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*Industrial Operations / Information Processing Convergence*

*Control Chain Management Body Of Knowledge*

# MI - Common understanding and Solutions

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# Wikipedia definition

- **Enterprise Manufacturing Intelligence (EMI), or simply Manufacturing Intelligence (MI), is a term which applies to software used to bring a corporation's manufacturing-related data together from many sources for the purposes of reporting, analysis, visual summaries, and passing data between enterprise-level and plant-floor systems.**
- **As data is combined from multiple sources, it can be given a new structure or context that will help users find what they need regardless of where it came from. The primary goal is to turn large amounts of manufacturing data into real knowledge and drive business results based on that knowledge.**

# AMR definition

- **five core functions of Enterprise Manufacturing Intelligence**

- Aggregation:

- Making available data from many sources, most often databases.

- Contextualization:

- Providing a structure, or model, for the data that will help users find what they need. Usually a folder tree utilizing a hierarchy such as the ISA-95 standard.

- Analysis:

- Enabling users to analyze data across sources and especially across production sites. This often includes the ability for true *ad hoc* reporting.

- Visualization:

- Providing tools to create visual summaries of the data to alert decision makers and call attention to the most important information of the moment. The most common visualization tool is the dashboard.

- Propagation:

- Automating the understanding of data from the plant-floor up to enterprise level systems such as SAP, or vice versa.

# Aberdeen definition

- **The Manufacturing Intelligence Benchmark Report: Bridging the ERP and Shop Floor Divide**
  - Manufacturers seek solutions to bridge the gap between ERP (Enterprise Resource Planning) and the shop floor
  - Cost pressures continue to drive manufacturers to do more with less,
  - manufacturers are looking to automated solutions to enable the aggregation of plant to enterprise data for enhanced decision-making.
  - While MES has been the traditional anchor point for integrating the plant with enterprise level systems such as ERP, Aberdeen finds Best in Class manufacturers utilizing Manufacturing Intelligence solutions to provide greater visibility and an added level of intelligence, enhancing the value gained from both ERP and MES.
  - Best in Class manufacturers are leveraging intelligent solutions that can also provide real-time visibility, event management and analytical tools that enhance proactive and predictive control to drive execution, instead of only operating as another data collection system.

# J Vieille definition (2005)

- **Intelligence: to rationalize the processes and practices based on the accrued experience and knowledge**
  - Business/Manufacturing intelligence for business/physical processes
  - Industrial Intelligence = Business + Manufacturing intelligence
- **Intelligence: closing the loop between performance observation and decision**
  - Real Time: feedback is handled during the course of the process execution by the actors of the process themselves: operator, foreman, PID controller...
  - Deferred time: feedback is handled at the design level (R&D and engineering for physical processes). The product lifecycle development is an ongoing agile process rather than a classical waterfall process
- **Data collection and performance measurement is a critical point**
- **Risk management is the complementary ingredient**

# Automation.com Manufacturing Intelligence Portal

- Manufacturing Intelligence is comprised of software and hardware used to gather and understand manufacturing data together from many sources throughout a production process, including ERP, Supply Chain management, Lean Manufacturing, and Manufacturing Execution Systems (MES). The goal is to understand the current production status and improve business results.

# Vendors positions

- **GE Fanuc - « Intelligent Platform »**

- EMI - Enterprise Manufacturing Intelligence

“Benchmarking your capabilities and having a pulse on performance requires intelligence from the shop floor that goes beyond simple data collection. You not only need to collect the appropriate data but also make sure it is in a normalized, consistent, meaningful context across your plant and throughout your enterprise.

Without an Intelligence layer on top of your Operations, the islands-of-information that have evolved over time often remain largely inaccessible, and the homegrown applications that created them prove difficult and costly to support.

By employing an Intelligence solution, you can perform real-time and historical, ad-hoc analysis – with a meaningful, contextualized view of information – specific to the roles and functions within your organization. This intelligence empowers you to identify and remove constraints to improve throughput, quality and overall performance and profitability.”

# Vendors positions

- **Siemens**

- Manufacturing Intelligence visualizes performance indicators in cockpits and dashboards for specific target groups, thereby assuring real-time traceability of manufacturing performance. This provides a transparent database for decision-making on the management level.
- Manufacturing Intelligence (MI) derives from the known concept of Business Intelligence (BI). BI focuses on acquiring data and keeping it available for Management. MI, by contrast, links the various data sources including proprietary data providers and BI systems in order to extract the requisite information from them. Ideally, this enables MI to realize synergies between the top-down approach of Enterprise Resource Planning (ERP) and the bottom-up approach of Manufacturing Execution Systems (MES). This involves aggregating business management, production engineering and technical product data in order to derive important performance indicators such as cycle times, order levels and utilization rates.

# Vendors positions

- **Emerson – The Device company...**
  - « Smart SIS » for digital intelligence (Safety)
  - « Smart Wireless » network intelligence
  - « Intelligent devices » (sensor and valves)
- **Invensys Wonderware – « Plant Intelligence Software Provider»**

“Wonderware Enterprise Manufacturing Intelligence (EMI) software solutions

  - empower companies to analyze their overall operational performance using simple yet powerful data analysis and reporting tools.
  - collect, aggregate and display production, costs, process capability, equipment downtime, quality and variance data
  - deliver this information to the full range of plant workers – tailored to their specific information requirements using powerful and secure web interface .
  - offer a single, open and scalable software architecture, ArcestrA, that allows you to standardize on a common EMI solution and propagate it across multiple manufacturing or infrastructure operations sites.”

# Vendors positions

- **Schneider Electric: motor first...**
  - Motor Control Center provides *plant floor intelligence...*
- **SAP: MII**
  - Manufacturing Intelligence Dashboard
  - Intelligence and Integration go together (MII)
- **Intercim: French have Ideas**
  - Intercim's acquisition of Pertinence has proved to be a masterstroke, since it has helped the company to integrate manufacturing intelligence (MI) tools with the MES solution to deliver a closed-loop feedback with shop-floors and offer real-time visibility across the supply chain. While the MES addresses process rules formation, the MI tool helps in taking proactive measures to improve the process flow by analyzing and providing corrective actions.

# Vendors positions

- **Rockwell Automation - Incuity.**

- We bring you true Business Intelligence for Manufacturing.
- Our unique software products connect to multiple real-time plant data sources and transaction-oriented enterprise applications providing unified access to information that allows staff and senior executives to better control costs and improve productivity through greater insight into their manufacturing operations.

# Vendors positions

- **Honeywell**

- “Provides specialized engineering skills for developing intelligent based systems.

These systems are used to reduce human error in the decision making process, reduce labor in inspection and detection operations, and identify critical features or anomalies.

- Machine Intelligence
- Machine Vision
- Pattern Recognition”
- Modeling Production-Chain Information
  - model + data + intelligence = information.
- Intelligence services