PAT Pulse

Asset Optimization to Drive the Next Wave of Energy Efficiency in India

November 18, 2016

Sustainability Outlook

Alliance for an Energy Efficient Economy

Introducing PAT Pulse

- 'PAT Pulse' is **a quarterly briefing series on PAT with DCs, policy makers, catalysts and industry experts to capture the pulse of the energy efficiency market in India** created by Sustainability Outlook and Alliance for Energy Efficient Economy (AEEE) in collaboration with Shakti Sustainable Energy Foundation.
- The objective of this stakeholder briefing series is to provide evidence based, market assessment tool to present the stakeholder view point, enable higher uptake of PAT through peer learning and incubate industry and policy action on energy efficiency.
- PAT Pulse a **neutral platform** to present and share unbiased views and experiences of the key stakeholders of PAT scheme, primarily the **DCs** and provide linkage

June 2016 issue of PAT Pulse

- **Focus:** Sustainability Outlook and AEEE explored the prevalence, drivers, business case and key challenges for IoT based Smart Manufacturing (SM) solutions in Indian industry.
- **Current Solution Providers in Smart Manufacturing stream:** Snapshot of the active solution providers currently in the Smart Manufacturing stream is enlisted in this issue.
- **Policy and market updates:** The issue also provides updates on PAT cycle 2 sectors and targets as announced by Bureau of Energy Efficiency (BEE) and a brief snapshot of key news and events in the industrial energy efficiency domain.

Key Highlights of PAT Pulse June 2016

Optimization of **Overall Equipment Effectiveness** will define the next wave of Industrial Energy Efficiency (EE) in India

Internet of Things emerging as a key enabler for Smart Manufacturing

Market penetration of IoT based smart manufacturing solutions will increase from current levels of **~5%** to **30%** by **2020**

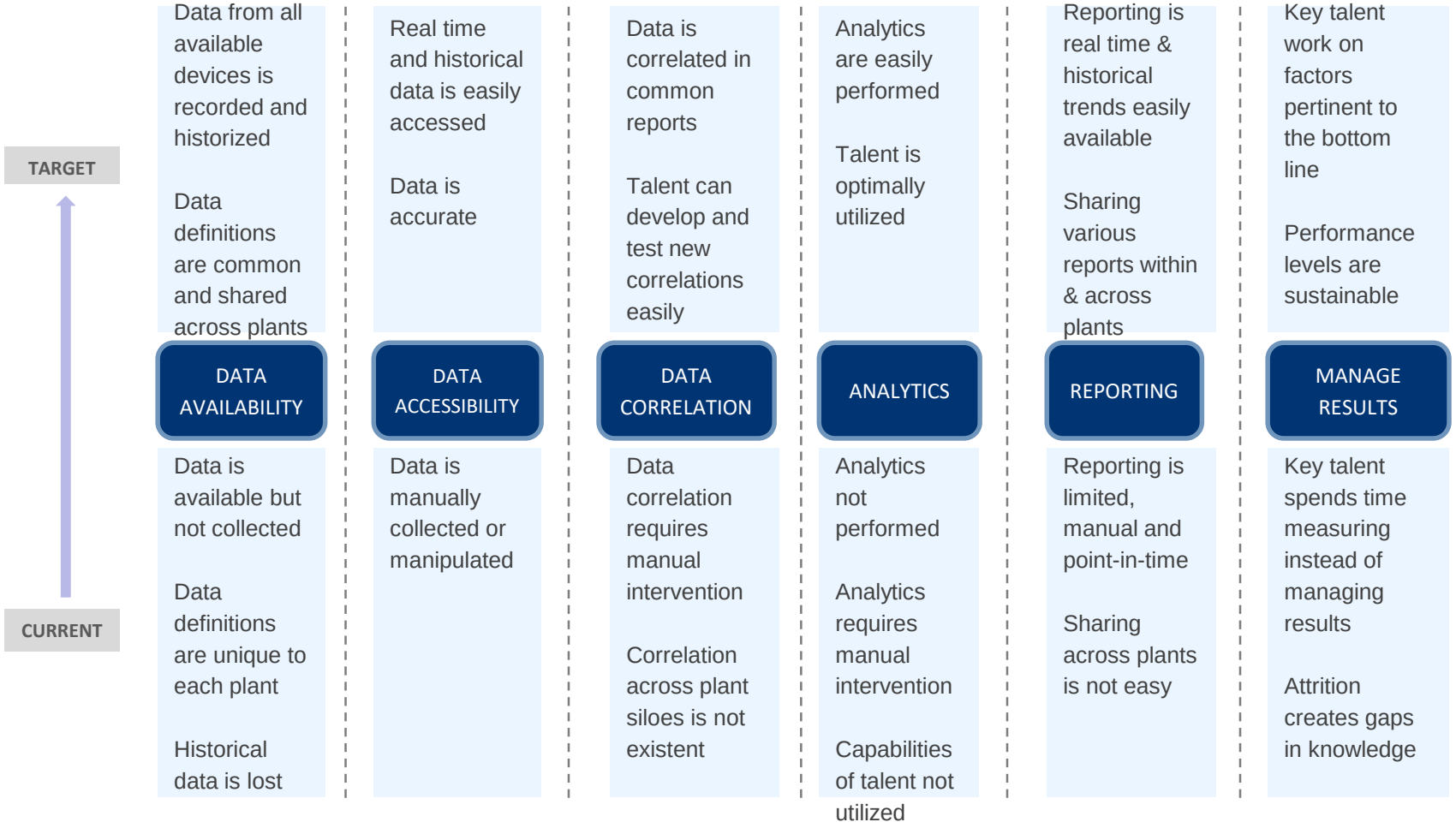
Skill building required for enhancing ease of using IoT based smart manufacturing solutions and developing good quality data scientists

Increasing awareness about the potential and business case of IoT based smart manufacturing solutions crucial to reach the next stage of Industrial EE

Smart Manufacturing: The Next Big Leap Influencing Energy Efficiency

- The American Council for Energy-Efficient Economy defines Smart Manufacturing (SM) as "*the use of information and communications technology to integrate all aspects of manufacturing, from the device level to the supply chain level, for the purpose of achieving superior control and productivity*
- Such a digital transformation can be enabled through technologies such as Internet of Things (IoT), machine learning, SMAC (Social, Mobility, Analytics, Cloud) technologies
- **Smart manufacturing solutions enable better process execution and better practices by utilizing intelligent insights that are born out of the data collected from multiple areas within the factory**
- Internet of Things as a technology is pretty unique as it entails the collaboration of four distinct industries. There are:
  - **Sensor manufacturers**: They are responsible for accurately capturing information
  - **Communications industry**: They are responsible for transfer of information
  - **Information Technology Service providers**: They are responsible for analysing and presenting the information
  - **Specific domain of application**: Expertise in specific manufacturing sectors, for example, any of the PAT sectors

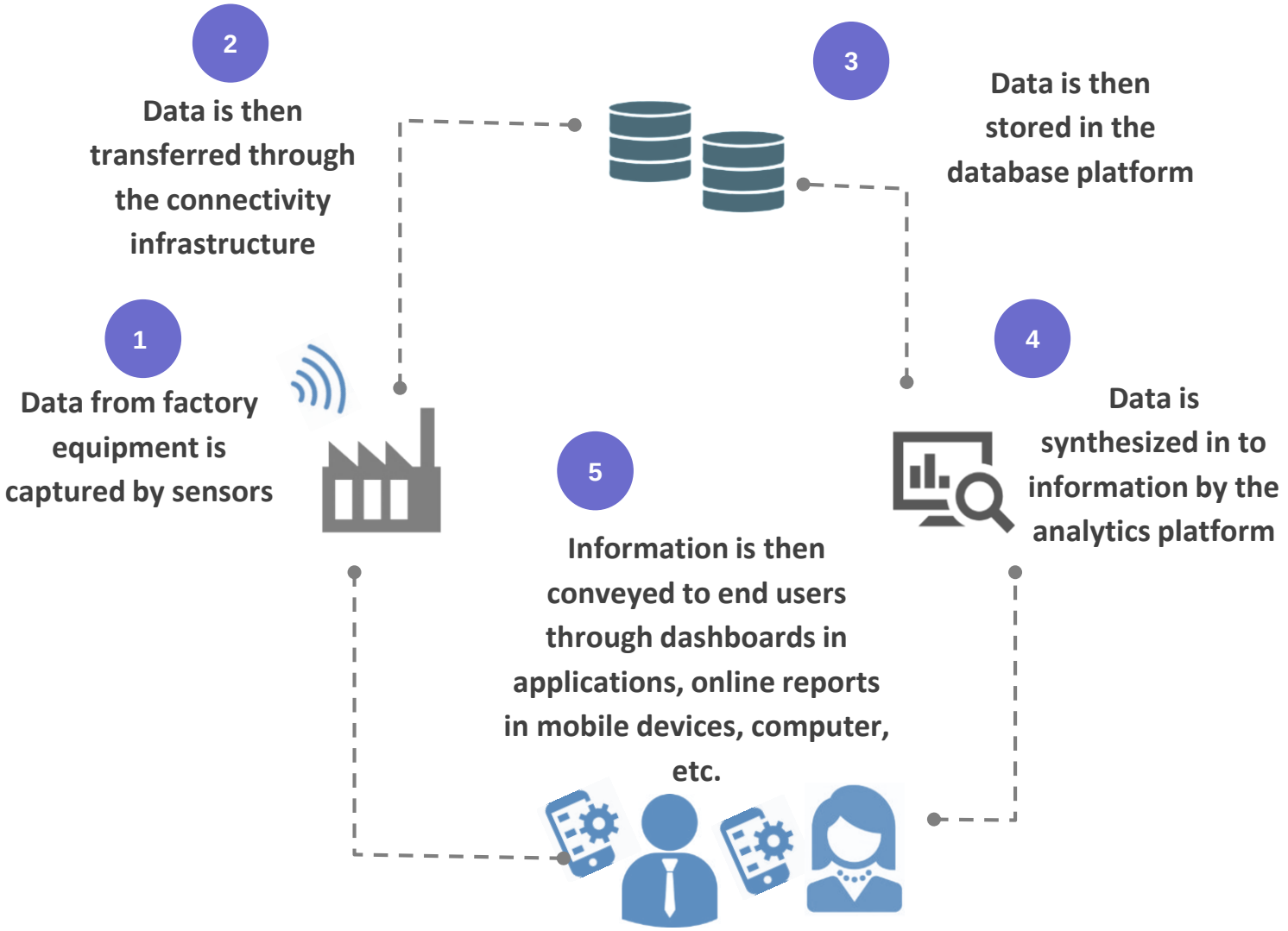
Good Quality Data Drives the Development of Intelligence



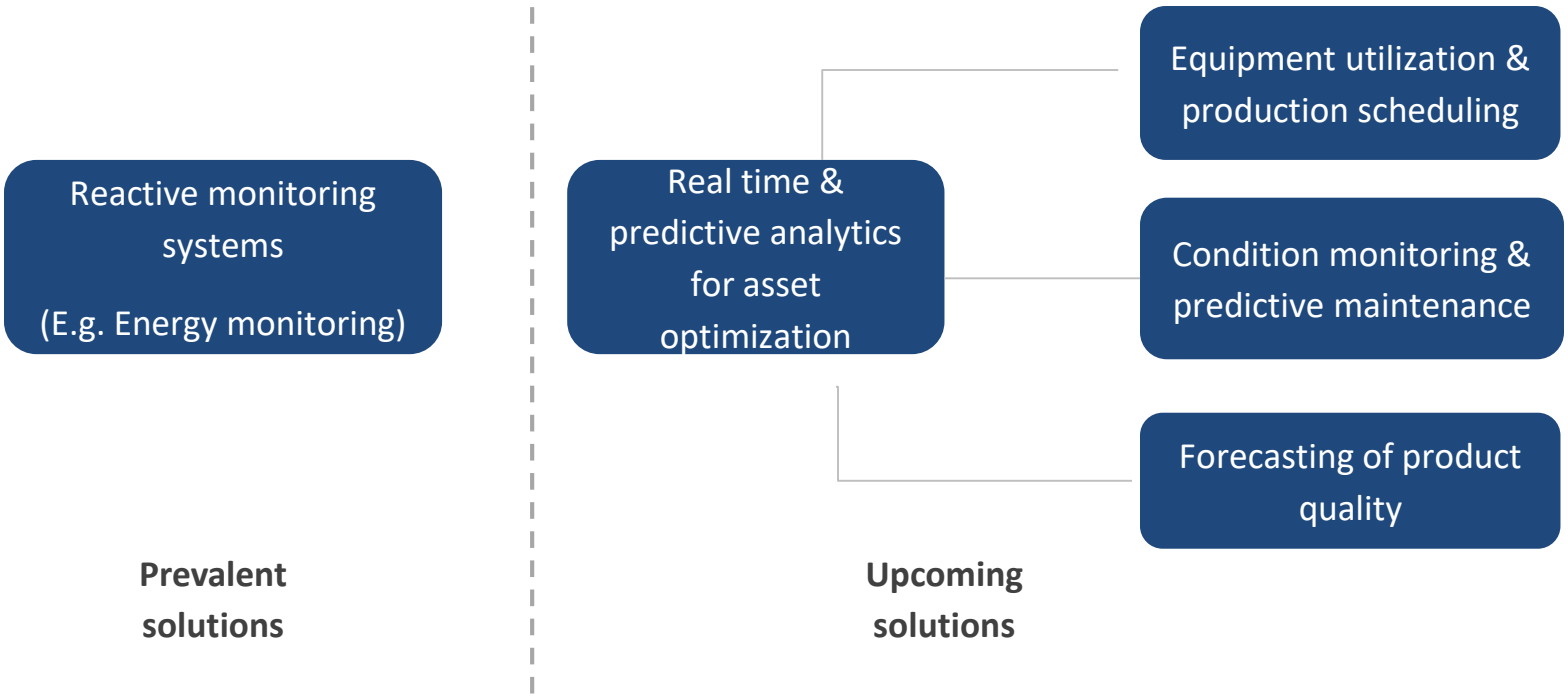
Data capability and maturity model

Source: Alcoa, The SMART Manufacturing Business Case

Layers of Data in IoT Based Smart Manufacturing Solutions



Asset Optimization: An Emerging Area for Smart Manufacturing Solutions



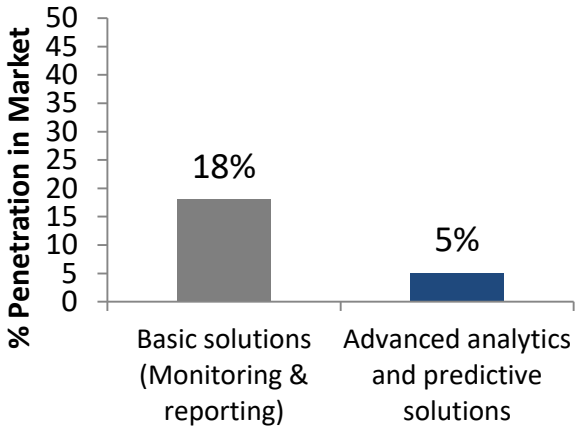
Asset optimization directly influences energy efficiency

- **Potential of Improving Overall Equipment Effectiveness (OEE)**
  - OEE can be described as the ratio of actual running hours of a given equipment or process when compared to the planned running hours of the same. The deviation from planned operation is owing to non-value added tasks such as waiting, machine changeovers, stoppages, and maintenance and quality issues in the product
- **Equipment Utilization and Scheduling Can Instantly Impact Energy Efficiency**
  - Get a real time picture on how effectively is each machine running when compared to its output and with minimal idling time through IoT based SM solutions.
  - Helpful in remote location monitoring
- **Predictive Maintenance has Direct Economic Benefits**
  - Industrial maintenance accounts for over 30% of a factory's annual operating costs and between 60-75% of a machines lifecycle cost
  - One can gain better visibility on equipment's conditions by monitoring certain parameters such as temperature, current, voltage, revolutions per minute, etc. and mathematical analysis on this bulk data, compare the results with critical values and predict when a components could fail so that action can be initiated much before the failure actually occurs (predictive maintenance).
- **Forecasting of Product Quality Enables Timely Correction of Flaw**

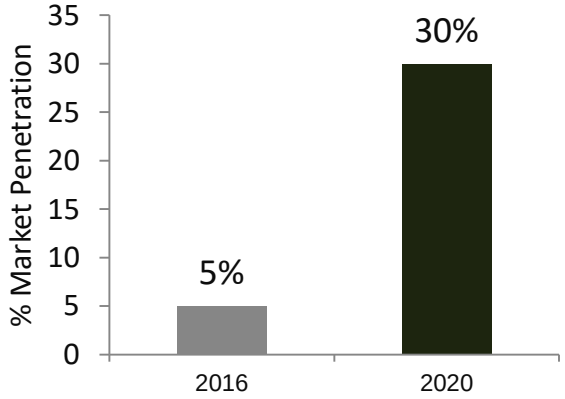
What sets IoT based smart technologies apart is that they provide insight and actionable information to the end users as also possess capabilities for predicting future conditions

Smart Manufacturing Solutions Currently have Low Penetration in India

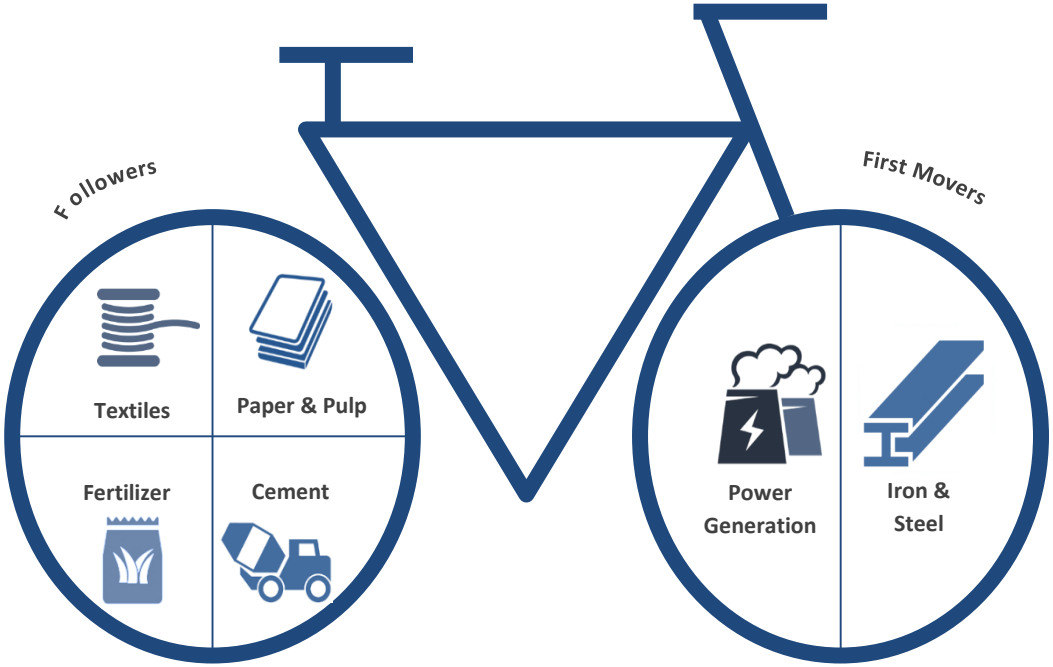
Estimated Current Market Penetration of Data Based Manufacturing Solutions



Expected Market Penetration of Data Based Manufacturing Solutions by 2020



PAT Sectors that are using IoT Based SM Solutions



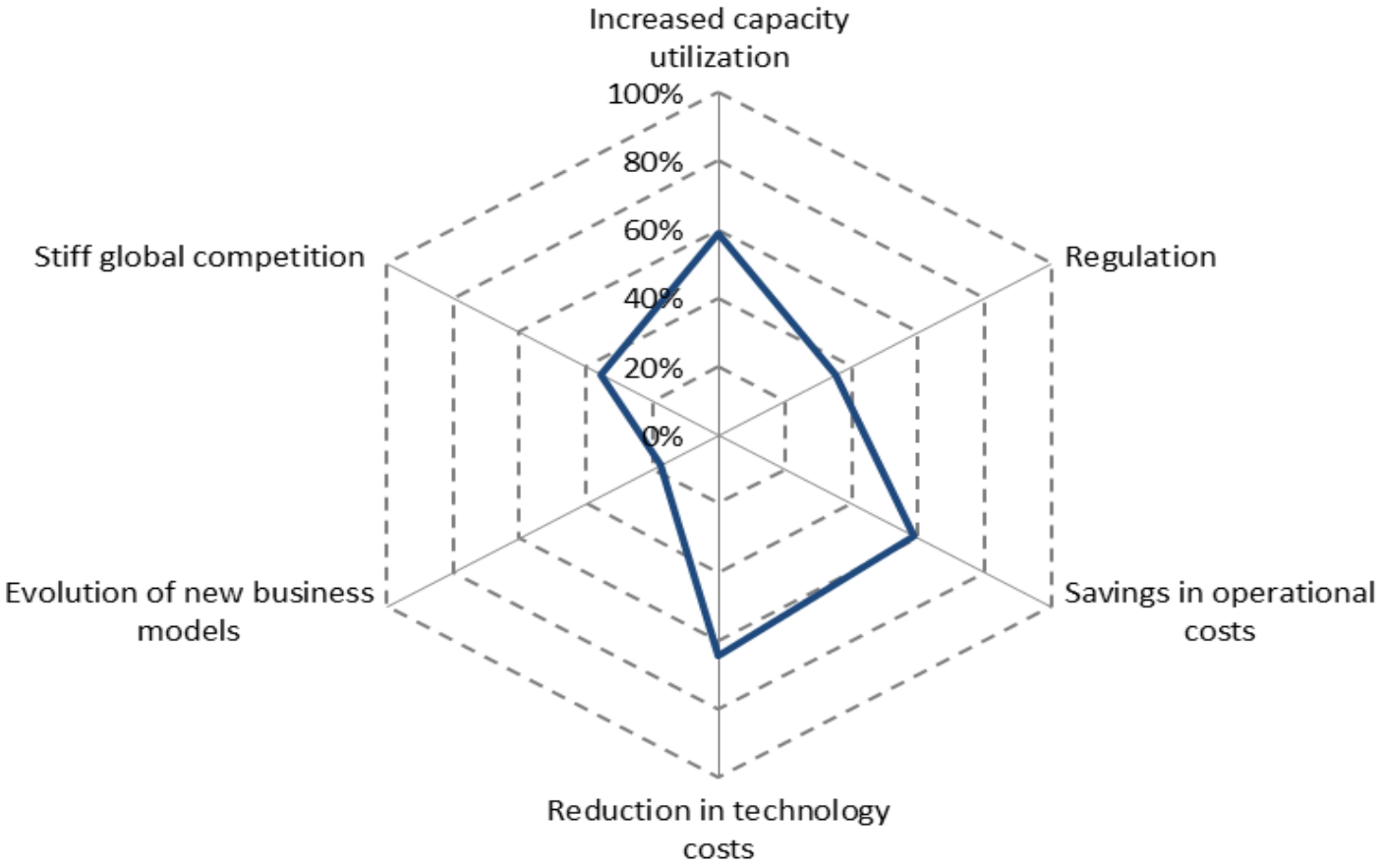
Business Case for Smart Manufacturing is encouraging

- Savings in energy to the tune of at least 10-15% could be anticipated
- Energy monitoring and management solutions alone have the potential to reduce energy costs by 4-5%.
- Operations and maintenance expenditure could be reduced by 2-5%.
- Productivity improvements are also estimated to be at a minimum of 12-15% by just basic monitoring of equipment and streamlining of production schedule.

Payback Ranges from 12 – 60 months; Depending on Complexity of Solution and Extent of Coverage

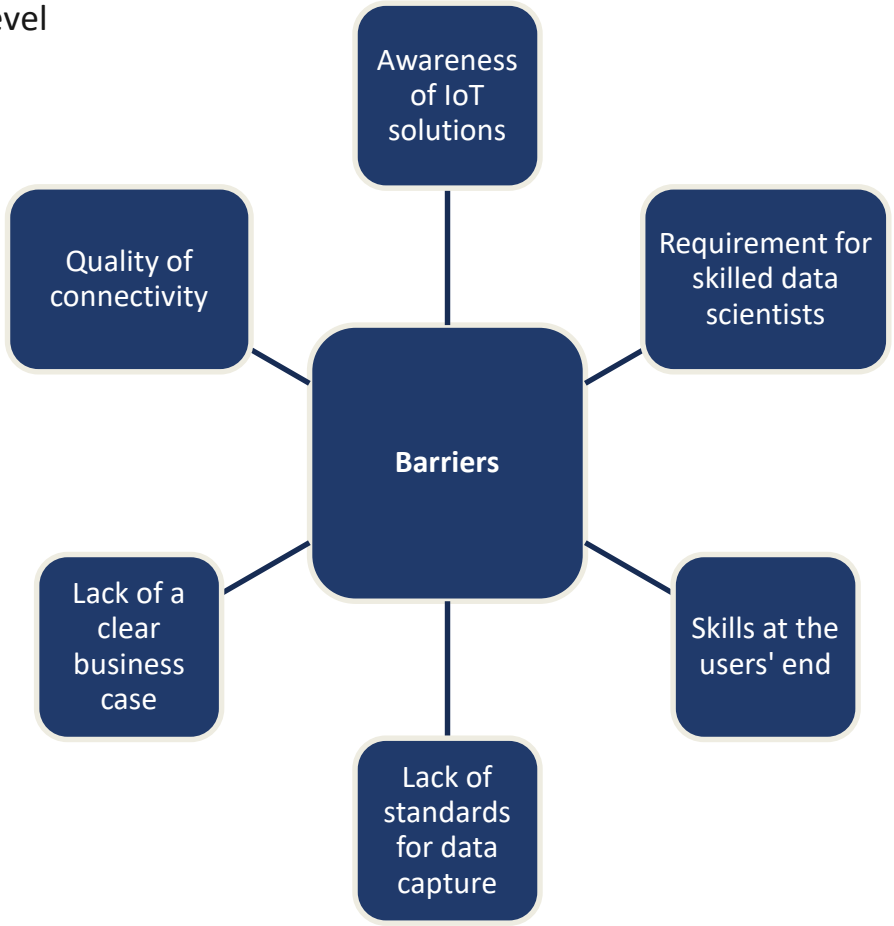
Reducing Technology Costs Coupled with the Need to Optimize Performance Efficiency and reduce Operational Costs Likely to be the Key Drivers for IoT Based SM Solutions

Drivers for IoT Based SM Solutions in the Future



Key barriers for Uptake of Smart Manufacturing Solutions

- Change Management and Definition of a Clear Business Case could be the biggest challenges for accelerating SM solutions.
- Lack of awareness about the solutions available in the market, their features and their likely benefits is also a grave issue hampering the uptake of IoT based SM solutions, among other reasons.
- Skill gap at the operator level



Key Trends that are Likely to Emerge

- **Number of solution providers to increase** with increase in clarity as well as in the number of use cases for smart technologies.
- **Manufacturers will continue to seek end to end solutions.** Hence, the market which may be fragmented at present will get increasingly consolidated.
- **Hardware costs likely to reduce.** The kinds of sensors and their sensitivity will improve and move towards more rugged designs.
- **Automation based on analytics** would be a key area that would emerge over the next few years.
- There could be a **need for reorganizing of the skilled labour** of today
- **Influence of IoT based SM solutions on energy efficiency likely to move beyond the fence** of the factories to the entire value chain of manufacturing.

Way Forward

- Need to improve the awareness of available solutions
  - Solution providers should make more case studies and project references available to manufacturers which could help them gain confidence
  - Experience must be spread through 'word of mouth' by units of an industrial cluster successful in implementing solutions to various factories within the industrial cluster
- Enhanced skill sets of the operational staff through classroom and shop floor trainings on topics like:
  - Basic computer and software skills
  - Data entry and its quality(if applicable) and its importance
  - Basic appreciation for IoT / Digitally connected assets
- Capacity building should happen on an ongoing basis to address the attrition within factories

Some of the current active Solution Providers in the Smart Manufacturing domain

Wipro Eco Energy

Customized solutions using “Managed Energy Services” engagement model to provide a Capital Expenditure light efficiency solution for all phases of manufacturing. Under this solution providence, Wipro Eco Energy takes the ownership of identifying savings opportunities, developing the best fit custom solution, deploying site instrumentation, deploying software and eventually delivering time bound savings.

Flutura Business Solutions Private Limited

A leading Machine Intelligence Platform – “Cerebra” for managing and optimizing machine performance. Cerebra enables industrial and commercial machinery manufacturers create new business models around predictive maintenance for their equipment. Equipment owners leverage Cerebra for optimizing performance of their machines in their production operations. Cerebra's state of the art machine diagnostics and prognostics algorithms enable several asset centric functions.

Aeris

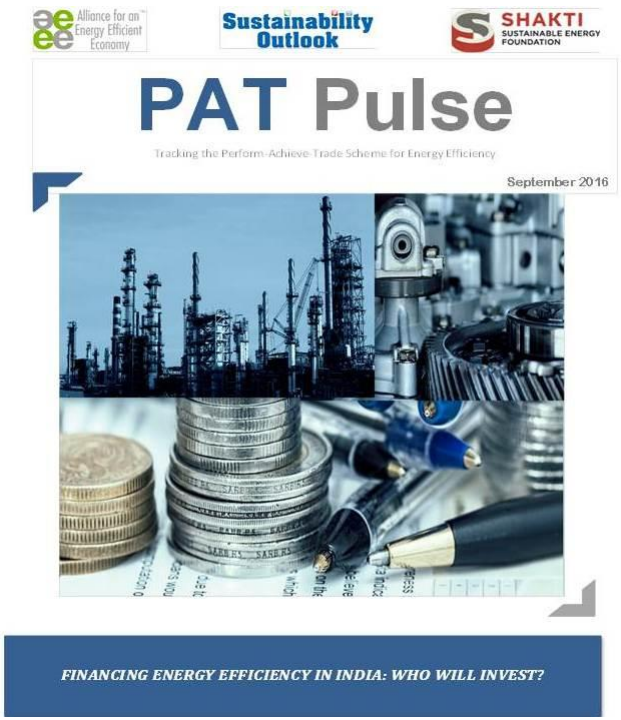
AerVoyance by Aeris provides IoT analytics to effectively manage customer’s IoT/M2M deployment using an intuitive, visual presentation. It is designed to help address the challenges of gaining visibility and insight into devices, connectivity, and billing information. Being both a technology provider and a cellular network operator delivering comprehensive IoT / M2M services to leading global brands, Aeris is a pioneer in the machine-to-machine market.

Eco Axis

SuperAxis™ Smart Manufacturing Suite is a Software as a Service (SaaS) offering to industrial customers which enables Role-based analytics for plant operations and management, Condition-based maintenance, OEE, production, productivity, availability, losses, KPIs, Energy & resource management, Remote monitoring for plants, discrete equipment, and utilities, Enterprise-wide deployment (including multi-plant) and benchmarking and Integrated MIS.

Latest and upcoming issues

PAT Pulse-4



Fourth Issue of PAT Pulse

- Focus: Financing Routes for Industrial Energy Efficiency in India
- Released : September 2016

PAT Compendium

- Focus: Compilation and a thematic comparative analysis of all the four PAT Pulse releases
- PAT experiences, learnings and challenges and developing an Outlook based on areas covered in market briefs
- To be Released : November 2016

How you can contribute

- Engage in the upcoming knowledge products and stakeholder discussions

- Share your energy efficiency innovations.

To engage with us on industrial efficiency focus areas, please contact
Dr. Koshy Cherail (koshy@aeee.in)
Aparna Khandelwal (akhandelwal@sustainabilityoutlook.in)