IoT Technologies and Manufacturers

by Anil Janardhanan | January 9, 2023

Today's manufacturing landscape is increasingly becoming complex due to changing customer demand, market trends, global competitors, supply chain challenges, demanding sustainability goals and so on. In addition, the traditional challenges such as escalating costs, productivity loss due to unplanned shutdowns, and aging equipment & infrastructure also hinder progress for the manufacturing segment. Adoption of a capable automation technology is the need of the hour. More and more manufacturers across the globe are turning to IoT enabled intelligent automation to accelerate their digital revolution. Major digital trends in manufacturing segments are AI / ML, IoT, Big Data, Robotics, and Analytics.

How IoT works for Manufacturing sector?

Internet of Things is a network of connected devices communicating with each other of other networks. IoT devices are mainly leveraged to collect data and perform analytics to extract insights from the collected data.

IoT devices, also referred to as Smart Devices, are integrated with embedded software & built-in sensors, connect and exchange data to drive informed decision making at critical levels of the manufacturing process. Industrial IoT is not a futuristic technology anymore, but a technology that is being leveraged by manufacturers to improve their processes today.

IoT Solutions, enable Manufacturers with:

1. Data collection and automation across processes – IoT technologies are enabling each component in a process line to collect data and receive remote commands. IoT enabled PLCs are a good example.

2. Improved Data quality & security – IoT allows digitization of data management, which reduces the manual handling of data and facilitates remote and automated data handling. This reduces the number of human users and reduces the chances of intrusion of malicious actors.
3. Enhanced workplace visibility and safety
4. Remote production visibility - Connecting and collecting data from machines on the production floor significantly enhances the visibility to supervisors and managers and equip them to take the right decisions at the right time.

Manufacturers can achieve

a. Improved energy efficiency – IoT enables breakdown on energy consumption across process lines and at equipment levels. Smart alerts and analysis of consumption data allow the system to provide timely insights and recommendations on improving energy wastage and opportunity for savings.
b. Predictive maintenance – One of the most labor intensive and time-consuming processes in manufacturing is maintenance of equipment. IoT technologies facilitate predictive maintenance through a combination of smart sensors and AI/ML, eliminating breakdowns, downtime, and reduction in maintenance costs.
c. Enhanced Product Quality – IoT enables the identification and elimination of reasons for poor product quality whether it is faulty machines or process.
d. Improved asset life and utilization – Through remote monitoring and predictive maintenance, reduces actual breakdown of machines and with timely replacement of parts/ maintenance activities enhances its life. Through measuring and tracking the overall equipment effectiveness (OEE) of machines, manufacturers can improve the utilization and efficiency of assets.
e. Ability to make quick informed decisions – IoT unlocks the critical data from the entire manufacturing production chain - machines, processes, quality of products, assets, energy utilization, and many more. These data are analyzed using AI/ML techniques generate valuable insights and drives faster decisions.

Challenges in the IoT Technology adoption in Manufacturing

There are many broader challenges in managing an Industrial IoT network with an array of networked devices. These IoT devices are also open to cyber security risks. To make the deployment of an IoT solution successful, there are many steps of planning and assessments are required. Main aspects that require attention are:

- Alignment of key performance Indicators (KPIs) and business objectives
- Identification of key Stakeholder and alignment
- Availability of right IoT technology expertise
- Assessment and mitigation of Security threats

These challenges can be addressed by running an IoT adoption readiness assessment and roadmap planning including a security risk assessment. The security risk assessment to be conducted at regular intervals during the IoT solution lifecycle. Training for the staff in all aspects of the IoT solution at regular frequency will also enhance the value of the IoT technology deployment.