

# Performance Benchmarking and the Road Map to World Class Manufacturing

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ACHEMA 2012 – Presentation 5137

21<sup>st</sup> of June 2012 in Frankfurt/Main, Germany

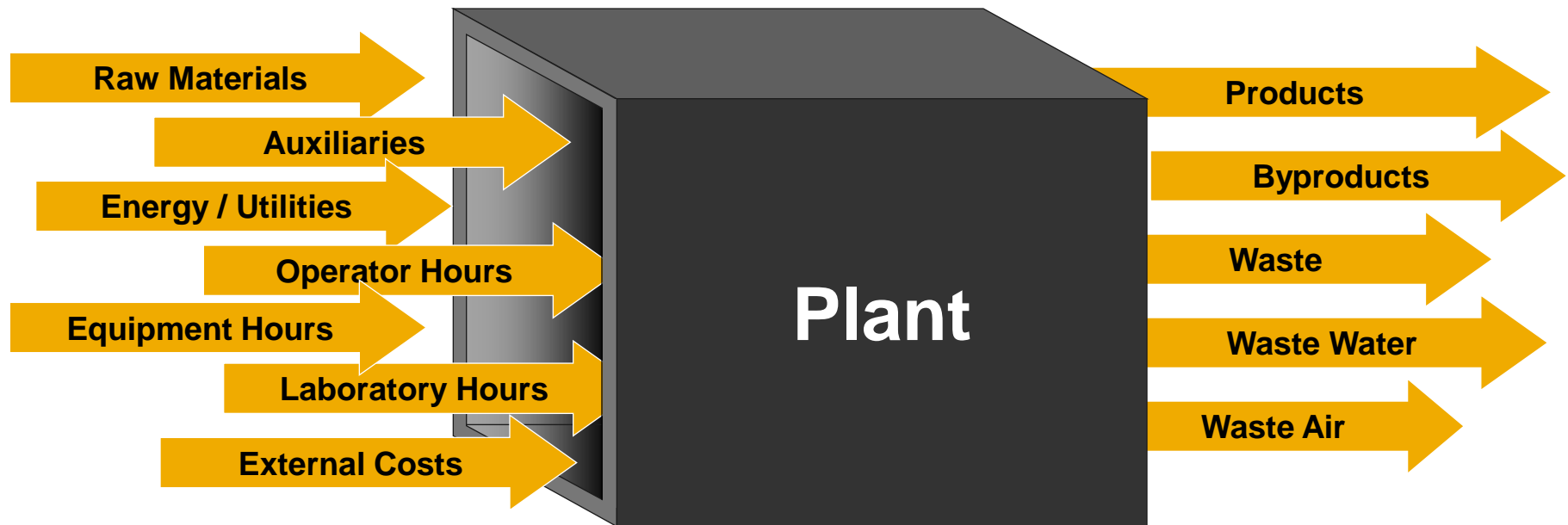
The SAP logo is located in the bottom left corner of the slide. It consists of the letters 'SAP' in a bold, white, sans-serif font, set against a blue rectangular background. The background of the entire slide is a photograph of a large industrial refinery or chemical plant, featuring numerous tall distillation columns, complex piping systems, and storage tanks under a clear blue sky.

**SAP**

# The Manufacturing Plant is for other Functions very often a Black Box

## *View from Outside*

*The manufacturing plant is a part of the Supply Chain, which absorbs enormous resources and generates high costs.*

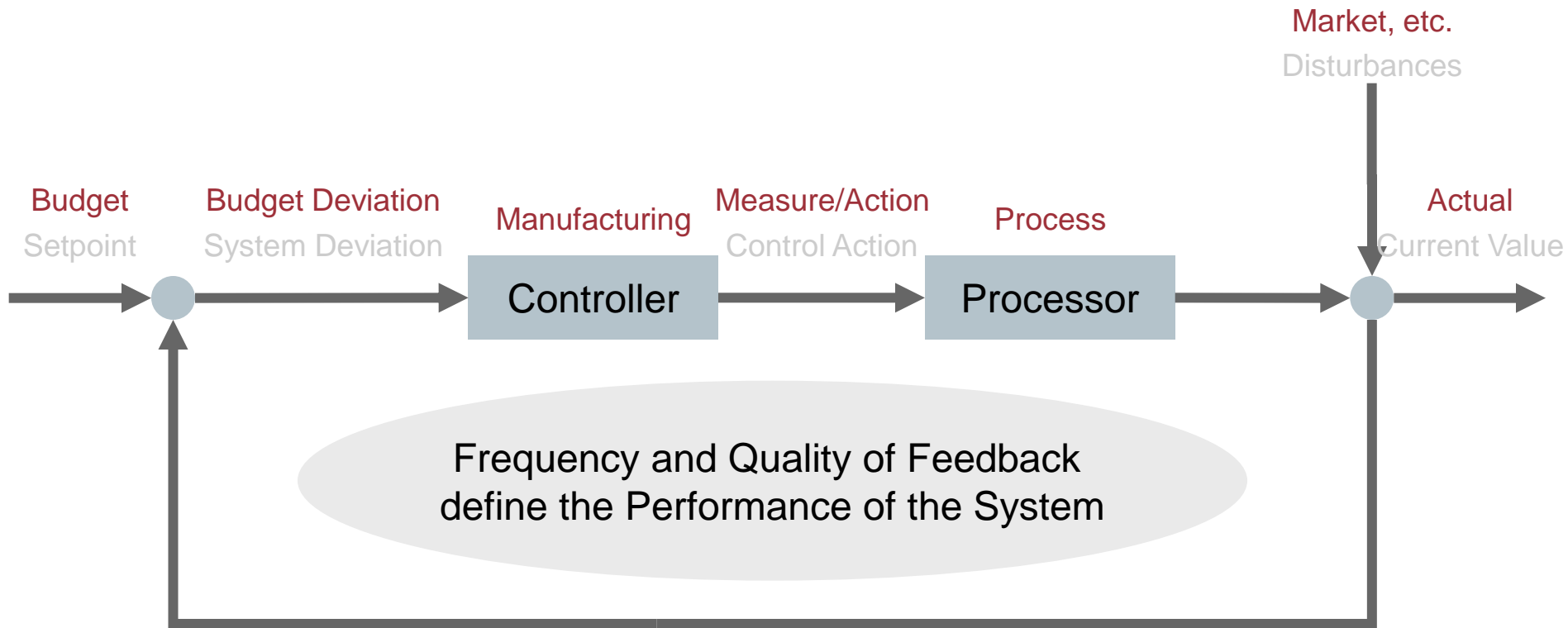


## *View from Inside*

*The manufacturing plant is the core function of the company with the central task to produce all required products with the right quality and to ensure timely delivery to the customer.*

# Manufacturing as Cybernetic Model

## The learning Organization

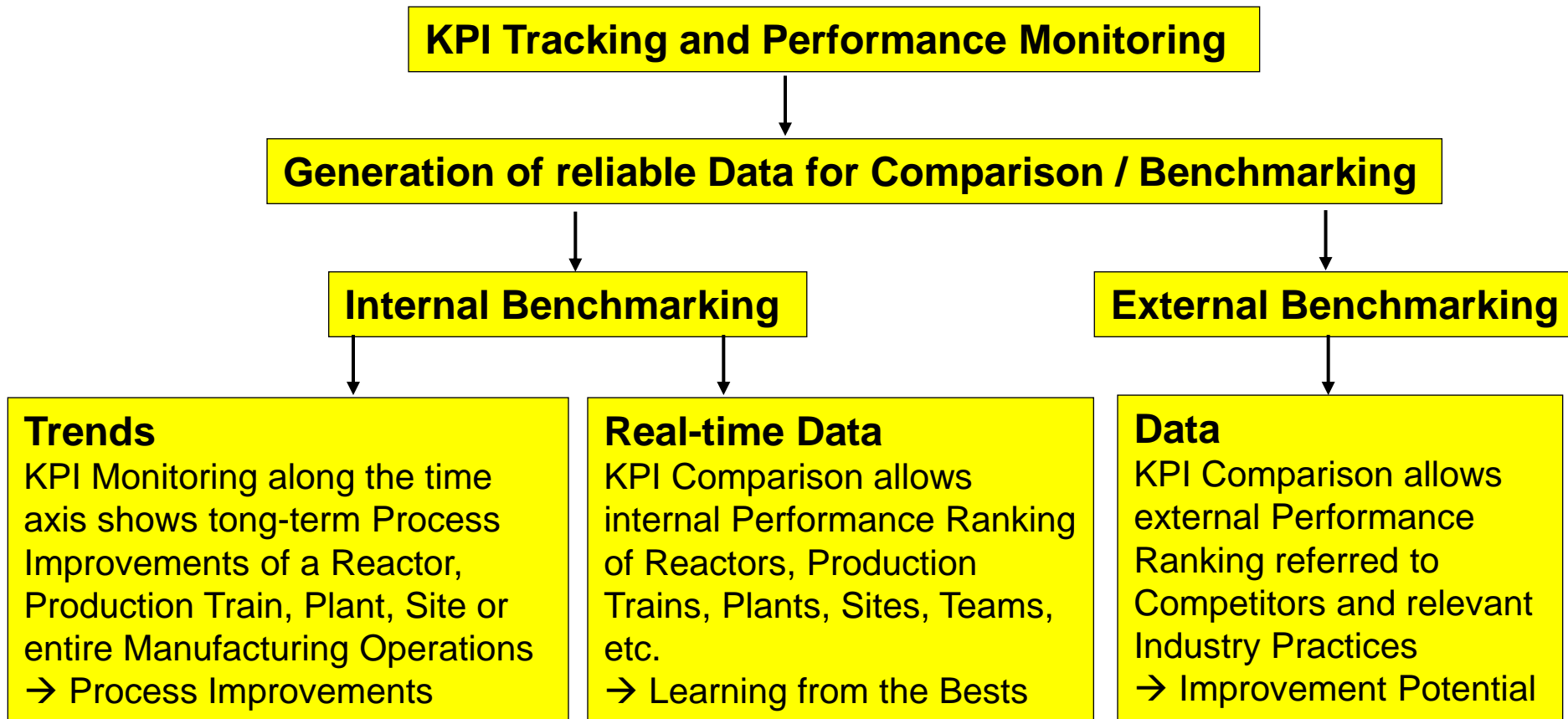


**Manufacturing will be successful on long Term, if it optimizes Frequency and Quality of ist Performance Feedback.**

**➔ Therefore Manufacturing needs high ERP Integration and KPI Reporting**



# KPI Tracking and Performance Monitoring are Basis for systematic Improvement



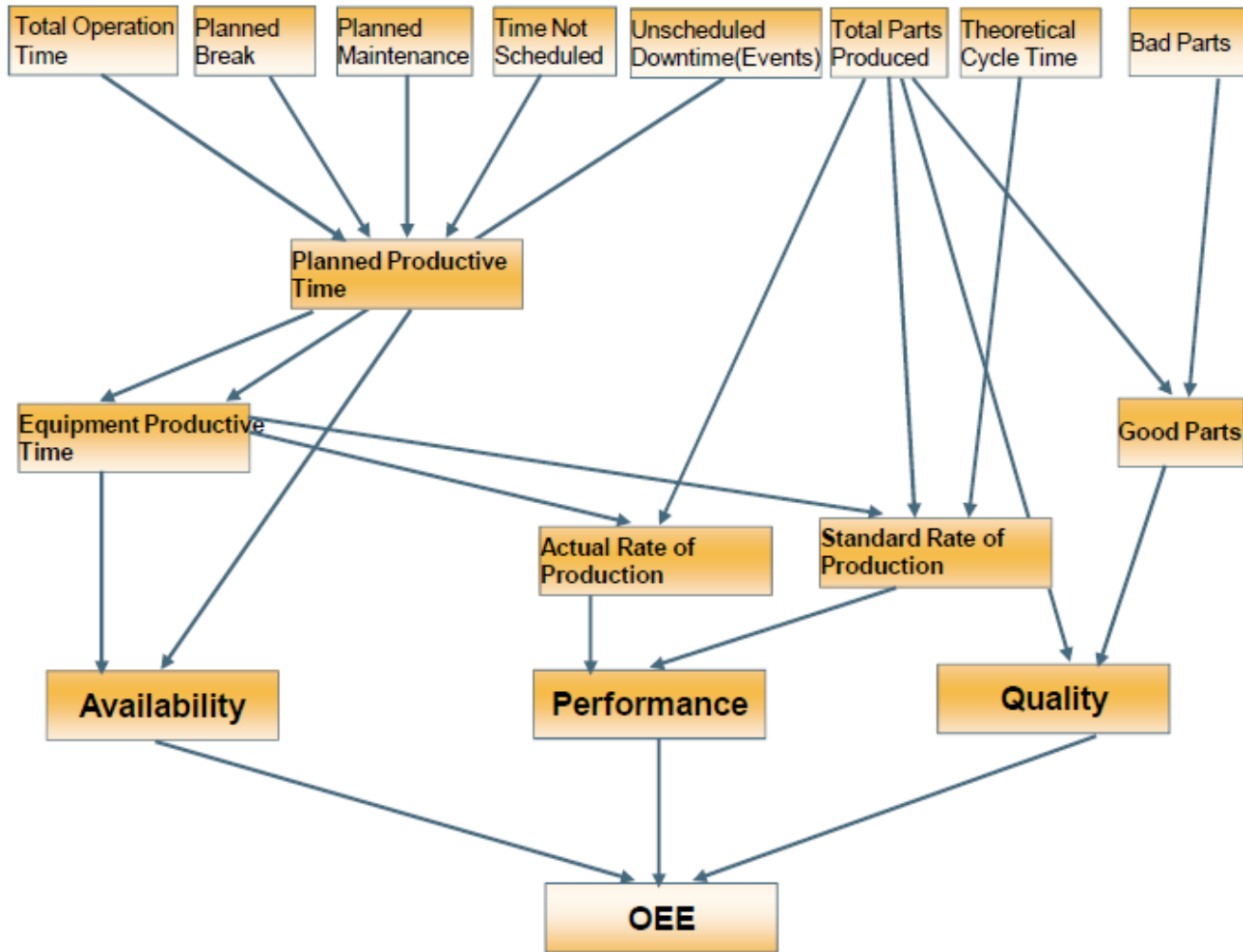
**Foundation of these Comparisons is a set of common KPI Definitions**

# Typical Key Performance Indicators (KPIs) for Production Execution (Examples)

---

- Overall Equipment Effectiveness (OEE) [%]
  - Equipment Availability [%]
  - Equipment Performance [%]
  - Right first Time (Quality) [%]
- Specific Conversion Cost [€/Ton FG manufactured]
- Manufacturing Cycle Times [h or d]
- Specific Steam Consumption [Tons steam/Ton FG manufactured]
- Specific Quality Assurance Cost [€/Ton FG manufactured]
- Specific Production Scheduling Cost [€/Order or €/Ton FG manufactured]
- Specific Waste Volume [Ton/Ton FG manufactured]
- Specific Waste Water Load [TOC/Ton FG manufactured]
- Specific VOC Emissions, CO<sub>2</sub> Emissions, Dust Emissions, etc
- Utilization of Personnel [SAP Hours booked/total Number of Hours available]
- Utilization of Equipment [SAP Hours booked/total Number of Hours available]
- Specific Maintenance Costs [% of Fixed Assets] / World Class Maintenance
- Technical Spare Part Stock [€ or % of Fixed Assets]
- Production Plan Adherence, annual, monthly or daily [%]

# OEE KPI Calculation Tree (Example)



# Performance Benchmarking by SAP

## Overview

### Overview



- Established end of 2004
- Complimentary service
- Available to SAP and non-SAP customers

### Reach



- > 15,000 participants from more than 4,500 companies
- Global: in 2010 more than 60% participants from outside NA
- Partnerships with ASUG and other user groups
- Studies available in 12 languages

### Content Coverage



- > 20 business process assessments available
- > 700 KPIs, > 1,000 Best Practices
- > 300 peer groups



Deutschsprachige  
SAP® Anwendergruppe



# SAP Benchmarking: Manufacturing is covered by four Modules

## Financial Excellence

Finance

Financial Compliance

Financial Performance  
and Risk Management

## Best People and Talent

Human Capital  
Management

Talent Management

## Operational Excellence

SRM/ Procurement

Manufacturing

Responsive  
Supply Networks

Supply Chain Planning

Transportation  
Management

Warehouse Management

Product and Service  
Leadership

NPDI

## Strategic IT

Total Cost of Ownership  
(TCO)

Business Intelligence/  
Analytics

Enterprise Information  
Management

Best Run IT

## High Performing Assets

Enterprise Asset  
Management

EH&S Compliance

## Superior Customer Value

Customer Contact  
Centers

Sales Effectiveness

Trade Promotion  
Management

## End-To-End Processes

Enterprise Health Check

Order to Cash

Cash to Cash



# Benchmarking discovers your Improvement Potentials

typically 2-3 weeks

2-3 weeks

## Benchmark (e.g. Production)

Collection and analysis of company key figures



Customer vs. SAP Engagement: 80/20

Customer SAP

8-12 hrs time commitment from customer

## Potential Analyse (Value Lifecycle Manager)

Development of a business case based on information from the analysis and industry benchmarks



Customer vs. SAP Engagement: 0/100

SAP

## Benefits Validation

Validate key performance indicator and best practices potential

Potential Annual Benefits:		€967k	€1309k	Conservative Estimate	Likely Scenario
<b>Finance</b>	€443k	€593k			
Improve Finance FTE Efficiency	€149k	€156k			
Reduction in Uncollectible A/R Write-offs (Bad debts)	€120k	€150k			
Reduce DSO - Recurring Benefits	€133k	€166k			
Reduce Accounts Receivable Overdue	€20k	€27k			
Reduce External Audit Costs	€15k	€26k			
Reduce Finance SOX Closure Process Time	€8k	€11k			
<b>Procurement</b>	€172k	€242k			
Improve Annual Savings (Direct Materials)	€30k	€44k			
Reduce Inventory Spend - Direct Materials	€100k	€154k			
Improve Annual Savings (Indirect)	€21k	€28k			
Reduce Overall Procurement Costs	€17k	€25k			
Improve Annual Savings (Services)	€4k	€7k			
<b>Supply Chain Management</b>	€286k	€377k			
Reduce Inventory Obsolescence	€91k	€121k			
Improve Warehouse Management FTE Productivity	€24k	€30k			
Reduce Inventory Carrying Cost	€90k	€106k			
Reduce Expensed Transportation Cost	€59k	€51k			
Reduce Inventory Write-offs	€20k	€30k			
<b>Order-to-Cash</b>	€73k	€97k			
Improve Order-To-Cash Employee Efficiency	€73k	€97k			

Customer vs. SAP Engagement: 50/50

Customer SAP

Deliverables

Management Commitment  
Economic Business Case  
Buy-in of Stakeholders

# SAP Manufacturing Benchmarking Survey

<https://valuemanagement.sap.com>

**SAP** Value Management Center

Choose your preferred language: English

## VALUE MANAGEMENT

### ACHIEVE THE FULL VALUE OF YOUR SAP-ENABLED TRANSFORMATION

As you focus on technology innovations to help navigate an increasingly complex business environment, stay focused on delivering value and business outcomes aligned with your organization's strategy. Successful organizations apply a consistent, proven approach - the value management life cycle - to achieve better on-time, on-budget and on-value performance of their investments.

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**Days To Close Annual Books**

**Legend:**

- You? (Blue)
- Top 25% (Grey)
- Average (Light Grey)
- Bot 25% (Dark Grey)

**Spend Categories:**

- Direct Spend (Orange)
- Indirect Spend (Light Blue)
- Services Spend (Dark Blue)

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## Human Capital Management

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2 Page: 2

3 Page: 3

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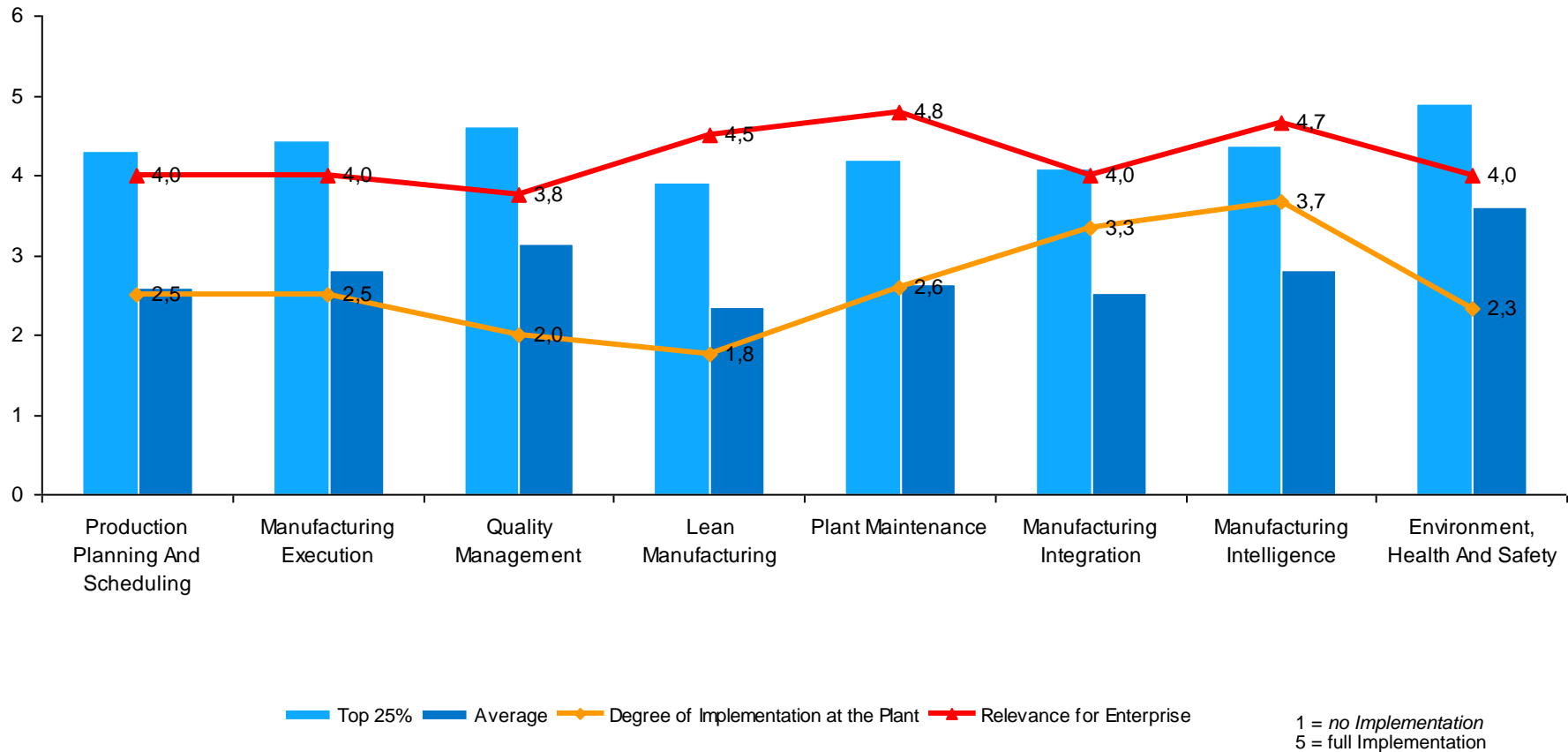
Metric	Answer
Number of Employees	<input type="text" value="13000"/>
Number Of Managers	<input type="text" value="722"/>

2 Please indicate the following strategic HR metrics:

Employee Engagement (on a scale of 1 - 10; 1 = Low, 10 = High)	<input type="text" value="7"/>
Employee Referral Rate (% of external hires)	<input type="text" value="10"/>
Employee Turnover (in %)	<input type="text" value="16"/>

# Best Practices (Example)

Best-Practice Relevance and Degree of Implementation compared to Peer Group Enterprises



# Selected KPIs Production (Example)

Category	Metric		Peer Group P1		Peer Group P2	
			Average	Top 25%	Average	Top 25%
Effectiveness	Plant On-Time Delivery (in %)		95.7	98.0	91.7	97.0
	Order Fill Rate (in %)		93.5	97.0	92.7	98.0
	Line Fill Rate (in %)		96.2	99.0	94.2	97.0
	Customer Reject Rate (parts per million)		43,683.6	9500.0	3,800.3	160.0
	Production Plan Adherence (in %)		88.1	96.0	90.4	96.0
Efficiency	Manufacturing Cycle Time (in days)		7.3	2.0	12.3	3.0
	Capacity Utilization (in %)		73.9	85.0	78.3	90.0
	Cost of Unplanned Overtime Hours as a % of Manufacturing Cost		0.22	0.03	0.29	0.06
	Wrench Time (in %)		88.7	95.4	72.5	83.0
	Overall Equipment Effectiveness (in %)		72.7	83.0	76.0	84.0
	Asset Availability as a % of Uptime		84.1	94.2	90.7	95.0
	Service and Maintenance Parts Inventory as a % of Plant Machinery and Equipment		1.6	0.7	1.6	0.8
	FTEs per Million in Revenue		1.95	0.82	1.55	0.58
	FTE Cost as a % of Revenue		6.5	2.2	6.0	2.8
	Manufacturing Cost as a % of Revenue		66.7	61.2	61.2	45.2
	Scrap as a % of Manufacturing Cost		0.65	0.25	1.17	0.25
	Days in Inventory		39.6	25.5	61.4	36.5
	Days in Inventory - Finished Goods		26.0	13.6	25.5	10.5
	Days in Inventory - Raw Material and WIP		15.5	9.9	40.2	20.2
	OSHA Related Costs per FTE (in '000s)		0.8	0.5	0.9	0.3

# High-level KPIs related to World Class Manufacturing (Examples)

KPI <sup>1</sup>	Benchmark Performance		
Unplanned Downtime or Outages (in %)	Bottom 25%	Average	Top 25%
	29.8	11.9	3.2
Annual Service and Maintenance Cost (% of revenue)	Bottom 25%	Average	Top 25%
	17.0	9.1	1.7
Inventory Turns for Service and Maintenance Parts	Bottom 25%	Average	Top 25%
	4.2	17.1	50.0
Overall Equipment Effectiveness (OEE) (in %)	Bottom 25%	Average	Top 25%
	63.1	72.7	82.8
Days In Inventory	Bottom 25%	Average	Top 25%
	51.6	39.6	25.5
Manufacturing Cost as a % of Revenue	Bottom 25%	Average	Top 25%
	74.5	66.7	61.2
Inventory Carrying Cost (% of revenue)	Bottom 25%	Average	Top 25%
	3.0	2.0	1.0

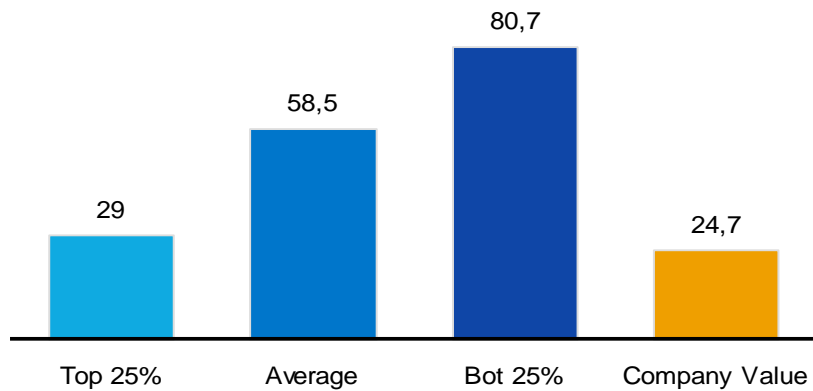
How is your company performing? ▲

What are you company's targets?

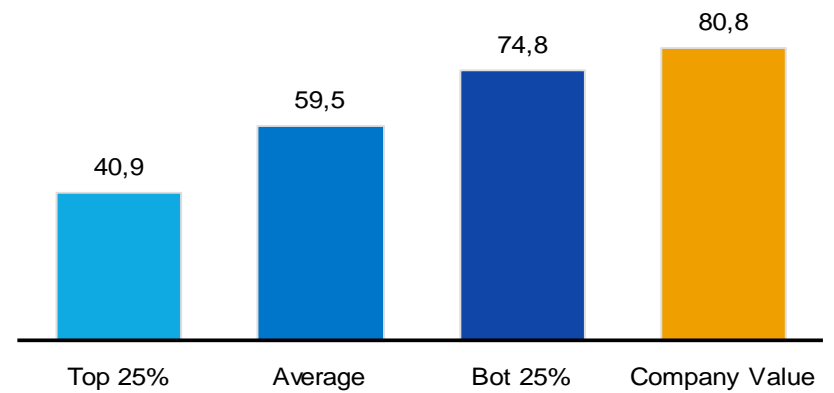


# Executive Summary

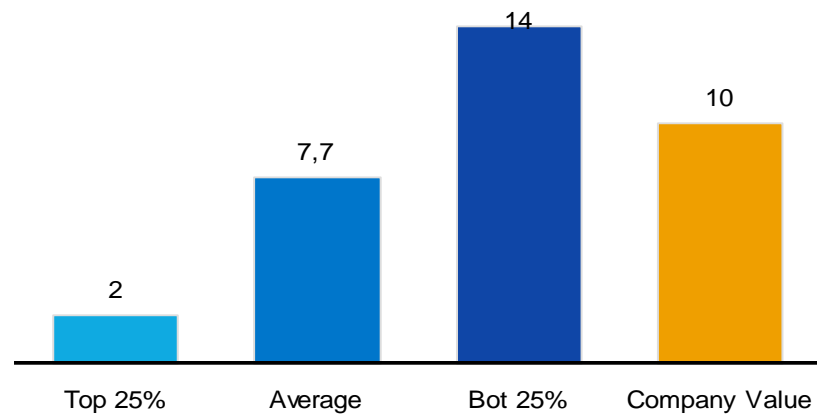
## Days on Hand



## Production Cost as % of Revenue

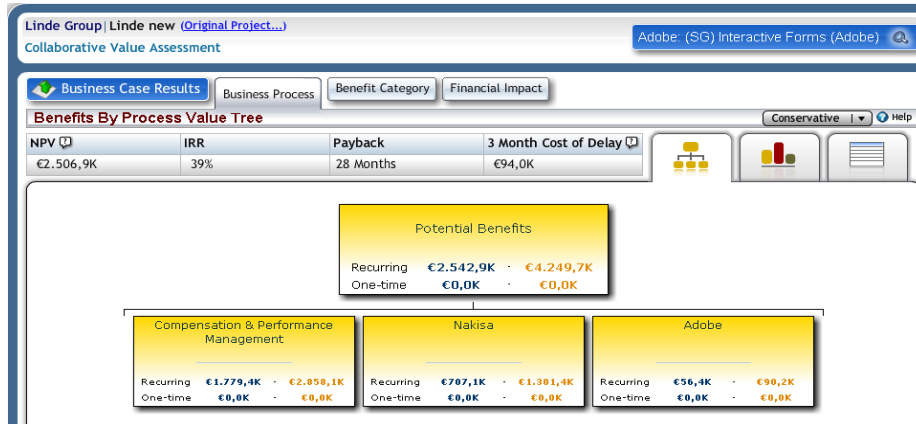


## Production Lead Time (days)

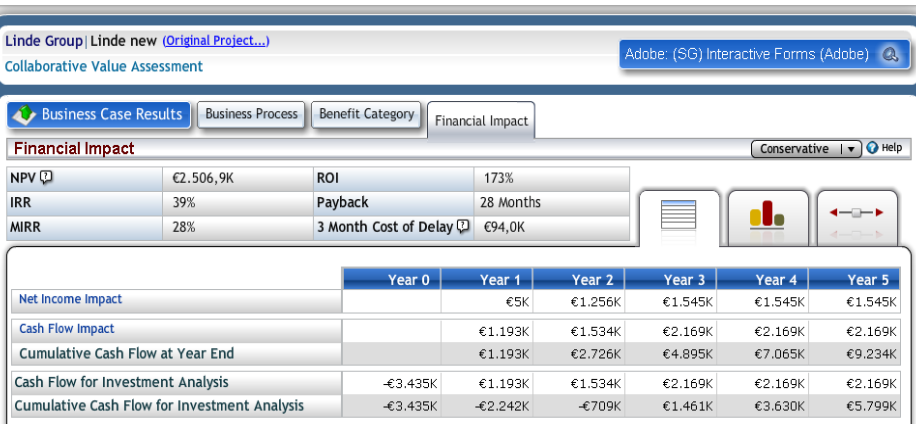


# Value Lifecycle Manager Results (Examples)

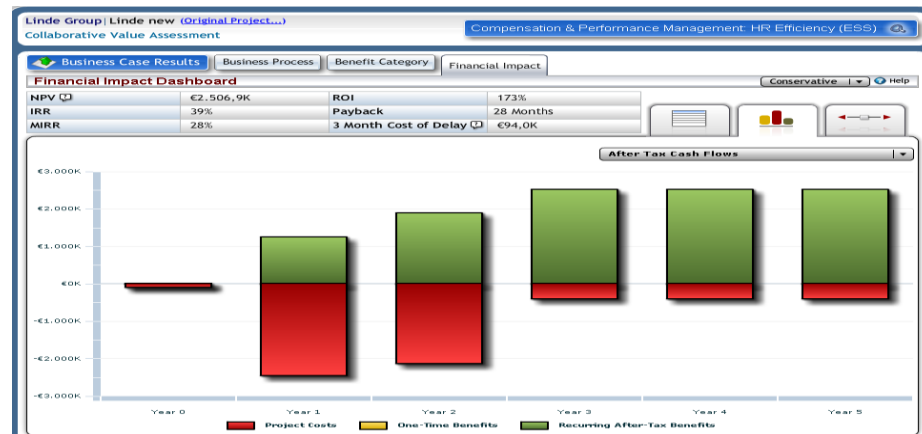
## Value Tree



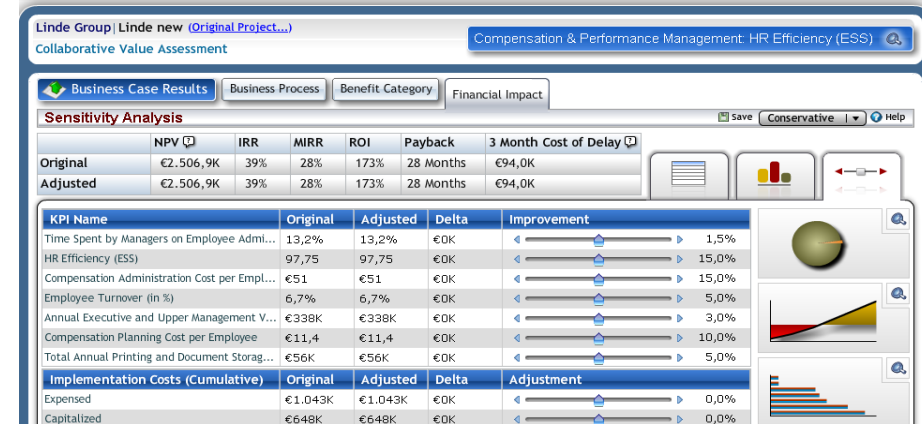
## Cash Flow



## Financial Impact Dashboard



## Sensitivity Analysis



# Based on Benchmarking Results and a well structured Methodology...

Client Example: Inventory

## Reduce Days In Inventory (DII)

### From Data Request

<b>b Total Inventory</b>	Total Inventory including Raw Materials, Work-in-Progress and Finished Goods from the Annual Filings.	€100.262.000
<b>c Total Revenue</b>	Total Annual Products and Services Revenues (Commercial Sector) or Total Budget (Public Sector)	€2.044.643.000
<b>d Cost of Goods Sold (% of Revenue)</b>	Cost of Goods Sold (COGS) expressed as a Percent of Total Revenue. If COGS was provided in \$, please divide that amount by Total (Annual) Revenue to get COGS as a % of Revenue	59,7%

Customer Data

### KPI: Days In Inventory (DII)

Formula	Baseline		
$a = (b*365)/(d*c)$	30,0		
	Before SAP Solution	After SAP Solution	
		Conservative	Most Likely
	Improvement	1,00%	2,00%
	Baseline	Conservative	Most Likely
KPI Value (a)	30,0	29,7	29,4
value driver = $a*(d*c)/365$	€100.262.000	€99.259.380	€98.256.760
One-time Benefit		€1.002.620	€2.005.240

..... DII

Assumption: 1% Improvement

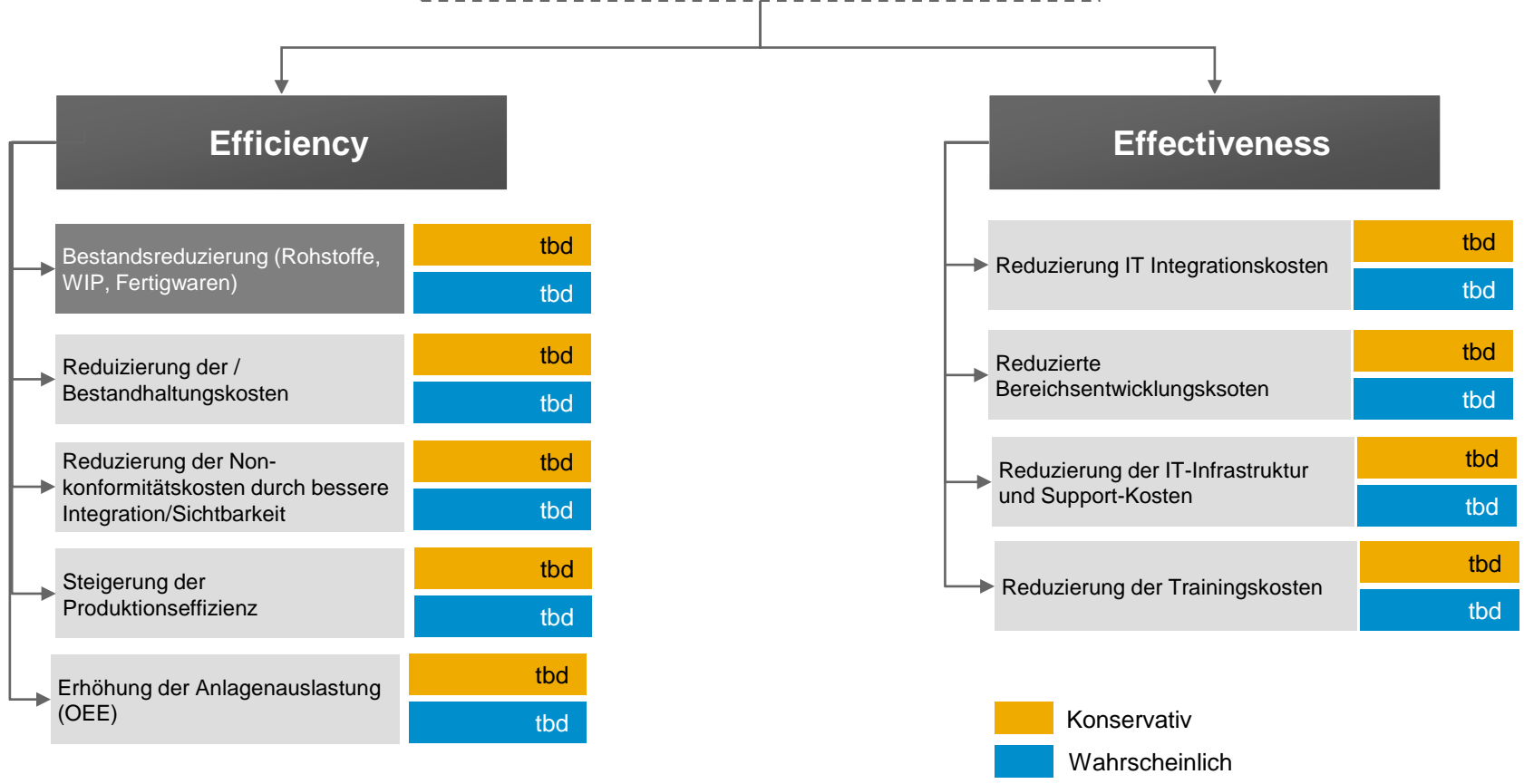
Value of Inventory

Improvement Potential (one time)

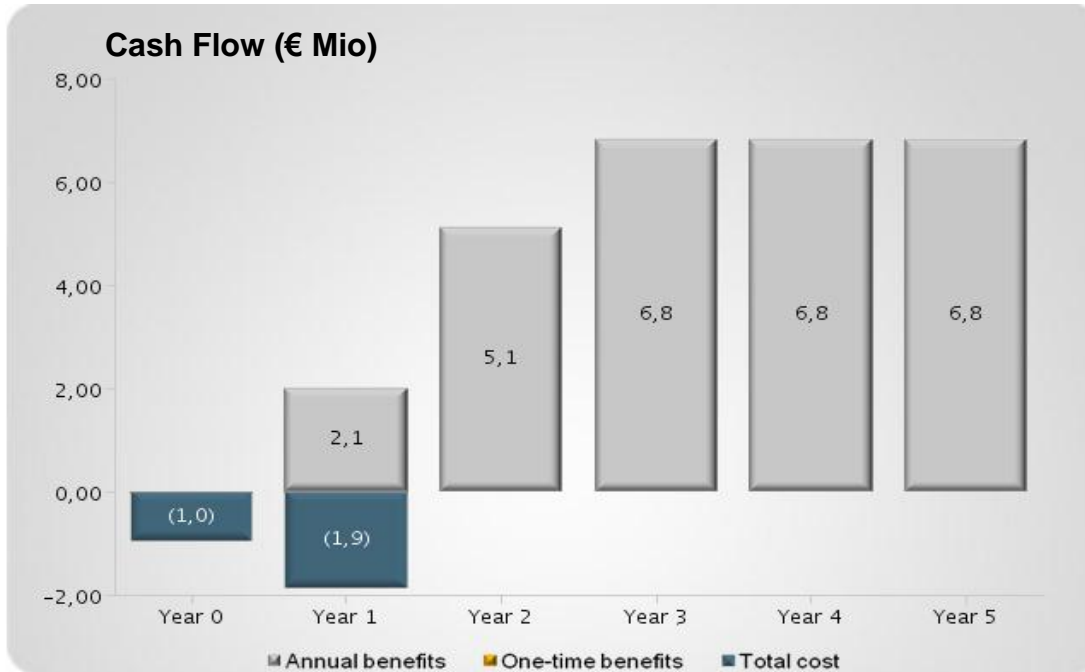
# ...Improvement Potentials can be identified...

Example

Value Potential World Class Manufacturing	Konservativ	tbd
	Wahrscheinlich	tbd



# ... and Business Case Calculations can be supported



## Assumptions:

- WACC: 9%
- ....
- ....

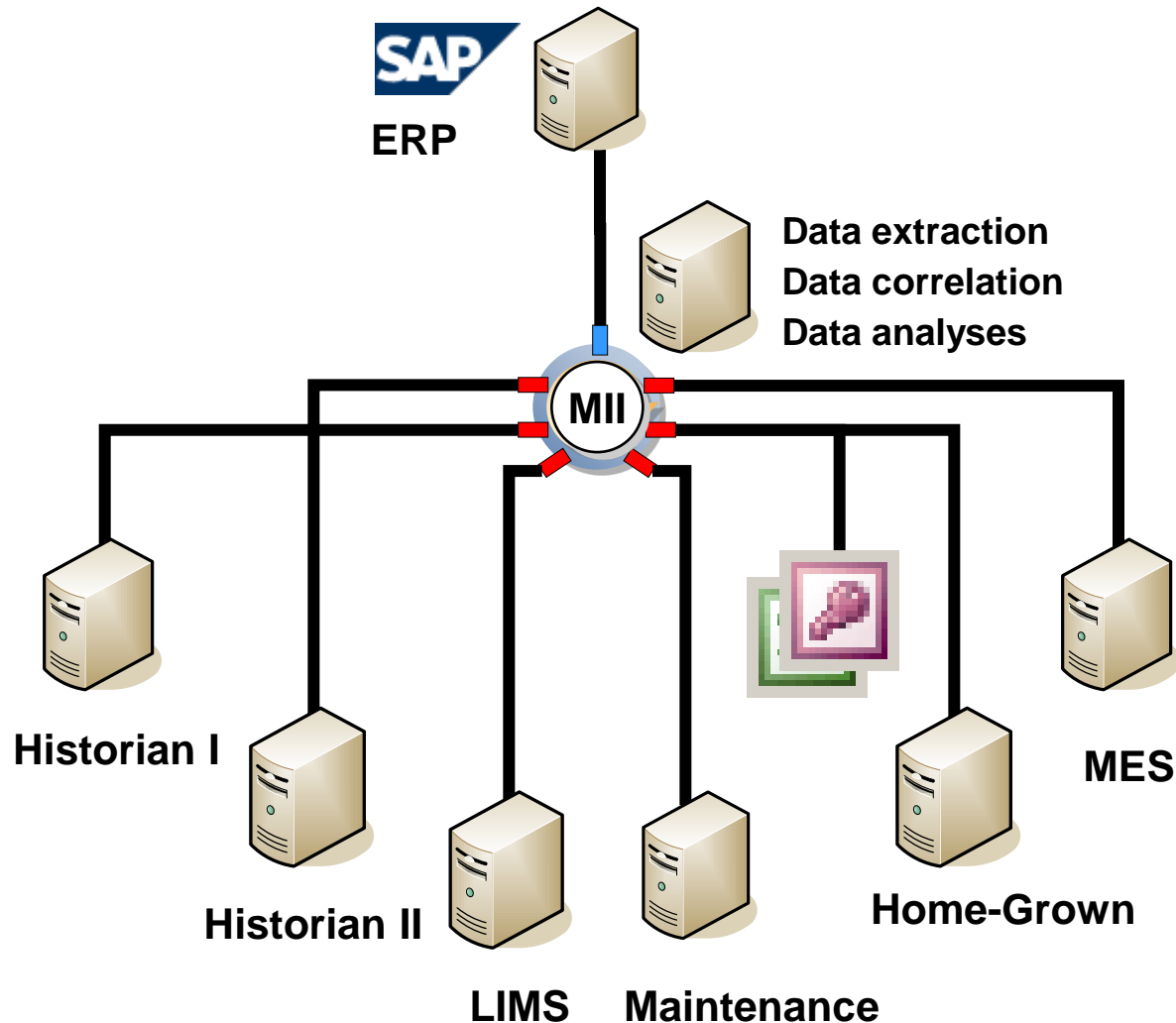
**Example**

Value Potential World Class Manufacturing	tba
	tbd

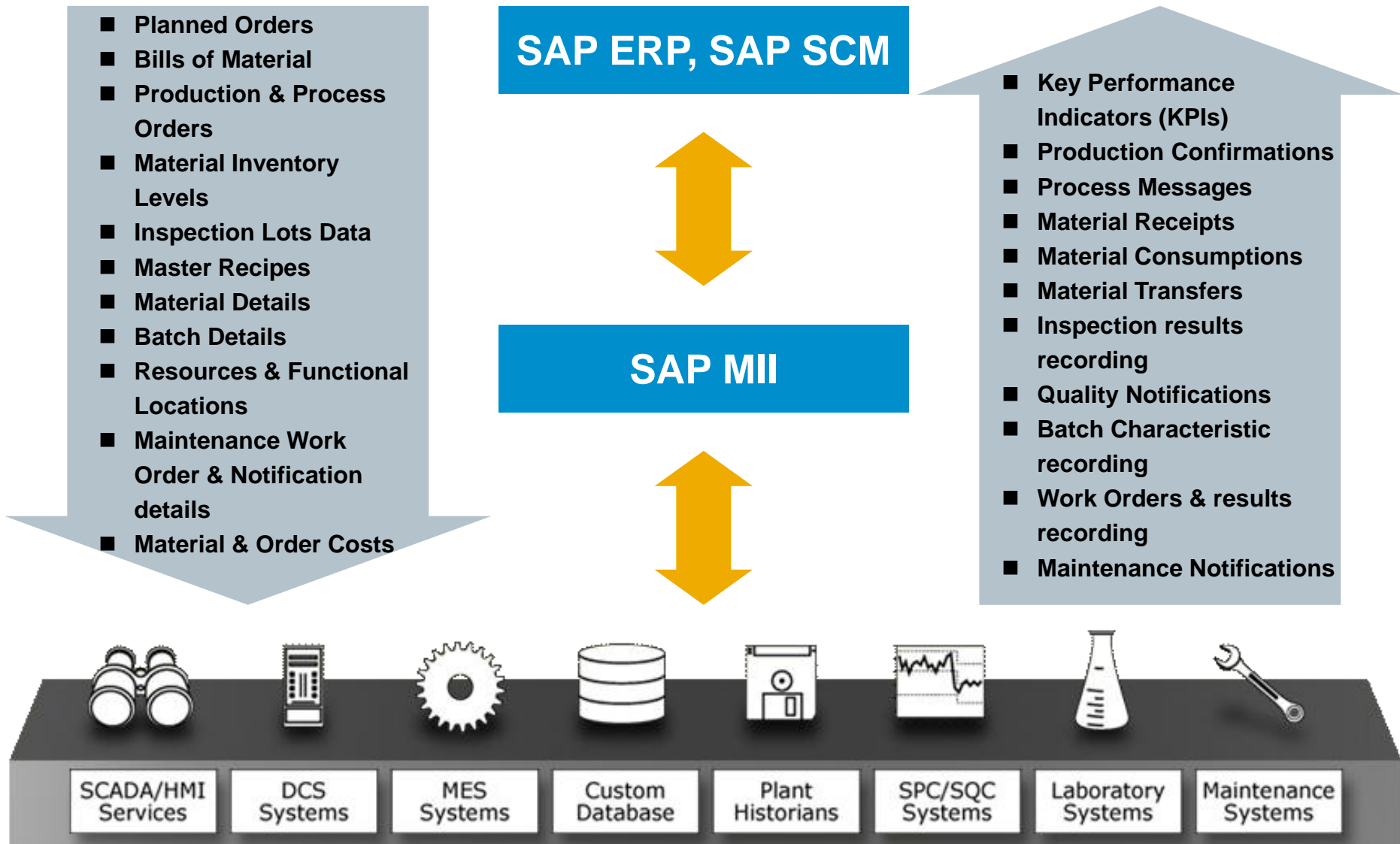
5 years	
NPV	
IRR	
ROI	
Payback Period	
3 Month Cost of Delay	



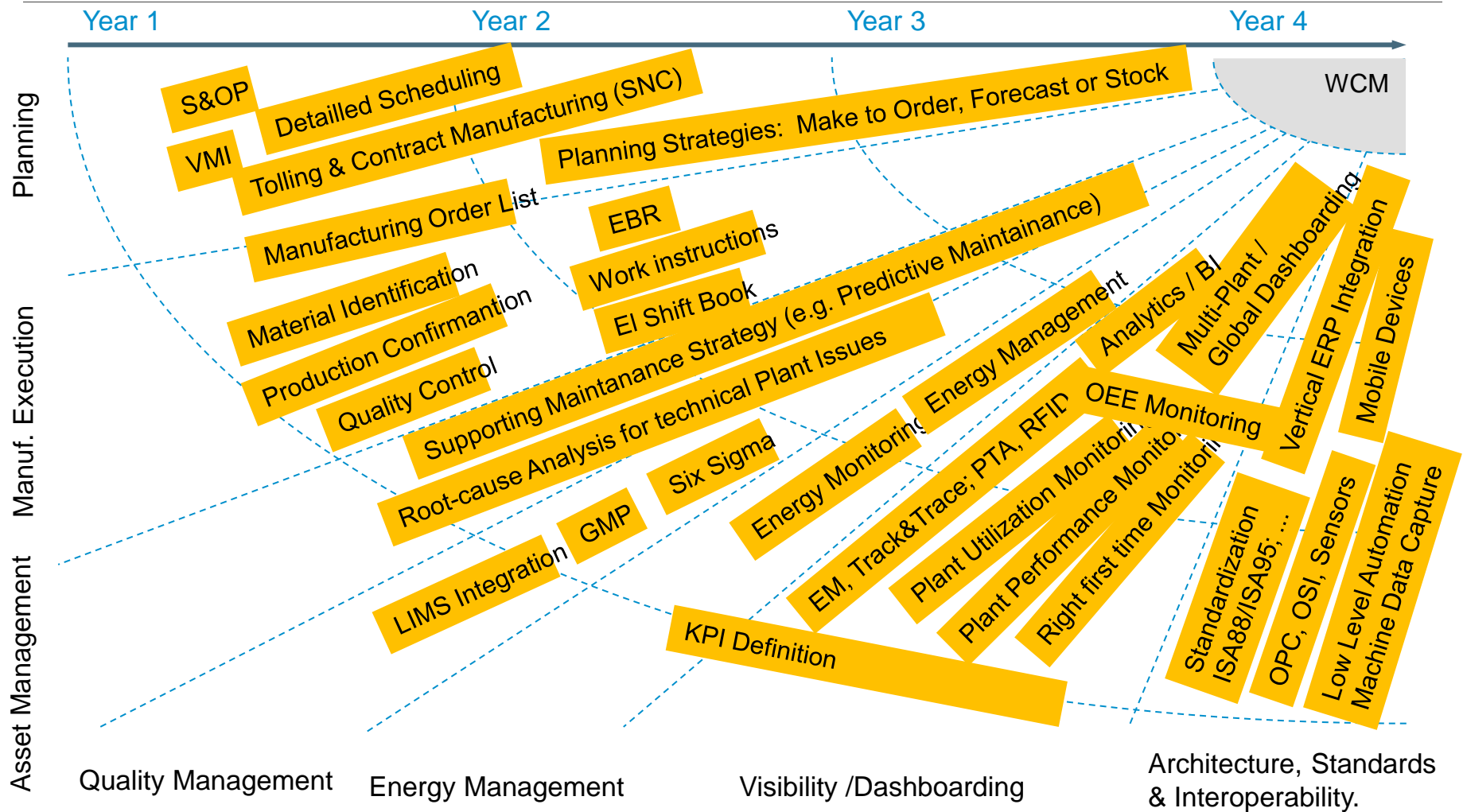
# Vertical Integration with SAP MII enables Plant Transparency



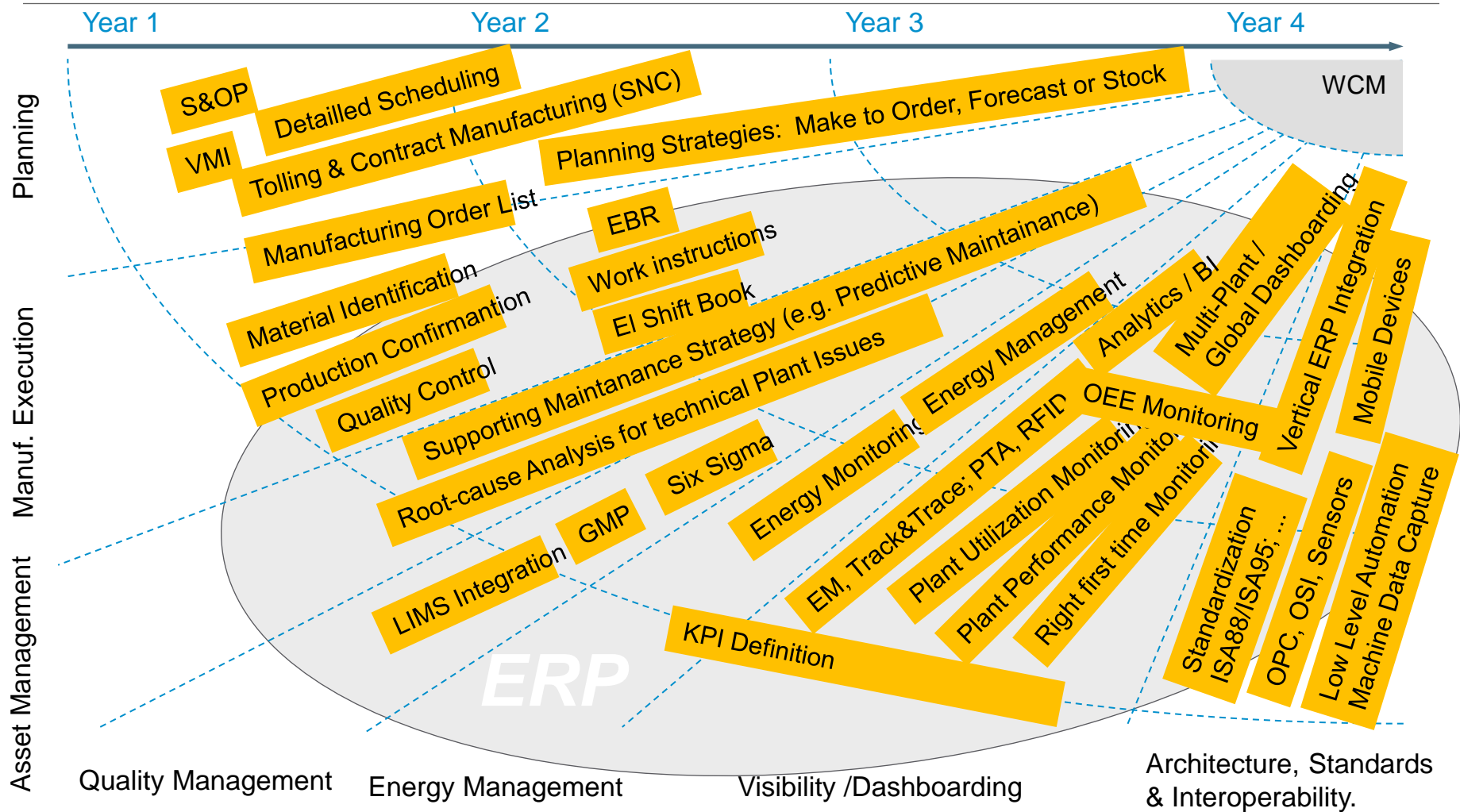
# SAP Manufacturing Integration & Intelligence (SAP MII) enables full Integration of Plant IT into Business Processes



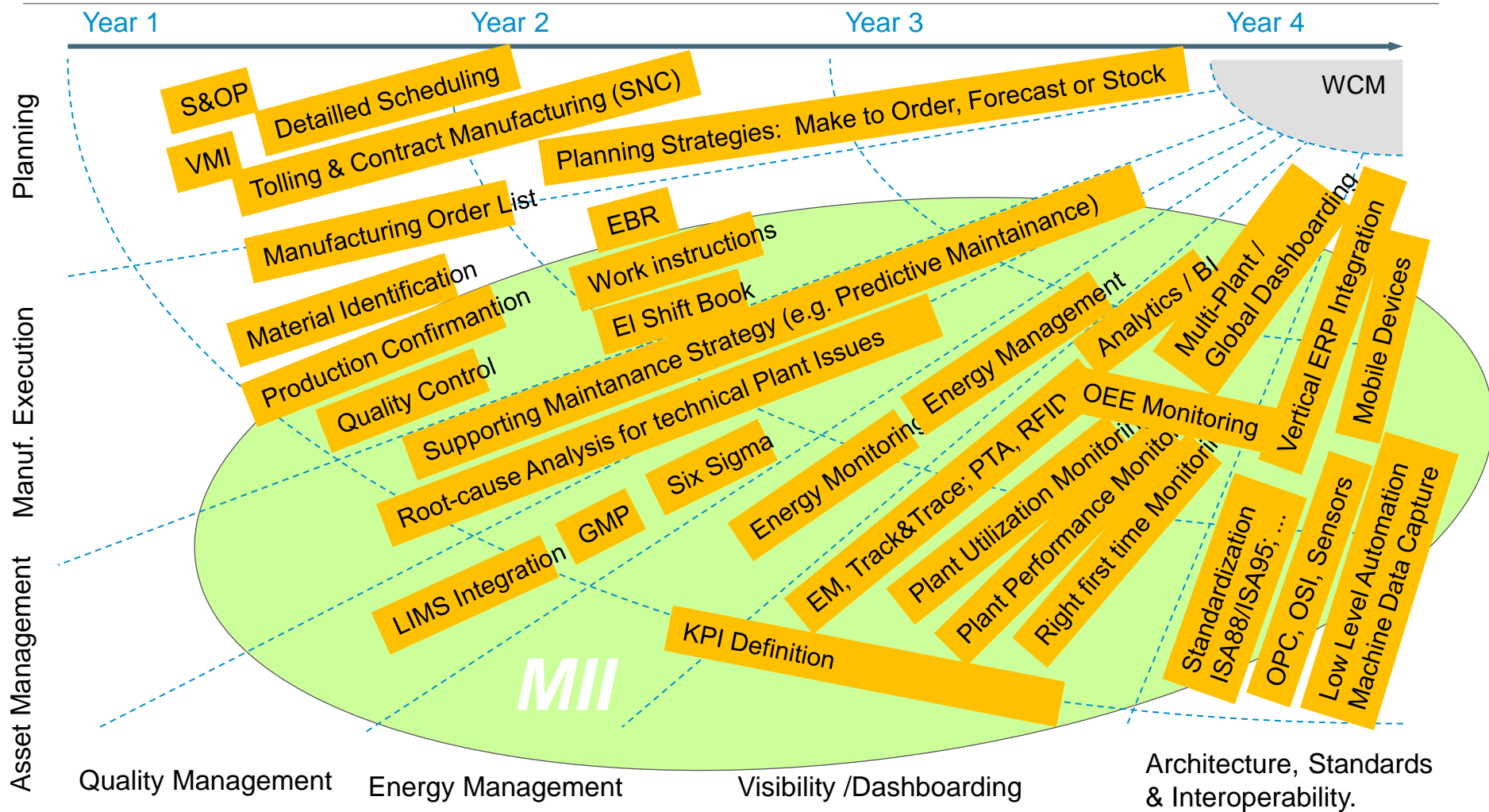
# Transition Map to World Class Manufacturing



# Transition Map to World Class Manufacturing

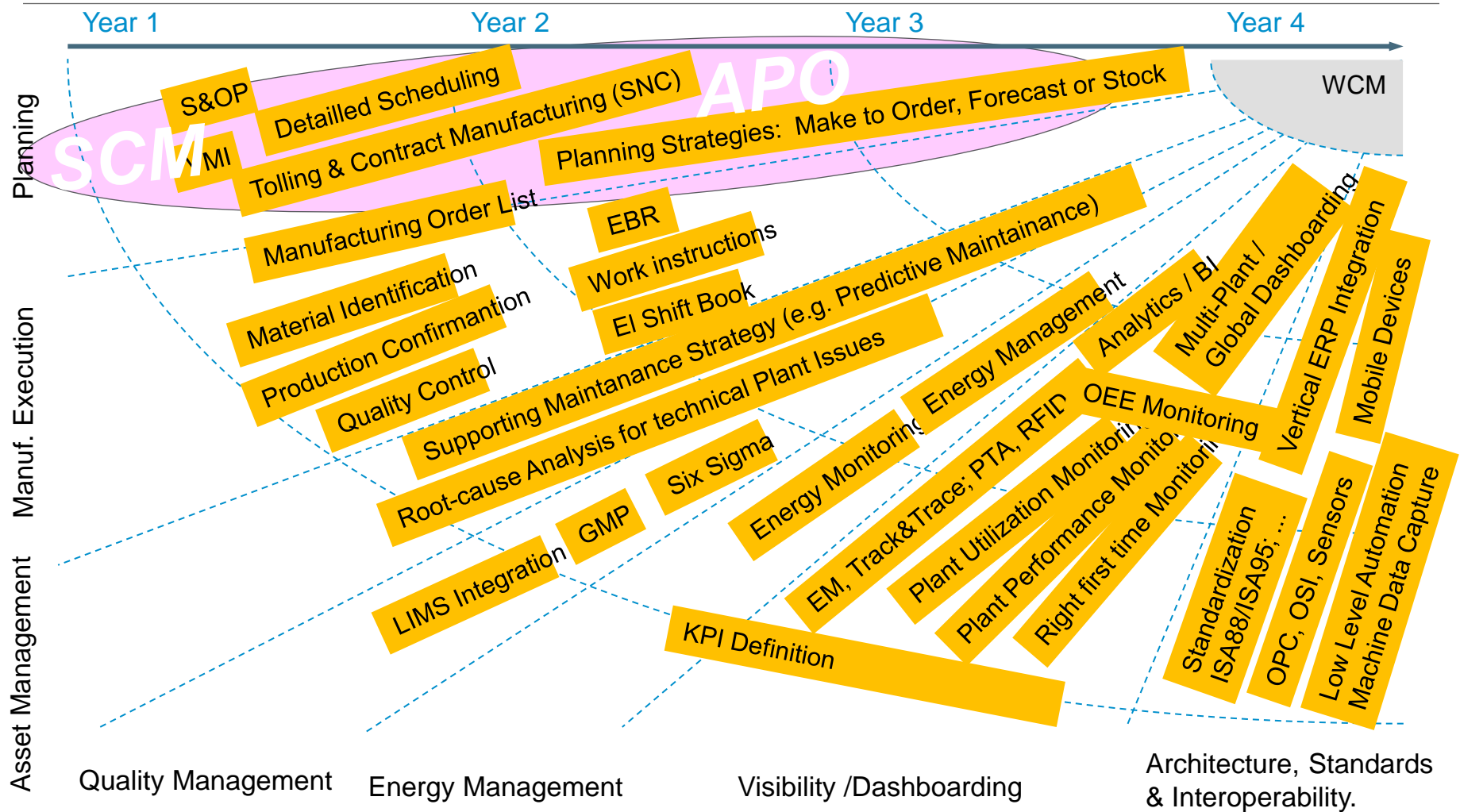


# Transition Map to World Class Manufacturing





# Transition Map to World Class Manufacturing



# SAP Solutions for World Class Manufacturing

## 1. Manufacturing Planning

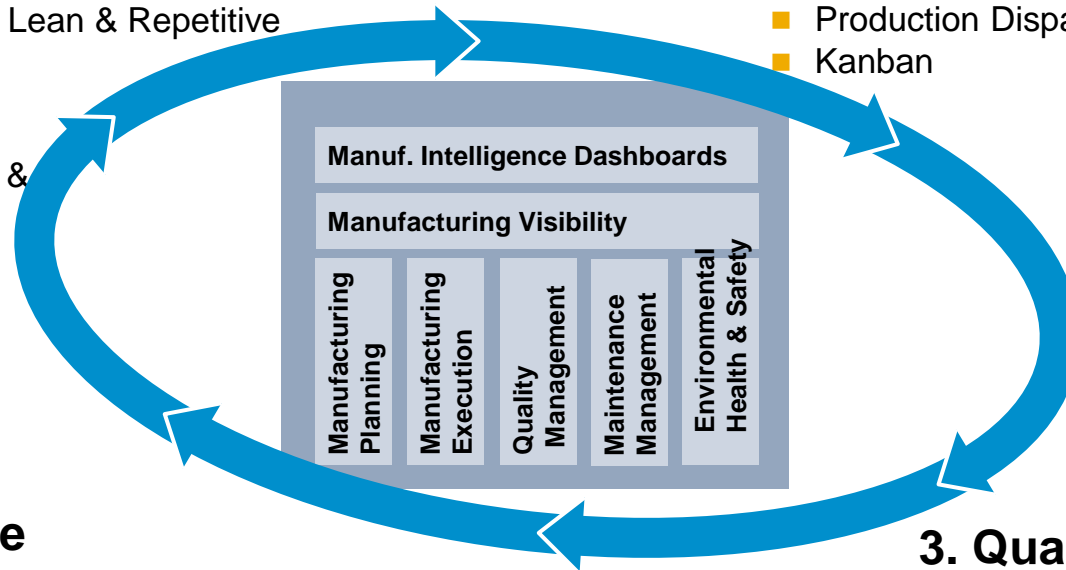
- Forecasting/Collaborative Forecasting
- Make-to-Stock / Make-to-Order
- Finite Capacity Scheduling
- Material Requirements Planning
- Recipe Management
- Lean & Repetitive

## 2. Manufacturing Execution

- Production Process Management
- Batch Management
- Labor & Resource Management
- Outbound Processing
- Production Dispatch
- Kanban

## 6. Visibility

- ATP/CTP
- Safety / Target Stock
- Manufacturing Costing & Performance Mgmt.
- Tracking & Genealogy
- Subcontracting and Collaboration
- Manufacturing Event Management



## 5. Plant Maintenance

- Technical Asset Mgmt
- Predictive & Preventive Maintenance
- Maintenance Execution
- Integration to purchasing

## 4. EH&S Compliance

- Product Safety Management
- Hazardous Substance & Dangerous Goods
- Emissions & Waste Management
- Industrial Hygiene and Safety
- Occupational Health

## 3. Quality

### Management

- LIMS integration
- Quality Engineering
- Quality / Tracking Control
- Quality Improvement
- Audit Management
- SixSigma/SPC

# Value from SAP Manufacturing (Examples)



**Rockwell  
Collins**



**EASTMAN**



**Pratt & Whitney Canada**

A United Technologies Company

## **Global Process Improvement in over 30 plants:**

*20 X ROI in the first two years*

## **Implemented Lean Manufacturing with SAP:**

*Productivity by up to 22%, reduced cycle time by 41%, decreased inventory by up to 46% and decreased WIP by up to 40%*

## **Improved Asset Utilization:**

*Overall Equipment Effectiveness (OEE) from 65% to 80%; implemented in 120 days*

## **Improved supply network visibility:**

*Savings of \$10 million in first year implemented in 120 days*

## **Improved quality, execution and mfg process:**

*\$14 million in annual savings*



## Contact



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