

birla**soft**



Plants of Future enabled by New Age Technologies



Index

1 Plants of the Future – Manufacturing Revolutionized

2 What is in it for Manufacturers?

3 Birlasoft's PoV on Plants of the Future

4 Client Success Stories

- Cement Manufacturer integrates 50+ plants, improving operational efficiency by 15% with an Edge & Cloud Platform
 - A global engine manufacturer monitors 85+ KPIs through real time monitoring across 1000+ Connected assets
 - Connected Smart Factory solution reduces asset downtime for a textile machinery and components manufacturer by 30% with Predictive analytics & IOT
 - Distributed Quality Control leads to 30% reduction in rejection for a leading motorcycle manufacturer
 - Digital Twin for Supply chain value chain performance optimization
-

5 What does the future hold?

Plants of the Future

Manufacturing Revolutionized

The plant of the future refers to the integration of advanced technologies and innovative processes to create smart, sustainable and autonomous manufacturing facilities.

The factory of the future involves the use of technologies like AI, -machine learning, real-time data analytics, and 3D design/simulation. In addition, 5G, Edge computing, Automation, IIoT, digital twins, and big data also play a significant role.



This calls for highly automated, data-driven, and agile production environments that can respond quickly and efficiently to changing customer demands, disruptions, and tech advancements by making improvements in three major areas:-

01.

Plant structure and processes

Flexible layouts, future-oriented systems and an integrated approach with agility combined with ecologically sustainable production processes.

Optimization using lean management to facilitate customer centricity and continuous improvement.

03.

Connected Workforce

Drive safety, efficiency and collaboration with digital tools and empower the workforce with real-time actionable insights.

02.

Digitization

Intelligent automation, robots, AR/VR, mixed reality, interactive dashboards, Digital Twins, and simulations to optimize processes.

What is in it for Manufacturers?

The plant of the future promises to revolutionize manufacturing and address prominent queries that Manufacturers delve into day in and day out, such as -



01.

**Monetizing
diverse data
across
IT-ET-OT**

domains and allow high value applications to access any data, anywhere

02.

Driving **co-innovation** and manage **experience by design** and not as an afterthought

03.

**Modernize
legacy
Engineering &
OT Apps** as a transformation accelerator

04.

Managing **Platform as a Product** and optimize for **agility** and **product longevity**

Staying Ahead: Embracing Industry Trends in Manufacturing Plants

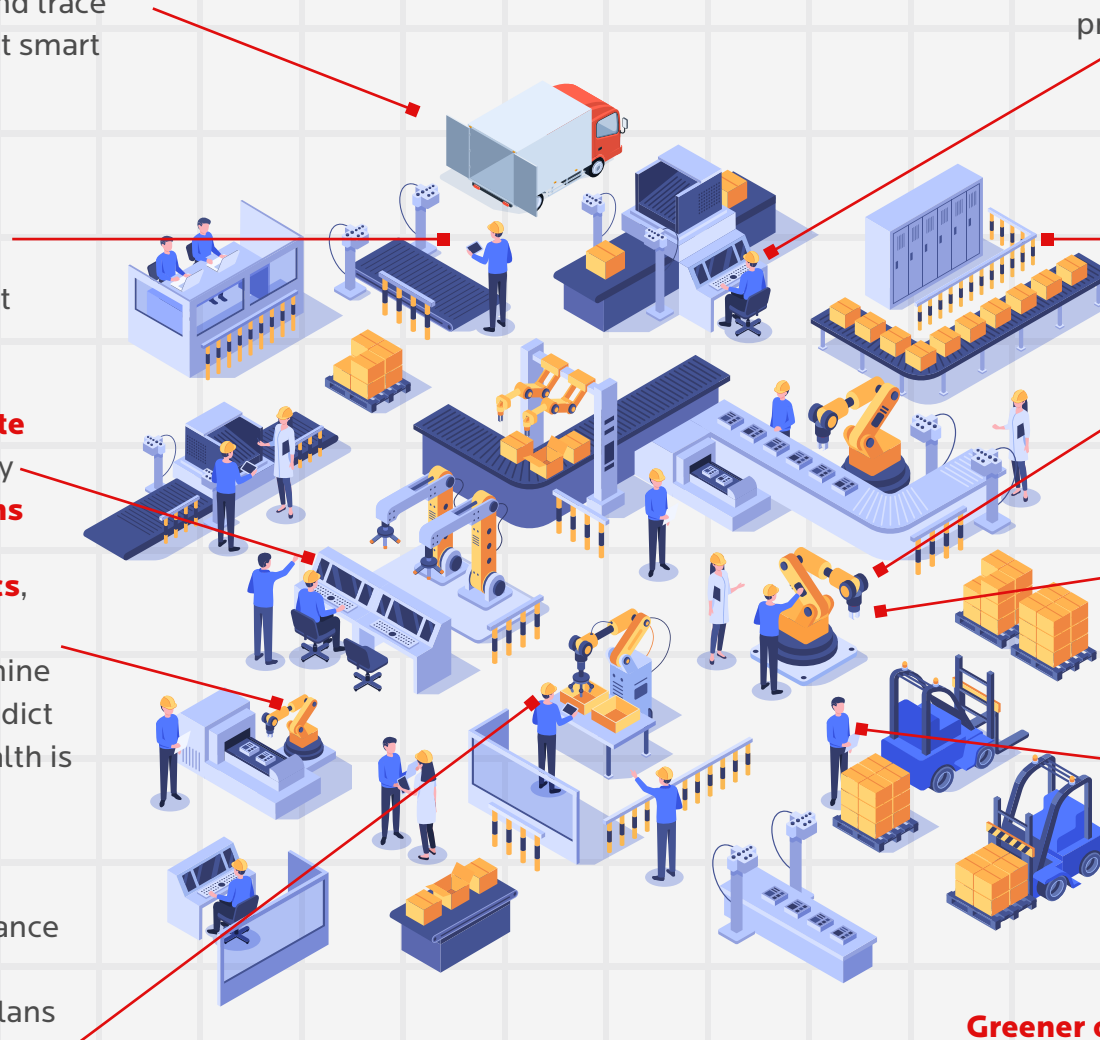
Using **blockchain** to manage global trade documentation, track and trace cargo shipments, and conduct smart contract transactions

In order to **track & trace** with real-time operational transparency, manufacturers plan to boost their investment in IIOT

Manufacturers would **simulate and assess** their entire supply chain risks using **Digital Twins**

Predictive Machine Analytics, which generates models by combining data mining, machine learning, and analytics, to predict future outcomes on asset health is becoming more popular

Leveraging Gen AI in factory operations to create maintenance plans based on asset health improving OEE, production plans based on real-time capacity and volume forecast optimizing production efficiency



Industrial AR/VR is leveraged extensively for product design and prototyping, product maintenance and repair, and employee training

US manufacturers intend to increase their **workflow automation spending** to maintain competitive production costs

Cobots are low-cost, easy to deploy, and quick to program, helping manufacturers increase the production efficiency

By automatically **detecting product defects**, computer vision powered by AI & ML improves quality control operations

Industrial Manufacturers are increasing their investments in **smart factory with 5G & Edge computing** presenting an ecosystem of opportunities

Greener operations with energy consumption optimization, waste reduction & recycling technologies along with sustainability data collection across the value chain to increase visibility into carbon hotspots thereby build the future roadmap to meet **Net Zero target**

Client Success Stories



**Cement
Manufacturer
integrates 50+
plants, improving
operational
efficiency by 15%
with an Edge &
Cloud Platform**





Solution

- Complex integration and interface development for Edge platform data collection and acquisition with old legacy Historian and DCS system
- Enabling Predictive and Prescriptive analytics at the Edge
- Design & Development of IIoT Platform integrating 50+ plants with 75 OPC servers connected using OPC as a data source comprising of 1.5 Lakh tags
- Development of application with real time monitoring dashboard (25 Mimic Screens) and future proof stack built on modern architectural concepts and cutting-edge technologies

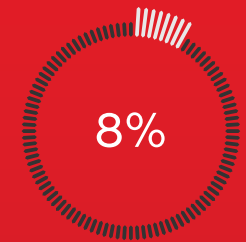
Key features

- Scalable solution architecture starting with building the foundation with a cloud-based OT data model which can be leveraged for future analytics
- Flexible to accommodate future requirements and to establish a connectivity with cloud gateway to connect seamlessly and securely

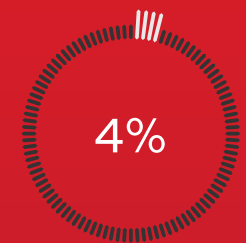
Benefits



improvement in
operational efficiency



improvement in
throughput



reduction in specific
energy consumption

A global engine manufacturer monitors 85+ KPIs through real time monitoring across 1000+ Connected assets

Client wanted to gain useful insights from their factories, machine systems at multiple locations to improve the production process by increasing asset efficiency, reducing defective units, shortening delivery time and improving throughput.





Problem Statement

- Inability to generate insights from vast amount of uninterpreted data
- Lack of real-time visibility and inability to monitor multiple KPIs
- Reduced throughput and machine productivity
- Increasing machine downtime across locations
- Operational costs rising due to unexplainable reasons
- Need for KPI Monitoring to enable Operational Excellence, Predictive Asset Maintenance, Decarbonization

Solution Highlights

- **User Empowerment**– Role based (Business, Engineering, Maintenance, Supervisor, Planner, Operator) with **Situational Awareness Platform**
- **Independent** Production, Asset, Energy Performance, Insight and Intelligence templates
- **Unified data model** – IT – OT system, process data convergence
- **Intelligent actionable** alerts and alarms
- **Production insights and Operations Intelligence** for Smart Production, Quality, Inventory, Maintenance
- **Interoperability** – Supports different data connectivity and communication protocols
- **Extensibility**- Interfaces to connect with different Enterprise, SCADA, Maintenance systems
- **Domain-based configurable** system, KPI, Diagnostics, Predictive analytics, Actionable Report Template
- **Highly Scalable** - Supports 100+ concurrent users and 1000+ connected assets
- **End to End security** (Plant, Asset, Network, User)

Value Created

Real Time Visibility, Actionable Alerts & Alarms for Manufacturing, Machine Health and Energy KPIs to drive:

Productivity increase

OEE increase

Quality cost reduction

Energy efficiency increase

Time to market reduction

Reduction in GHG

Monitoring 85+
KPIs currently

**Connected Smart
Factory solution
reduces asset
downtime for a
global textile
machinery and
components
manufacturer by
30% with
Predictive
analytics & IOT**





Problem Statement

- Improve asset utilization and uptime
- Control production costs
- Overcome unplanned downtime of critical assets
- Identify potential weak points in the system and perform preventive maintenance

Solution Highlights

Connected factory solution leveraging digital technologies like **Predictive analytics & IOT** with real time shop floor monitoring, improved asset utilization, minimized downtime and enhanced operational efficiency

- Birlasoft Big Data Platform was leveraged to manage near real time data and analytics
- Developed Predictive Maintenance Expert System to ensure high utilization and to avoid unplanned downtime of spinning machines
- Captured real time sensor data and applied Conditional and Correlation alarm generation
- Developed abnormal behavior detection and known fault predictive models to proactively predict the occurrence of faults
- Planned maintenance and ticket generation

Value Created



reduction in asset downtime



reduction in overall maintenance cost



faster data availability for operational control

**Distributed
Quality Control
leads to 30%
reduction in
rejection for a
leading
motorcycle
manufacturer**





Problem Statement

- Lack of visibility and real time monitoring of processes which are critical to the quality at vendor's end
- This resulted in delayed response in controlling critical quality parameters

Solution Highlights

Coverage across 23 processes including 2 In-house plants & 12 supplier locations

- The solution was developed on **IIoT Platform**
The process parameters data is captured from the **OPC layer** from the **local SCADA system servers**
- Edge Connector Programs were developed for some of the systems and **industrial connectivity** of Kepware was leveraged in some cases, optimizing the overall costs further
- **Reports & Customized Dashboards**
- Tracked standard SOPs of vendors to manufacture high quality products, avoiding unnecessary inspection at later stages for the identified processes
- **Real time monitoring of processes** and anomaly detection
- **Performance Monitoring dashboard** and reports with role-based access
- Digitization of the processes as a foundation for further analytics and process improvements

Value Created



reduction in rejection



reduction in scrap

Reduction in rework

Digital Twin for Supply chain value chain performance optimization

The client is one of the world's largest wood products manufacturer. Facility processes the raw material from forests and timberlands to manufacture OSB products.





Problem Statement

- Unavailability of a digital system to predict the delays in the entire process of finished goods
- Lack of alerts or notifications to inform the operator when the actual time elapsed surpasses the estimated time of loading and strapping in the mill
- Lack of digital devices to identify vehicle occupancy, tracking of the truck movement and time elapsed (Cycle Time/TAT) throughout the finished goods loading process in the mill
- Inability to estimate exact loading and strapping times for different trucks

Solution

The vision of the program was to build a **cutting-edge scalable Digital Twin solution and Microsoft Azure IoT Platform** to build a web application that empowers the client to do the following -

- Monitor the movement of the truck at all stages and determine cycle time/TAT
- Track, trace and analyze truck movements and state variable
- Calculate the occupancy in parking, loading, and tarping bays
- Alert or notify the operator users when the actual time elapsed exceeds the estimated time of parking, loading, and strapping
- Predict and simulate the delays in loading process of the finished goods using Digital Twin

Value Created



increase in near visibility of truck movement and occupancy



increase in accuracy of identifying the delays in on-time shipment



increase in accuracy of identifying the exact turn around time (cycle time)

What does the future hold?

The factory of the future has the potential to revolutionize the manufacturing industry, and many companies are already investing in this vision.

Overall, the factory of the future is an exciting and transformative concept that has the potential to drive innovation, growth, and sustainability in the manufacturing industry. Manufacturers that can incorporate a cohesive mix of strategy, advanced technologies, optimal digital architecture and appropriate operational adjustments in labour and talent will be equipped to chart the path to exponential growth in a competitive landscape.



RESOURCES

contactus@birlasoft.com | birlasoft.com

Challenge The Norm

Birlasoft combines the power of domain, enterprise, and digital technologies to reimagine business processes for customers and their ecosystem. Its consultative and design thinking approach makes societies more productive by helping customers run businesses. As part of the multibillion-dollar diversified CK Birla Group, Birlasoft with its 12,500+ professionals, is committed to continuing the Group's 161-year heritage of building sustainable communities.

Copyright © 2023. Birlasoft and its logo(s) are trademarks of Birlasoft All rights reserved.
All other logo(s) used are trademarks of their respective owners.

Birlasoft has its in-house Consultative Assessment Framework which helps manufacturers to assess their plants of future journey being rated on four stage maturity

Connectivity & Operational Visibility	Improve Operational Efficiency
Improve Supply Chain Visibility	Reduce time to Market

These levels are based on current technology landscape & help manufacturer build the future roadmap to achieve the highest maturity level of plant of the future.

Let's Begin