



## ThinkIQ: Complimentary MES

**Progressing manufacturers** toward the full benefits of Industry 4.0 Smart Manufacturing and beyond the limitations of traditional MES





As with all software implementations, Manufacturing Execution System (MES) implementations have their own benefits, limitations, and risks. This document identifies several common functional and operational limitations of MES and highlights how combining ThinkIQ with your MES solution provides unprecedented insight and operational control across your extended supply chain. The below recent report from McKinsey & Company highlights the limitations companies face today and highlights the opportunity ahead.

*“The baseline found in many companies today can be described as follows: the enterprise software layer is not connected consistently to the factory, line, or machine level. Often, data is not collected at all or is fragmented between organizational silos. Manual translation between the enterprise and operations layers (often via a spreadsheet software) leads to limited transparency and is prone to human errors. Furthermore, either no MES or multiple ones for different value chain steps are in place with little to no interconnection; integration with SCM and other enterprise systems is mostly missing. Last but not least, there is a low level of interconnectedness between process steps, few sensors/analytics are built in, and most machines within lines are not interconnected. Of course, some industries and companies have already made progress on their Industry 4.0 transformations and solved some of the challenges outlined above, e.g., through building up dedicated analytics capabilities and connecting key components of their manufacturing ecosystem. Despite the progress made by some, very few have achieved a fully integrated industrial automation stack.”*

McKinsey & Company, Industry 4.0: [Capturing value at scale in discrete manufacturing](#), July 2019

As referenced in the above quote, many MES providers require a considerable amount of customization to effectively integrate with related enterprise systems within and beyond the manufacturing floor. ThinkIQ complements those MES providers and progresses manufacturers toward the full benefits of Industry 4.0 Smart Manufacturing and beyond the limitations of traditional MES, enabling a material-centric view of operations.



The [ThinkIQ manufacturing platform](#) can identify previously unseen correlations, and even root causes, from your supply chain across internal manufacturing and external processes. ThinkIQ reveals material movements and creates a comprehensive [material ledger](#) to identify new insight and unlock improvement opportunities. Our platform incorporates [four unique elements](#) that make the analysis and presentation unique:

- **ThinkIQ's Next Generation Historian:** captures highly detailed time-series supply chain and manufacturing time-series data
- **ThinkIQ's Semantic Model:** creates required context to relate sensor data to equipment, processes, materials, and goods
- **ThinkIQ's Query Language, TIQQL:** allows your manufacturing data to be queried through the lens of the Semantic Model, using our powerful and differentiated manufacturing data analytics algorithms
- **ThinkIQ's Material Ledger:** a key innovation in supply chain data analytics

## Product Functionality - Continuous Manufacturing

Manufacturing Management	Typical Manufacturing Functions	ThinkIQ	MES
	Process Execution Management	✓	
	Intelligent Attribute Propagation	✓	
	Material Row Tracking	✓	
	Asset/Equipment Performance	✓	✓
	Non-conforming Material Management	✓	✓
	Manufacturing Order Management		✓
	Material Inventory Management		✓
	Product Documentation		✓
	Production Planning & Scheduling		✓

The combination of these elements leads to a revolutionary, transformative view of manufacturing data.

The following table identifies several common functional and operational limitations of MES and highlights how combining ThinkIQ with your MES solution provides unprecedented insight and operational control across your extended supply chain.

## ThinkIQ/MES Comparison - Continuous Manufacturing

Function	ThinkIQ	MES
Process Execution Management	Enables collection, analysis and management of any measurable process attribute across supply chain	Does not support granular process execution below the batch level
Intelligent Attribute Propagation	Creates and tracks critical attribute values associated with each material transaction within the material ledger	Does not support material ledgers nor the requisite propagation of attribute values
Material Row Tracking	Delivers material flow tracking enabling forward and backward traceability of an individual unit of material	Does not support traceability and/or material tracking in continuous manufacturing environments
Asset/Equipment Performance	Can provide near-real time equipment performance and process monitoring including uptime/downtime and cycle time measurements	Delivers non-real time performance monitoring of equipment performance including uptime/downtime and cycle time measurements
Non-conforming Material Management	Provides highly granular (sub-second), contextualized process data attributable to individual parts and/or unit of product enabling highly effective root cause analysis and resolution	Provides higher level batch/lot visibility of non-conforming materials. Does not provide specific process information which can be attributed at the individual part and unit of material level



With the following key capabilities, ThinkIQ provides a potential alternative or enhancement to those companies seeking to avoid the following limitations associated with traditional MES.

- Extends MES beyond the manufacturing floor to broader material flow
- Visualize and monitor real-time material flow within and beyond your manufacturing process
- Solves for manual connectivity and translation between the enterprise and operations layers (i.e., spreadsheets and manual inputs)
- Closed-loop capability to provision operational systems in real-time
- Cause and effect analysis of upstream events
- Contextualize and rationalize plant data with business systems (ERP, MES, QMS)
- Provides insight capability *between* process steps where automation is not present
- Real time alerting of upstream events to optimize downstream activities for better yield and quality
- Complete material trace and attribute tracking across the extended supply chain to minimize recall events
- Tightly contained recalls resulting in minimum impact to customers and bottom-line
- Gain clear insight to better understand how materials move through the manufacturing process
- Provides clear visibility to the effect material attributes have on the complete manufacturing process
- Provides ability to quickly and easily adjust manufacturing operations to meet changing business requirements
- Lowers cost of ownership, reduces complexity, and accelerates time to value

[Contact us](#) today to learn more about how ThinkIQ compliments MES and progresses manufacturers towards the full benefits of Industry 4.0 Smart Manufacturing, enabling a material-centric view of operations.