MANUFACTURING EXCELLENCE IN INDIA – CURRENT & FUTURE

SURVEY REPORT - 2021



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About the FICCI-EFESO Survey

Method and Survey Population

FICCI – EFESO survey on **Manufacturing Excellence in India – Current & Future** was launched in the Q4 2020. The aim is to measure the pulse of our current Indian manufacturing practices while also anticipating the preparedness of the industry for the future. The survey is designed to cover three axes of Manufacturing Excellence viz. "**P**rocess – **H**uman Dynamics – **D**igiTech". Through a range of questions, we have tried to understand the maturity of the Manufacturing Excellence journey in their businesses, as well as exploring the barriers that companies face and the solutions they have adopted.

The survey received 150 responses across the sectors. The Responses were analysed with key themes and insights identified. Several one-to-one interviews with survey participants and subject matter experts were carried out to further deepen the survey and validate the meaning behind some responses. The consolidated findings have been summarised in this research report.

Manufacturing Excellence, in India, is still an emerging capability for most organisations. Few have mastered the topic today. The FICCI-EFESO team hopes that you find this survey report helpful and valuable in accelerating your own Manufacturing Excellence progression.

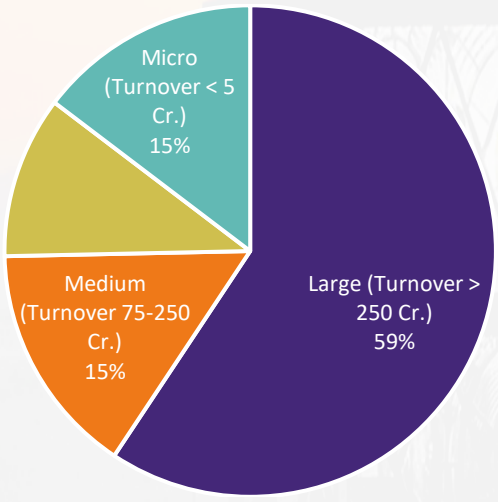


Figure 1: Split of participants by turnover

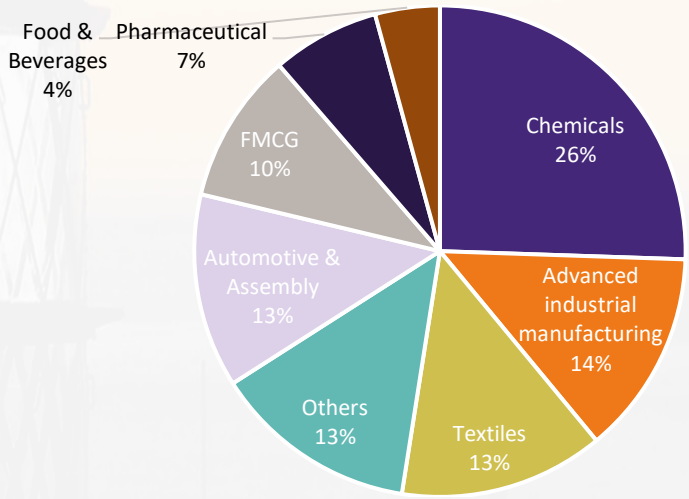


Figure 2: Split of participants by Industry sector

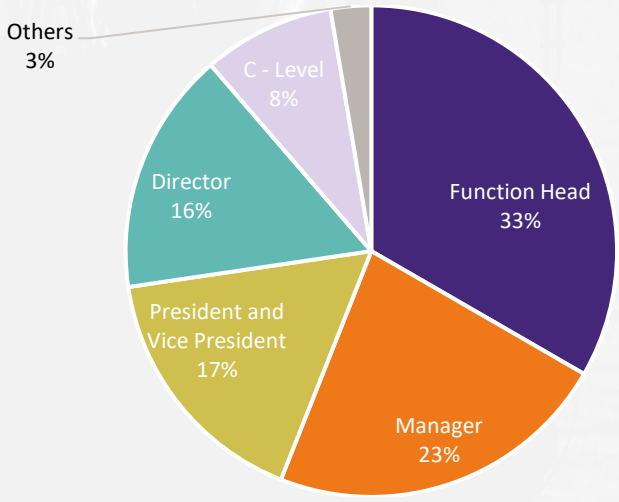


Figure 3: Split of participants by Role

Acronym Glossary

Acronym	Definition
AGV	Automated Guided Vehicle
AI	Artificial Intelligence
AR/VR	Augmented Reality / Virtual Reality
E2E	End-to-End
ERP	Enterprise Resource Planning
HD	Human Dynamics
IoT	Internet of Things
KAI	Key Activity Indicators
KPI	Key Performance Indicators
OEE	Overall Equipment Effectiveness
OEM	Original Equipment Manufacturer
OT	Operational Technologies
OTIF	On Time In Full
SCM	Supply Chain Management
TPM	Total Productive Maintenance
TQM	Total Quality Management
WCM	World Class Manufacturing
WCOM™	World Class Operations Management
WEF	World Economic Forum

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Executive Summary

Indian Manufacturing Excellence Scenario

- 1 out of 3 participants believe that "Top management is driving the Manufacturing Excellence initiatives at plant right now". Our analysis clearly highlights the positive impact of Internal teams and Top management on manufacturing excellence practices.

- 1 in 2 participants organizations are using structured methodology such as TPM, TQM, WCM, etc. to predict product, equipment, and process failures. Only 13% participants organizations are using IoT devices to predict failures in a pilot area or across the plant.

- 41% of participants organizations are following traditional Key Performance Indicators (KPIs) in use (P, Q, C, D, S, M) to ensure people work towards company objectives. Only 6% participants organizations understand Key Activity Indicators (KAI).

- More than 90% of participants are using 5S manufacturing practices in organizations whereas only 30% participants are using Anomaly Tagging – De-tagging, VSM and Poka-Yoke in their organizations.

- 1 out of 3 participants organizations have skill building plan made for a small group of employees. Only 10% participants organizations have done data analytics skill development in a few pilot areas.

- 1 in 3 participants organizations are using TPM/WCM approach to reduce unplanned breakdowns. Only 21% are focusing on total cost of Maintenance, using IoT (Sensors etc.) for condition monitoring, real time alerts and Artificial Intelligence to prevent breakdowns.

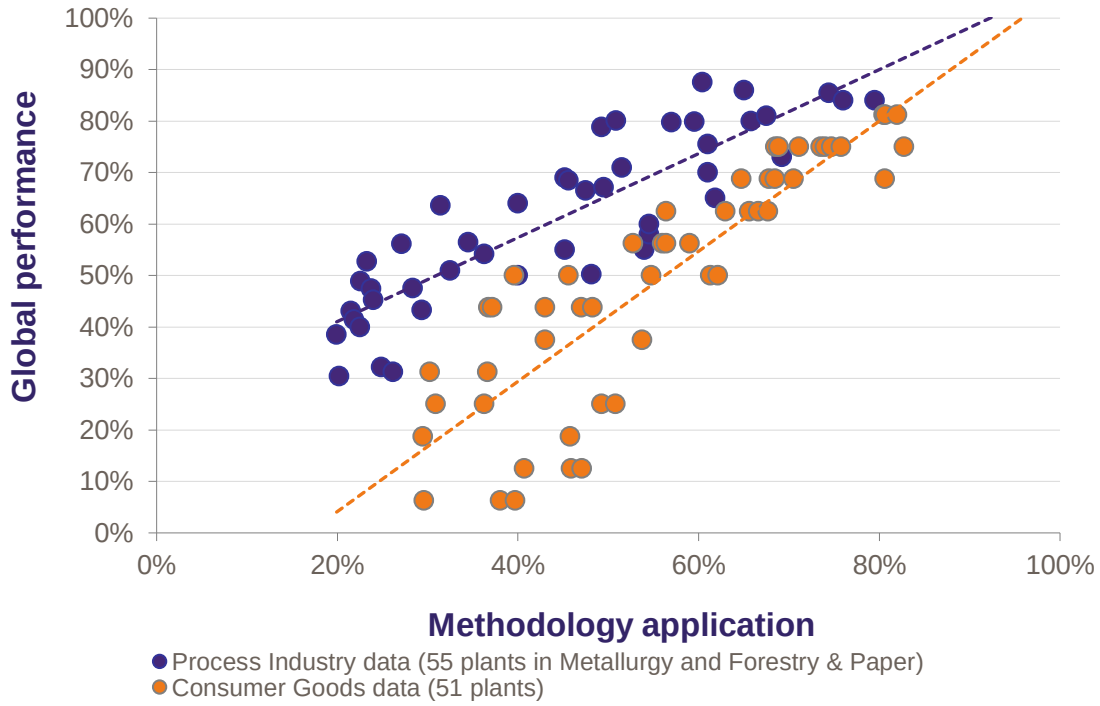
- 1 in 3 participants organizations are using "Sensors for reliably collecting data from diverse sources. Only 18% participants organizations have all assets monitored in real-time with negligible delay.

- 1 in 2 participants organizations are using advanced automation in some pain areas. Only 15% participants organizations have advanced automation across the plant and Artificial Intelligence and Machine Learning are integral part of running the plant.

Performance and Manufacturing Excellence

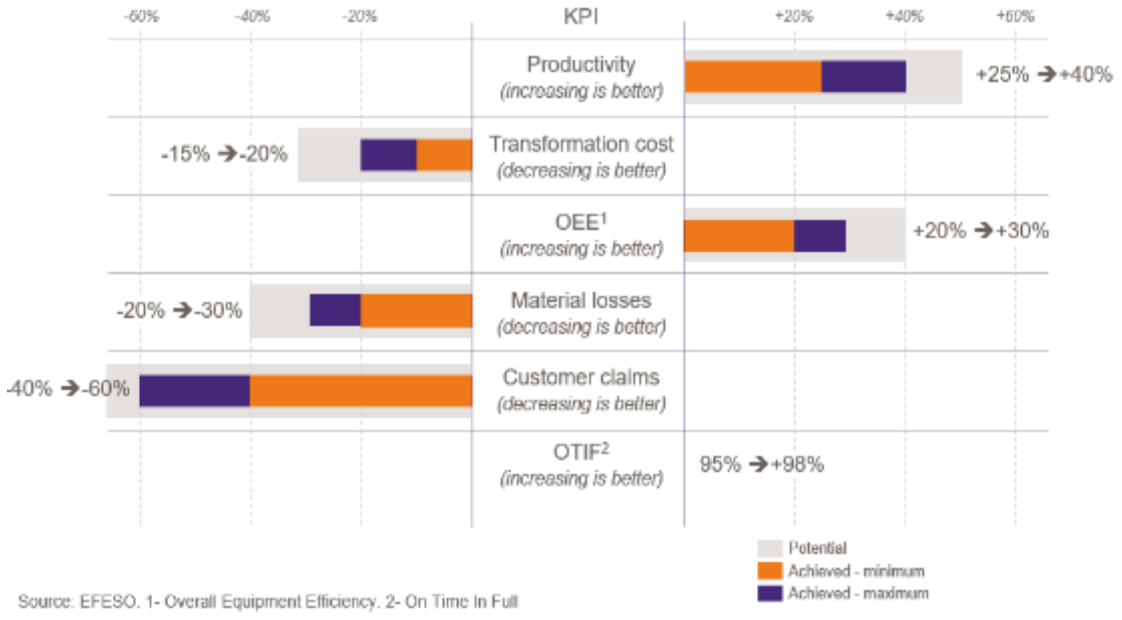
Companies with Manufacturing Excellence will dynamically adapt and respond faster to the "new normality". It is time for business leaders to embrace and actively lead Manufacturing Excellence and capitalise on the opportunities that excellence in end-to-end operations can bring.

There is an undeniable correlation between performance and manufacturing excellence application with tangible and sustainable results.



*This graph is not a representation of this survey findings

Typical results in plants implementing Manufacturing Excellence after 1.5 – 2.0 years



Source: EFESO. 1- Overall Equipment Efficiency. 2- On Time In Full

The 3-Axes of Manufacturing Excellence

Process – It is the most fundamental axis of any business organization. Organisations must cover all the dimensions of an end-to-end value chain: procurement, innovation, supply chain, manufacturing, marketing & sales to customer service. Regularly assess and measure the "health" of company's supply chain processes, its success in eradicating losses, managing performance, seamlessness of planning processes, etc. Some examples are product feature optimization, synchronized end-to-end planning, loss intelligence, performance management among others.

Human Dynamics – Ultimately, it is the people who will drive progression and can influence process indicators. Measure adoption and engagement along with the actual behaviour displayed by people from all levels in an organization, on HD Entities such as Leadership, Teamwork, Individual Behaviour and Organizational Culture. Get these insights and appropriately acting on them can significantly boost the rate of success and sustainability of any progression journey.

DigiTech – Digital & Technological transformation today is vital for the sustainability and future success of any organization. It is critical to look at data and data management as the bedrocks for achieving real-time visibility of a business and embarking on DigiTech transformation to align both process and people. Assess and measure the digital maturity level of organizations on four dimensions - IT and Digital Architecture, Applied Digital Business Solutions, Digitization of E2E Supply Chain Systems and Processes and Organization Design and HR Digital Maturity.

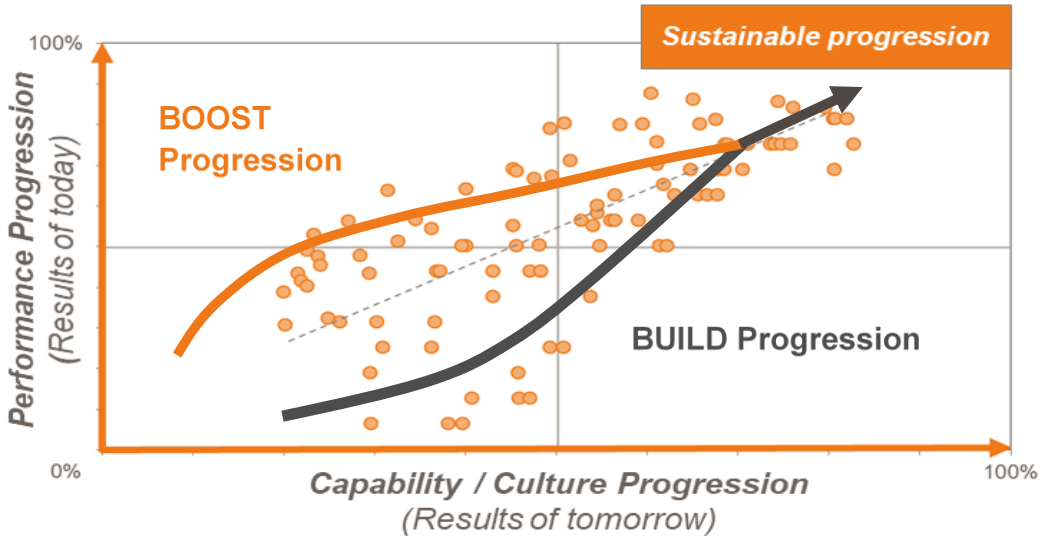


Introduction

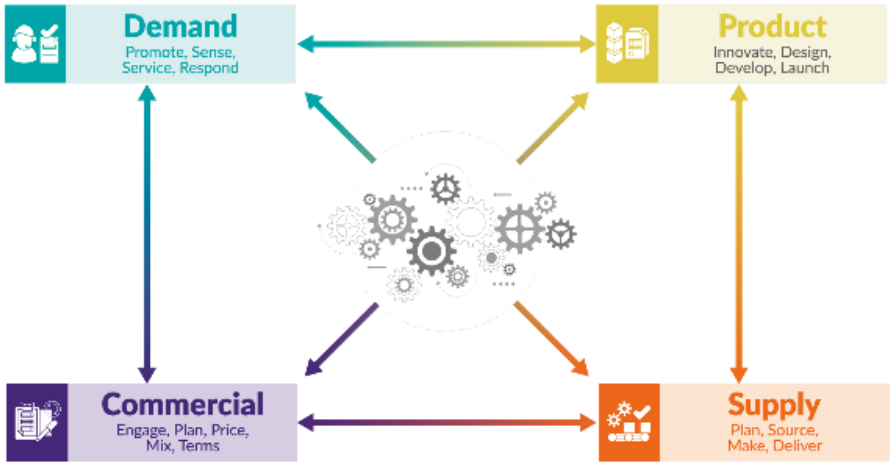
Be ready to change and adapt fast

Heading into the new decade, business leaders were already unsettled by trade uncertainty, political instability and more intensive competition resulting from disruptive technologies. Then, a new turn! The shocks of the pandemic began to reverberate, with far-reaching consequences for the way the world works and does business.

Businesses are being forced to challenge and rethink their manufacturing practices. Where manufacturing was once shaped to maximize efficiency and low cost, the needs for resilience, speed and agility are now front of mind.



Firms are seeing the urgency to be fleet-of-foot and dynamic in their decision making; the ways they plan, evaluate scenarios, and orchestrate/ deploy their resources. This calls for stronger coalitions, collaboration, and levels of connectivity not only internally, but also outside with Suppliers, Customers, and Eco-system generally, bringing greater transparency and visibility throughout the entire network.



Manufacturing Excellence Journey

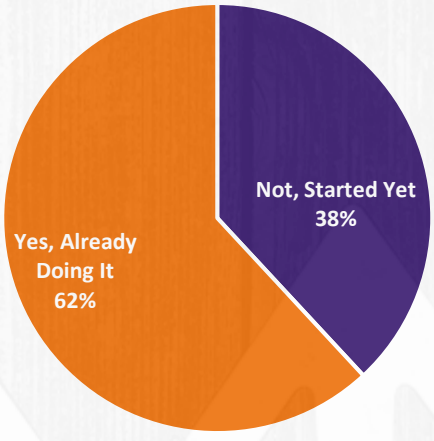
Structured Manufacturing Excellence Program

Ensuring sustainable progression starts right at the beginning, when an organization determines the results to be achieved within a given framework. A structured Man-Ex approach can make a quick impact on results and simultaneously ensure that the foundation is strong enough to sustain on any of the continuous improvement methodologies such as WCOM™, TPM, Lean, Six Sigma etc.

Structured Manufacturing Excellence program is a comprehensive approach of systematically eliminating losses to maximise efficiency and profitability in the end-to-end value chain. Results are achieved by the comprehensive implementation of methods and tools involving all employees through capability building and creating a culture of progression excellence. Typical results are in terms of cost reduction, improved reliability, increased throughput, high quality, or high delivery performance in supply chain with very reliable, efficient, and sustainable management system.



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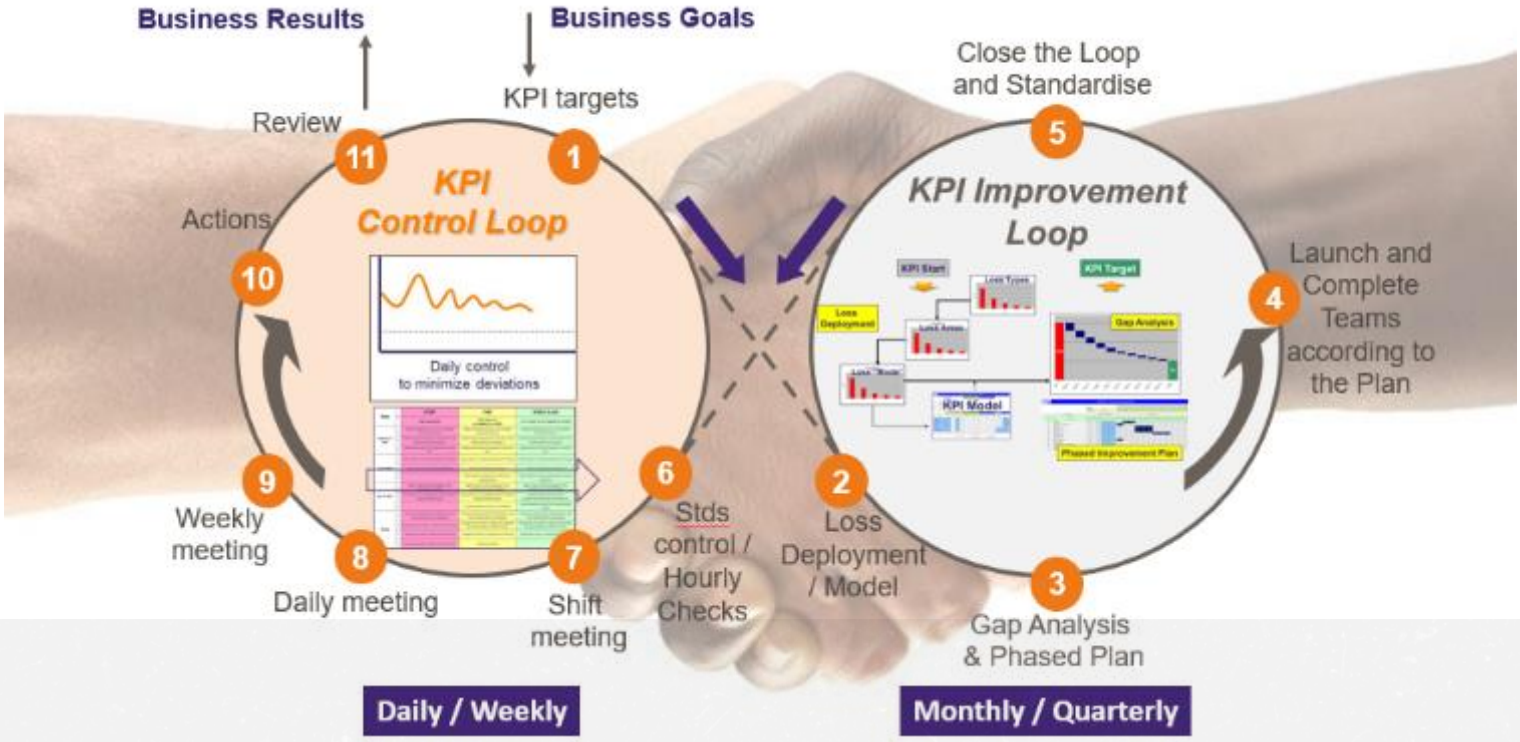
23% of Organisations will start "A structured Manufacturing Excellence program to make improvements and eliminate process losses / waste" in next 1-2 years.

Figure 4 : *A structured Manufacturing Excellence program to make improvements and eliminate process losses / waste.*

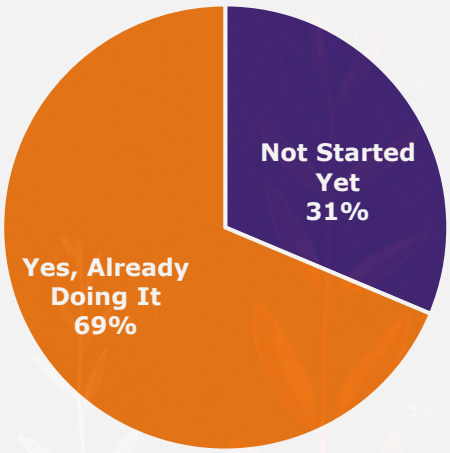
Boost Long Term Sustainability

Long-term sustainability means staying ahead of the curve. Consequently, understanding these unmet needs and crafting products and services to address them is critical to the success of an organization.

A large and growing number of manufacturers are realizing substantial financial and environmental benefits from sustainable business practices. Creation of manufactured products through economically-sound processes that minimize negative environmental impacts while conserving energy and natural resources boosts long term sustainability. It also enhances employee, community, and product safety.



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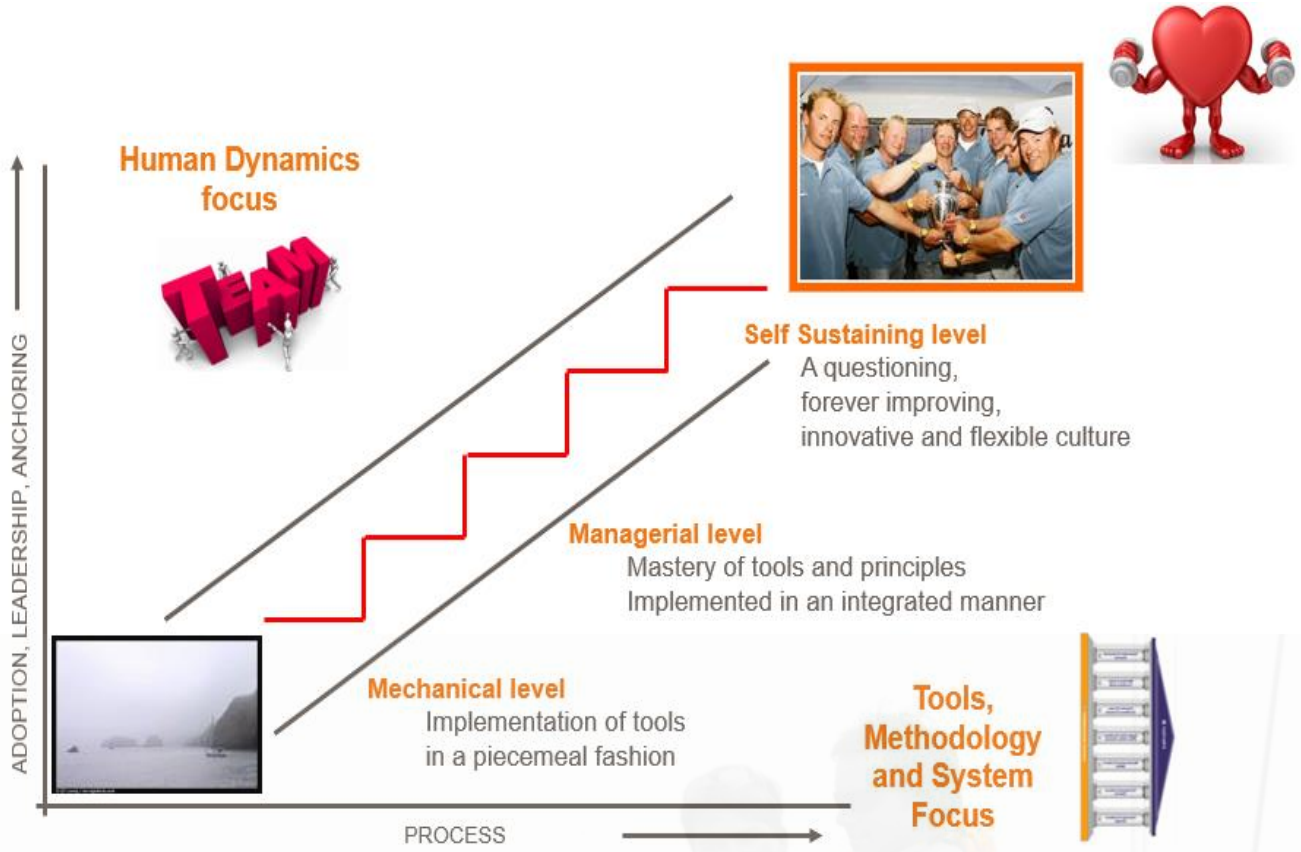
13% of Organisations will implement "Company wide use of sustainable and environment friendly methods to boost long term sustainability" in next 1-2 years.

Figure 5 : *Company wide use of sustainable and environment friendly methods to boost long term sustainability.*

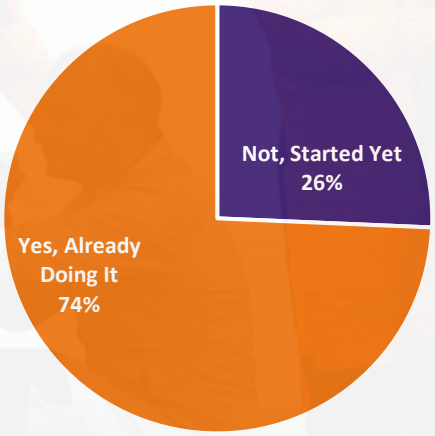
People Friendly Practices

Applying People Friendly Practices through Change Leadership / Change management to every day organizational variations is all about finding the most efficient and effective way to steer people's current mind-set and behaviour towards the desired mind-set and behaviour.

The role of leadership is to make sure that people really understand the reason for the change, the strategy that drives it and how they can contribute to the realisation of that strategy at every level. People want to do a better job, so leadership should concentrate on creating the space to excel.



Already Doing, Not Started Yet



17% of organisations will "Use of People Friendly Practices to motivate people in adopting new methods" in next 1-2 years.

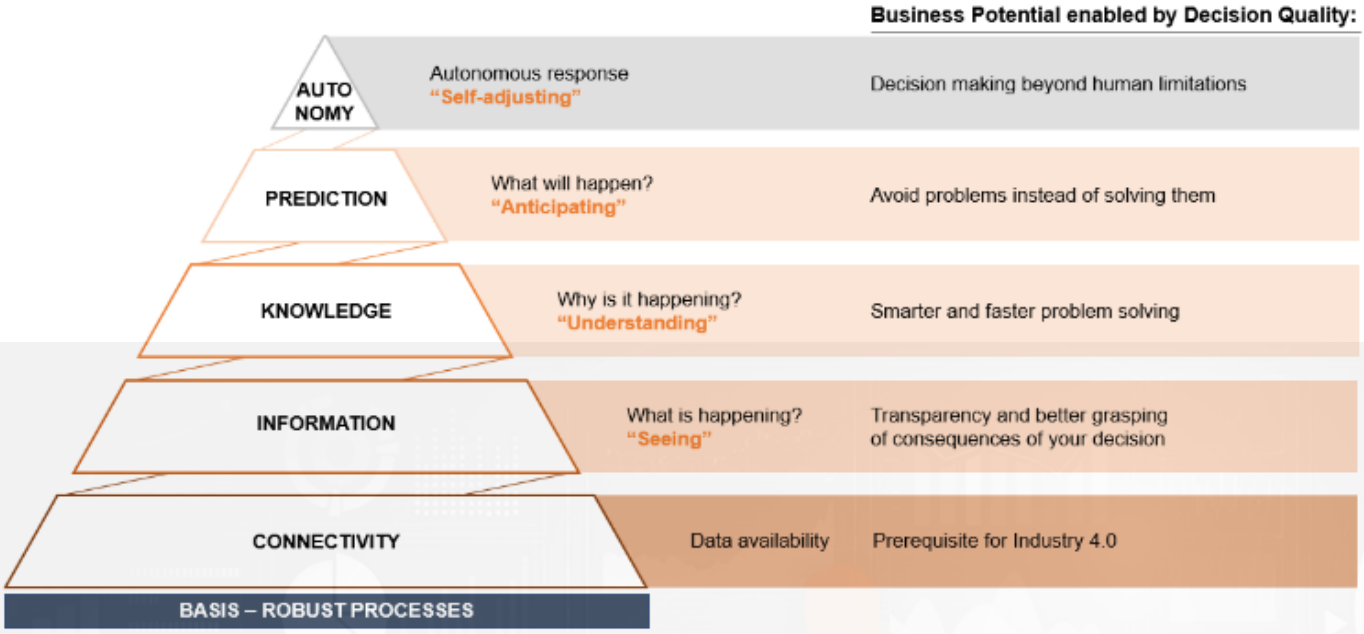
Figure 6 : *Use of People Friendly Practices to motivate people in adopting new methods.*

Data Analytics Skill Building

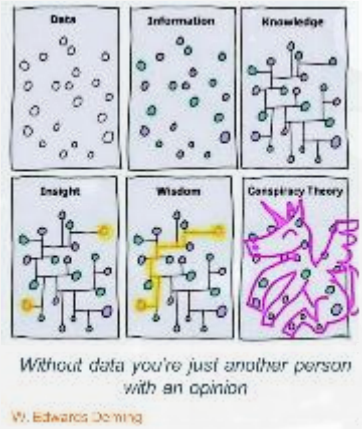
Operationally intensive companies have entered a new wave of automation and digitization. That will have a big impact on the skills they need to remain competitive.

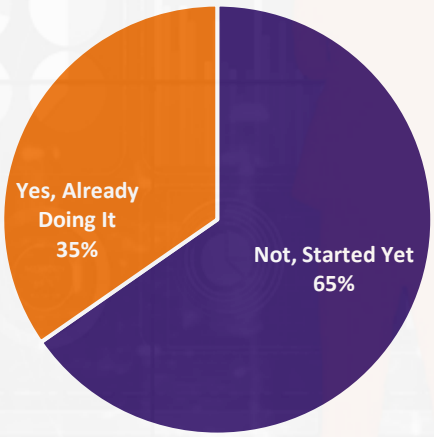
As Industry 4.0 gathers momentum, data analytics is a key skill for sustainable manufacturing excellence. According to a WEF (2017), rapidly emerging exponential technologies, such as robotics and additive manufacturing triggered by artificial intelligence and deep machine learning; including the Internet of Things (IoT), that is driving industrial automation, are all spurring the development of new production techniques. These are leading to enhanced productivity and business models facilitating greater interconnectivity, monitoring, and efficiencies of resources.

Companies can use several different approaches to address skill gaps. They can look outside the organization, hiring new staff with the right skills. They can build skills internally, retraining their existing workforces to prepare people for new roles. Or they can take a hybrid approach, including using a skilled contract workforce to fulfil short-term needs while developing the necessary skills internally.



Already Doing, Not Started Yet





35% of organisations will implement "Companywide skill building in data analytics & digital tools for using data to solve and prevent problems" in next 1-2 years.

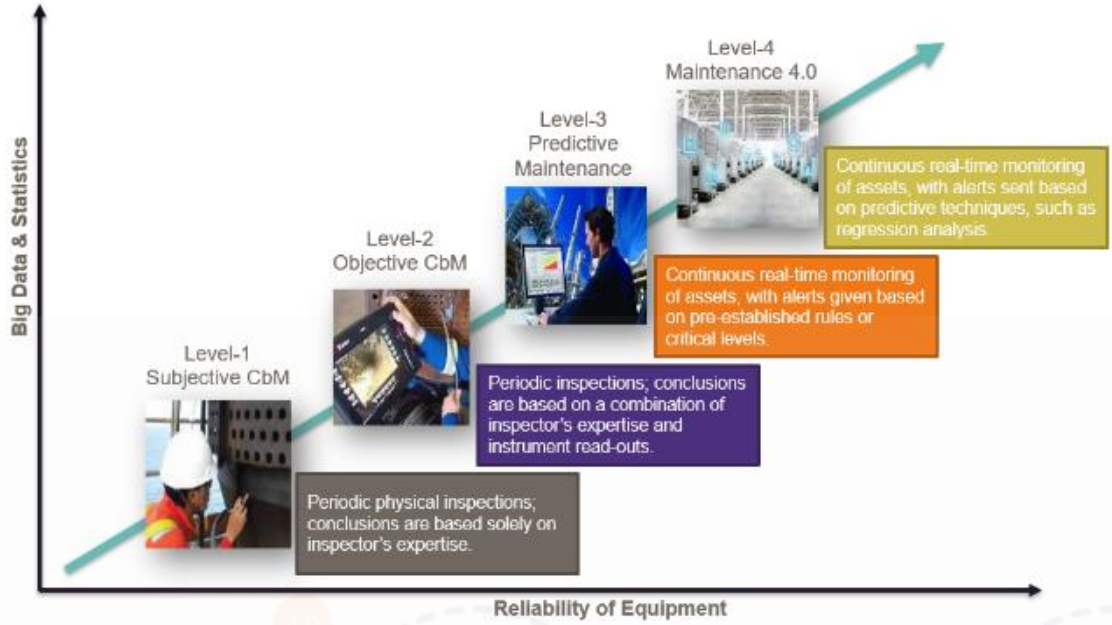
Figure 7 : *Companywide skill building in data analytics & digital tools for using data to solve and prevent problems.*

Predictive Maintenance

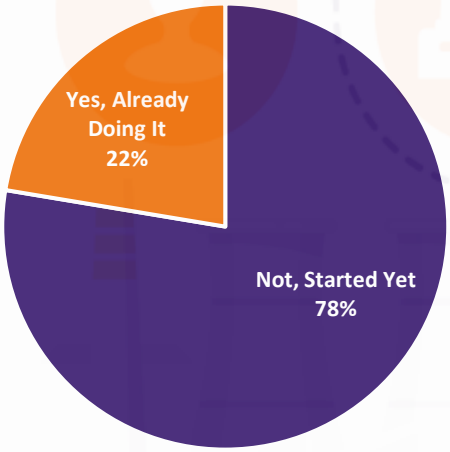
The better a manufacturing site's maintenance processes, the more productive its assets and making a big impact on cost.

Predictive maintenance is a hot topic among executives in manufacturing to warehouse to logistics. A cutting-edge maintenance strategy harnesses the power of IoT, data, and advanced analytics algorithms to monitor and gauge the condition of a company's assets on an ongoing basis, predict precisely when these assets will need maintenance, and recommend the optimal window of time in which to schedule and perform maintenance activities.

A growing number of companies are discovering that predictive maintenance-based planning and operations – which allows them to foresee asset failures and carry out maintenance only when it is utterly necessary (rather than conducting routine preventive maintenance according to a prescribed schedule or corrective maintenance after an asset breaks down) – can enable them to minimize asset downtime and maintenance costs.



Already Doing, Not Started Yet



36% of organisations will implement "Use of Industry 4.0 technologies for predicting failures in machines, products and processes" in next 1-2 years.

Figure 8 : *Use of Industry 4.0 technologies for predicting failures in machines, products, and processes.*

Advanced Technologies

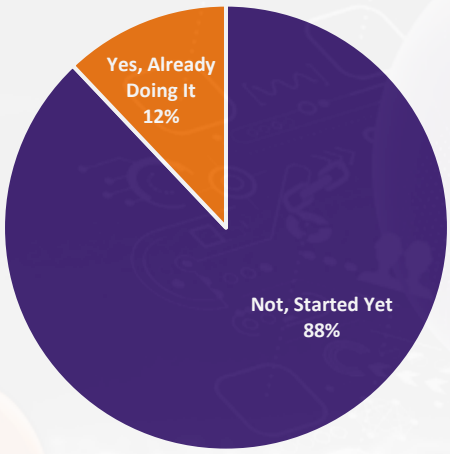
Several factories worldwide have successfully combined automation, artificial intelligence, and the Internet of Things to achieve game-changing productivity.

Cyber-physical systems form the basis of Industry 4.0. This way, products and means of production get networked and can 'communicate', enabling new ways of production, value creation, and real-time optimization. Cyber-physical systems create the capabilities needed for smart factories.

Technologies such as IoT, big data, IT, OT, several security technologies (industrial cybersecurity, visual monitoring of critical facilities, wearables to monitor worker safety in hazardous environments), artificial intelligence (AI), cloud, edge, fog and more you can add: additive manufacturing and 3D printing, digital twins, virtual and augmented reality (also in the context of digital twin simulation), advanced robotics and cobots, autonomous production, rapid application development, autonomous production, consistent engineering across the entire value chain.



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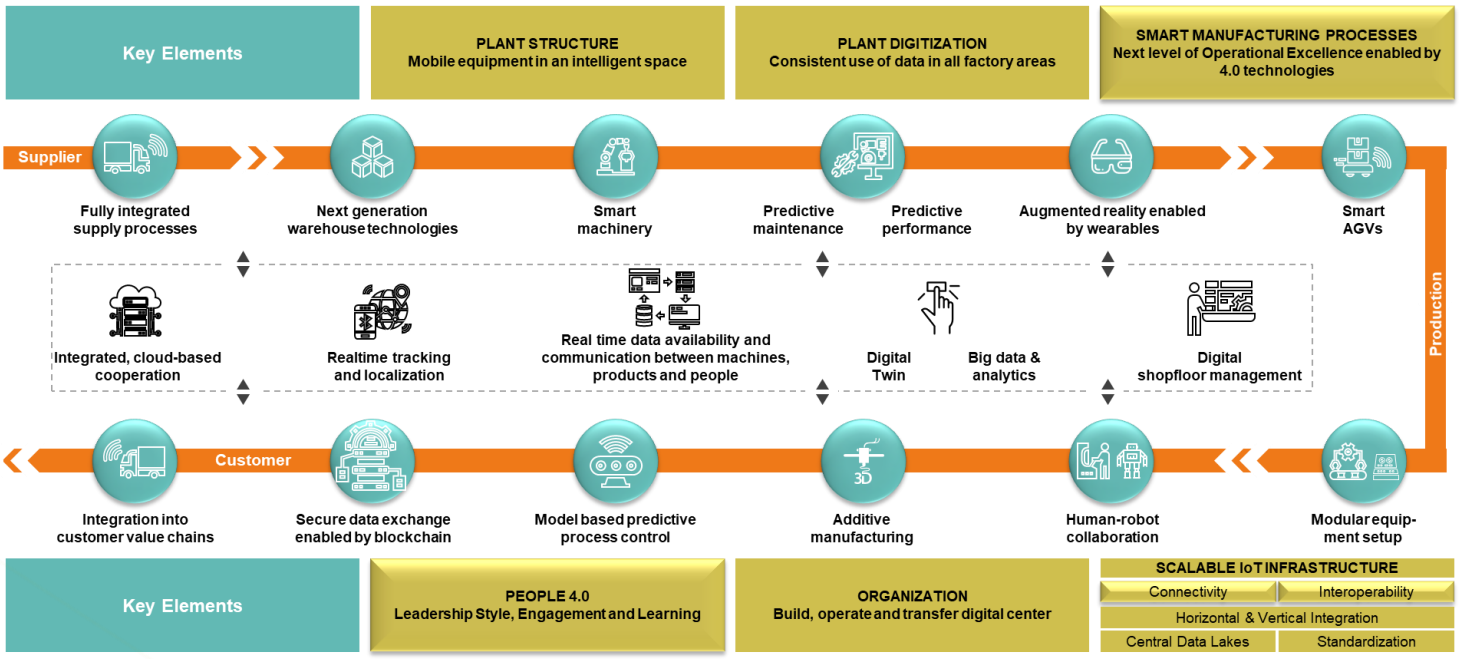
17% of organisations will implement "Using additive manufacturing/3D printing technologies to offer customised products or services" in next 1-2 years.

Figure 9 : *Using additive manufacturing / 3D printing technologies to offer customised products or services.*

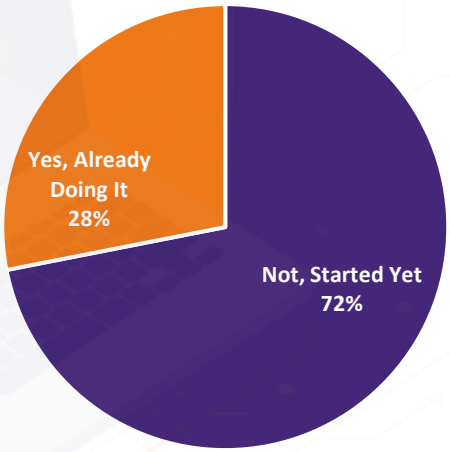
Advanced Automation

New technologies are opening a new era in automation for manufacturers—one in which humans and machines will increasingly work side by side. Cheaper, more capable, and more flexible technologies are accelerating the growth of fully automated production facilities.

This "lights out" production concept—where manufacturing activities and material flows are handled entirely automatically—is becoming an increasingly common attribute of modern manufacturing. Automation in manufacturing has been transforming factory floors, the nature of manufacturing employment, and the economics of many manufacturing sectors.



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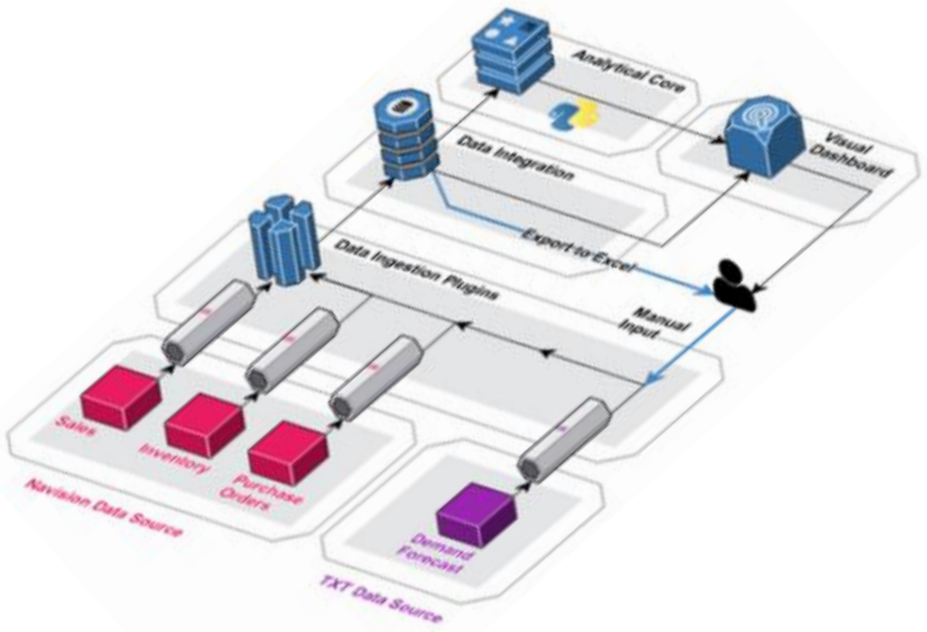


18% of organisations will implement "Using advanced automation (E.g. robotics, automated guided vehicles etc.) for regular manufacturing activities" in next 1-2 years.

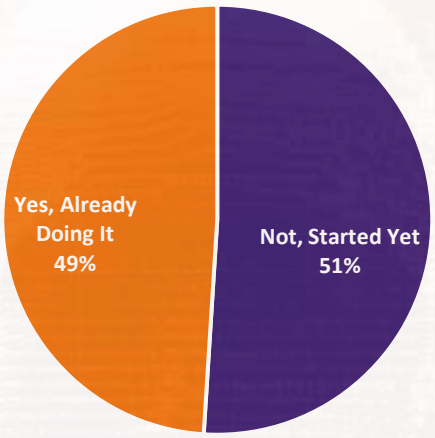
Figure 10 : *Using advanced automation (E.g. robotics, automated guided vehicles etc.) for regular manufacturing activities.*

Real Time Data Collection

With the increased buzz around the Internet of Things (IoT) in manufacturing, many companies are excited about deploying thousands of low-cost sensors within their operations to collect real time data. It helps win the hearts and minds of frontline employees while strengthening a data-driven decision culture.



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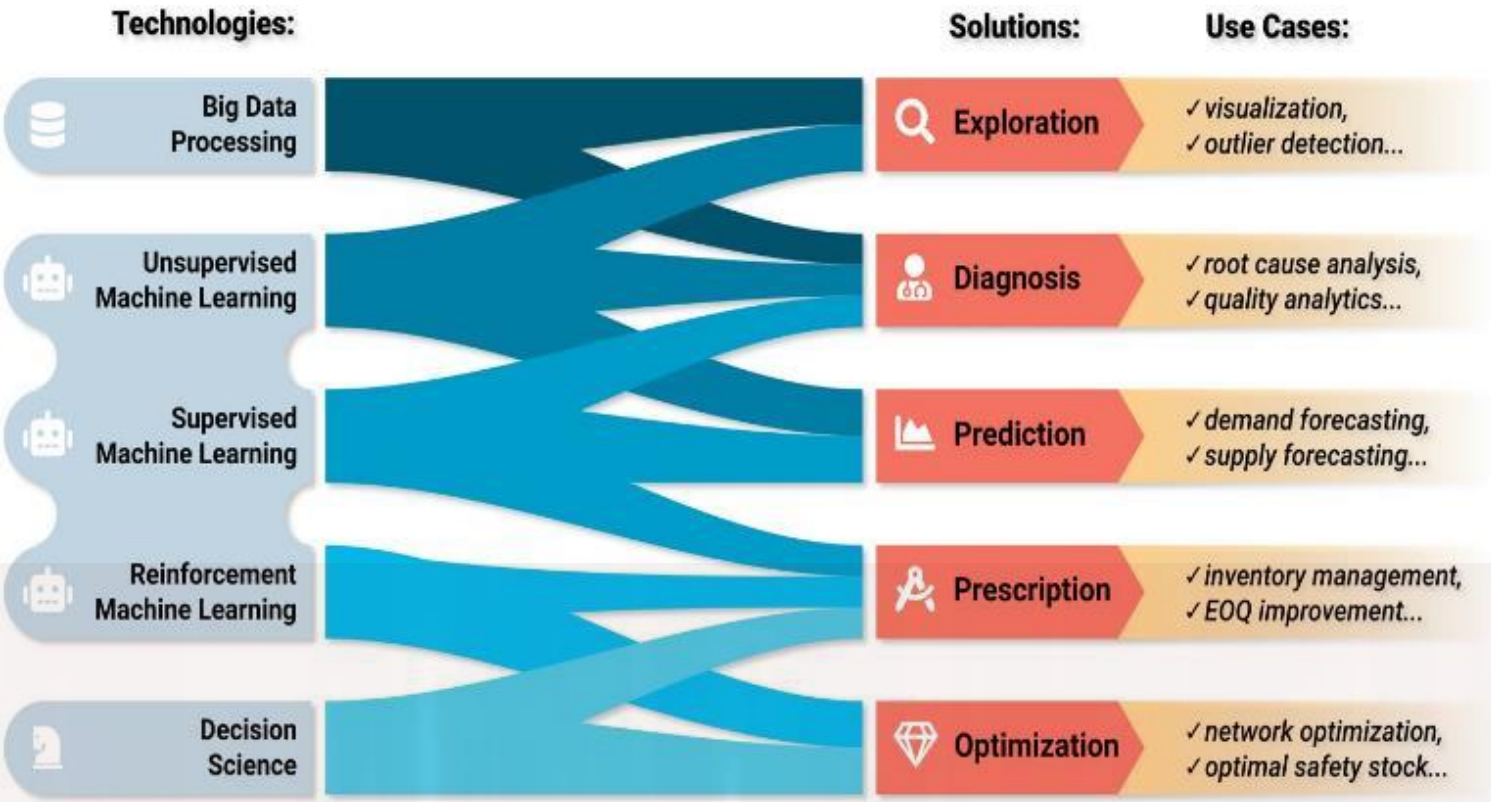
22% of organisations will implement "Use of sensors, electronic devices etc., for collecting and using real time data" in next 1-2 years.

Figure 11 : *Use of sensors, electronic devices etc., for collecting and using real time data.*

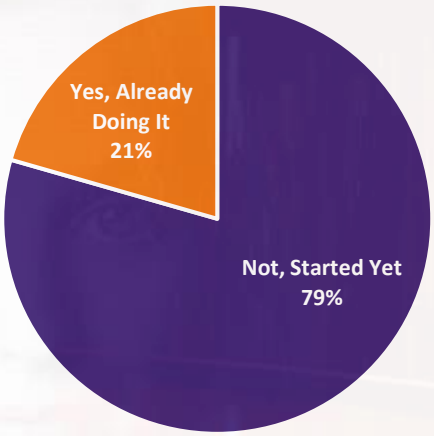
Big Data Analytics

Big data and the era of digital means a big analytics landscape for manufacturing to work with. Supply chains generate big data. Big data analytics turn that data into real insights.

It uses data and quantitative methods to improve decision making for all activities across the supply chain. It does two new things. First, it expands the dataset for analysis beyond the traditional internal data held on Enterprise Resource Planning (ERP) and supply chain management (SCM) systems. Second, it applies powerful statistical methods to both new and existing data sources. This creates new insights that help improve supply chain decision-making, all the way from the improvement of front-line operations to strategic choices, such as the selection of the right supply chain operating models.



Already Doing, Not Started Yet



32% of organisations will implement "Use of Big Data Analytics in manufacturing" in next 1-2 years.

Figure 12 : *Use of Big Data Analytics in manufacturing.*

Detailed Survey Findings

1. Product, equipment, and process failures prediction approach.

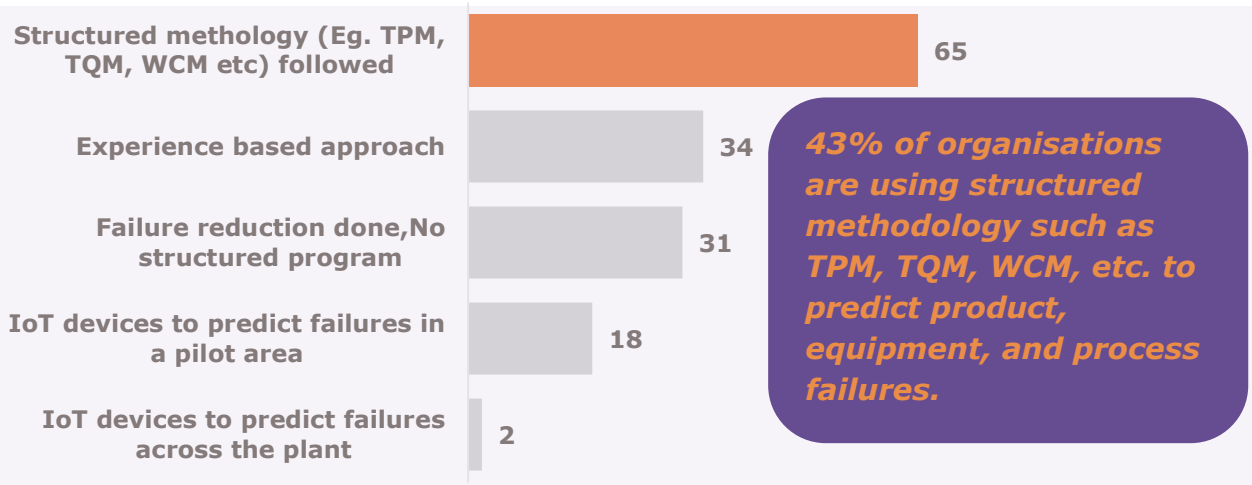


Figure 13: *What approach are you using currently to predict product, equipment, and process failures?*

2. Ways to ensure people work towards company objectives.

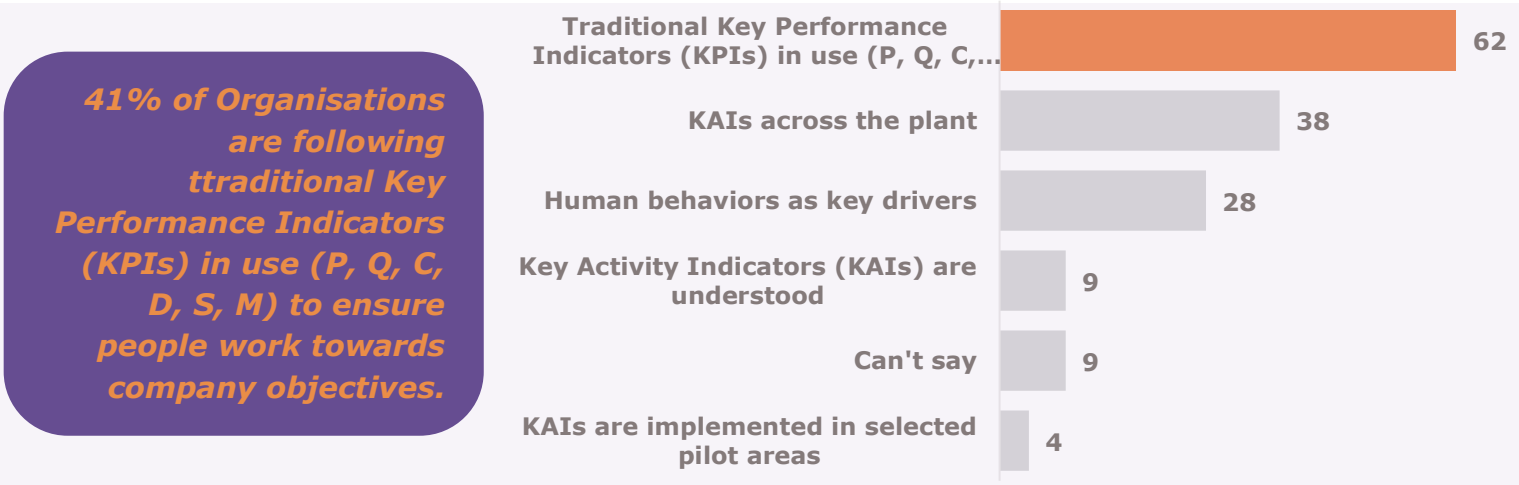


Figure 14 : *How do you ensure that your people work towards company objectives?*

3. Drivers of manufacturing excellence initiatives at plant.



In 38% of Organisations Top management is driving the Manufacturing Excellence initiatives at your plant right now.

Figure 15: *Who drives the Manufacturing Excellence initiatives at your plant right now?*

4. Manufacturing practices in organization.

85 % Organizations are currently using 5S manufacturing practices.

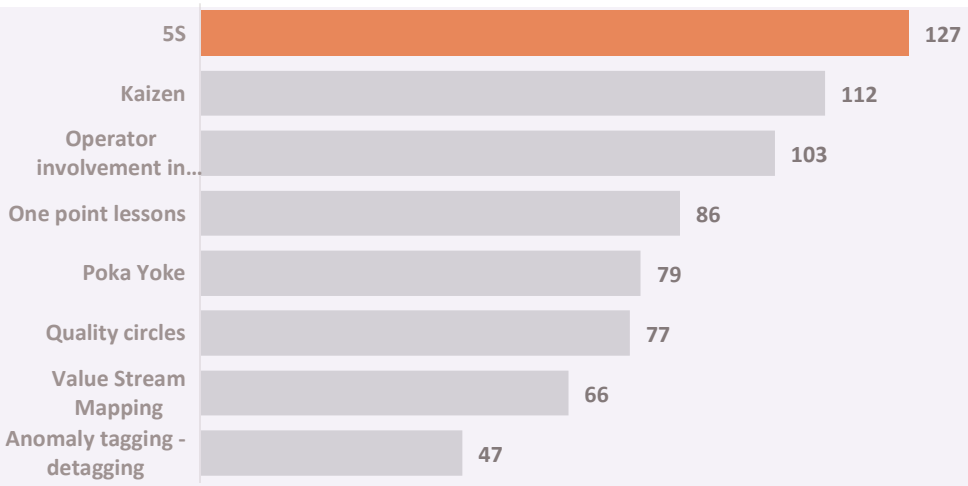
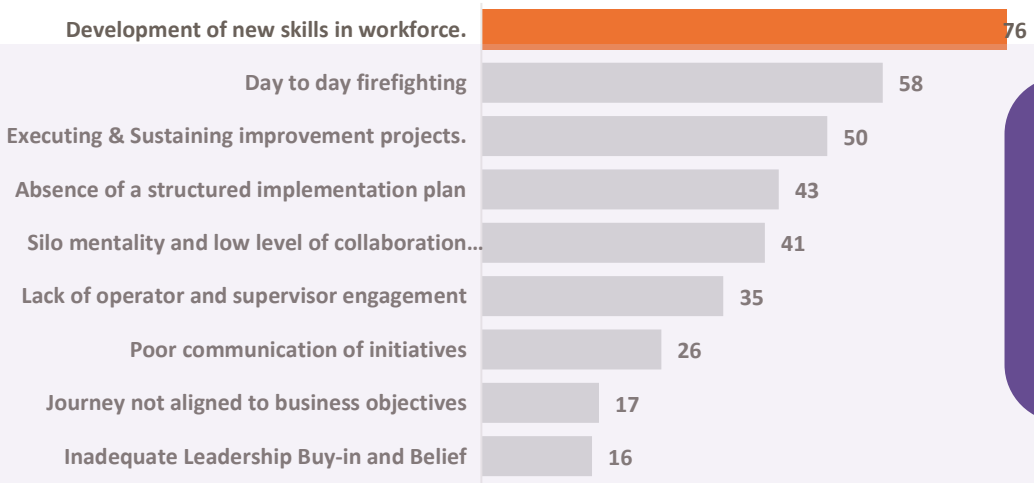


Figure 16: *Which manufacturing practices are you currently using in your organisation?*

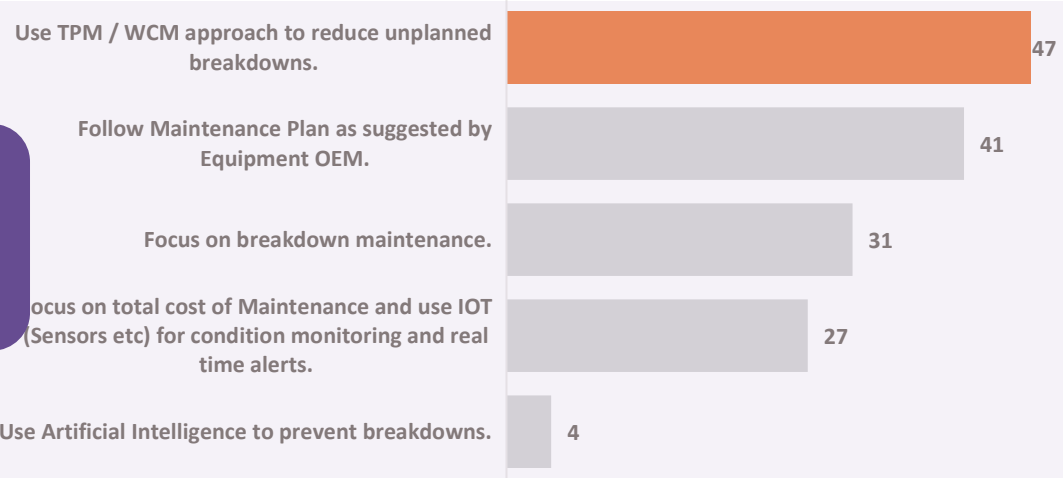
5. Roadblocks in Manufacturing Excellence journey.



In 51% of Organizations, Development of new skills in workforce is a roadblock faced in manufacturing excellence journey.

Figure 17: *Which are the roadblocks you face in your manufacturing excellence journey?*

6. Plant & Machinery maintenance activities in organization.



31% of Organizations are using TPM/WCM approach to reduce unplanned breakdowns.

Figure 18: *How would you rate the Plant & Machinery maintenance activities in your organisation?*

7. Companywide skill building on data analytics & digital tools.



In 31% of Organizations, Skill building plan made for a small group of employees.

Figure 19: *Are you currently doing any company-wide skill building on data analytics & digital tools to identify, visualise, solve, and prevent problems?*

8. Use of sensors, electronic devices etc. for collecting and using data.

27% of Organizations are using "Sensors for reliably collecting data from diverse sources.

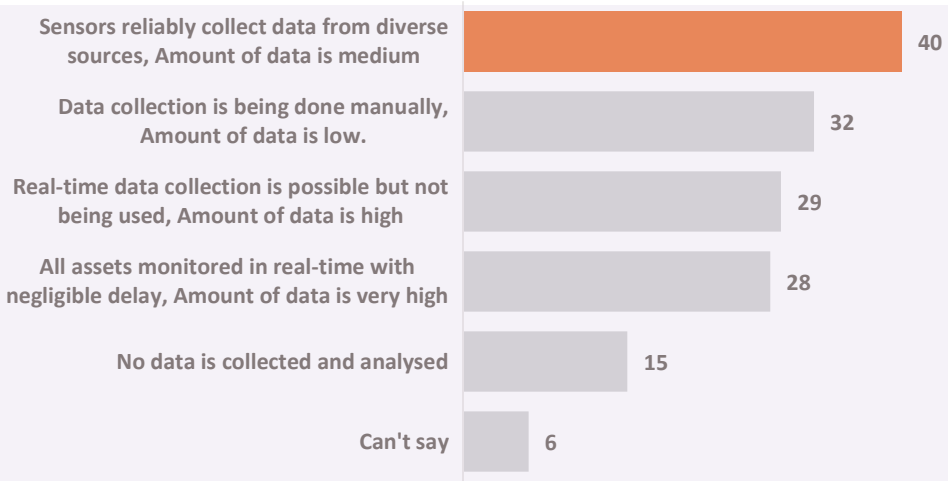


Figure 20: *What is your status in the use of sensors, electronic devices etc. for collecting and using data?*

Conclusion

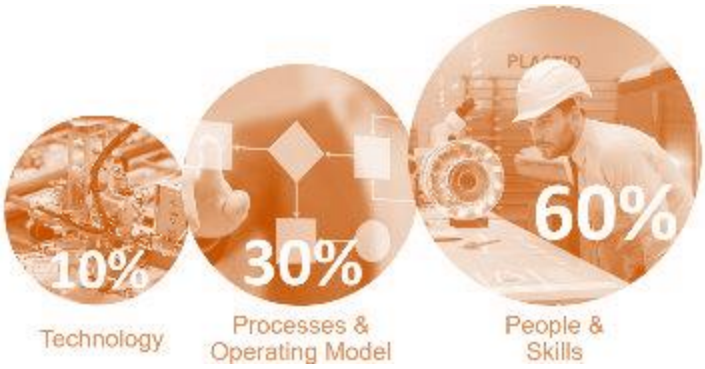
What we have learned

The speed of excellence, meaning the speed at which you manage to convert the most relevant improvement opportunities into tangible results, becomes the differentiator between top and average, between survivor and casualty.

Accelerating manufacturing excellence therefore becomes a key imperative for every business, and every unit within a business.

DYNAMICS TO ACCELERATE MANUFACTURING EXCELLENCE

Accelerating Manufacturing Excellence is also about leveraging three basic dynamics that we capture under the acronym PHD2:



- **Process Dynamics:** ensuring flows of activities adapt to new requirements and possibilities.
- **Human Dynamics:** ensuring people adopt new ways of thinking and acting.
- **DigiTech Dynamics:** taking advantage of the innovative opportunities brought by exploiting better data with all types of new Digital technologies (Analytics, AI, Robotics, AR/VR, …

Missing one of these three dynamics automatically lowers the speed of Progression, or worse, leads to unstable progression that backfires at the worst possible moment.

IMPROVING YOUR RESULTS TODAY, SECURING YOUR RESULTS FOR TOMORROW

Manufacturing Excellence must always be sustainable. Ensuring Sustainable progression starts right at the beginning, when you determine the results that you want to achieve.

RESULTS^2

- **Results today:** tangible performance improvement in the short term (boost angle)
- **Results tomorrow:** investment in the processes, capabilities, assets, … to ensure you will continue to realize target results in the medium/long term (build angle)

It is not only about generating results quickly; it is also about moving the Company in the direction where it will be able to generate results tomorrow.

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"Improving results today, securing results for tomorrow" means achieving tangible business results and simultaneously developing the capabilities, leadership and culture to continue progressing faster than competition.

EFESO Consulting brings more than 40 years' experience and thought leadership, supporting many of the leading global brands in both mature and emerging markets. We are a group of over 500 experienced consultants representing 45 nationalities, operating from 35 offices around the world with a strong presence in Europe, USA, South America, Middle East, Africa and Asia.

We are a licensed affiliate to the Shingo Institute and the global partner for JIPM. We have helped clients achieve remarkable success in their value chains by creating value through Business transformation and progression, TPM and manufacturing excellence, WCM, Lean transformation, Supply Chain, Change leadership and Change management.

Our people bring together hands-on experience and expertise spanning sectors and functional capabilities and, in an engaging and sustainable way, we partner with our Clients on their Progression Journey.

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About FICCI

Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

About FICCI Manufacturing Excellence Taskforce

FICCI has been working on various aspects of manufacturing relating to policies, productivity, competitiveness, and operations. FICCI through its various committees and services has been helping industry in capacity building, creating awareness, and providing support by taking up its cause. It is also working closely with the Government’s vision to increase the share of manufacturing in GDP and also to ensure its long-term sustainable growth.

It was decided to have dedicated Manufacturing Excellence taskforce in FICCI that would look holistically into the areas that would work to improve the manufacturing competitiveness and systems thereby enabling industry to achieve better performance and results. The manufacturing excellence taskforce has been created to provide opportunity to the industry to learn and also to make others learn about best practices that lead to better systems for improving organization’s performance through good practices in operations, supply chain and quality. The key to the activities of this taskforce is to enrich the industry with horizontal, vertical, cross-functional and multi-sectoral approach. The objective is to spread these good practices to the greatest extent possible within the industry and to achieve higher standards for Indian manufacturing.