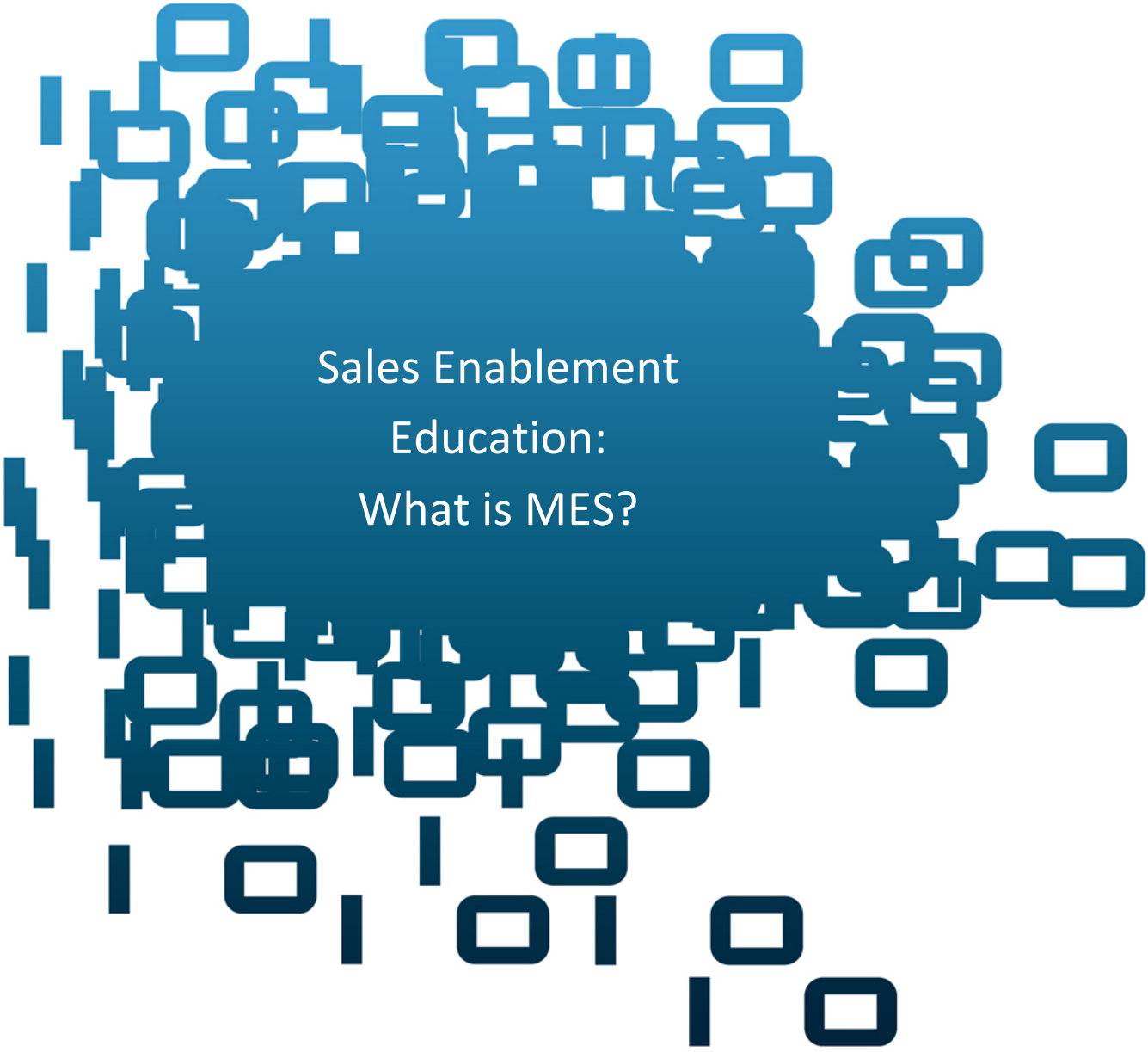

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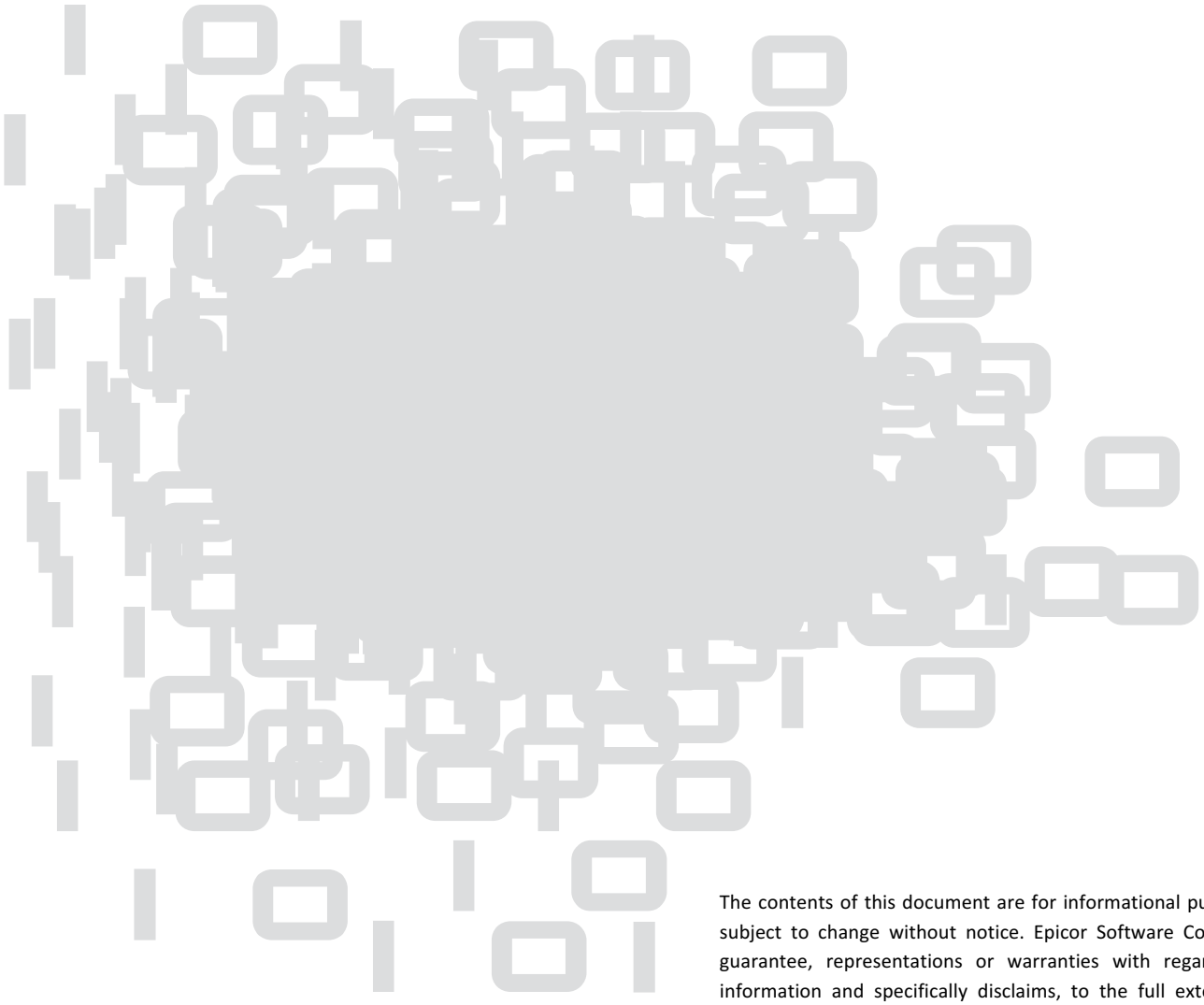

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What is MES?

In the early days of MES (manufacturing execution system(s)), its scope was not very clear. It was certainly a product of data collection systems of the early 1980's, and using data for a dedicated purpose. Long before that, the 1960's and 1970's witnessed the early steps of automated manufacturing, and laid the groundwork for the use, growth and standardization of digital communications connectivity in manufacturing. As computers became more common in manufacturing, the distinction between the different 'levels' of manufacturing were needed to provide a framework for optimal design, operation, control, and reporting. Along the way, the boundaries between ERP and MES, and MES and SCADA (and process control systems) became blurred, because functionality often overlapped. Even as distinctions were being made, systems providers and integrators, along with their innovative solutions continued to contribute to the confusion around the scope of MES.

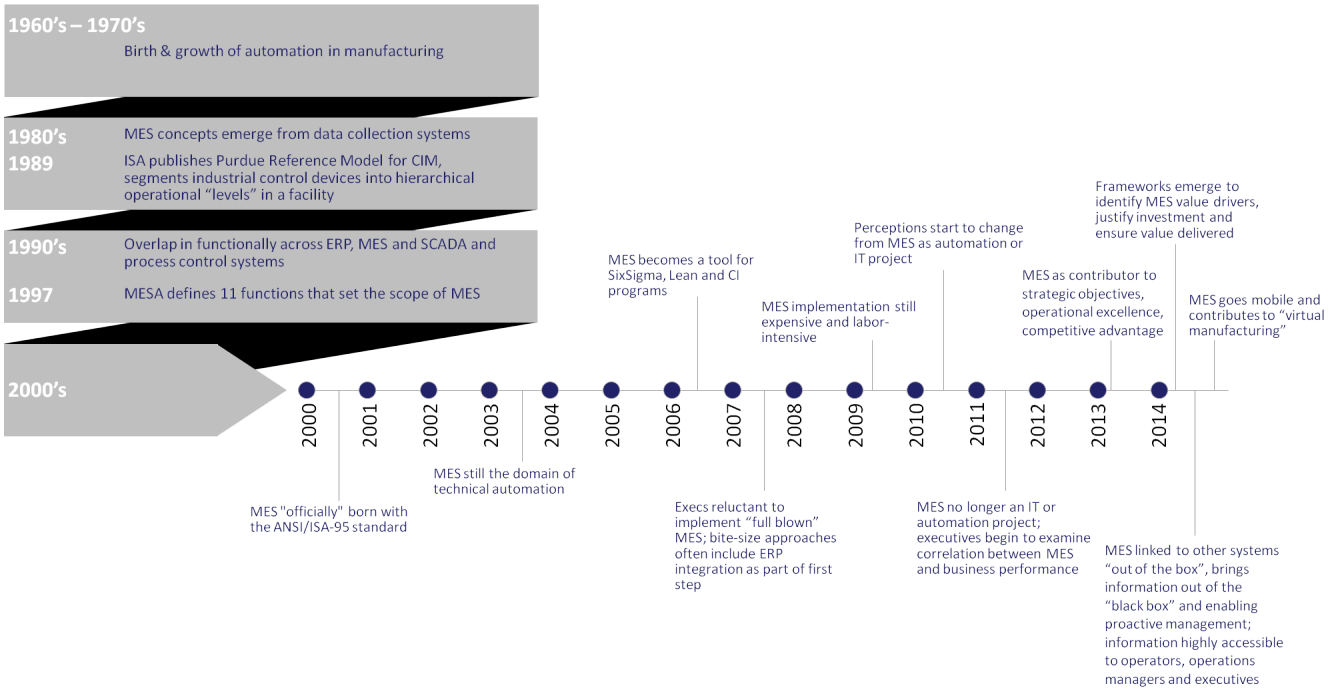

Figure 1 | A History of Manufacturing Execution Systems (MES)

In 2000, the ANSI/ISA-95 standard combined MESA's 11 MES functions and scope with the Purdue Reference Model (PRM), and became the international standard for developing an automated interface between enterprise and control systems. The ISA-95 standard placed MES firmly at Level 3 as part of manufacturing operations management (MOM), between ERP (level 4) and process control (levels 1 and 2). In 2005, the publication of the third part of the standard divided level 3 MOM activities into four key operations: production, quality, logistics and maintenance.

Even with a clear scope and definition, the globalization of manufacturing, and the virtualization of systems and processes, still fuels the debate today about what "is" and "isn't" MES. The boundaries seem highly variable, and seem to shift with each new generation of "best-in-class" enterprise, MES and process control applications. To complicate matters, it is not necessary for a system to meet all four of the level three requirements to be considered "MES".

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In simplest terms, at minimum, an MES system must monitor plant operations and present information about current conditions on the plant floor; so that people can control production processes and make changes to improve production output.

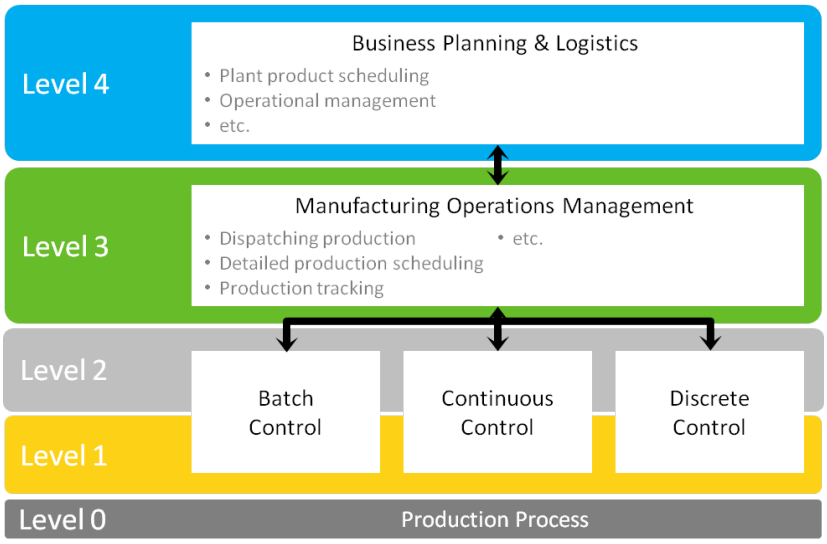

Figure 2 | ISA-95 Model of Production Operations Management

A comprehensive MES system that meets all the needs for the activity across ISA-95 level 3 will:

- Receive information, orders or signals from level 4, the enterprise
- Tell the shop what to make, how much and when
- Receive or pull data from machines to record production

Today's MES systems offer functionality beyond the scope in the ISA-95. And, best-in-class MES systems provide the ability to expand and enhance information:

- How data is collected
- Amount and quality of production and process data
- Timeliness of information
- How data is presented
- Analysis capability
- Extended system use of the data (across the enterprise, along the supply chain)

The challenge today is not so much finding an MES system that can meet basic criteria, but sifting through the long list of available solutions. Evidence for the breadth of choices on the market is a corresponding array of analyst firms, associations, comparison sites and media that exist to inform and advise on the topic of MES.

Ultimately, companies that cling to business-related motives are the winners, regardless of the countless modules, selections and features of MES available today. They are the ones that can correlate and quantify the value of their MES implementation against business results.

ISA-95 & MES

MES was "officially" born in 2000 with the ANSI/ISA-95 standard. ISA-95 is the international standard for developing an automated interface between enterprise and control systems. It combined MESA's 11 functions and scope with the Purdue Reference Model (PRM). According to the American National Standards Institute (ANSI), "The objectives of ISA-95 are to provide consistent terminology that is a foundation for supplier and manufacturer communications, provide consistent information models, and to provide consistent operations models which is a foundation for clarifying application functionality and how information is to be used. There are 5 parts of the ISA-95 standard: Context, Hierarchy Models, Functional Data Flow Model, Object Models, and Operations Activity Models."

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Learn More About It

"Manufacturing Operations Management Best Practices Guide"

The Manufacturing Operations Management (MOM) Best Practices Guide establishes a framework for companies to align their people, architect systems and processes to achieve market leading performance in a rapidly evolving space. Topics covered in the guide include: how to better translate business and manufacturing strategies and goals into action, examples of successful closed-loop and end-to-end business and manufacturing processes, and how to leverage emerging technologies to support business improvement programs and achieve rapid rollouts and ROI.

http://www.lnsresearch.com/research-library/research-articles/manufacturing-operations-management-best-practices-guide

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