

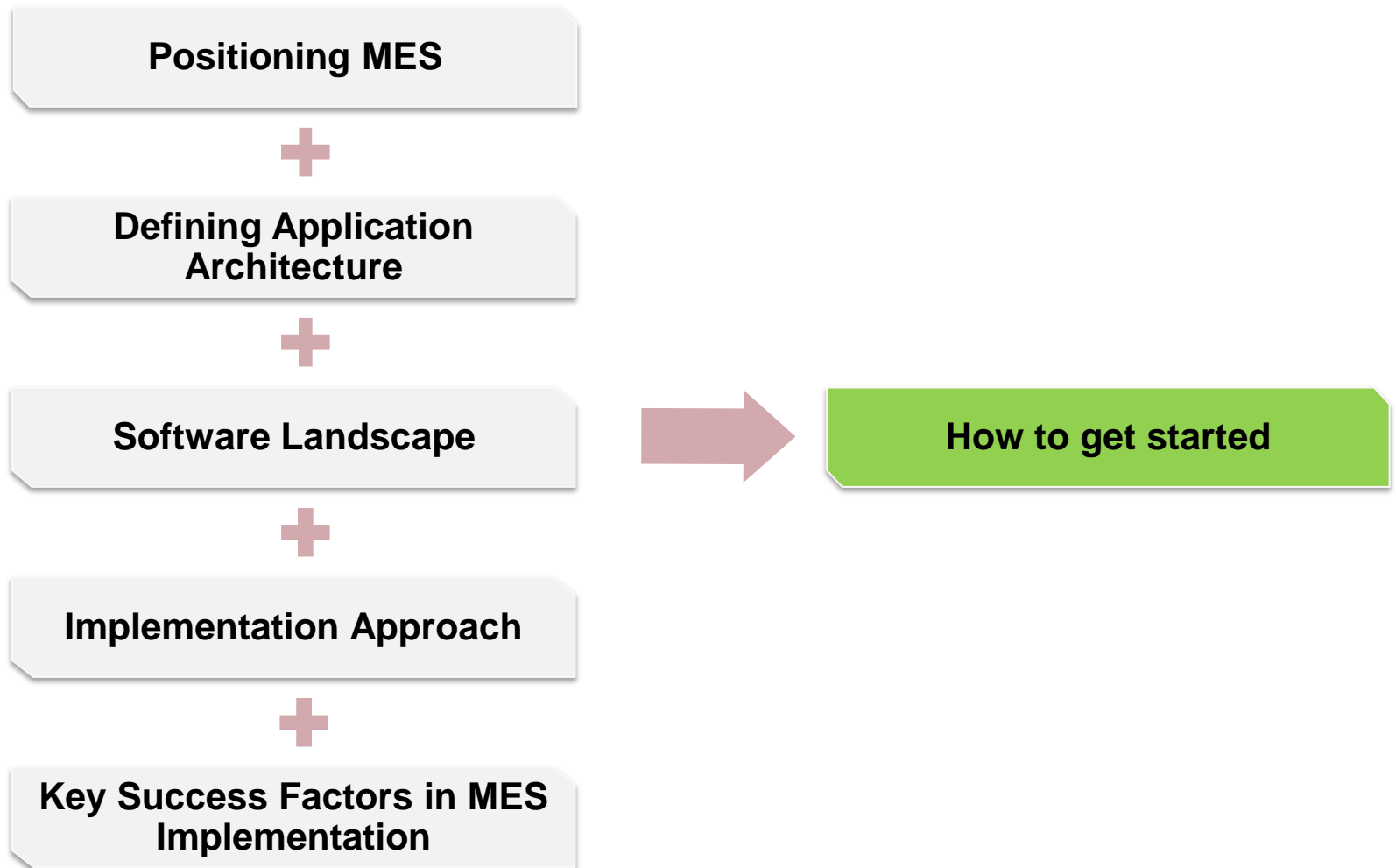


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MES Implementation Project – Key Considerations

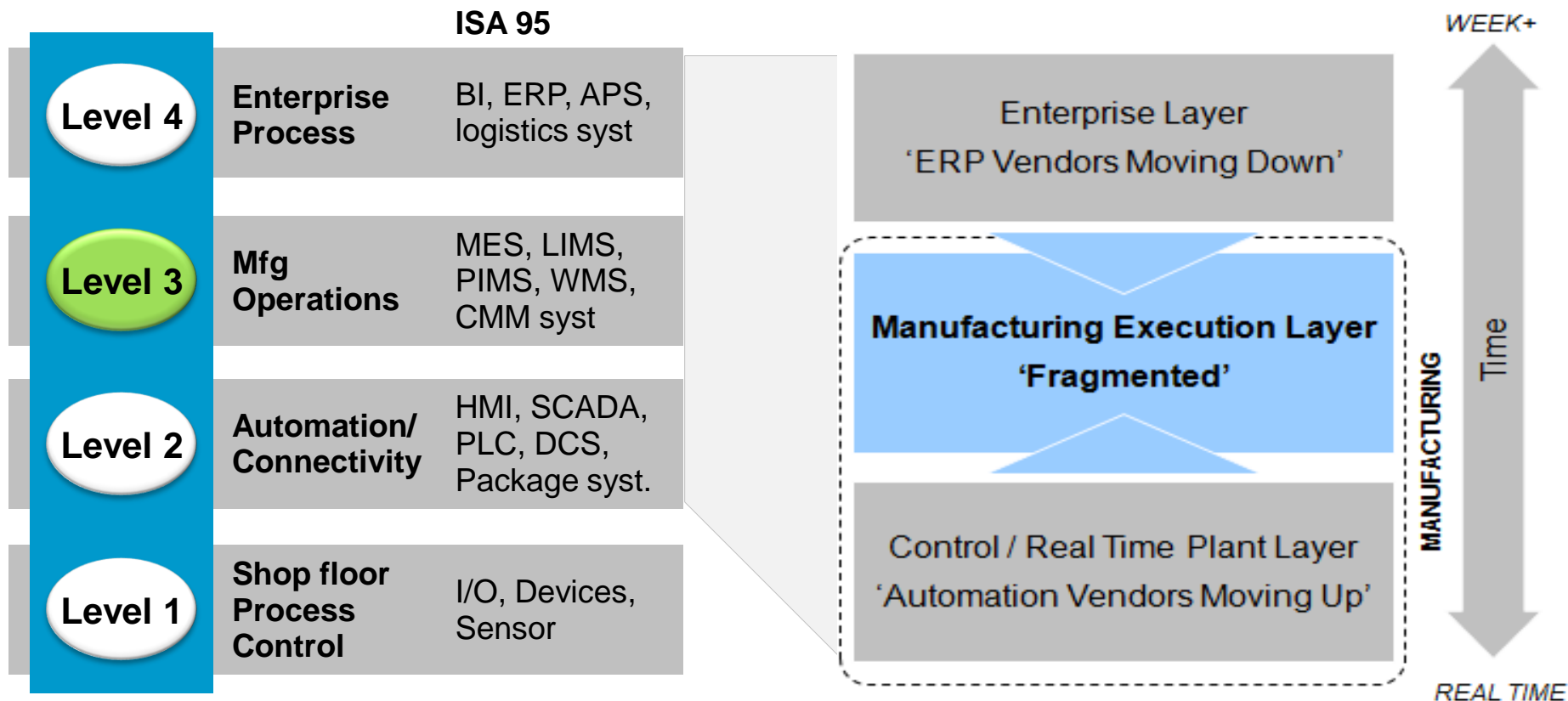
11th of May 2011

Agenda

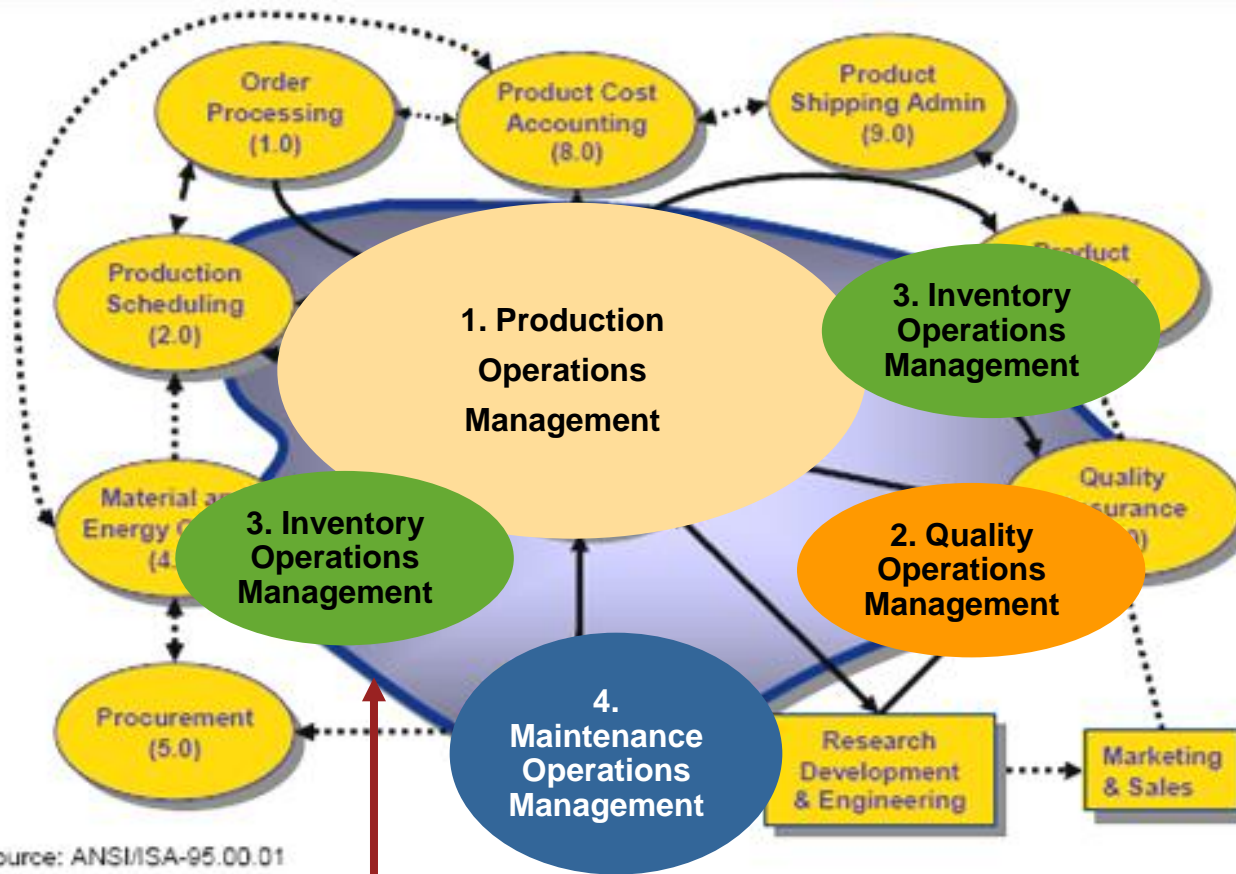


Positioning MES

Traditional understanding of MES functionality and scope is getting fuzzy as there's increasing fragmentation of the type of solutions called MES.



The Integrated Manufacturing Enterprise



The boundary between ERP (outside blue) and MES (inside blue) is different for different industries, and between companies.

1. Production Operations Management:

- Production Planning & Scheduling
- Production Execution
- Production Monitoring
- Production Analysis & Reporting

2. Quality Operations Management:

- Quality Assurance
- Quality Control

3. Inventory Operations Management:

- Product / Order Tracking
- Inventory Management
- Utilities Management

4. Maintenance Operations Management:

- Maintenance and Reliability Management

Defining Application Architecture - ERP, APS and MES



ERP

Forecasting

Order Entry,
Product
Configuration,
Master Data

Sales &
Operations
Planning

Quota
management
ATP/CTP
Analysis,
Due Dates,
Routing,
Capacity
planning

ERP

Forecasting

Order Entry,
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APS

Quota
management
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Analysis,
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planning

Detailed
Scheduling,
Revisioning

MES

Manufacturing
Execution

ERP

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Order Entry,
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MES

Detailed
Scheduling,
Revisioning

Manufacturing
Execution

APS

Detailed
Scheduling,
Revisioning

MES

Manufacturing
Execution

MES Trends - Work Process Management and SOA



- For some years now there's been strong focus on Business Process Management and SOA enablement in the Level 4 systems. As an example SAP, Oracle and Microsoft have architected their ERP solutions to be SOA based. Furthermore, all the main vendors are providing solution and tools for Business / Work Process Management
- Now this trend is also reaching MES systems. Some key drivers for Work Process Management are:
 - There are often manual and automated processes included in the overall manufacturing process and it's very useful to tie this all together in IT system.
 - There are more requirements for composite solutions including functionality from Level 4, Level 3 and sometimes even Level 2. This means that it's key to provide system functionality as services that can be used by other applications / Work Process Management solution.
 - New MES implementation are often planned to cover multiple sites which normally means more integration points to both manual processes and legacy systems.

Software Landscape

MES / APS / Automation SW vendors



Maintenance SW Vendors



... and custom developed solutions

Choosing between a Packaged or Custom Solution



Custom

- Migration may be the solution if existing system is fulfilling business requirements and code is well structured
- Possibility to obtain best fit with business requirements, ... but solution will be as good as the design
- Sets high requirement on IT design / architecture skills
 - Recommended to use application framework to ensure good structure and modularization of the system
- Potential to create "composite application" by wrapping key functions from old system as services and to integrate to new system using SOA
- Maintenance (AM) & further development of the system is dependent on limited number of resources
 - Can increase the Total Cost of Ownership

Packaged

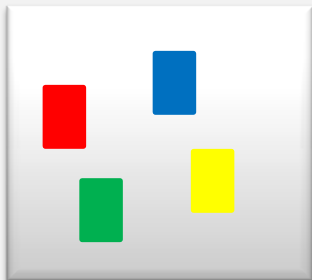
- Recommended approach for greenfield investments in certain industries where process is simple
- Reduced time needed to design & implement, ...but solution is limited by the SW capabilities (customization should be avoided)
- Some vendors have included Work Process Management and SOA capabilities which makes systems easy to integrate and to expand in future
- More options available how to arrange maintenance (AM) - less dependent on limited number of resources
- SW enhancements & further development is done by SW vendor
 - Potentially long lead-time to get own enhancements included
- License costs can be high for large operations with full functionality

Selecting the Implementation Approach Requires Careful Evaluation



Incremental

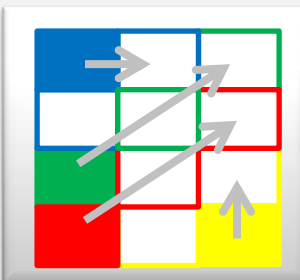
- Typical approach to development
- Risk for complicated solution
- Leads easily to new applications that are tightly linked with / dependent on existing solutions
- Localized point of business impact in the case of implementation difficulties
- Gradual adaptation to changes → easy to manage



Focus on benefits realization with incremental improvements

Phased with overall plan

- Manageable with known target
- Reduce peaks of resource load and investments required
- Each step / phase is a landing point (e.g. if business priorities change)
- Integration between phases increase costs



Approaches:

- System layer
- Process
- Sites/ production step
- Etc.

Big bang

- Size and complexity make's implementation & change management difficult to manage
- High demand for resources and investments over shorter implementation period
- Eliminates need for temporary interfaces & procedures



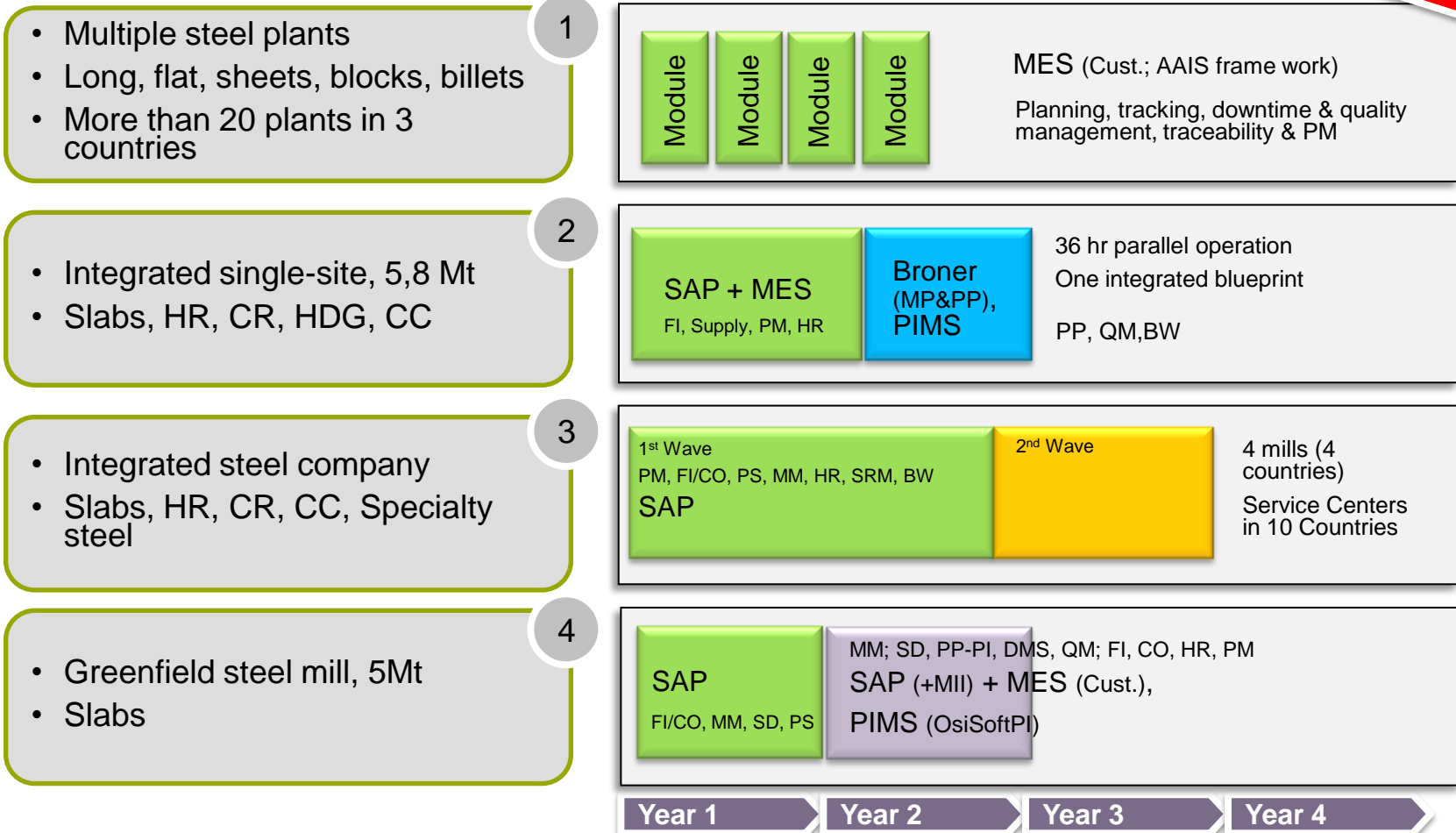
Changing the systems all at once

There Is Not a Single Right Approach for ERP & MES Implementation – Each Case Is Different and Requires Tailored Approach

Case Examples

Description

Schedule & approach (big bang / phased)



What is a MES Blueprint and Why it is a good practice?



What is a MES Blueprint?

- Blueprint is where the MES strategy is defined, the most important requirements are identified and prioritized, the business drivers and financials are presented, key modules are selected and make vs. buy decisions are made.

Why is it a good practice?

- A MES Blueprint allows the definition of the right MES strategy for the client business:
 - Reducing costs and risks with MES implementation gaps or failures by defining MES right strategy,
 - Reducing costs with MES Development & Implementation by deploying a MES strategy based on industry leading practices,
 - Nominating the appropriate option for MES implementation
 - reducing cost with unused tools and / or developments,
 - Defining architecture to allow integration with current assets reducing investments in new technologies or tools.
 - Empowering traditional MES benefits driving manufacturing efforts to enterprise business goals.



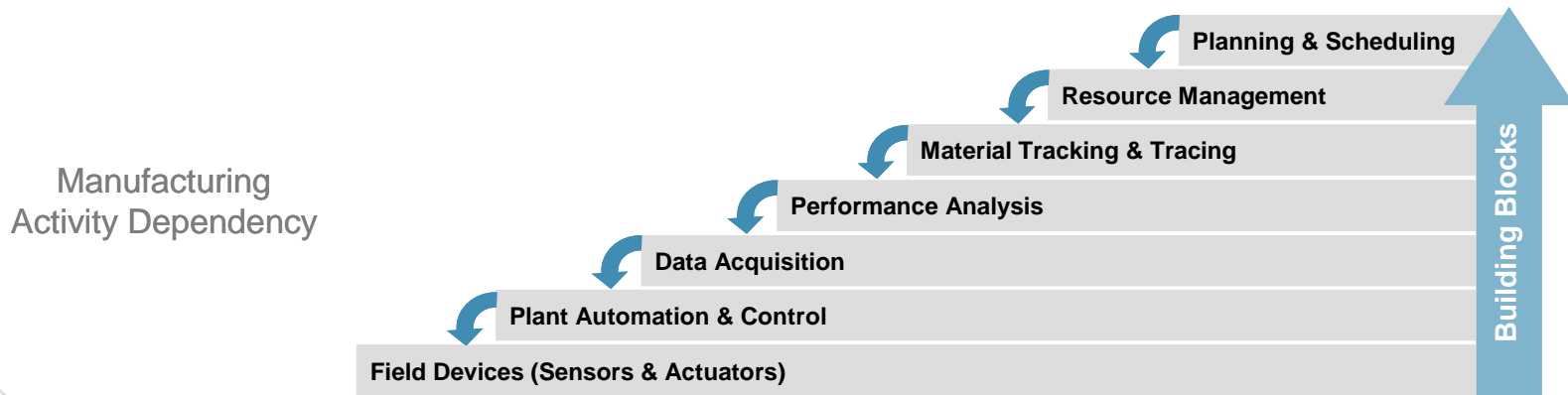
“Fail to plan and you are planning to fail”

Key Success Factors in MES Implementation Project



- MES implementations are typically high potential, but complex and high risk – the following are **key success factors** based on our experience
 - Engage / ensure **management commitment** in a continuous way during the project
 - Use of **proven methodology** to deliver highly complex projects
 - Build **cross competence** team of people with management, process, IT and Automation skills
 - Use **metrics** to follow progress and monitor business case as program progresses
 - Implement **rigorous** and well define **scope and change control** process
 - Be aware & prepared for technology / **infrastructure related risks** & challenges
 - Implement **rigorous test approach** to cover all business requirements and scenarios
 - Invest enough on process work, **change management** and end-user training
 - Define go-live / **cut-over strategy** and include requirements in the design
 - Clear definition of the **support model** and transition strategy to application maintenance after go-live
 - Carry out performance test & required **tune activities** after stabilization period

Make sure the fundamentals are in place first before focusing on the more advanced items



Example Plan for MES Project Planning Phase

