

TRACKING PROCESSES. REDEFINING EFFICIENCY.

An Intelligent Approach to Manufacturing

 Engineering a *better world.*



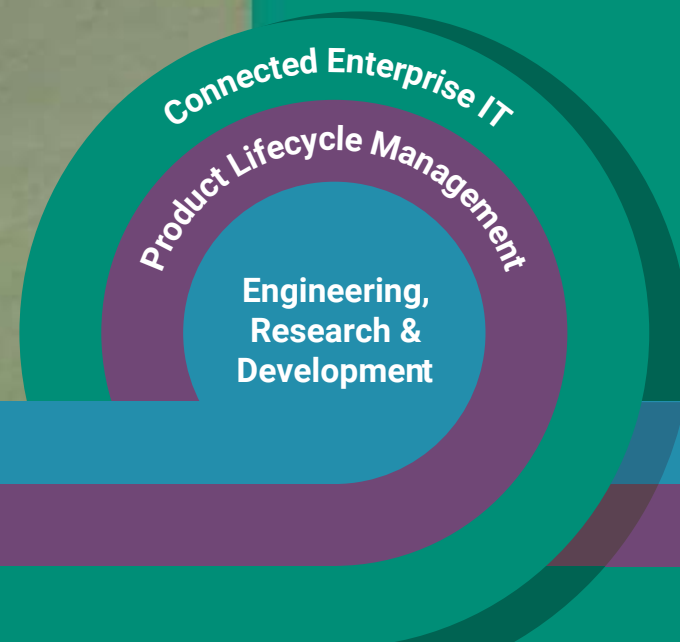
MANUFACTURING
EXECUTION
SYSTEMS

PRODUCT DEVELOPMENT IS AT THE CORE OF EVERYTHING WE DO

We empower our clients to make their product dreams a reality by designing, engineering, validating and industrializing better products.

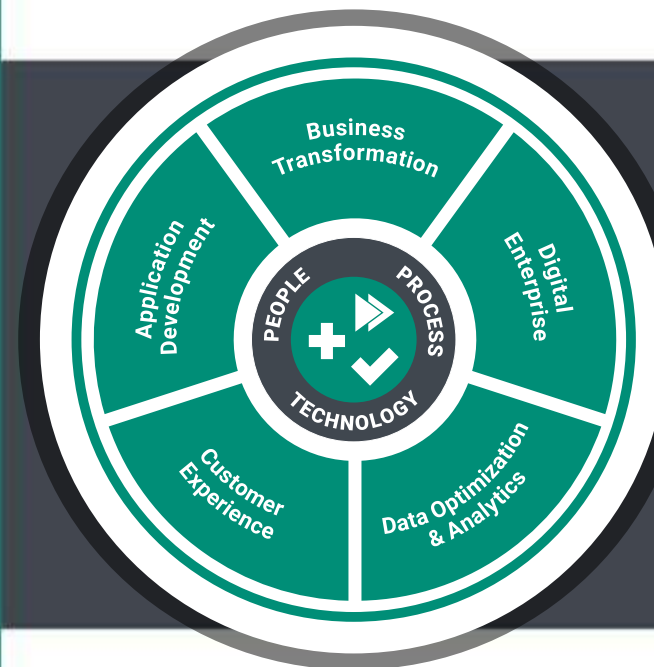
Unlike any other organization in our sector, beyond engineering and product development, we've had the curiosity to pursue the optimization of end-to-end manufacturing. The result is a complete understanding of the benefits associated with the digitalization of modern manufacturing.

Architected well, the complete product realization lifecycle is a virtuous feedback loop designed to embrace the data that supports the continuous improvement of better products.



WHY TATA TECHNOLOGIES?

Tata Technologies leverages more than 25 years of cumulative knowledge and experience to help the world's leading manufacturers create great products and select, deploy and adopt the technologies that underpin the entire product realization lifecycle. Drawing on a combination of people, process and technology, we drive efficiencies and innovation to help our clients meet their design, engineering and production challenges.



CONNECTING THE MANUFACTURING ENTERPRISE

Tata Technologies' connected enterprise IT solutions enable businesses to optimize the application of technology for the manufacturing sector, removing critical data discontinuities and enabling a platform for the complete digitalization of modern manufacturing. Our vast experience with product development and manufacturing engineering helps provide enterprise-wide visibility of the key performance indicators for seamless manufacturing execution.

CONNECTED ENTERPRISE IT (CEIT) SOLUTIONS

- Enabling smart connected factories
- Delivering global solutions for digital manufacturing
- Extending the digital lifecycle into effective manufacturing with enterprise resource planning (ERP), manufacturing execution systems (MES), supply chain management (SCM), customer experience management (CXM), business analytics and intelligence (BA/BI), complemented by world-class application maintenance services (AMS)
- Other legacy IT systems

Capacity to Create

Process to Create

Manufacturing Enterprise IT

OPTIMIZED PROCESSES. SMARTER MANUFACTURING.



LEADING EDGE

Tata Technologies delivers customized manufacturing execution systems that enable informed decision-making and identify opportunities for production process improvements. Our practitioners possess deep domain knowledge of complex manufacturing processes, business issues and the technologies required to improve operational efficiency. We've worked with global companies in the automotive, aerospace and industrial heavy machinery industries for more than 25 years, with a value-focused approach of helping them achieve a higher degree of manufacturing efficiency. Our innovative capabilities and best-of-breed consulting and implementation services deliver immediate business value and enable organizations to realize the power of the integrated enterprise, ultimately resulting in business growth.

MANUFACTURE INTELLIGENTLY BY IMPROVING DECISIONS FROM SHOP FLOOR TO TOP FLOOR

Companies are struggling to achieve a sustainable competitive advantage in today's rapidly changing business environment. Manufacturers must deploy intelligently different solutions to gain visibility into production processes in real-time, in an effort to respond to market changes quickly and effectively. A critical component to help achieve this is an efficient manufacturing execution system (MES).

The manufacturing industry is currently facing the following challenges:

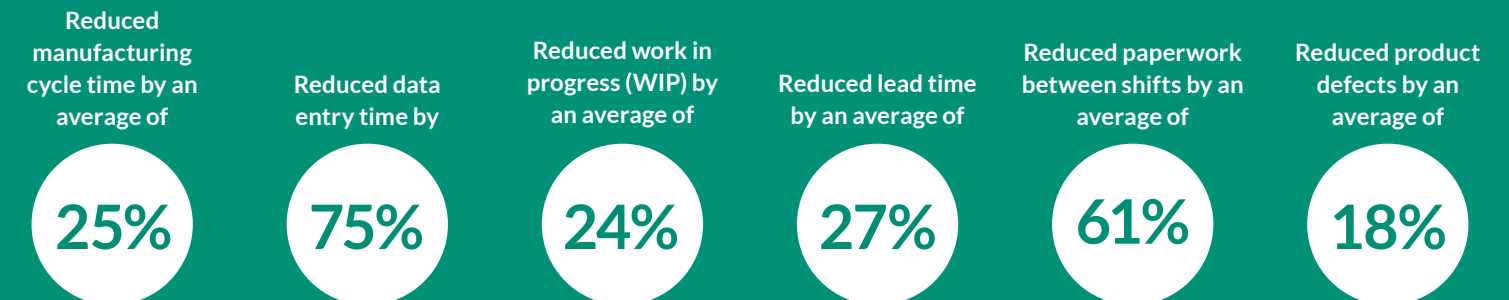
- Getting to market faster to combat fierce global competition
- Consumer demand for lower cost, higher quality products
- Increasing productivity

- Maintaining track, trace and genealogy records
- Managing a robust materials management system
- An increasingly complex supply chain

Implementation of a flexible, agile and robust manufacturing operations management system is one way organizations can combat these challenges. MES provides increased visibility and control over shop floor operations and the supply chain, to ensure customer satisfaction targets, profitability requirements and delivery commitments are met.

SEE YOUR SHOP FLOOR LIKE NEVER BEFORE

Industry surveys suggest that businesses implementing and using a MES experience quantifiable changes in profitability, quality, productivity and process performance. These can be summarized as shown below:



BETTER SOLUTIONS.
BETTER OUTCOMES.

Integration and Interfaces

- Shop Floor Control Systems
- Test Equipment and Data Loggers, Laboratory Information Management System (LIMS)
- Enterprise Resource Planning (ERP)
- Product Lifecycle Management (PLM)
- Supply Chain Management (SCM)
- Warehouse Management
- IT Systems
- Data Sources – Microsoft® Excel®, Access® and SQL Server®, and Oracle®
- Mobility Solutions

Facility Monitoring and Controls

- Energy Monitoring and Consumption Optimization
- Utilities Management
- Real-time Consumption Trends
- Warning Alerts
- Safety Alerts
- Consumption Reporting and Billing Management
- Carbon Footprint Reduction

Production Order Management

- Make to Stock (MTS) and Make to Order (MTO)
- Work Order Management
- Scheduling and Resequencing, Substitution and Dispatching
- Work Order Broadcasting
- Materials Flow and Complex Routings (Rework/Repair)
- Work Order Visibility
- Throughput Management
- Production Monitoring and Control

Inventory Management

- Kitting Accuracy
- Kanban/Just in Time (JIT)/Just in Sequence (JIS)
- Line Side/Workstations/Inventory Management
- Supermarket Management
- Vendor Managed Inventory (VMI)

Performance Management

- Reporting
- Enables Plant Operation Visibility
- Overall Equipment Efficiency (OEE)
- Process and Plant Key Performance Indicators (KPI)
- Production and Downtime Reporting
- Product History and Analytics
- ANDON and Real-time Annunciation
- Maintenance Management

Quality Management

- In-line Quality
- End of Line Quality
- Quality Containment
- Closed Loop Quality Control
- Defect Capture and Analysis
- Statistical Process Control (SPC)
- Regulator Compliance
- Lean/World Class Quality (WCQ)/Total Productivity Maintenance (TPM)
- Audit Trail

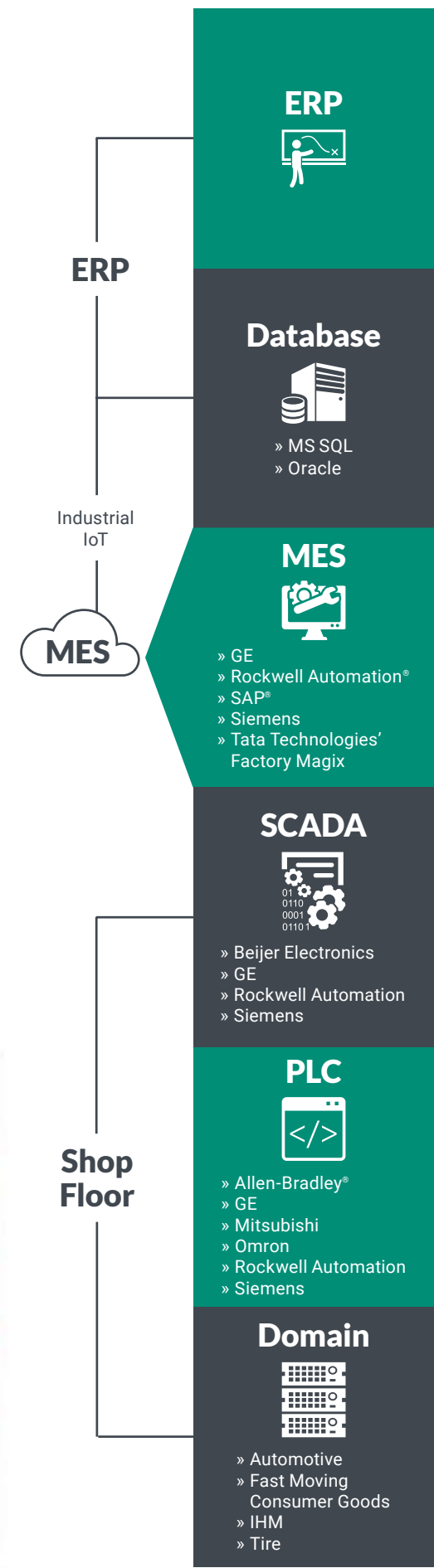
Track, Trace and Genealogy

- Real-time Production Tracking with Build History
- Machine, Operation Status, WIP Visibility
- Capturing Critical Process Values
- Operator Accountability in Decision Support
- Material Traceability (Lot/Serial)
- Data Capturing of Critical Parts and Aggregates
- Child Parts to Final Product
- Consumption/Raw Material
- Warranty and Recall Management

Error Proofing

- Pick to Light
- Digital Work Instructions (DWI) for Quality Procedures
- Poka-Yoke
- Autonomation
- Test and Inspection

SERVICE OFFERINGS



OUR MANUFACTURING EXECUTION SYSTEMS SOLUTION FRAMEWORK

Our MES solutions help businesses respond to market changes both quickly and effectively by providing visibility into production processes in real-time. We develop customized line of business applications to meet the organization's operational objectives and ensure quick and cost-effective implementation.

Objectives				
Reduced Total Cost of Ownership (TCO)	Alignment with Business Objectives	Innovation and Business Transformation	Solution Quality, Flexibility and Speed	Comprehensive Coverage
Enablers	Transform	Realize	Enable	Enablers
People Domain Experts Process Owners Subject Matter Experts Process Governance Communication Quality Delivery Metrics Infrastructure Scalable Data Center Secured Offshore Delivery Engineering Center (ODEC) Failover and Clustering Virtualization	Inputs			Alliances Solution Partners – GE Intelligent Platforms, Rockwell Automation, and Siemens Tools PLC Allen Bradley, GE, Mitsubishi, Omron and Siemens SCADA Beijer Electronics, GE Cimplicity, Rockwell® FactoryTalk® View and Siemens WinCC® Automation/Data Exchange Protocols DeviceNet, Ethernet IP, PROFIBUS®, PROFINET®, Modbus® and OPC® MES GE-Proficy®, GE-Integrated Platform Management System, Rockwell Automation-FactoryTalk ProductionCentre®, SAP, Siemens-SIMATIC IT and Tata Technologies-Factory Magix MES and ERP Integration Methodology Remote Function Call, FTP, Intermediate Database Tables, Computer System Validation and Standard Connectors
	MES SCAN and RFQ	Deliver MES KPIs, Resources and Operational Targets	Opportunities for Improvement and Strategic Inputs from Identified Roadmap	
	Work Streams			
Define, Plan, Execute and Verify	Business Analysis, Definition, Design, Development, Testing, Deployment, Verification and Sustainability	Process Improvement and Continuous Improvement		
Deliverables				
Functional Requirement Specifications, Timeline, Alignment and Value Driven Analysis	Optimized Delivery Model, Metrics Report, Improved Client Experience, Quality, Efficiency and Reduced Maintenance	Improved Time to Market, Enhanced Productivity and Improved Throughput		
Jump Start Launch →	Operational Excellence →	Strategic Solutions →		

Tata Technologies Differentiators				
Focus on Business Objectives and Value Drivers	Industrialization of Relevant Best Practice Processes for Business Aligned Solutions	Leveraging the Right Shore for Delivery to Drive a 'Fiscally Responsible' Solution	Effective Reuse of Existing Assets to Ensure Quality and Speedy Delivery	Complementary Teaming Agreements for End-to-end Coverage



ACCELERATING PROGRESS. DRIVING RESULTS.

KEY DRIVERS TO SUCCESS



1,050 man-years of manufacturing execution systems implementation experience



150+ specialized resources in the MES practice



Key technology partners with Microsoft, Oracle, Rockwell® and Siemens

VALUE DELIVERED

Tata Technologies partnered with the industrial giant in India to establish shop floor to top floor connectivity to provide end-to-end visibility across the in-bound and out-bound enterprise supply chain.



THE COMPANY

A Swedish industrial company who manufactures industrial tools and equipment. It is considered a world-leader in providing sustainable productivity solutions and serves customers in more than 180 countries with products and services focused on energy efficiency, safety and ergonomics. The company has operational centers spread across 20 locations within India and features among the most innovative companies in the world.

“During the integration of our supply systems with the shop floor and supply chain, our top management required a dashboard on a web-based application which could help them monitor the activities at the ground level with a click of a button, either from office premises or from external locations. The team at Tata Technologies did an exceptional job and we have taken a unanimous decision of implementing a similar system upgrade at another plant location too.”

– Plant Head, An Indian subsidiary of a Swedish industrial company

THE CHALLENGE

The client's IT system was not integrated with other systems, posing challenges on the shop floor. Information was housed in silos at different locations within the plant.

- ▶ High work in progress at sub-assembly levels, which resulted in blocked capital
- ▶ Leveraging its existing presence and small customer base to propel sales of the new product line
- ▶ Generating hype for the new product line by identifying a healthy sales pipeline

THE SOLUTION

Tata Technologies was able to provide:

- ▶ A custom-built application to provide end-to-end manufacturing solutions inclusive of interface and integrations with ERP, shop floor control system, third party logistics, supermarket and finished goods yard
- ▶ A system deployed across two flexible assembly plants – make to order configurable products
- ▶ Implementation of key functionalities notably order management, kitting, pick list generation, JIT/JIS, eKanban, ANDON system, genealogy, traceability, torque and test data logging, digital work instructions and finished goods yard management, pick-list and barcode printing, and real-time updates via reports, dashboards and email

THE RESULTS



Single version of truth – meeting time reduction (MTR)



Sub-assembly WIP reduction from three days to four hours



Product planning improvement by 30%



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