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MANTHAN-I

VIRTUAL CXO ROUNDTABLE ON CONDITION-BASED MAINTENANCE

A Detailed Report

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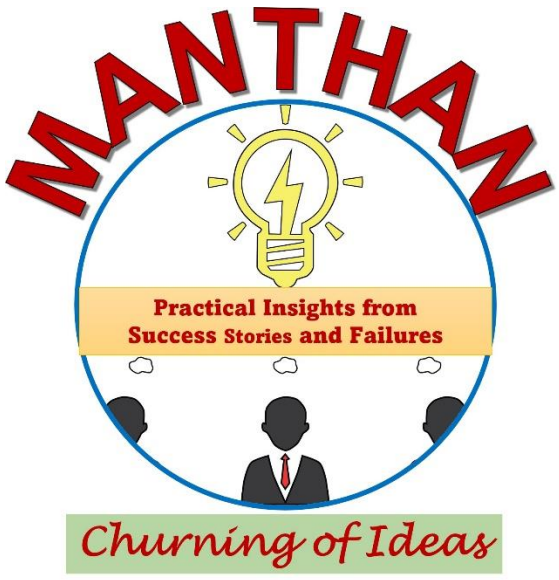
1. INTRODUCTION



CIOs Of India and **NASSCOM CoE- IoT & AI** partner in many initiatives like **Manufacturing Innovation Challenge (MIC)**, **Fusion 4.0**, and **Udyam 4.0 for MSMEs** after signing an MOU last year. Manthan is another initiative in continuation of the same collaboration. Manthan is initiated to create a cross-learning platform for CXO leaders. Manthan is a series of virtual roundtable discussions on various topics to bring together senior thought leaders to collectively discuss the challenges and best practices. In Manthan, 12 to 15 leaders share views about a pre-decided topic and learn from each other. The learnings of the Manthan are shared with the tech community through a detailed report.

Manufacturing has always been an industry that harnesses technology to deliver greater efficiency and productivity. With the advent of industry 4.0 in the manufacturing industry, various plants are fostering digital technologies to enhance, automate, and modernize the whole process. Digital technologies are shaping the future of the manufacturing industry, and the industry is certainly overwhelmed with the buzz and poised for a new chapter of growth, transformation and re-evolution.

In partnership with **NASSCOM CoE- IoT & AI, CIOs of India** hosted the first CXO roundtable, **"Manthan",** on 27th June 2021. This Manthan brought together the CXO community from the manufacturing industry for a peer group collaboration to share their challenges, success stories, experiences and upcoming opportunities. In this roundtable discussion, 12 CXOs and the team members of NASSCOM CoE shared their thoughts about condition-based maintenance, citing examples of use cases from their organizations while also listing down the challenges faced before carrying out predictive maintenance.

In today's world, where man and machine are working hand-in-hand, preventive health monitoring is not just needed for humans; we need regular assessment of the condition of our high-value assets in plants to minimize the risk of breakdowns. In the Manthan discussion, the group deliberated on the value of condition monitoring, challenges and best practices around using AI/ ML and Analytics solutions to keep track of operational parameters.

2. EXECUTIVE SUMMARY

The global machine condition-monitoring market is expected to grow from $2.6 billion this year to $3.6 billion by 2026, according to the *Markets and Markets*, mainly due to the increased availability of condition monitoring sensors and the growing number of organizations looking to implement advanced maintenance strategies like Condition-Based Maintenance (CBM) and Predictive Maintenance. This is a CAGR of 7.1 %. Indian machine condition monitoring market size is also witnessing growth and set to grow at a CAGR of 10.95% and projected to reach $193.3 million by 2025. Many companies in India have started using CBM as a part of their manufacturing strategy under Industry 4.0.

CBM is an aspect of "predictive maintenance" that relies on monitoring and networking technologies; it's sometimes known as "Condition-Based Monitoring." CBM maintenance is the procedure that follows when indicators show critical equipment performance is declining or nearing a catastrophic incident.

Under the Manthan initiative, 12 manufacturing Tech Leaders have discussed various factors related to CBM and its challenges. All leaders felt that CBM can definitely add value to business by reducing the unplanned downtimes, by reducing the spare parts cost, increasing the overall efficiency of equipment and by gathering data for creating predictive algorithms in the future. However, there are many challenges in starting CBM, like finding ways to put sensors on old machines to collect data. Finding the right skilled partner, right skilled people and creating a CBM culture in the plants are other vital areas of consideration.

There are various initiatives that companies are already working on. These include using Industrial Data Enabler (IDE) "vEdge", Jump Server installation, Retrofitting sensors, taking the help from OEM and using PLCs by Siemens, Rockwell Automation, Total Control Systems etc.

Data collection is the first challenge for planned maintenance and forecasting as the entire CBM is based on the correct data collected at the right time. When OEMs use their PLC, extracting data is a challenge, so the company should collaborate with the OEMs; however, it increases the cost. In case retrofitting of sensors is not possible, proxy sensors can be used. There are data security concerns while importing data to the server using the internet. Using Jump Servers can resolve the issue, but more focus on security should be given.

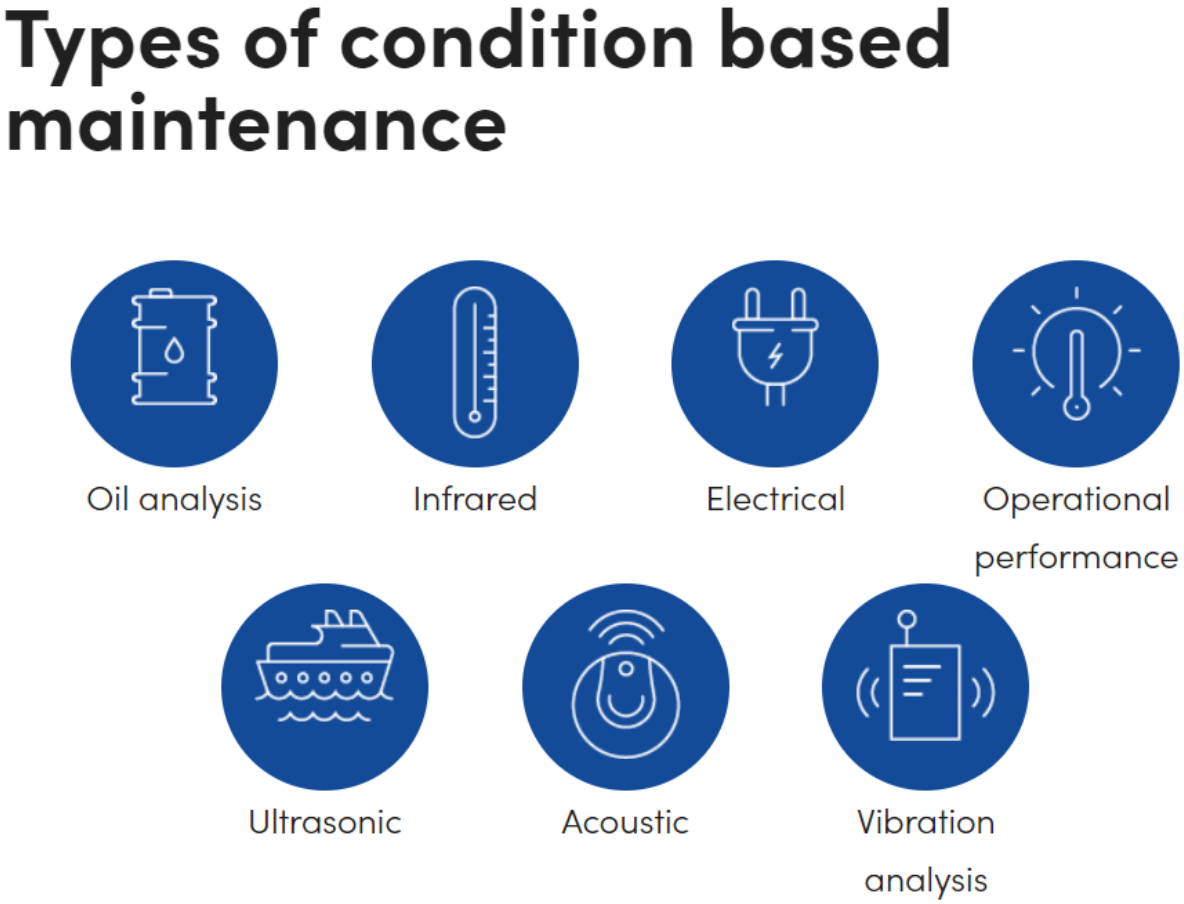
3. WHAT IS CBM

Condition-based maintenance (CBM) is a maintenance strategy that monitors the actual condition of an asset to decide what maintenance needs to be done. CBM dictates that maintenance should only be performed when specific indicators show signs of decreasing performance or upcoming failure. Checking a machine for these indicators may include non-invasive measurements, visual inspection, performance data and scheduled tests. Condition data can then be gathered at specific intervals or continuously (as is done when a machine has internal sensors). Condition-based maintenance can be applied to mission-critical and non-mission-critical assets.

Unlike in planned maintenance (PM), where maintenance is performed based upon predefined scheduled intervals, condition-based maintenance is performed only after a decrease in the equipment condition has been observed. Compared with preventive maintenance, this increases the time between maintenance repairs because maintenance is done on an as-needed basis. This also helps in reducing the unplanned downtime because of sudden breakdowns as machines are continuously monitored using sensors.

There are various types of condition-based monitoring techniques. Here are a few common examples:

- **Vibration analysis:** Rotating equipment such as compressors, pumps and motors all exhibit a certain degree of vibration. As they degrade or fall out of alignment, the amount of vibration increases. Vibration sensors can be used to detect when this becomes excessive.
- **Infrared:** IR cameras can be used to detect high-temperature conditions in energized equipment
- **Ultrasonic:** Detection of deep subsurface defects such as boat hull corrosion
- **Acoustic:** Used to detect gas, liquid or vacuum leaks
- **Oil analysis:** Measures the number and size of particles in a sample to determine asset wear
- **Electrical:** Motor current readings using clamp-on ammeters
- **Operational performance:** Sensors throughout a system measure pressure, temperature, flow etc.



In CBM, sensors are used to monitor various parameters like wear and tear, vibrations etc. Slight wear, deterioration or contamination is not necessarily a problem; a lot of wear, deterioration or contamination is almost always a problem. The good news is that when these kinds of failure causes take significant amounts of time to actually create a loss of function, we can often choose from alternative courses of action. If the consequence of failure is small or negligible, we may choose to do nothing, especially if doing something costs more or has more negative consequences than doing nothing. However, suppose the consequence of failure is not negligible, for example, when production loss or repair costs are high. In that case, it will almost always be worth the effort to detect the failure "process" as early as possible before the failure so that we may take whatever corrective action required to either avoid the failure, if possible or reduce its consequence.

The P-F Curve and the P-F Interval: The horizontal (X) axis of the P-F curve represents time-in-service for an asset or asset component, and the vertical (Y) axis represents some measure of performance, rate, condition or suitability for purpose. The curve shows that the performance or condition of an asset or component declines over time, leading to functional

failure, i.e. loss of function for which it was intended. The curve may take various shapes, linear or exponential, but is generally represented as exponential, as shown in Figure 1.

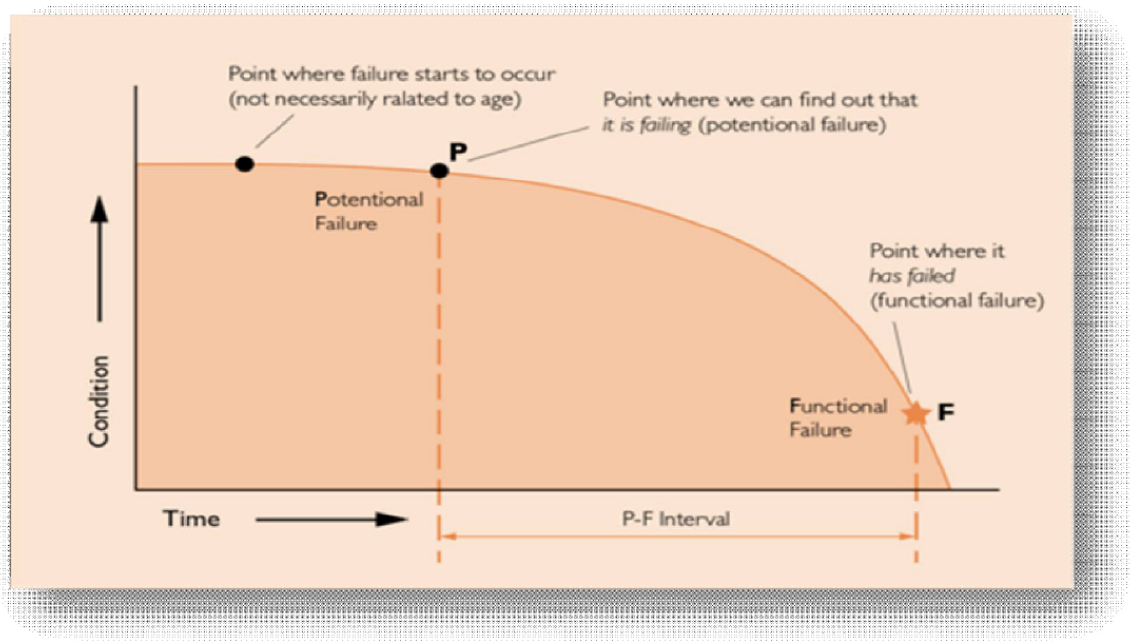


Figure 1. P-F Curve represents the behaviour of an asset (pump, motor), or asset component (belt, bearing) before functional failure has occurred.

The P-F Interval is the key. It may be days, weeks or months. Still, whatever it is, it must provide a sufficient "window" of time between the latest inspection and functional failure to prioritize, plan and execute the necessary maintenance activities before the failure (Figure 2).

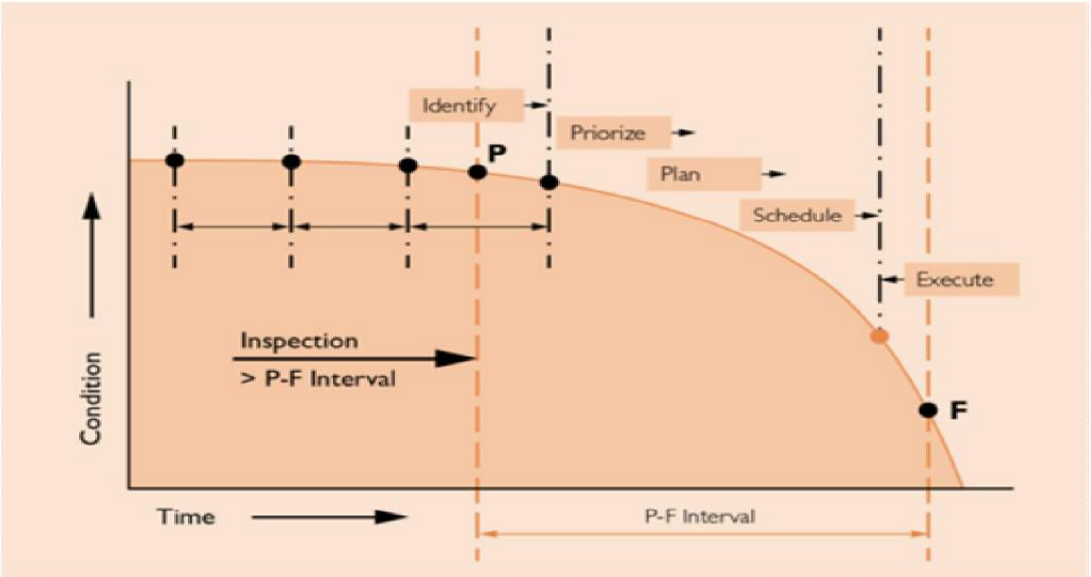


Figure 2. Inspection intervals must be less than the P-F Interval. In practice, inspection intervals equal to ½ the P-F Interval is usually acceptable.

Obviously, the longer the P-F Interval, the better it will be. Maximizing the P-F Interval Using Condition-Based Maintenance Technologies The method and frequency of inspection makes a difference in the length, and therefore the utility of the P-F Interval.

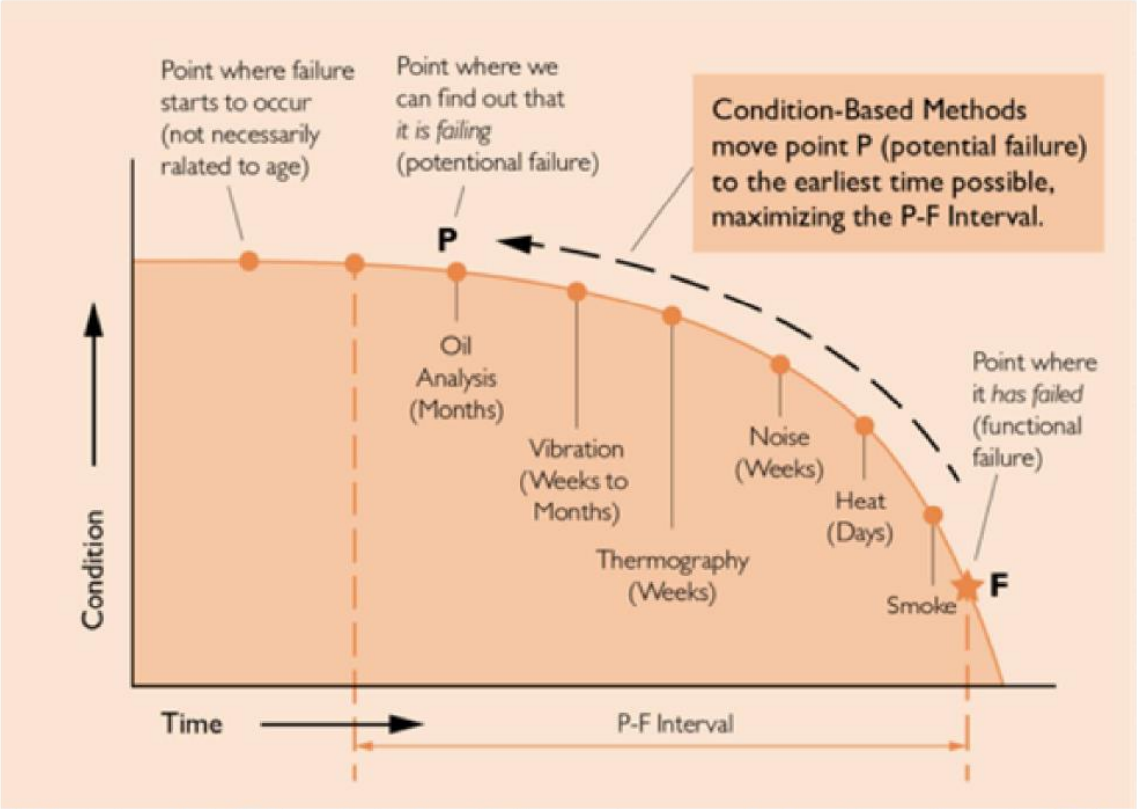


Figure 3. Maximizing the P-F Interval, which can be days, weeks, or months depending on Inspection Methodology!

Generally, technologically-based Condition-Based Maintenance (CBM) methods (on-line inspections) provide the most significant P-F Intervals (Figure 3) and are less disruptive than alternative time-based shutdown inspections. The avoidance of off-line inspections, which often cause loss of production, can make CBM methods economically feasible.

New technologies, such as the Cloud, big data management, complex systems modelling and advanced analytics and concepts, such as the Industrial Internet of Things (IIoT) and Industry 4.0, offer users the ability to strategically plan, forecast and optimize their maintenance. Leveraging these new technologies enables an evolution beyond traditional reactive maintenance and toward proactive maintenance. This is the future of maintenance, operations and asset management, namely Condition Based Maintenance.

If we see Performance Management Maintenance Pyramid (Figure 4), we will observe that the most basic approach is reactive maintenance at the bottom of the maintenance maturity pyramid. The next level of maintenance maturity is preventive maintenance (PM), which is

regularly scheduled maintenance implemented hoping that an asset will not reach the point of failure. Condition-based maintenance (CBM) is the third level that creates a ground for Levels 4 and 5. So CBM is always recommended for reaching a higher maintenance maturity level. CBM focuses on the physical condition of equipment and how it is operating. It is ideal when measurable parameters are good indicators of impending problems. The condition is typically defined using rule-based logic, where the rule does not change depending on loading, ambient, or operational conditions. If the condition is met, work orders can be automatically generated to help mitigate risk and proactively resolve potential problems.

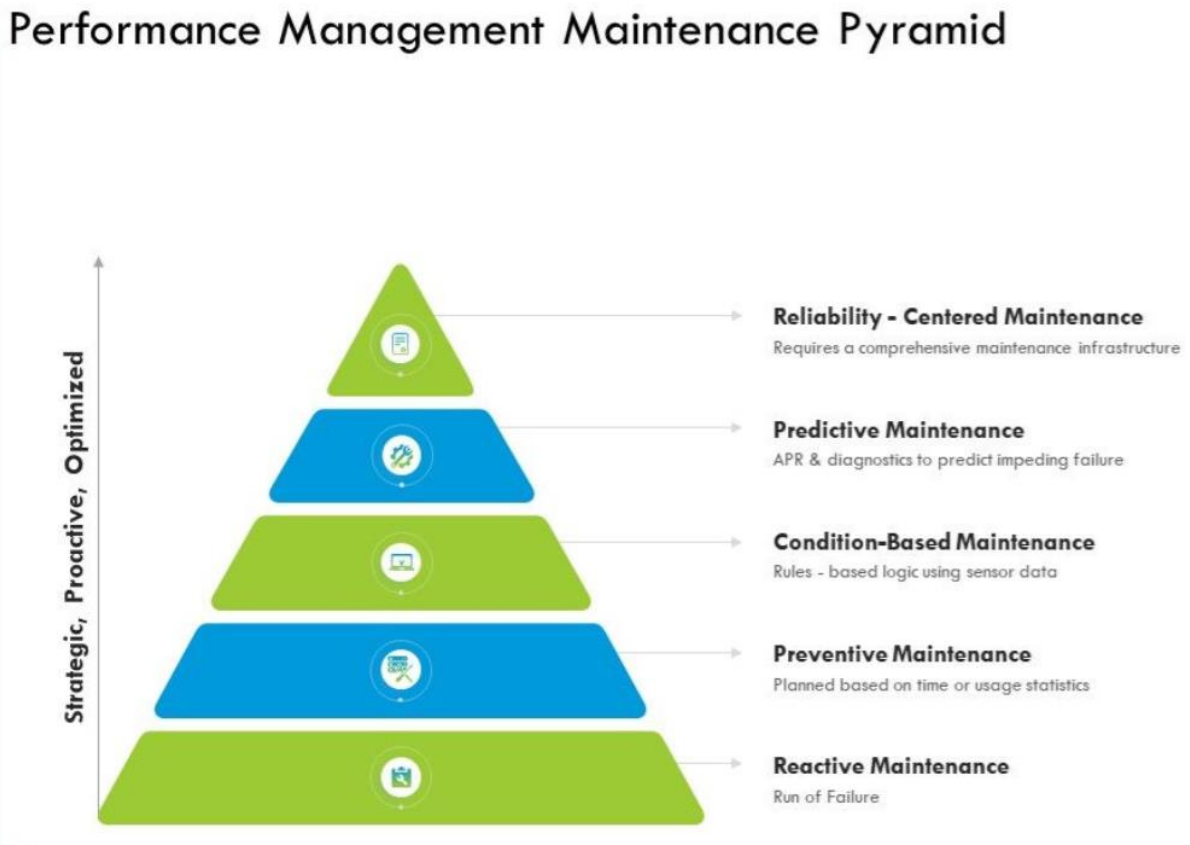


Figure 4: Performance Management Maintenance Pyramid

In CBM, not all types of equipment need to be monitored. From the equipment perspective, an organization must find the critical types of equipment which must be monitored through sensors to get real-time data. These equipment are selected based on the ROI they give for CBM. ROI of CBM is calculated based on the criticality of the equipment. Criticality is derived from the impact of the failure of equipment on the other parts of the plant. Figure 5 gives an idea of this approach.

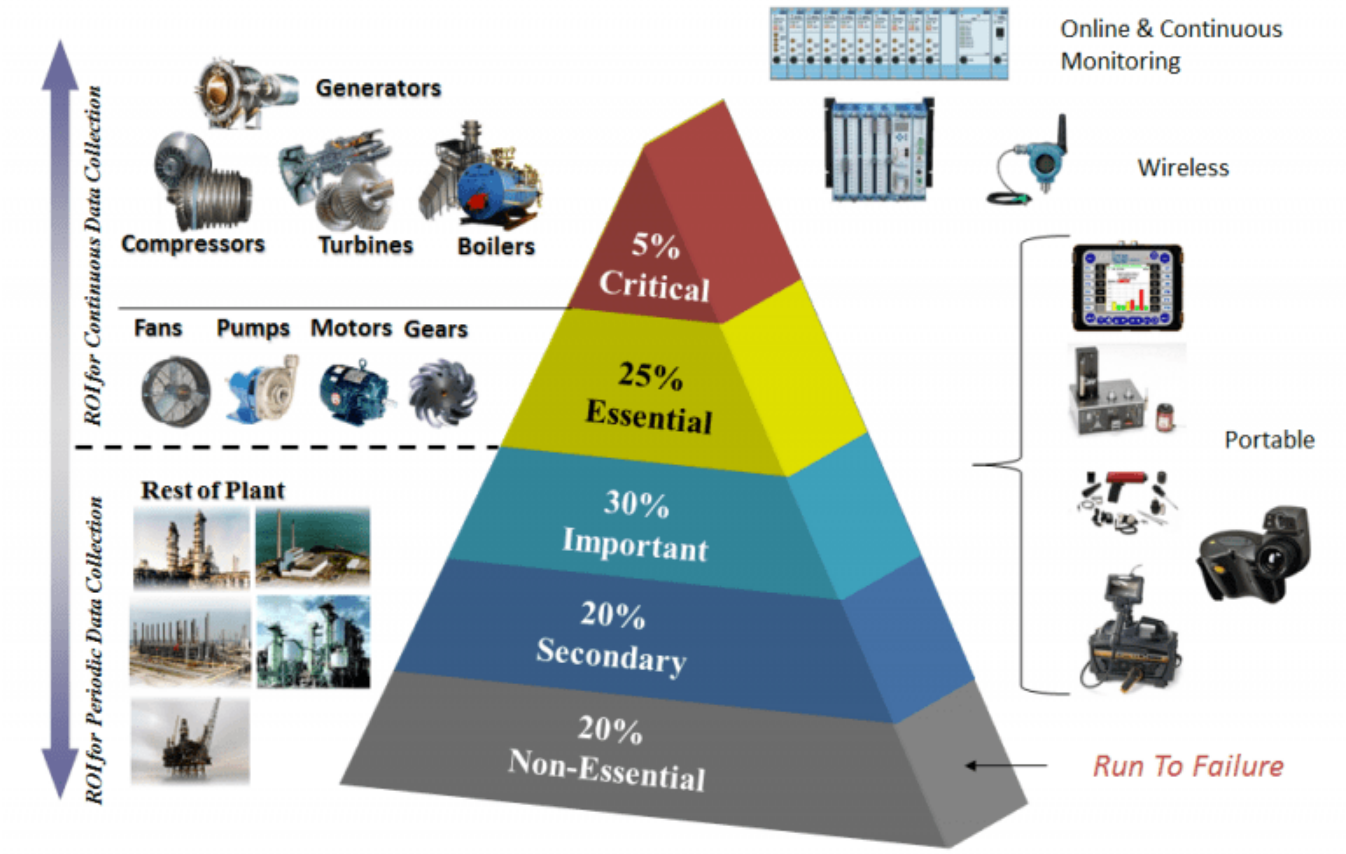


Figure 5: Selection of types of equipment for CBM

4. PARTICIPANTS

In Manthan-1, the following participants discussed the topic of Condition Based Maintenance.

1. Abhay Bapna, AVP Head Application, Adani Wilmar
2. Amit Saluja, Senior Director & Center Head, NASSCOM CoE
3. Annie John Mathew, Chief Information Officer, Mother Dairy Fruit & Vegetable Pvt Ltd
4. Atul Govil, Chief Transformation Officer & Head (SAP & IT) – Corporate, India Glycols
5. Kamal Karnatak, Group CIO, RJ Corp
6. Maitrey Modha, Head ICT Technology-AMEA AND ANZ
7. Manzar Abbas, Chief Information Officer & Head- Corporate Social Responsibility (CSR), Rockman Industries Ltd.
8. Parna Ghosh, Vice President & Group CIO, UNO Minda Group
9. Prakash Dharmani, Global CIO, EPL Limited (Formerly Essel Propack Ltd)
10. Rajesh Kumar Singh, Vice President & IT Head, JK Lakshmi Cement Ltd
11. Shaveta Wadhera, Chief Digital Officer, Hero Cycles
12. Vijay Sethi, Ex CIO, CHRO, Head CSR, Ex Hero Motors

5. DISCUSSION

Leaders shared their experience and success stories (use cases)

Amit Saluja welcomed the participants and introduced NASSCOM CoE and its objectives. He spoke about several focused initiatives, including MIC, Udyam 4.0, Fusion 4.0 Forum and Smart Manufacturing Competency Centre. Elaborating on Condition Based Monitoring, he stated that CBM has evolved over the years, with many companies using it extensively. He also highlighted that a large segment of manufacturing enterprises still work at the preventive level despite the progress.

Kamal Karnatak focused on the need for condition-based maintenance in the new reality where affordable sensors are available, and various technologies are helping organizations to focus on data analysis. He mentioned that AI-ML models are being created by companies that help in predicting the possible failure of equipment.

Atul Govil said that for a manufacturing organization, equipment is a lifeline. So getting the best efficiency from the critical equipment is of immense importance. He talked about various CBM areas like vibration management, thermography etc. He also stressed the need for CBM for manufacturing organizations to keep the right spares for the right time.

Vijay Sethi set the context for the session on why condition monitoring. Recalling previous scenarios, he mentioned that the focus was on planned or preventive maintenance where it resulted in under maintenance or over maintenance which involves a lot of costs. The plants for such activities are shut for a certain period when even the healthy machines have to undergo maintenance. This leads to the need for condition-based maintenance, where the maintenance is done based on the machines' requirements. However, this comes with its own challenges as the amount of data required for CBM are not in place, as things are manual. However, in the last few years since the evolution of technologies like AI and IoT, machines are becoming smart and helping in making the analysis of the entire process easy. CBM applied with technology is meaningful and can play immense significance in manufacturing industries.

Abhay Kumar shared his experience of how data collection was the first challenge for preventive maintenance. He mentioned how his organization implemented tags and sensors on machines to collect real-time utility information. While doing this, it was narrowed down to critical machines. For real-time data collection, edge level sensors were used. He also mentioned that the CBM process requires ownership from the business managers as well.

Manzar Abbas spoke about the concept of Original Equipment Efficiency (OEE) and how it is calculated based on critical factors of quality, performance and availability (QPA). Underlining the significance of CBM, Manzar talked about churning value out of machines. He also insisted

on understanding the language of machines to monitor their health by observing the critical elements, i.e. vibration, pressure, temperature, current and noise.

Parna Ghosh, while throwing light on his experience with implementing CBM, said that their machines were not smart enough to take the data out. So they made their SAP smart and implemented CBM in their paint shop at Pune Plant. With the use of technology, the plant does not require downtime for maintenance. He used the term 'micro maintenance,' where they book specific areas of machines for maintenance while the entire machine does not go under downtime. Their CBM helps them to make a purchase order for spare parts, and now they do not hold any unused inventory of the spare parts.

Parna also mentioned about the electricity maintenance solutions offered by one of the incubated startups of the NASSCOM CoE, which helped them in cost reduction at their plants.

Rajesh Kumar Singh spoke about data security while predicting failure. Transferring data from machines to the servers makes the data vulnerable, where he sought suggestions from the group.

Prakash Dharmani brought forward the challenge of doing CBM on machines supplied by their OEMs. He highlighted that their PLCs were not compatible with their OEMs, making the data capturing difficult. He mentioned that there is a need to work in collaboration with OEMs for predictive maintenance. Highlighting the transition from manual data logging to digital logs, he said that there is a need to define the outliers. Sighting an example, he said that many times while logging the digital data, they found that the readings were not in the range of min-max compared to the data collected traditionally.

Shaveta Wadhera explained the use cases that she recently dealt with - broadly under three categories Machines, Product and Oil. Machines in production are 15-20 years old which do not have protocol-based communication available, and that's when the real challenge came in. They retrofit the sensors externally, but the requirements were still unmet with these sensors. Therefore, they came up with proxy parameters to help read from systems and interpret. She also discussed a success story of how products like cycles required monitoring in terms of the condition of battery, wheels, breaks etc., to monitor the condition and maintain it on a real-time basis to avoid any downtime. The team has successfully achieved it to capture the real-time data and to maintain the inventories. She then highlighted the third category of uses case, which is on Oil replacements which concluded as a considerable business case where they identified the condition of oil in terms of its viscosity, how much life it has. Its condition monitoring helped in converting 180th-day replacement to 260th day, which helped in huge cost reduction.

Annie Mathew mentioned that they have done some experiments with vibration sensors to detect & prevent breakdowns. She mentioned that they have plans to explore PLC data to extend the current usage for analytics to possible CBM.

Maitrey Modha also shared the importance of the data that is being collected. He stressed the need for data granularity and the period of data collection. CBM would require the right amount of data collected over a long period to have some meaningful outcomes. **Abhey Bapna** also mentioned that around 6-9 months of data is required to study machine behaviour.

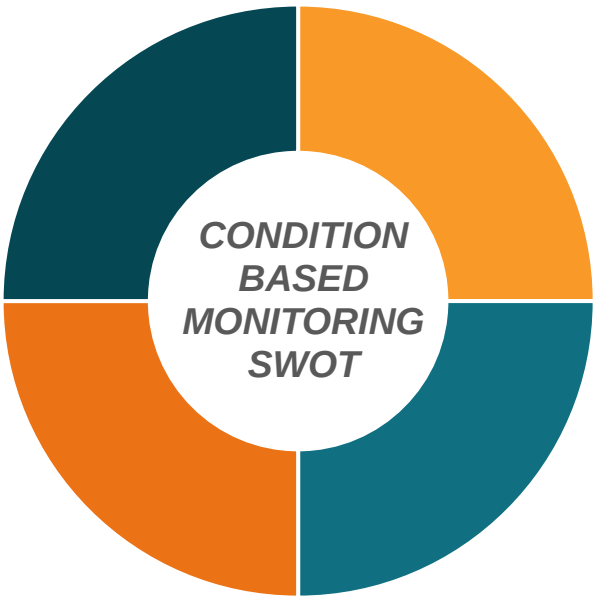
Figure 6: SWOT Analysis of CBM based on the discussion with leaders.

STRENGTHS

- Improves Machine Reliability
- Minimize unscheduled breakdowns and reduces downtime.
- Enables better asset management across its lifespan.
- Decreases costs, particularly with emergency maintenance.
- Provides the basis to develop predictive algorithms in the future.

OPPORTUNITIES

- Use of AI to predict the failure in advance and plan production accordingly
- Remote monitoring of plants and equipment
- Monetization of Data



WEAKNESSES

- Expensive to install, and databases cost money to analyze
- Cost to train staff–you need a knowledgeable professional to analyze the data and perform the work
- May require asset modifications to retrofit the system with sensors
- Unpredictable maintenance periods

THREATS

- Security vulnerabilities.
- High expectations, low outcome
- Wrong interpretation of data

6. MANTHAN DISCUSSION SUMMARY

The participants shared their thoughts about condition-based maintenance, citing examples of use cases from their organizations while also listing down the challenges faced before carrying out predictive maintenance.

Current Challenges Faced by Manufacturing Leaders

- What are the ways to sensorize machines to predict failure or downtime?
- How to gather data?
- How to plan spare parts availability at the right place, right time?
- How often to do overhauls?
- How to monitor the health of high-value assets?

Digital Solutions currently in use

- Industrial Data Enabler (IDE) "vEdge"
- Jump Server
- Retrofitted sensors
- PLCs by Siemens, Rockwell Automation, Total Control Systems

Key Takeaways

- With CBM, value can be churned out of the machines
- Data collection is the first challenge for planned maintenance and forecasting
- Planned maintenance means downtime, means loss of business
- Implement tags & sensors to collect real-time utility information
- OEMs use their PLC, extracting data is a challenge
- Need to work in collaboration with the OEMs
- In case retrofitting of sensors is not possible, proxy sensors can be used
- Data security concerns while importing data to the server using internet
- Connecting the machines to the internet is a challenge
- Using Jump Servers can resolve the issue
- Transition from 'manually logging data' to 'digital logs has challenges in terms of defining outliers

- Diagnostic parameters fall outside the minimum-maximum range while logging digitally as compared to manual logging done traditionally
- During transition and adoption of technology, for how long and at what scale should the pilot projects be run?
- Micro-maintenance is a buzzword where a company books specific area of the machine, while the rest of the machine does not go into downtime
- Predictive maintenance allows to place purchase orders of spare parts on need-basis, saving from the pile-up of unused inventory.

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Practical Insights from Success stories and Failures
CHURNING OF IDEAS

An initiative towards generating lighthouse ideas through exchange of learning from past success stories and failures in digital adoption.

APPENDIX

A. How to Calculate Condition-Based Maintenance Savings

Calculating the savings by predictive maintenance allows us to justify all technology, services, and personnel investments. It also serves as the foundation to calculate the ROI (Return or Investment) of condition-based maintenance.

This article will explain in a simple way how to calculate the direct savings generated by predictive maintenance to be able to justify investments, gain visibility in the company and quantify the value that is contributed to the company. CBM has a huge potential of saving for manufacturing organizations.

Accounting standards are made to describe the money transactions to and from the company. The problem in predictive maintenance or condition-based maintenance (CBM) is that we have to estimate an expense that was not executed. If we don't calculate the savings, we don't speak the same language as our finance department.

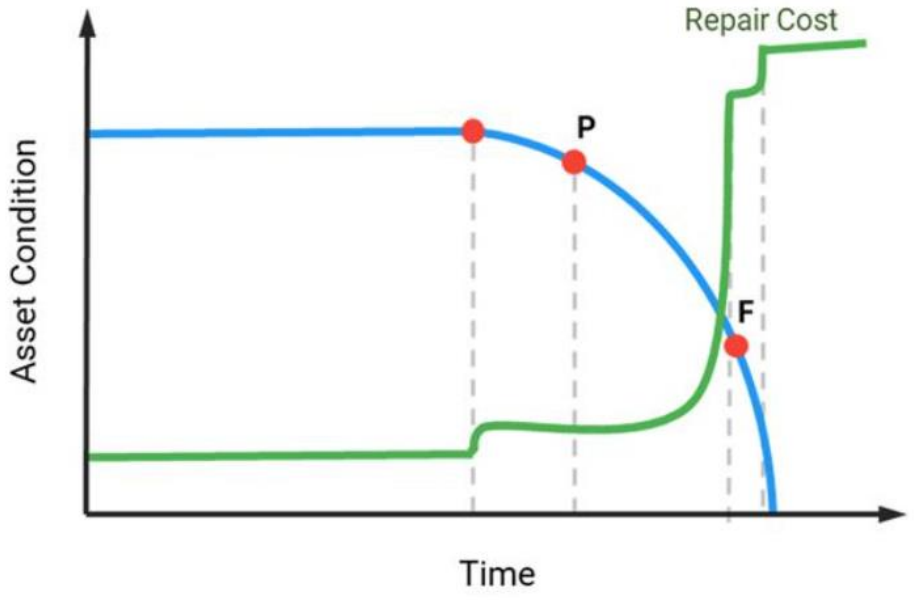

Figure 1: Schematic representation of repair costs shown in the P-F Curve. Repair costs will be relatively low if action is taken before the functional failure (F) is reached.

The P-F curve (as discussed earlier in the report) is the basis of predictive maintenance. It is a graphical model to visualize an asset's condition versus time. We can detect a fault starting at P (potential failure), and F is when the asset cannot perform its function. All predictive maintenance efforts are to anticipate functional failure, point F.

Figure 1 shows that repair costs rise rapidly as the asset approach F.

When a predictive analyst detects a potential failure in P-F time, he reports the fault; a work order is made from the report, a corrective repair is done. Upon completion, the analyst will check that the signals or symptoms that generated that failure have disappeared. Well, the story doesn't end there. After we have verified that the fault has disappeared, we must document the case study. And it is for that case study that we will calculate the savings.

Figure 2: Predictive maintenance proceedures

Savings is the difference between what we spent on the repair at the point of potential failure and what would have cost us to repair it if it had reached a functional failure. That difference is what we save our company.

Savings = CostF - CostP

If we start to calculate the savings in every case study and demonstrate the money saved over a whole year on verifiable evidence and data, the results are usually surprising.

How do we calculate the costs?

Well, the costs of a maintenance task are made up of:

- Personnel costs
- Contracted service costs
- Costs of parts
- Unexpected production shutdown costs

If we calculate the costs of these two scenarios: what it cost us acting on time (P) and what would have cost us if it had reached a functional failure (F) for not having predictive maintenance and calculating their difference, we obtain the savings.

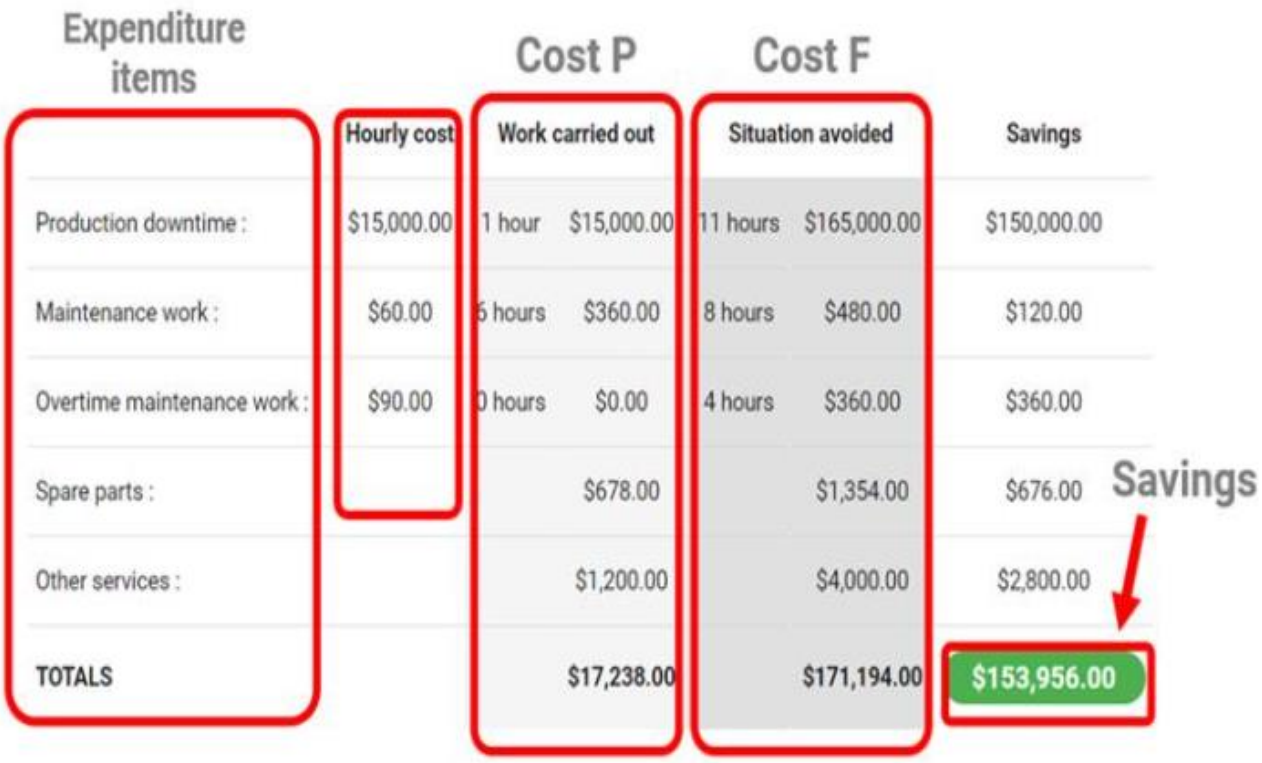

Figure 3: Repairs cost expenditure items

We are only talking about direct costs. The significant savings are in the indirect costs, as shown by the **Weinker model** in the image. To calculate these indirect or hidden costs, it is necessary to interact with another department or unit of our company (production, quality, risk prevention, environment or others).

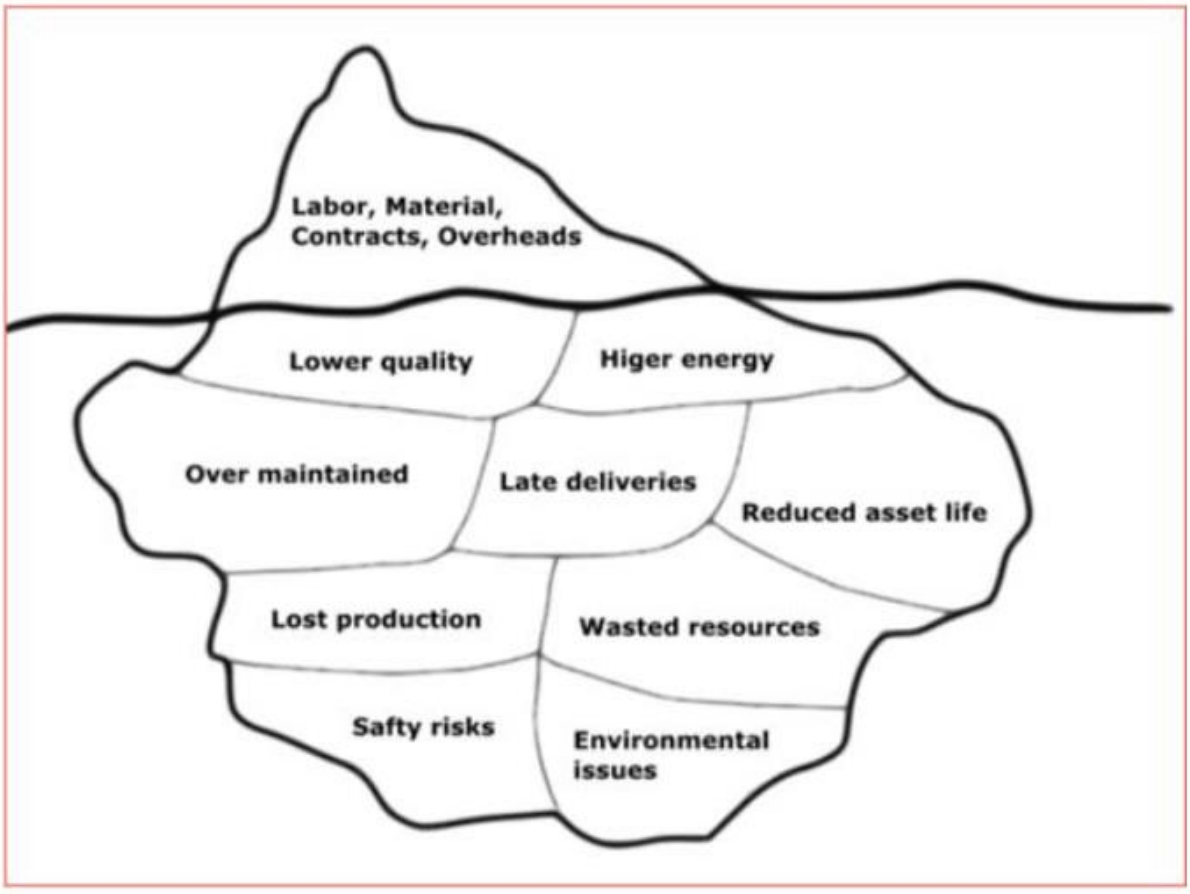

*Figure 4: The Wienker Iceberg Model **

So if we take direct and indirect costs, it is a considerable saving, which will make ROI possible in quite a little time. When you can show savings to your company, It is more likely that proposing investments in condition-based maintenance (buying sensors, equipment, software, hiring staff, digitizing procedures, doing root cause studies) will be much easier. Investments will be approved without problems.

B. Brief Profile Of The Leaders

Abhay Bapna

Abhay Bapna is a Digital Transformation leader with 25 years of global experience in all continents (USA/Canada/European Countries/Japan/China) in multiple domains from Agri/FMCG/Oil Refining/CPG/Retail/Steel/Semi-Conductor with a focus on Manufacturing & Supply chain Process improvement. Have worked on both sides, i.e. Product and Customers facing (Seagate/IBM Semi-Conductor/Intel/Nortel/Continental /Panasonic/Canon/Sony/Essar Algoma). He has worked as CIO for Adani Wilmar, Adani Agri fresh, & Adani Logistic and Currently working as "Application Head", focusing on building a future-ready digital core platform.

Amit Saluja

Amit Saluja is Senior Director and Head of Manufacturing Vertical at NASSCOM.

In addition to NASSCOM, Amit has held leadership positions at IBM, General Electric, and RPG Transmission in a career spanning over 25 years. Having worked with industrial and technology companies in multiple domains, Amit has gained a rich and diverse experience in using digital technologies such as AI, Cloud, Analytics, and IoT to usher in greater efficiencies in manufacturing and driving business growth. He is a firm believer in making optimum use of technology for transforming internal business processes.

Amit is a certified Six Sigma Black Belt and an expert in devising design thinking methodology.

Annie John Mathew

Annie John Mathew is the CIO of Mother Dairy Fruit & Vegetable Pvt. Ltd. Over a career spanning more than 2 decades, she has experience in diverse domains through having worked in organizations like NOCIL (India), Bharat Shell (India), Datacom Systems (NZ), Fonterra (NZ) and Xenacom (NZ).

She has primarily worked on technology enablement from within the business environment and made significant achievements by facilitating technology enablement of forward and backward linkage processes through mobile-based and traditional applications, SAP implementation etc in Mother Dairy. Annie is B.Tech (Chemical Engg) from LIT, Nagpur, PGDST from CDAC, (erstwhile NCST), Juhu, Mumbai and had industry certifications like PMP, CPIM.

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Atul Govil

Atul Govil is Chief Transformation Officer, Head (SAP and IT) for India Glycols Limited – a public listed company having an annual turnover of more than INR 6000 Cr. Atul is a Graduate engineer with a dual degree in Marketing & HR streams. He drives Business Transformation initiatives in India Glycols and brings in rich domain knowledge coupled with practical experience on new-age technologies. He has successfully implemented IoT based projects in his organization to drive manufacturing excellence & cost optimization initiatives. He is also a member of the Risk Management Committee for the company.

Kamal Karnatak

Kamal Karnatak is a seasoned CIO with experience of 26+ years, and he has held senior IT leadership positions with Indian Multinational Companies in India. Kamal is known for consistently delivering business value by cultivating, motivating, and leading high-performance teams that are passionately invested in the organization's success and the enterprise. He is known for building IT infrastructure from scratch. He has worked in Aditya Birla Group, DCM Shriram Consolidated Ltd, Unitech before joining RJ corp.

He has completed his PhD from IIT, Delhi. He is B. Tech, MBA, and he has done management courses from the Indian Institute of Management, Ahmadabad and Indian School of Business, Hyderabad.

Maitrey Modha

Maitrey Modha has 23+ Years of IT experience in various domains at different levels, from hands on to middle management to leadership roles. Currently heading ICT Technology at CNH Industrial for Asia, Middle East, Africa & Australia-New Zealand region.

Experienced in IT for Tool Rooms, Engineering consultancy, Pharmaceutical, Automobile Manufacturing, Capital Goods manufacturing, Financial Services. Highly experienced in setting up greenfield manufacturing facilities, setting up new companies, fresh ERP implementation, ERP upgrades and reimplementation, MES implementation, Industrial IOT, Robotic Process Automation, Digital Transformation, IT Infrastructure, Security and End User support function setup from scratch for large multinational companies.

Manzar Abbas

Manzar Abbas, Rockman Industries Ltd. is a technology professional with 21+ years of experience developing and executing IT & OT strategies globally. An established track record as a leader & business partner who collaborates with other executives to use technology to drive innovation, transform and simplify business processes and deliver bottom-line measurable benefits. Currently, he is working with Rockman Industries Ltd as CIO. Key highlights are establishing and implementing Operational Technology (OT) based on Energy Management System, IIOT & Data Analytics on Shopfloor to deliver savings across seven manufacturing plants across India.

Parna Ghosh

Parna Ghosh is associated with UNO Minda Group as Group CIO. He has 30 years of experience in various leadership capacities. Winner of 50+ awards in IT and leadership categories. Prior to Uno Minda, he was associated in leadership positions with CNH Industrial, Honda Motorcycle & Scooters India, Tata Group (TACO) & Pricol. He is a distinguished speaker in various IT Forums. Represents various national forums – National Digital committee and Chairman for North Zone Digital Committee of ACMA, Member Governing Council of CII – Center for Digital Transformation, Knowledge and Innovation Council. He holds Post Graduate Degree in Information Technology & certification from reputed institutes.

Prakash Dharmani

Prakash Dharmani, is Information Technology & Digital Transformation leader with a firm belief that only 'Change is constant'. He is a Chemical Engineer & completed executive management program from IIM, Bangalore. He has 28 years of diversified global experience working with multiple industries like Petrochemical, Utilities, EPC, Shared services, 3PL Logistics and discrete Manufacturing & different work-cultures alike. He has worked in India's largest private sector organizations like Reliance Industries, Essar group and currently working as Global CIO at EPL Limited.

Rajesh Kumar Singh

Rajesh Kumar is the Vice-President & IT Head for JK Lakshmi Cement is having more than 22 years of experience in digital space across Industries like Auto, Consumer Durables and Building Materials. His interest is in resolving core issues of industries and take them to the next level of journey on transformation. He is practicing both conventional & emerging technologies for creation of sustainable solutions for the industry. His major style of functioning is to build teams and ecosystem where teams can transform functions independently and also able to run them efficiently. He has done his graduation from Delhi College of Engineering and post-graduation from IIM-L.

Shaveta Wadhera

Shaveta Wadhera has extensive experience championing the digital transformation for financial services and manufacturing organizations across the technology domains: ERP implementations, Brilliant factory applications, infrastructure operations, high-performance computing, IT sourcing and cost center management. Her roles have been focused on laying out strong strategic directions, leading the execution of digital and organizational transformation journeys, building business partnerships, improving customer experience, defining and simplifying business processes, enabling operational efficiencies and leading successful talent strategy across various industrial verticals.

Vijay Sethi

Vijay Sethi is a Digital transformation and sustainability evangelist and serves as Advisory Board Member in various organizations. He advises and mentors corporates and start-ups in various facets of management, Digital transformation and sustainability. He also serves as Chairman of SAP India User Group (INDUS). Mr Sethi has more than 30 years of experience in the manufacturing industry and consulting environment and has served as the CIO, CHRO and Head CSR at Hero MotoCorp. Prior to that, he worked with Ranbaxy and Tata Consultancy Services.

A huge proponent of digital technologies and cybersecurity and risk management, he has major experience in Digital Transformation roadmap and projects, Large Scale IT projects, Community Development Projects, Talent Development and Employee Engagement.

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About CIOs Of India

CIO's of India is a 25-year-old Professionals' body in India. It is a national technology body with more than 1000 members (In India and abroad), including Indian and multinational companies. CIOs Of India was set up in 1996 in Delhi with the name ISMF (Information Systems Managers Forum) to facilitate interaction among IT/IS professionals in software and services and encourage software technology advancement. It is a not-for-profit organization.

CIOs Of India runs many programs for Tech Community. Some of them are Professional Networking events, Gyan Hub, Gyan Bytes, Family Connect, Learning with Experts, Health-related Program, Wealth related sessions, Certification program under #SharpenTheSaw etc.

Under the program **#SharpenTheSaw,** CIOs Of India focuses on upskilling tech leaders. CIOs Of India tied up with IIT Delhi, IIT Bombay, IIT Kanpur and other prominent institutions to facilitate the certification programs for Tech Leaders. CIOs Of India also signed MOU with the "NASSCOM Centre of Excellence IoT & AI", and they are partnering in various programs like the Manufacturing Innovation challenge, SMCC (Smart Manufacturing Competency Center). CIOs Of India has done one certification program through the Indian Institute of Production Management on Condition Based Maintenance. CIOs Of India has also tied with NASSCOM Future Skill Prime to provide the learning platform for the tech community.

If you are CXO and want to become a part of future Manthan Programs, please fill this form.

For Membership, Partnership, Collaboration opportunities, please write to info@ciosofindia.com

About NASSCOM CoE- IoT & AI

NASSCOM Centre of Excellence (CoE) for IoT & AI has been established on Public-Private Partnership model under Digital India initiative of Government of India by Ministry of Electronics and Information Technology (MeitY) and State Governments. NASSCOM CoE is building India's largest deeptech collaborative platform to bring together Industries, Government, Academia and Start-ups to drive innovations through adoption of digital technologies. CoE has four centers in India - Bangalore, Gurugram, Gandhinagar and Vizag. Industry 4.0 and Healthcare & Lifesciences are key priority areas for the CoE. The CoE has a number of focused initiatives including Manufacturing Innovation Challenge to solve use cases from manufacturing enterprises and UDYAM 4.0 for guiding MSMEs on their digital journey. CoE has also built an experience center – Smart Manufacturing Competency Centre to showcase Industry 4.0 technologies, in the form of permanent virtual exhibition