push: Enablers for AI manufacturing**

India's policy landscape looks to be evolving well in order to support this transition. The National Strategy for AI (NSAI) identifies manufacturing as a high-potential sector. The draft National Policy on Advanced Manufacturing outlines the role of AI, IoT, and robotics in future-readiness.

States like Telangana, Karnataka, and Gujarat are launching AI and Industry 4.0 missions. The newly released Odisha AI Policy 2025 is an example of how regional strategies can be tailored to local industrial strengths while aligning with national digital goals.

But beyond policies, implementation will be key of India. Regulatory clarity on AI ethics, and robust data governance frameworks are the need of the hour to support innovation and sustain momentum.

Today, AI is a lever of disproportionate power. Especially for the manufacturing space, it brings together precision and adaptability, with uncompromised speed - the very qualities required to thrive in the volatile world of today.

India's opportunity lies not just in adopting AI, but in shaping how it is applied. If done timely and right, India will not just join the AI race, it will set the pace.