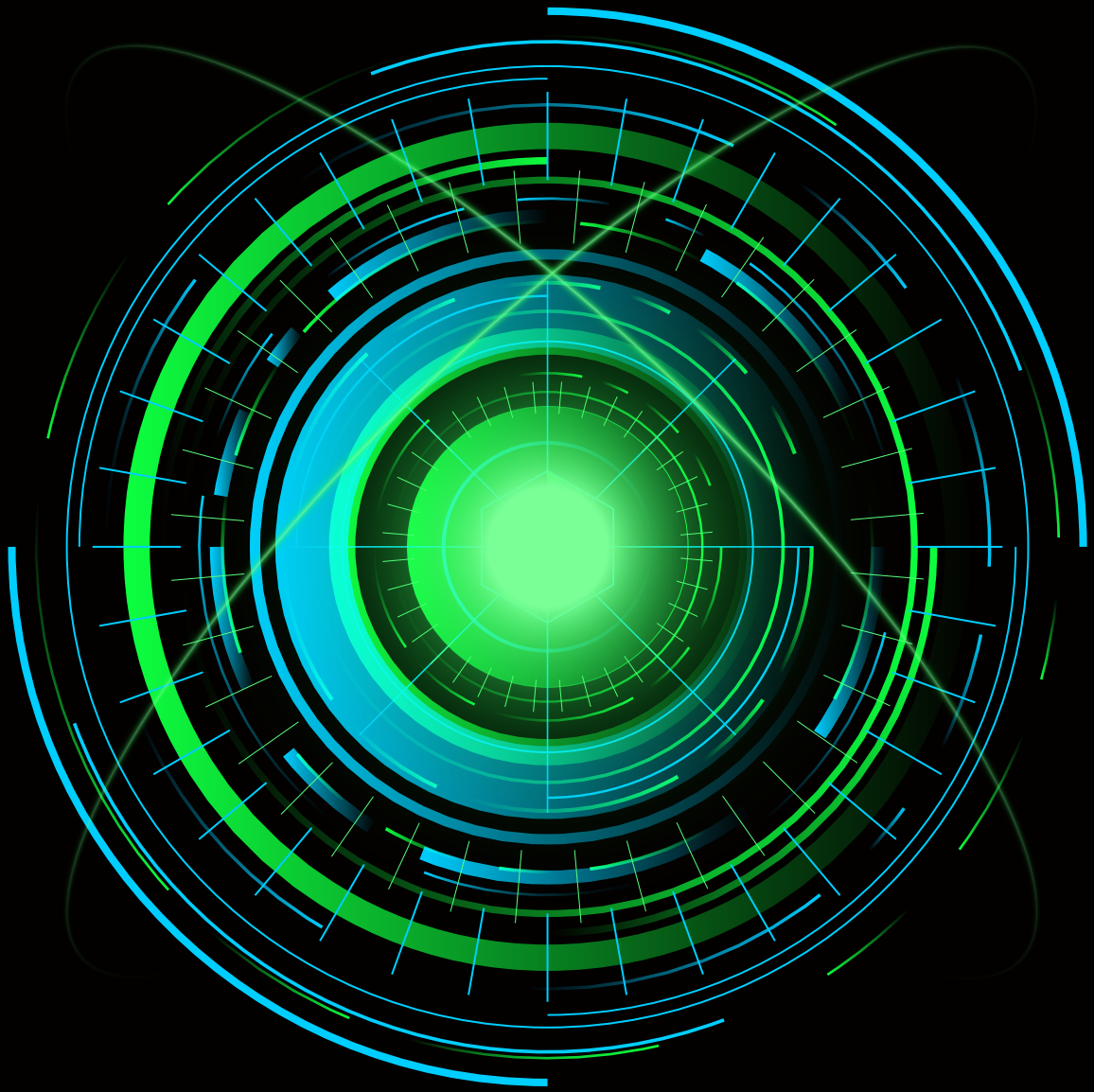
Deloitte.

Confederation of Indian Industry



Manufacturing Innovation Conclave 2023

Industry 4.0: Learn and Propel

September 2023

Table of contents

Foreword by CII

It is with great enthusiasm that I introduce the report "Industry 4 − Learn and propel," an in-depth exploration of the transformative landscape of Industry 4.0.

In an era where innovation unfolds at an unprecedented pace, this report serves as a vital resource for policymakers, industry leaders, academics, and all those who seek to harness the potential of Industry 4.0 for the betterment of society.

As we navigate the intricate interplay of technology, automation, and indispensable human ingenuity, the insights within this report are both timely and significant. The pages herein unveil a comprehensive analysis of the profound shifts that Industry 4.0 brings, underscoring its potential to reshape economies and redefine the way we work and live.

The data, trends, and case studies included in the report provide not only a panoramic view of the technological breakthroughs but also a thoughtful examination of the challenges and opportunities that accompany them. From Artificial Intelligence (AI) and Internet of Things (IoT) to advanced robotics and sustainable practices, the report encapsulates the essence of the transition towards the next technological era.

I commend the dedicated team of researchers and experts who have collaborated tirelessly to bring this report to fruition.

Kishore Jayaraman
Conclave Chairman and
President - India and South Asia
Rolls-Royce

Foreword by Deloitte

Industry 4.0 witnessed significant growth in India and is becoming mainstream. Although organisations are adopting industry 4.0 practices, such as predictive maintenance, 3D printing, and connected operations, progress varies amongst industries. This paper explores some challenges pertaining to implementing industry 4.0, reasons for the failure of certain initiatives, and how companies can overcome these challenges and fuel growth and advancement. We have identified some compelling success stories to illustrate some characteristics of successful industry 4.0 initiatives and their benefits to facilitate broader adoption.

We witness rapid advancement in new technologies, such as 5G, generative AI, model-based enterprise, and digital thread. These technologies have immense potential to reshape industries and redefine possibilities within the realm of industry 4.0. This paper explores how these technologies be used to bolster innovation, competitiveness, and productivity.

I hope you find this paper insightful as we collectively navigate the path towards a more efficient, innovative, and dynamic manufacturing ecosystem.

Shridhar Kamath
Partner, Consulting
Deloitte India

Industry 4.0 and its significance

The ongoing revolution in Industry 4.0 signifies a fundamental transformation in the way industries operate. The revolution revolves around the convergence of internet of things, data analytics, cyber-physical systems, and artificial intelligence. These have been working in harmony to revolutionise productivity, enhance product quality, and nurture agility in manufacturing sectors.

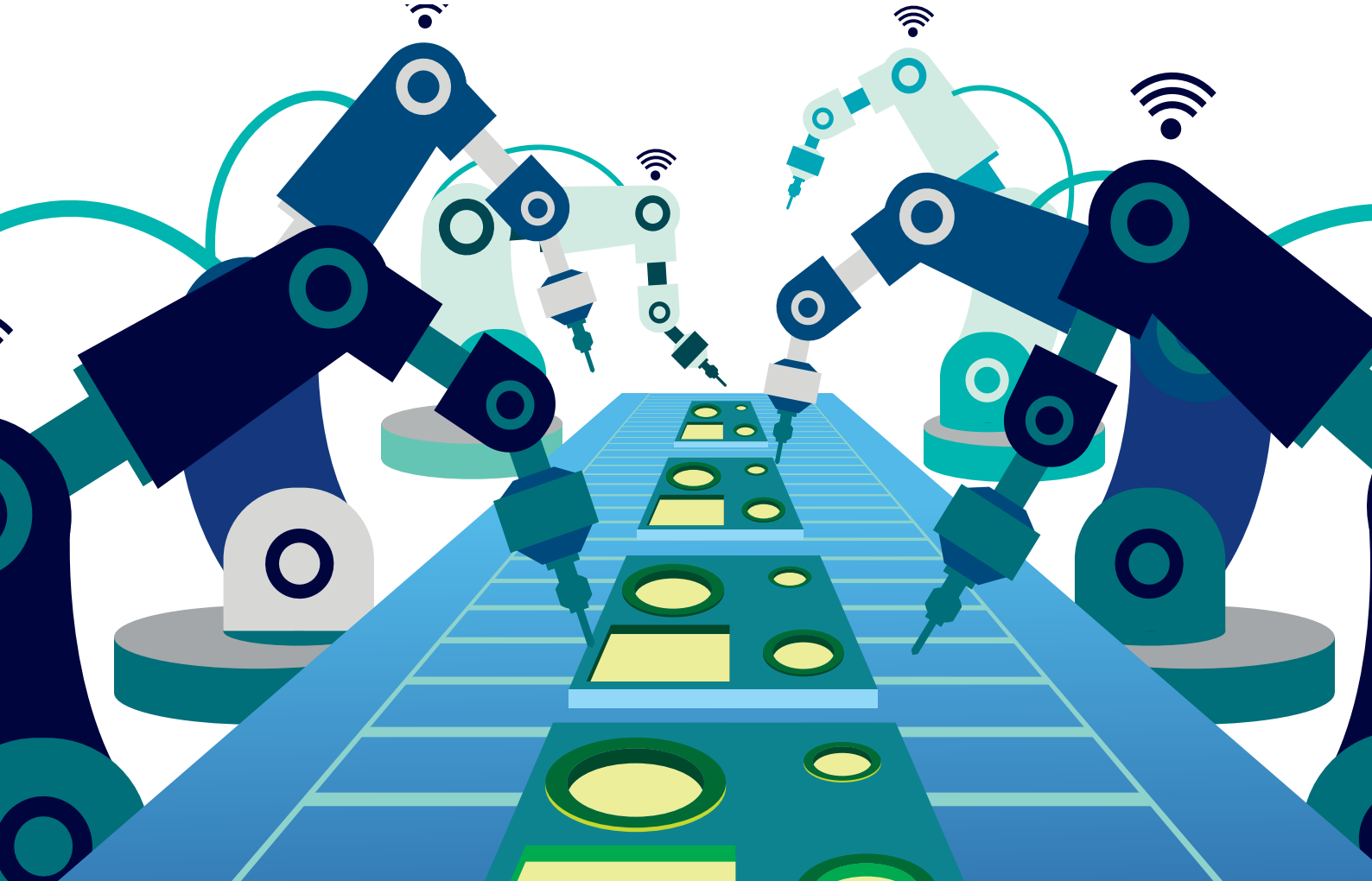
The industry 4.0 wave continues to gather strength in India and across the globe:

- Digital technologies are likely to constitute about 40 percent of the manufacturing tech spend by 2025 in India. Of which, 50 percent of the digital technology spend will be on industry 4.0.[7]
- Further, 50 percent of the spend on industry 4.0 in India would be on foundational technology, such as cloud and IoT.[7]
- Most manufacturing companies across the world are contemplating or implementing minimum one metaverse-related use case.[15]

Indian manufacturing firms are emulating the global trend of deploying industry 4.0 solutions, such as connected operations, additive manufacturing, predictive maintenance, and AR/VR.

- However, about 34 percent companies are still in Proof of Concept (PoC) stages in terms of implementing technologies such as AI/ Machine Learning (ML).[7]
- Thirty percent Indian manufacturing companies follow a reactive approach when it comes to analysing data. This is because the data is captured only for a few occasions involving decision-making.[7]
- In addition, 86 percent Indian manufacturers have different data management systems with isolated MES, PLM, SCM and ERP systems .[7]
- Overall, digital transformation projects across industries have resulted in more than 25 percent reduction in time taken from PoC to adoption to RoI.[7]

This paper identifies common challenges facing Indian manufacturing companies and key interventions needed to overcome them.



Hurdles to heroes: Learning from implementations - Challenges and Solutions

More successful use cases are coming up as Industry 4.0 is becoming mainstream. IoT projects have a 14 percent higher success rate today than five years ago.[2] Successful Industry 4.0 projects often share common characteristics, such as strong executive leadership support, a clear strategic vision, effective change management, and a dedicated cross-functional team. In addition, common challenges, such as lack of funding, complex projects, and data management, have reduced by about 50 percent.[2]

However, not each Industry 4.0 initiative yields positive results. Challenges are often associated with a lack of alignment between technology adoption and an organisation's goals, inadequate change management strategies, and failure to consider specific contextual factors. Failed initiatives can result in wasted resources, demotivation amongst employees, and a setback to the organisation's competitiveness.

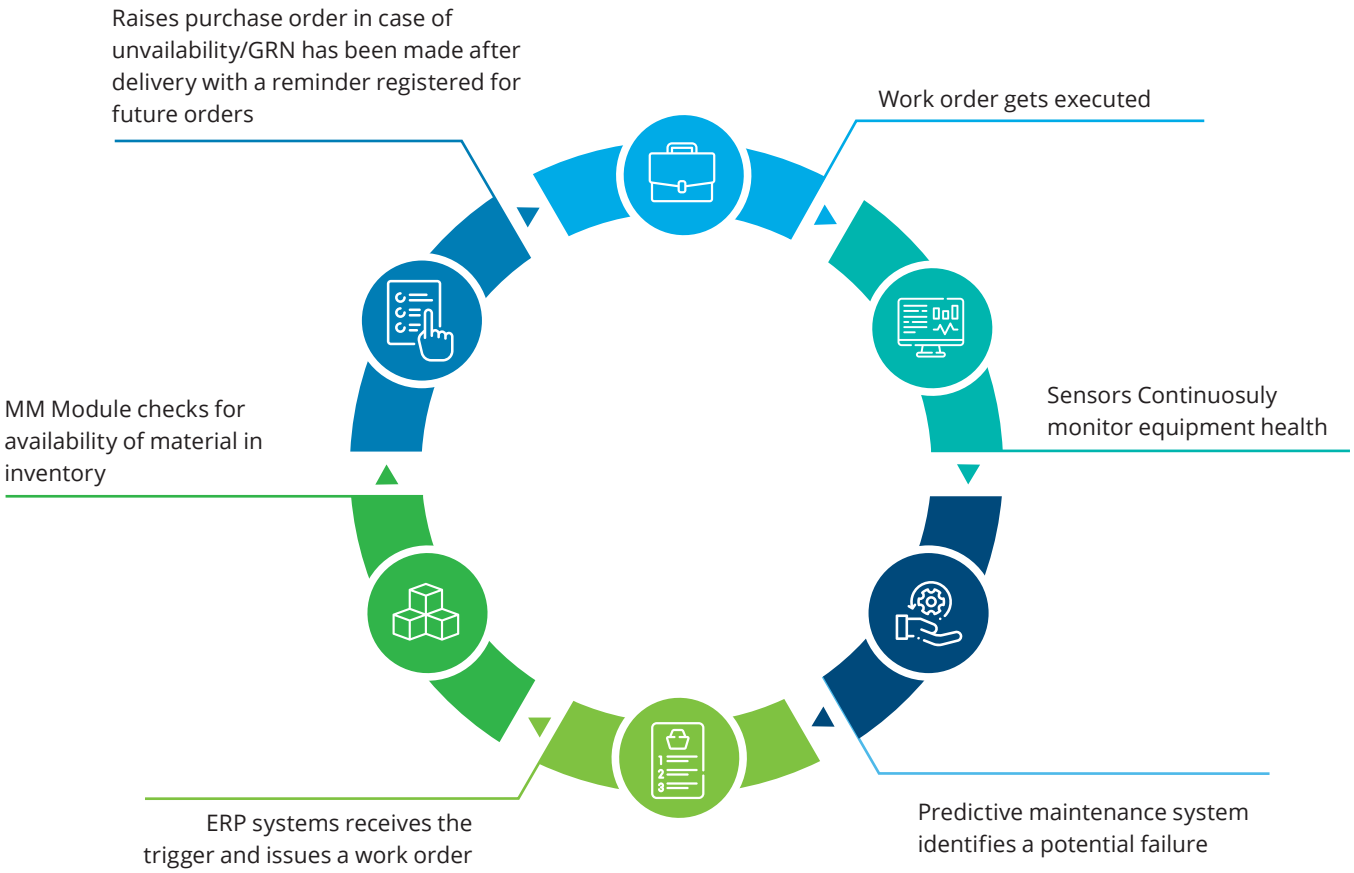
Need for reference architecture

One of the common problems that manufacturing companies face is siloed systems, resulting in failed industry 4.0 implementation. This happens as data and insights from systems cannot be used beyond a certain point due to a lack of integration as they cannot connect to other systems, workflows, or other transactional systems. Therefore, organisations are unable to leverage the full potential of Industry 4.0.

Rather than blind replication of solutions from similar initiatives across industries, companies should come up with reference architecture that will detail the L0 to L5 stack. This would ensure that data flows seamlessly, applications get integrated with each other etc. When an organisation implements an industry 4.0 solution, the reference architecture acts as the guiding framework, thus ensuring that every time a step is taken, it is in line with this reference architecture.

Integrated approach

Integrating systems such as ERP, material management, and analytics tools, helps minimise the time taken to carry out maintenance activities. The below flow chart shows how an order is completed with minimal interventions (just carrying out actual maintenance) from workers.



Leadership acceptance

The primary challenge that many organisations face is securing full support and acceptance from senior leadership for transformative initiatives, such as Industry 4.0. Without active buy-in from top executives, obtaining the necessary resources and organisational commitment becomes a formidable obstacle.

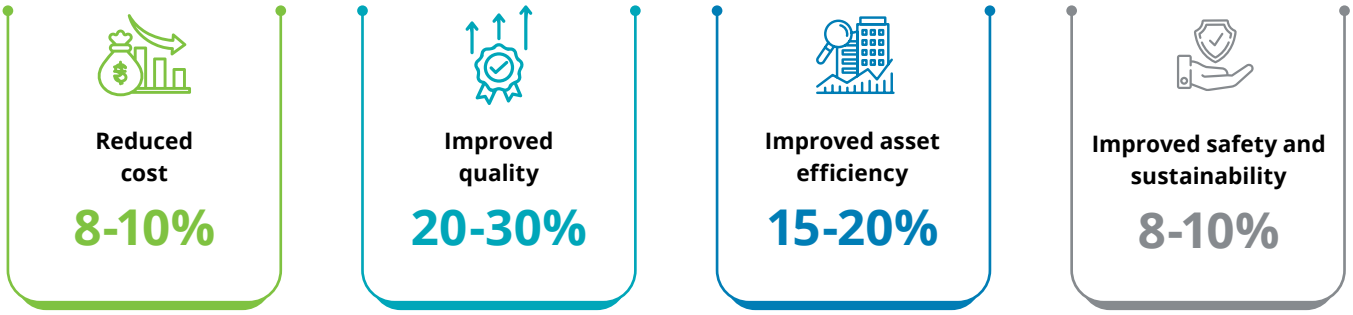
Organisations should implement a multifaceted strategy that includes conducting leadership workshops and educational sessions to showcase the potential benefits of Industry 4.0. Furthermore, showcasing successful pilot projects and demonstrating their tangible impact on the organisation's bottom line can be a persuasive means of convincing leadership of the initiative's value. In India, a leading automotive company, under the leadership of its CEO, embarked on a comprehensive Industry 4.0 transformation. It initiated a company-wide narrative for change management, emphasising the need for digitalisation and automation. This commitment from the top-down catalysed the adoption of Industry 4.0 technologies throughout the organisation.

Build vs buy dilemma

Manufacturing companies often find it difficult to decide whether to deploy off-the-shelf industry 4.0 solution or build a customised one. Their objective is to weigh the benefits of customised solutions with expertise, time taken and expenses needed for building from scratch and gains from existing solution with vendors. Conducting a cost-benefit analysis that considers the advantages of off-the-shelf solutions (such as vendor expertise and shorter deployment times) will lead to a more informed decision-making process.

Conquering challenges, celebrating wins: Success stories from industries

In today's dynamic manufacturing landscape, digital transformation is imperative for Indian manufacturers to thrive. Through digital transformation initiatives, Indian manufacturing companies have been able to significantly improve metrics in various KPIs



Let us explore a case study based on industry 4.0.

Low-voltage switchgear manufacturer – brownfield transformation using industry 4.0

Background

A Mumbai-based low-voltage switchgear[14] manufacturer wanted to transform its plant from three-production lines manufacturing 77 variants of switches to a single production line manufacturing more than 200 variants. The challenge was to ensure a balance between productivity improvement and capital infusion. The manufacturer decided to implement an automation and digitalisation-based transformation plan.

Goals

The manufacturer started with the following steps:

- Merging three conventional lines into a single production line that is capable of managing more variants and higher production over the combined capacity of original three lines
- Ensuring flexibility in production to allow production of batch sizes that consisted of single switch
- Minimising cycle time
- Decreasing the time-to market to 18-20 months from the initial 36 months
- Meeting higher compliance needs for next-generation products – 68 checks compared with 22 for older generation

Methodology

Three technologies – digital twin, a proprietary cloud and IOT system, and video analytics – were used at the core of the transformation.

Digital twin was used to simulate the production process. It virtually replicated design, production, and the end-product. This helped the manufacturer optimise process-based iterations and remove expenditure to produce real-size prototypes, thereby conserving capital while building traceability at subcomponent levels.

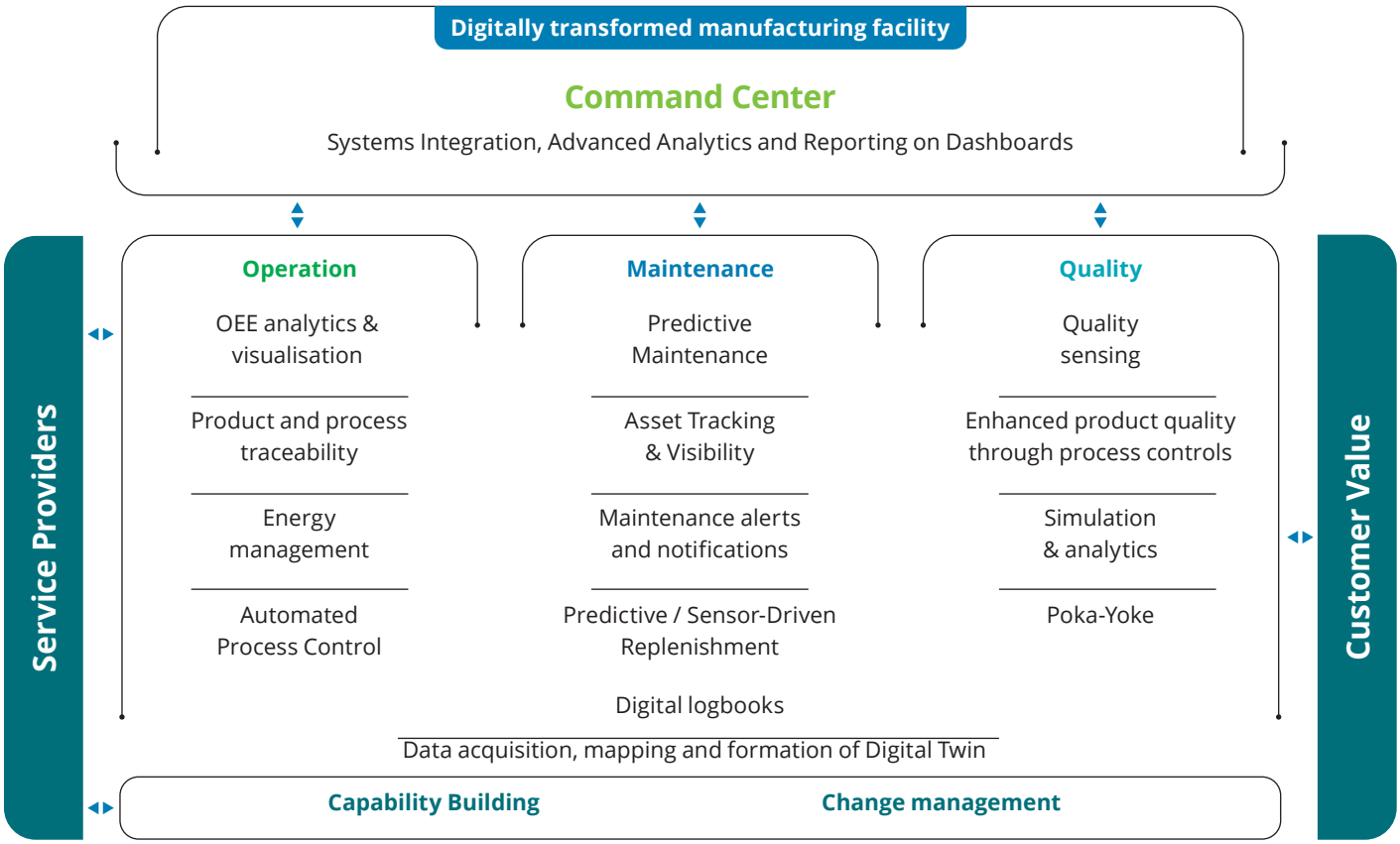
Physical assets were connected to the digital ecosystem through a proprietary cloud and IOT system. This helped use data analytics and foster process innovation. The platform helped manufacturers to digitally thread business-side systems, such as ERP with manufacturing execution systems, thus providing greater visibility across the value chain.

Video analytics was used to capture process parameters pertaining to design, make machines smart, and reduce cycle time from 12 to 9 seconds by generating data sets that digital twin had reprocessed.

Results

- The facility could manufacture more than 200 variants in one manufacturing line compared with 77 variants in 3 lines. The entire transition process took only 18 months.
- Overall Equipment Effectiveness (OEE) levels increased it comparable to the manufacturer's plant in Germany.
- Cycle time reduced by more than 50 percent from original 21 seconds to 9 seconds

Figure: A framework for digital transformation for manufacturing companies (Deloitte Analysis)



Key Features

- End to End visibility
- Secure Ecosystem
- Highly Scalable
- Best of breed solutions
- Advanced Analytics
- Seamless integration of large datasets
- Real Time workflow engine
- Mobile & desktop access
- Structured data management
- Integrated Dashboards & Real time reporting
- Live alerts and notifications
- Ease of Integration

We have listed below a few success stories describing how companies overcame their specific challenges and derived benefits through industry 4.0 interventions.

Mining solutions provider: Predictive maintenance to reduce downtime[4]

Need for change

Mining companies often face a common problem − maintaining equipment. Mining operations would stop or slow significantly if machinery does not function normally.

Approach

A mining company used the available data to predict when an equipment is most likely to fail, thereby customising scheduled maintenance.

Impact

By analysing data and acting on insights, the mining company reduced the downtime by about 30 percent and cost-per-tonne ore production up to **50 percent.**

A global specialist in design, production, and decoration of glass packaging: Connected operations to improve production efficiency

Need for change

A glass manufacturing company wanted real-time visibility into production to understand losses and line efficiencies.

Approach

The manufacturer installed and acquired data from sensors on production lines to measure losses at each stage and determine line efficiencies in real time.

Impact

The company could **improve productivity by 25 percent, reduce critical bottle defects by 5 percent, and manual data gathering by 40 percent.**

Auto ancillary: Reducing error rate with collaborative robots

Need for change

A two-wheeler maker's assembly lines were spatially challenged and required labour-intensive work. The lines had movements that were physically taxing and required a high amount of precision. The company wanted to minimise ergonomic risks to labourers as tasks were repetitive, required employees to have a static posture for prolonged periods, and identify solutions for standardised automation that could be deployed horizontally to enhance reliability and flexibility.

Approach

By partnering with a robotics company after extensive testing for 3 months, the manufacturer implemented technology solution that led to a **drop in redundancy-led errors and fatigue.**

Impact

The manufacturer went on to patent 30 force limiting features and easing work for women by building floor mount, ceiling mount, or wall mount co-bots.

Plastic food-packaging manufacturer – Improving quality control with ML

Context

A manufacturer of plastic food-packaging products was facing quality control issues. Even though it had installed instrument sensors in the latest production line, the manufacturer did not have the expertise to use machine sensor data and determine the root cause behind quality-related issues.

Approach

By analysing historical data with ML algorithms to identify process variables and build a user-friendly visualisation platform, it could identify issues without the need for programming or database queries.

Impact

The client could now troubleshoot conditions based on clear understanding of root causes of quality issues, thereby minimising downtime and reducing yield. This resulted in **annualised savings of US$ 2.8 million.**

Automobile manufacturer – Generative design[9]

Context

A leading automotive manufacturer wanted to consolidate eight different components of a small part (seat bracket) where seat belts are fastened, using additive manufacturing and generative design.

Approach

A design software programme produced more than 150 alternative designs using generative design using a new functionally optimised seat bracket design. The software used an algorithm to analyse existing data and evaluate potential design permutations. Based on its calculations, the software recommended an optimised solution.

Impact

The optimised design was 40 percent lighter and 20 percent stronger than the previous seat bracket. The automotive manufacturer also mentioned that consolidating parts using generative design would help reduce supply chain costs associated with having multiple parts supplied by different vendors.

Mobile manufacturer: Self-predicting and self-optimising factories[7]

Context

A leading mobile manufacturer faced a big external supply chain shock, leading to challenges in maintaining profitability and pressure to cut costs and improve efficiency in the supply chain.

Approach

The manufacturer implemented two solutions to improve production. The first was material movement using autonomous guided vehicles fitted with High Accuracy Indoor Positioning System (HAIP) running on sensors, IOT gateways, private LTE, etc. The second was implementing inventory control using a "pick to light system" in which an operator enters data into the asset management system to retrieve a particular part and the light at the specific rack goes on for easy access. The manufacturer also implemented a digital twin of the factory for fully remote-controlled operations and automated quality testing process.

Impact

The solutions resulted in a **31 percent reduction in labour time** through RPA and **16 percent improvement in OEE.**

Space exploration: Reducing material wastage via 3D printing[6]

Context

A leading public-sector company in India wanted to reduce material wastage for a component (grid fin – a type of flight control surface) for an upcoming space mission. The traditional manufacturing method involved starting with a titanium plate of 2,500 kg and finishing it with a part of 150-200 kg, thus resulting in more than 2000 kg of scrap.

Approach

A private manufacturing company in 2023 devised a prototype of a 3D-printed grid fin and delivered it to the public sector company

Impact

Through 3D printing, the private company printed grid fins with only 600 kg, thereby saving 75 percent of the material.

Future forward: 5G, GenAI, and Industry 4.0 powerplay

The ever-evolving technological landscape continues to reshape the manufacturing industry. Some technologies, such as industrial robots, IoT, and 3D printing, have already stabilised, while others such as digital twin, AR/VR in manufacturing, wearables, and sensors are yet to be fully adopted. A few remain on the horizon as futuristic possibilities. Some futuristic technologies are discussed below.

5G Connectivity[1]

Given the significant improvement in network characteristics, 5G shall act as a catalyst for digital transformation for enterprises. The new architecture (low latency, high speed, etc.) would make it suitable for time-sensitive applications, such as autonomous vehicles, first responder devices, and smart wearables. Further, the built-in redundancy would enable the network to continuously operate even during emergencies. Private 5G networks would drive innovations in many industrial and enterprise applications and increase reliability, connectivity, scalability, and security compared with previous communication technologies.

In manufacturing, 5G can be used in scenarios such as:

Autonomous vehicles: 5G can enable real-time communication amongst autonomous vehicles, enhancing safety and coordination within smart factories.

First responder devices: Manufacturing facilities can benefit from instant communication during emergencies, ensuring the safety of workers and assets.

Smart wearables: Wearable devices can transmit data seamlessly, promoting workers' safety and enhancing productivity.

Example: Car manufacturers can employ private 5G networks in its factories to power autonomous transport robots, leading to increased efficiency and safety.

Why it is better: 5G's speed and reliability outshine previous communication technologies. It offers continuous connectivity even in demanding industrial environments. It facilitates real-time data exchange that is critical for Industry 4.0 applications.

Generative AI

In the past, manufacturing companies took a conservative approach to adopt new technologies due to high investment and risks involved. This led to slower early adoption of generative AI. However, companies particularly in construction, mining, and energy production, have proprietary and exclusive data that can be used to calibrate GenAI models and thus, hold an advantage. Companies should also consider legal implications related to copyright infringement and IP ownership of GenAI generated content prior to implementation. Some use cases include the following:

Increasing worker safety[10]

Issue: Conventional Occupational Health and Safety (OHS) training often focuses on specific situations and does not offer hands-on chances to apply newly acquired skills and information. Although workers must be ready for emergencies, simulating these situations in a real-world environment is impractical and risky due to cost and safety concerns.

Solution: Companies can create tailored and immersive OHS training resources using gen AI and provide trainees safe exposure to authentic scenarios, helping them minimise the occurrence of or improve their responses to real-life OHS incidents.

Examples

- Virtual reality training can replicate operational environment, help employees traverse dangerous situations, identify risks, improve awareness and thereby, respond in a safer manner.
- Gen AI can help provide customised training materials for select work roles, environments, or regulatory needs.

Guidelines: Trainers must thoroughly review training content for inaccuracies, obsolete information, and potential issues. Furthermore, the content should be designed to be inclusive and accessible to different types of learners including those with disabilities. Companies can also take steps such as adding closed captions and modifying training scenarios in sync with various skill levels.

Providing field assistance to workers[10]

Issue: Shop floor workers often work in challenging or remote environments and usually face challenges due to lack of information. These challenges include determining paucity of manuals and identifying root cause of a problem. This necessitates shop floor workers to reach out to seek additional guidance and arrive back at the site after a period of time.

Solution: A generative AI-enabled field assistant can help engineers provide on-demand access to technical knowledge while supporting them in solving problems, enhancing efficiency, and enabling them to make better decisions.

Examples

Providing easily available technical information

- A generative-AI enabled virtual field assistant can give quick access to a large amount of engineering knowledge and thus serve as a ready reference. Further, the field assistant can help workers by answering to questions on fundamental concepts, principles, or calculations.

Providing support on diagnostics and troubleshooting

- On encountering a challenge or an issue in field, workers can explain the problem to a virtual field assistant. In turn, the assistant can reply with necessary questions to help workers identify the root cause of the problem or provide steps to seek resolution.

Guidelines: Companies must ensure that the training data is robust and reliable. Outdated or inaccurate data would lead to incorrect output, resulting in downtime, and compromising the safety of workers and equipment. Further companies should ensure that skilled workers cross-verify information, especially something that is related to safety, to rule out the possibility of misinterpretation or misinformation. Companies should train workers to apply their own skills and judgement to avoid overdependency on the virtual assistant as complex situations might require creative problem solving or critical thinking. Finally, to avoid complex liability issues in case of incorrect advice leading to accidents or failure in operations, clear guidelines and procedures to address the situations are needed.

Why it is better: Adapting generative AI would help avoid cost, increase operational efficiencies, and improve worker safety.

Model-based enterprise and digital thread

The Model-Based Enterprise (MBE) and digital thread are emerging technologies that can serve as the backbone for manufacturing innovation. MBE lays emphasis on using digital 3D models throughout the product lifecycle – from design and engineering to production and maintenance.

End-to-end visibility: MBE and digital thread provide manufacturers end-to-end visibility and traceability of product data and processes.

Streamlined collaboration: These technologies facilitate collaboration across departments and stakeholders by ensuring everyone works with the same updated digital models and data.

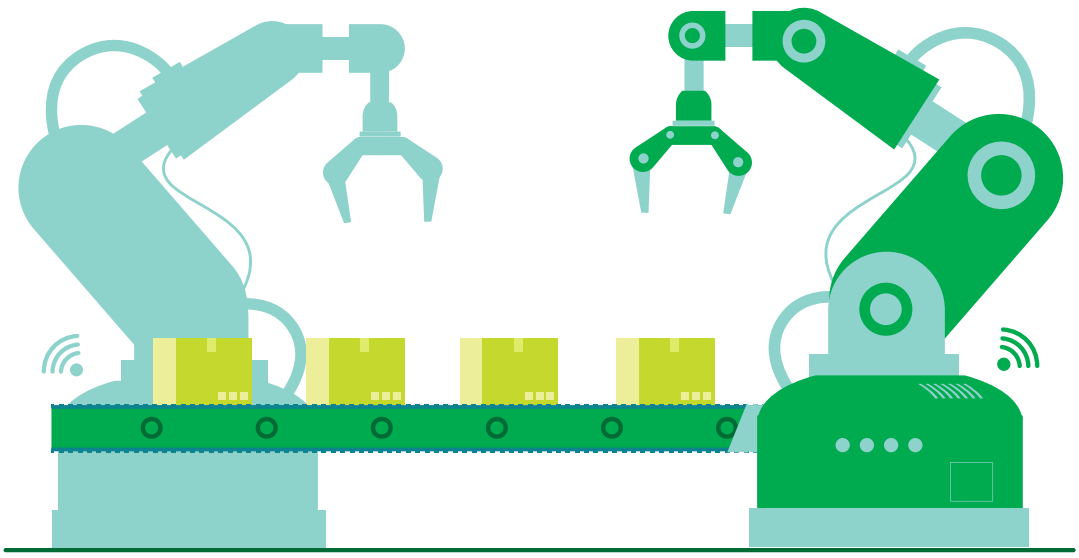
Quality and efficiency: Manufacturers can identify issues early in the design phase, reducing errors and optimising production processes.

Example: A global aircraft manufacturer uses digital thread to streamline aircraft production, reducing costs and improving quality by ensuring that teams have access to the latest design and manufacturing information.

Why it is better: MBE and digital thread technologies enhance collaboration, reduce errors, and improve efficiency by enabling seamless data flow across the entire product lifecycle.

The synergy of 5G, Gen AI, MBE, and digital thread: Transforming manufacturing

The convergence of 5G, generative AI, model-based enterprise, and digital thread heralds a new era for manufacturing. AI-driven insights, agile production systems, and real-time data processing will transform industries, enhance adaptability, efficiency, and agility to new levels.




INDUSTRY
4.0
092.2
584.0
04502.48
5030.24
8540.09
4822.14
8699.50
36.5
20.8
82.7

Conclusion

The journey of Indian manufacturing companies towards Industry 4.0 has been a testament to their resilience and capacity for growth. Certain technologies such as predictive analytics and 3D printing have already attained a level of stability. Organisations should continue to invest in latest technologies, such as GenAI, 5G, and digital threads, to remain competitive.

What is the future going to look like?

We believe that industry 4.0 would transform key manufacturing functions in the following manner:

- **Product development:** Generative AI can be integrated with CAD software and 3D printing systems to assist in new product development. This would facilitate collective brainstorming and out-of-the-box thinking while optimising functionality and minimising material wastage.
- **Operations:** Manufacturing operations will derive immense benefits from the confluence of AI and metaverse. Digital twin will conduct simulations that are harder to carry out in real-factory settings and provide output for production. AR and voice-based training would guide employees on operating machines, whereas production or warehouse robots will help in material movement.
- **Maintenance:** Real-time sensor data from manufacturing equipment shall be analysed by generative AI to identify possible failures and schedule maintenance plan.
- **Quality and compliance:** Generative AI shall analyse huge volumes of production data to detect anomalies, predict possible defects, and provide better inputs for quality issues, thus allowing manufacturers to improve product quality.
- **IT and cyber security:** Cyber reliance strategy will be a prominent trend that would need automation of cyber defence using AI, ML, and integrated frameworks that combine security measures with awareness of social factors and continuity protocols (as cyber threats will become more sophisticated).

What should companies do?

- **Demonstrate "never give up" attitude**

  Leaders should craft an inspiring narrative for change management, allocating resources strategically across the enterprise to motivate employees. They should encourage experimentation and not give up if earlier pilots were unsuccessful. Technologies that are mainstream today did not have 100 percent success rate at the beginning. A unified vision, shared by the leadership, forms the bedrock of this transformation.
- **Have a reference architecture in place**

  Companies should adopt a proof-of-concept-driven, cross-functional approach guided by a reference architecture towards creating an integrated solution.
- **Upgrade existing systems and use technological advancements**

  Companies should be constantly looking out to explore how new technologies, such as 5G, can be used to improve existing systems and prepare themselves for futuristic technologies, such as 6G. For example, although virtual assistants were in place since many years, their capabilities can be significantly upgraded using generative AI to provide real-time responses.

The future of Indian manufacturing is imbued with promise and technological prowess. By adopting a visionary perspective and embracing these innovative technologies, Indian companies can spearhead the global Industry 4.0 ecosystem.

References

1. 5G - The Future of Manufacturing (deloitte.com)
2. https://iot-analytics.com/iot-solution-development/
3. https://www.nasa.gov/feature/goddard/2023/nasa-turns-to-ai-to-design-mission-hardware
4. https://www.ibm.com/blog/machine-learning-transforming-asset-management-underground/
5. https://www.universal-robots.com
6. https://www.moneycontrol.com/news/business/3d-printed-key-part-for-gaganyaan-mission-handed-over-to-isro-10068551.html
7. India industry 4.0 adoption: a case to mature manufacturing digitalization by 2025; NASSCOM, Feb 2022
8. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/deloitte-analytics/us-ai-institute-generative-artificial-intelligence.pdf
9. https://www.autodesk.com/customer-stories/general-motors-generative-design
10. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consulting/us-ai-institute-gen-ai-use-cases.pdf
11. https://www.forbes.com/sites/forbesbusinesscouncil/2022/10/06/metaverse-use-cases-and-best-practices-for-the-manufacturing-sector/?sh=b1c6fd210fdc
12. https://azure.microsoft.com/en-us/blog/7-ways-generative-ai-is-bringing-bionic-business-to-manufacturing/
13. https://www2.deloitte.com/us/en/insights/industry/manufacturing/industrial-metaverse-applications-smart-factory.html
14. https://www.gatewayhouse.in/wp-content/uploads/2021/03/Gateway-House-paper-Digital-Manufacturing-in-India.pdf
15. https://www2.deloitte.com/us/en/insights/industry/manufacturing/industrial-metaverse-applications-smart-factory.html

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, with around 9,000 members from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from 286 national and regional sectoral industry bodies.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, livelihoods, diversity management, skill development, empowerment of women, and sustainable development, to name a few.

As India strategizes for the next 25 years to India@100, Indian industry must scale the competitiveness ladder to drive growth. It must also internalize the tenets of sustainability and climate action and accelerate its globalisation journey for leadership in a changing world. The role played by Indian industry will be central to the country's progress and success as a nation. CII, with the Theme for 2023-24 as 'Towards a Competitive and Sustainable India@100: Growth, Inclusiveness, Globalisation, Building Trust' has prioritized 6 action themes that will catalyze the journey of the country towards the vision of India@100.

With 65 offices, including 10 Centres of Excellence, in India, and 8 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with 350 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

Confederation of Indian Industry
(Northern Region) - Sub-Regional Office
Plot No. 249-F, Sector-18, Udyog Vihar, Phase IV,
Gurugram - 122 015
T: +91-0124-4014073 | F: +91-0124-4014070
E: ciinr@cii.in | W: www.cii.in

Connect with us

Rajeev Singh
Partner and Consumer Industry Leader
Deloitte Asia Pacific
rpsingh@deloitte.com

Avinash Singh
Partner, Consulting
Deloitte India
asavinash@deloitte.com

Shridhar Kamath
Partner, Consulting
Deloitte India
shridharkamath@deloitte.com

Contributors

Ankit Poonia
Sunny Talwar
Venkatesh Baliga

Acknowledgements

Aditya Khaitan
Arti Sharma
Ashish Nene
Deepak Sidha, CII
Harsh Trivedi
Riyanka Varavadekar

Confederation of Indian Industry

Published by Confederation of Indian Industry (CII).

Deloitte.