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Real Estate and Facilities



Plant and Production



Mobile Assets



Infrastructure



Information Technology

Enterprise Asset Management Life Cycle & Maintenance Strategies

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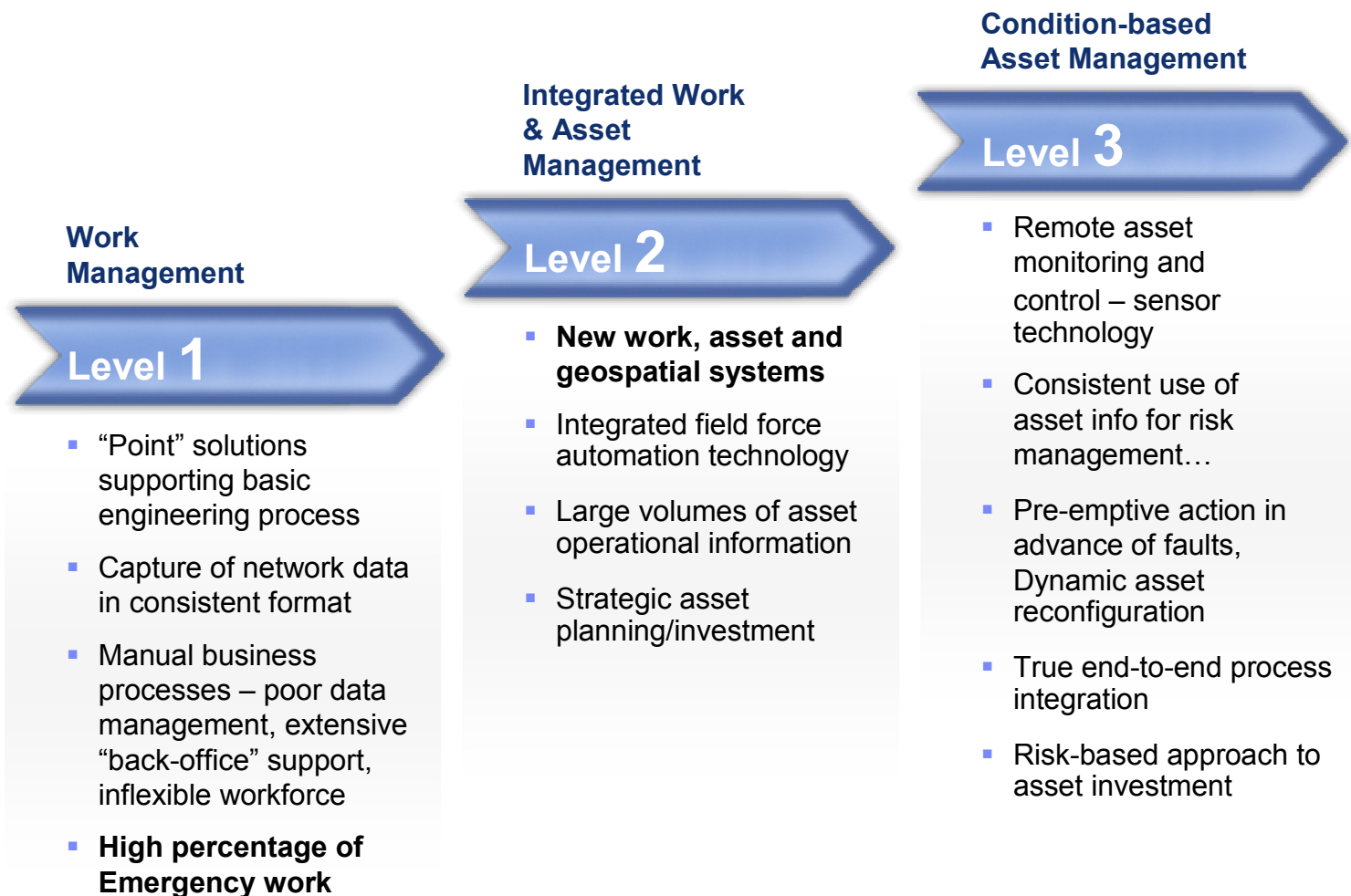
Comprehensive asset & service management



- Drivers of comprehensive asset service management:
 - Cost inefficiencies and complexity associated with redundant asset management infrastructure
 - Need to measure and manage the availability and use of all strategic assets
 - The emergence of pervasive devices, embedded chips, RFID, sensors, detectors and IP addresses attached to enterprise assets



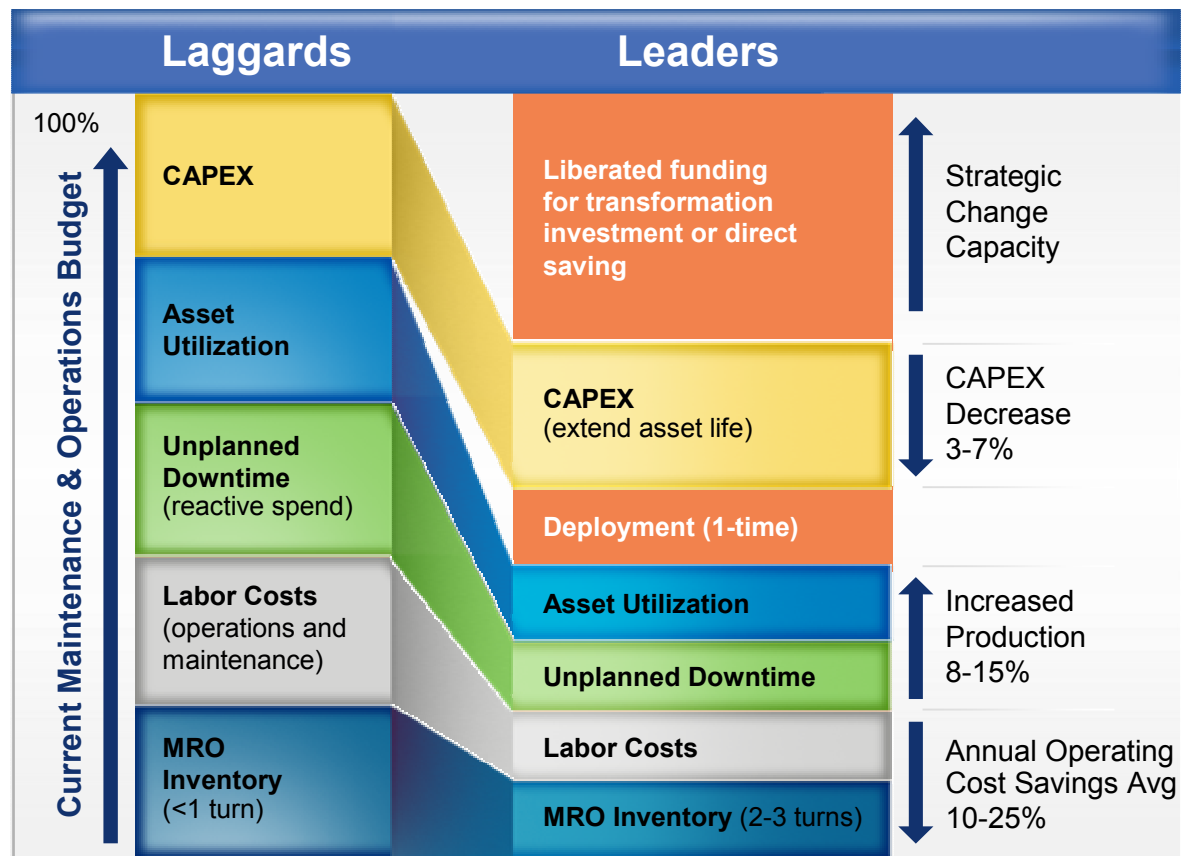
Trends in Enterprise Asset Management (EAM) Maturity





Industry Leaders Use Technology as a Competitive Advantage

- Asset performance creates saleable capacity, contributes to EBIT
- Inhibitors to success:
 - Too much investment in Inventory
 - Labor spent on non Value Add Activity
 - Resulting Downtime impacts availability

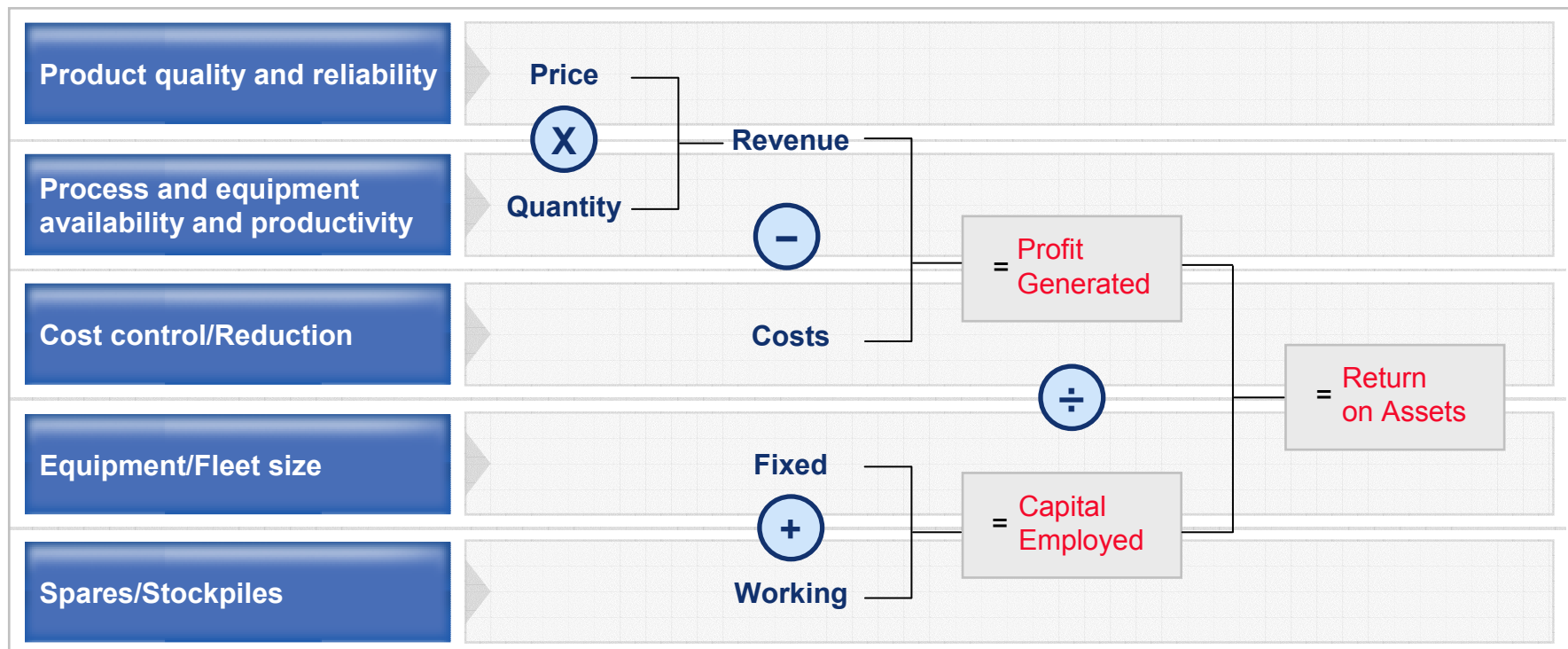


Industry Leaders have a global view of operational assets, interrelation between technology and assets and can **quickly implement change**



Asset Management – The Connection to Shareholder Value

Asset Management directly contributes to the ways our customers
INCREASE REVENUES
DECREASE COST





Three Key Metrics

Survey of more than 200 manufacturing executives: 41% from large enterprise, 41% from midsize, 18% from small*	Leaders Top 20% CAGR	Laggards Bottom 30% CAGR
Overall Equipment Effectivity: Availability x Performance x Quality	89%	59%
On time and complete shipments	97%	80%
Unscheduled downtime	2%	22%

*Source = Aberdeen Report Asset Performance Management, Nov 2008

What is the value of the differentials:

- The Balducci study (2006) collected average cost of downtime if an entire plant goes down for:
 - 20 minutes \$16,211
 - 1 hour \$28,197
 - 4 hours \$99,040



To Achieve Best in Class Performance

Align goals and metrics

- Position to align operational performance along with business metrics
- Executive visibility of equipment performance and its impact on business performance

Measure consistently and globally

- 92% of Leaders have real time visibility to asset performance information
 - Assets don't perform the same
 - More often than not, they use different resources
 - Property, Plant, Equipment, Human Resources, Etc.
 - Each has its own set of priorities and motivating forces
- Technology supports consistent measurement



Connecting to the Revenue Stream

Asset profiles create visibility to relationships

- e.g. all assets are not created equal
- Revenue vs non-revenue generating assets
- Understanding dependencies (convergence) creates an understanding of performance

Maximizing production capacity relies on developing strategies for critical assets

- Advanced Maintenance Strategies
 - Run to fail, preventive, condition based
- Advanced Management Strategies
 - Lean, TPM, TQM
- Resource Management Strategies
 - Strategic Sourcing, Outsourcing

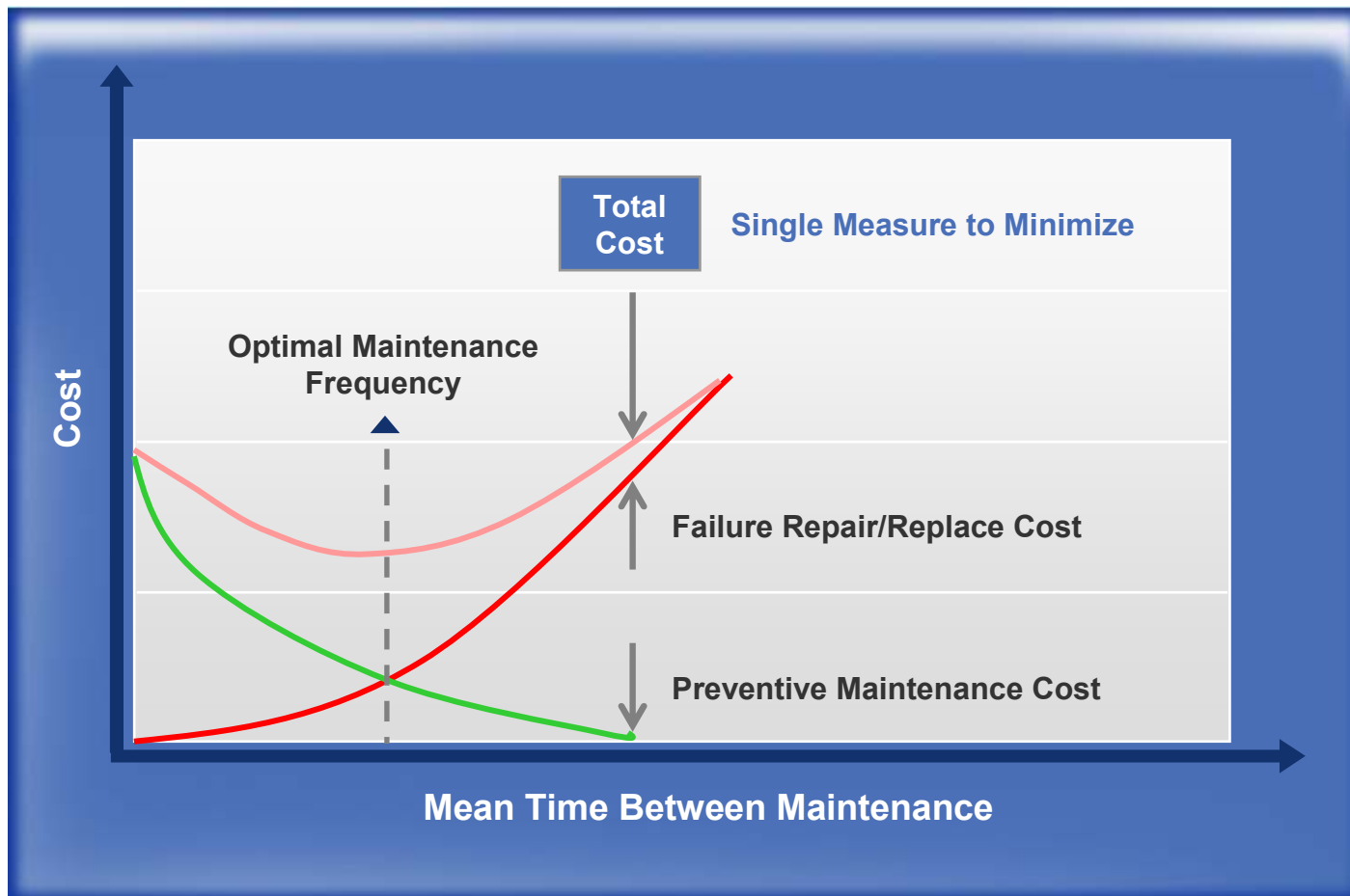
Establishing the right asset management strategy reduces asset lifecycle costs and increases production uptime, supports ability to take a best in class position

Best in class performers

- 6 x more likely to provide asset lifecycle information to employees
- 3 x more likely to dynamically update KPI and processes as best practices emerge
- 67% as likely to implement Condition Based strategies

Concept of Optimization

Where is Good Enough?



Consider the Effects of Optimization

Enterprise Asset Management tools create agility to implement strategic imperatives on a global basis

- Total Asset Lifecycle Costs are assessed for an Asset Family
- “Good Enough” strategies are put in place
- As new and better techniques are discovered, they are implemented against the Asset Group
- Each Asset Group achieves optimum performance status
- Delivering maximum Return on Asset Investment





Things Which Erode Asset Performance

Lack of closed loop design

- Poor equipment design adds cost to all phases of the lifecycle of an asset.
- A major A&D manufacturer is implementing a Customer Centric model of Field Service. Asset performance in the field is returned to Engineering through links between Asset Management and PLM. Since 80% of maintenance costs are designed in to the product, significant value to the customer is created when full lifecycle costs are considered during the design phase. Design of new equipment will be based on performance in the field metrics, propelling this enterprise to the top of the Leader category.

Lack of full visibility to asset portfolio

- Asset ownership brings fiscal responsibility to track and manage ownership
- A major pharmaceutical company reports and pays taxes on assets owned at each of their location. As assets were cataloged and inventory was validated, they discovered discrepancies in their ledgers in some cases, of more than 10% of the asset values they were paying fees on. Normalizing these registries accurately reports asset portfolios and makes assessments more accurate as well.

Top 10 offenders – Pareto Analysis at work

- Industry Leaders manage assets as a group
- A major automotive firm traditionally replaced 10% of it's oldest forklifts every year as planned in their CAPEX budget. Visibility to asset performance in the form of a Cost of Maintenance by Asset report, sorted in descending order revealed that the highest cost trucks were not necessarily the oldest. Getting rid of the lemons made them more efficient in their CAPEX spend AND in creating more asset maintenance time.



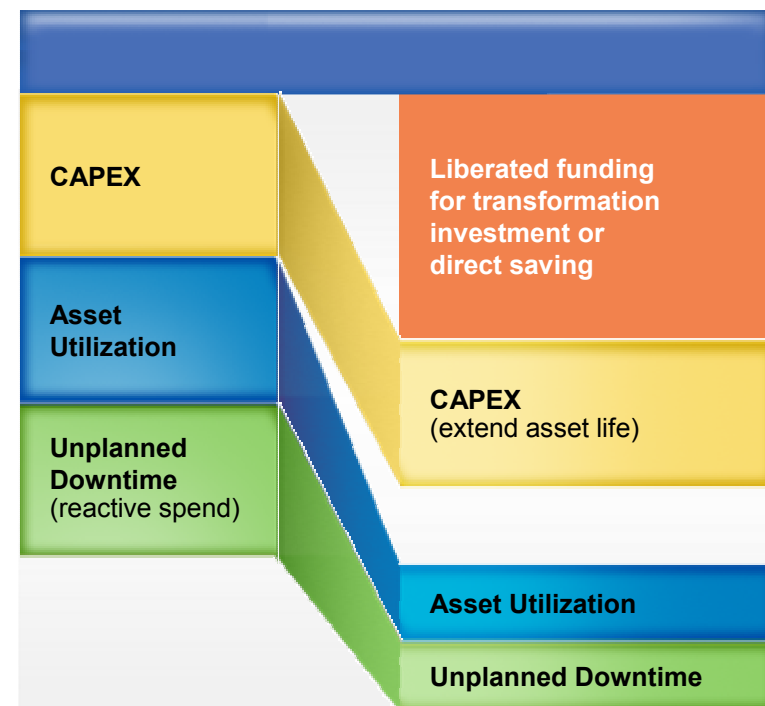
Effects of a Good Enterprise Asset Strategy

Improves CAPEX through increased asset life

- Asset life is impacted by asset reliability and maintainability
 - Basic equipment wellness
 - Maintenance labor responsiveness
 - MRO material availability

Reduces need to replace assets, from 10% to 3% production assets replaced

- Better maintenance increases lifespan
- Protects the environment, contributes to green strategy
- Planned maintenance activities increase
- Production schedules are met, on-time shipments go up
- Gross profit is increased with little additional investment
- Improves quality of end product
- Reduces rework





Labor



Things Which Erode Labor Efficiency

Lack of planning

- Priority of work or asset contribution is unknown or ambiguous
- Classification of priorities are ambiguous
- Resources “wait for assignment”
- Resource capacity is consumed by inappropriate tasks
- Overtime is authorized when crises arise

Lack of visibility

- Repeated calls for same problem; multiple response teams
- Subjective analysis of problem
- Inaccessible research materials: EQ History, Drawings, Documentation, Parts Lists, Experts
- Information is not updated on a timely basis for descriptions, progress, status, parts availability

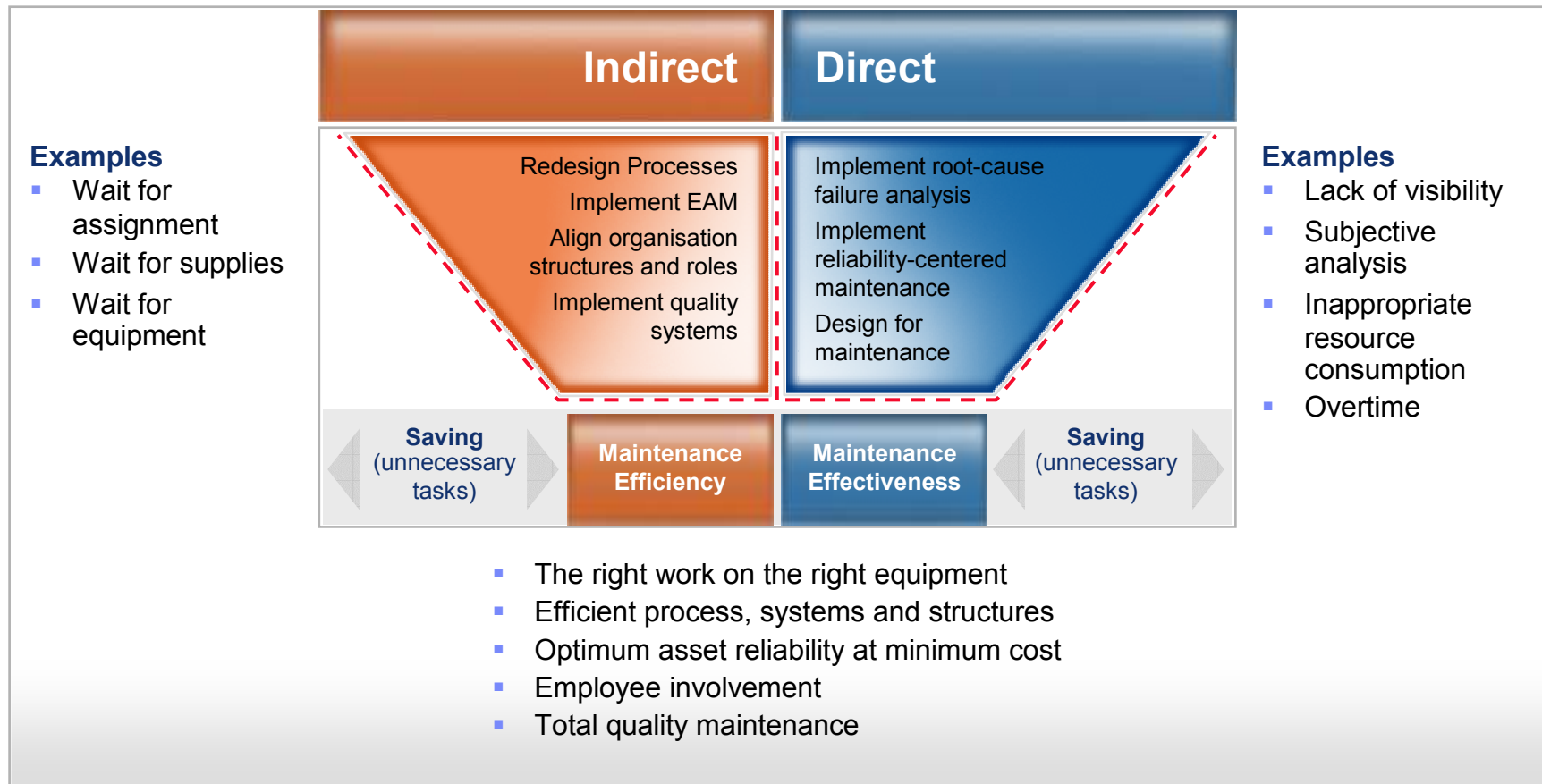
Lack of supplies

- Trades are ready to go but what about
 - Parts
 - Permits
 - Outside contractors
 - Tools



IBM MAXIMO Asset Management – Focus on Value Added Activities

Asset Management Activities





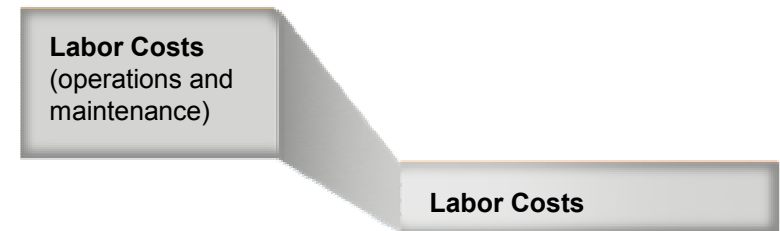
Effects of a Good Labor Strategy

Elimination of Wasted Labor

- Moves resources to Plan Based Strategies
 - Leaders 90% planned work vs Laggards at 65% planned work
- Efficient use of time
 - Equipment available
 - Tools available
 - Parts available

Increases amount of work accomplished

- From avg of 2 work orders per day to 4-5
- Decreases amount of overtime by 10-25%
- Avg savings of 10% of maintenance staff budget
- Increases job security of staff in place
- Justifies adjustments to skills on staff
- Creates visibility to outsource strategies





Inventory



Things that Erode Inventory Efficiency

Acquisitions

- Parts inventories are absorbed but not normalized; multiple line entries for the same part
- New equipment is purchased along with OEM recommended spare parts
 - OEM won contract for equipment build based on commitments to equipment performance and many times make the customer responsible for keeping parts on hand

Divestiture

- CAPEX investments provided the opportunity to replace old equipment; except that the parts never left the stores
 - Motors and pumps are still maintained
 - Original identities are lost
 - Shelf space is not free

Fear, Uncertainty and Doubt

- Last time the maintenance technician went to the window to get a part, he received the wrong one or had to wait for a new one, impacting his efficiency rating and making him look bad to customers
- The order he places offers a discount when a full box is ordered; he uses one and stashed the other 11 for when he needs them next time.
- Times are tough; the accountants have directed stores to eliminate 10% of the inventory.... How do you know which ones to eliminate?



Things that Erode Inventory Efficiency - *continued*

Storeroom Organization

- Are they stored according to equipment where used or by part category? How clean are they when you get the part, assuming it's the right one?
- There are 2 plants in the US..... Is it necessary to store that critical \$100,000 part at each one? What is the overall cost if you only stock one in a central location and agree to ship when necessary?

Sourcing

- Storeroom manager has an understanding with the local hardware store and receives many personal benefits in return.
- P-cards can be used by any technician in an emergency to buy a part from a local supplier
- Full price is paid for each part, except when quantity discounts are offered.
- Stores may elect to keep an overship
- For critical equipment, vendor viability to provide critical spare parts



Effects of a Good Inventory Management Strategy

“Right parts available for the right equipment at the right time and not before”

- Complete bill of materials for equipment
 - Parts cross references to equipment creates visibility to safety stock requirements
 - Eliminates obsolete inventory, avg 10-25% reduction in on hand inventory
 - Eliminates overstock of inventory, avg 12%
 - Eliminates maintenance of stocked parts; e.g. motors and pumps on the shelf
- Parts planning
 - Eliminates emergency shipment of parts
 - Enables strategic sourcing, avg 2-3% savings on per part cost
 - Eliminates labor wait time, 10%
- Improved Service Levels
 - Demonstrate that parts requests are fulfilled with the right part at the right time, eliminate the tradition of “personal storerooms” that trades own, estimated at 5% of on hand inventory values
 - Eliminate of stock out situations improves work delivery
 - Increase the number of times all the inventory is used (turned) each year



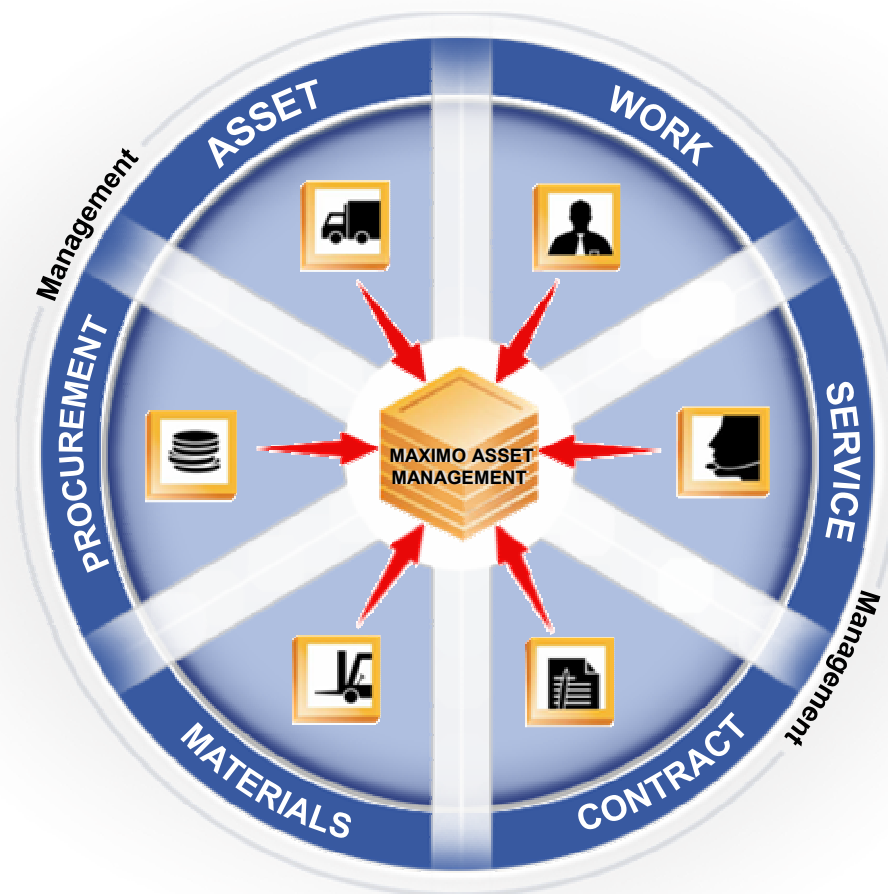


Additional Benefits that might be measured

- Asset Replacement Cost Avoidance
- Implementing advanced manufacturing strategies
 - Six Sigma
 - Lean
 - TPM
 - TQM
- Maintenance Staff Labor Cost Avoidance
- Warranty Reclamation
- Reduction in MRO Inventory Shrinkage
- Annual MRO Purchase Expedition Charges
- Improved MRO Strategic Sourcing Strategies
- Reduce Enterprise Asset Compliance Risks and Costs
- Enterprise Asset Ops and Admin Staff Labor Cost Avoidance
- Maintenance Supervisor Staff Labor Cost Avoidance
- Reduce Setup and Reconfiguration Costs



IBM's Asset Management Solution: **Maximo Asset Management**



- Addresses asset management challenges for line of business operations and IT
- Consolidates point solutions for Asset and Service Management into a Suite
- Includes enhanced Workflow
 - Event Driven
 - Context-based
 - Escalation Manager
- Provides Service Management capabilities for
 - Asset Owners
 - Asset Managers
 - Service Providers
- Next generation J2EE Technology Platform
- Service Oriented Architecture (SOA)



Maximo Asset Management Offerings for Government

IBM Maximo for Government

- Supports effective management of:
 - Government Contracts
 - Personal Property
 - Unique Identification (UID) Compliance
- Extensive reporting to support extensions

IBM Maximo for Transportation

- Support all types of moving assets
 - Cars, trucks, buses, trains, aircraft vessels
- Increase reliability, availability, labor optimization, warranty recovery, inventory reduction, aging workforce, safety, regulatory compliance, risk management

IBM Maximo Linear Asset Manager

- Effective support of linear assets
- Extends core applications to define, work on, and maintain history of linear assets
- Provides a generic linear base that can be applied to, and extended by, multiple markets
- Alternative to application clones via license and condition-based controls

IBM Maximo Spatial Asset Management

- Supporting work and asset management for utilities with geographically dispersed assets
- Provides visualization, spatial context, reference, quantification/measurement and modeling
- Supports spatial business data analysis

IBM Maximo Calibration

- Capabilities to calibrate Instruments, Measurement & Test Equipment and Standards
- Support all types of assets
 - production, facilities, mobile IT/infrastructure
- Increase reliability, availability, performance,
- Improve process safety and regulatory compliance

IBM Maximo Mobile

- Supports operator rounds, inspections and warehouse functionality
- PDA-based to mobilize Maximo Asset Management data
- Key functionality for Work, Inventory and Calibration Management
- Eliminate paperwork – complete more work
- Improved planning, scheduling and reporting
- Improve regulatory compliance

Who are using Maximo...



- 11 of the 12 largest PHARMACEUTICALS companies in the world are using Maximo
- 7 of the 10 largest AUTOMOTIVE companies in the world are using Maximo
- 5 of the 10 largest OIL & GAS companies in the world are using Maximo
- 10 of the 20 largest diversified UTILTY companies are using Maximo
- 11 of the 12 major AEROSPACE & DEFENSE companies in the world are using Maximo
- 7 of the 13 busiest AIRPORTS in the world companies are using Maximo
- 6 of the 17 largest ENERGY companies in the world are using Maximo



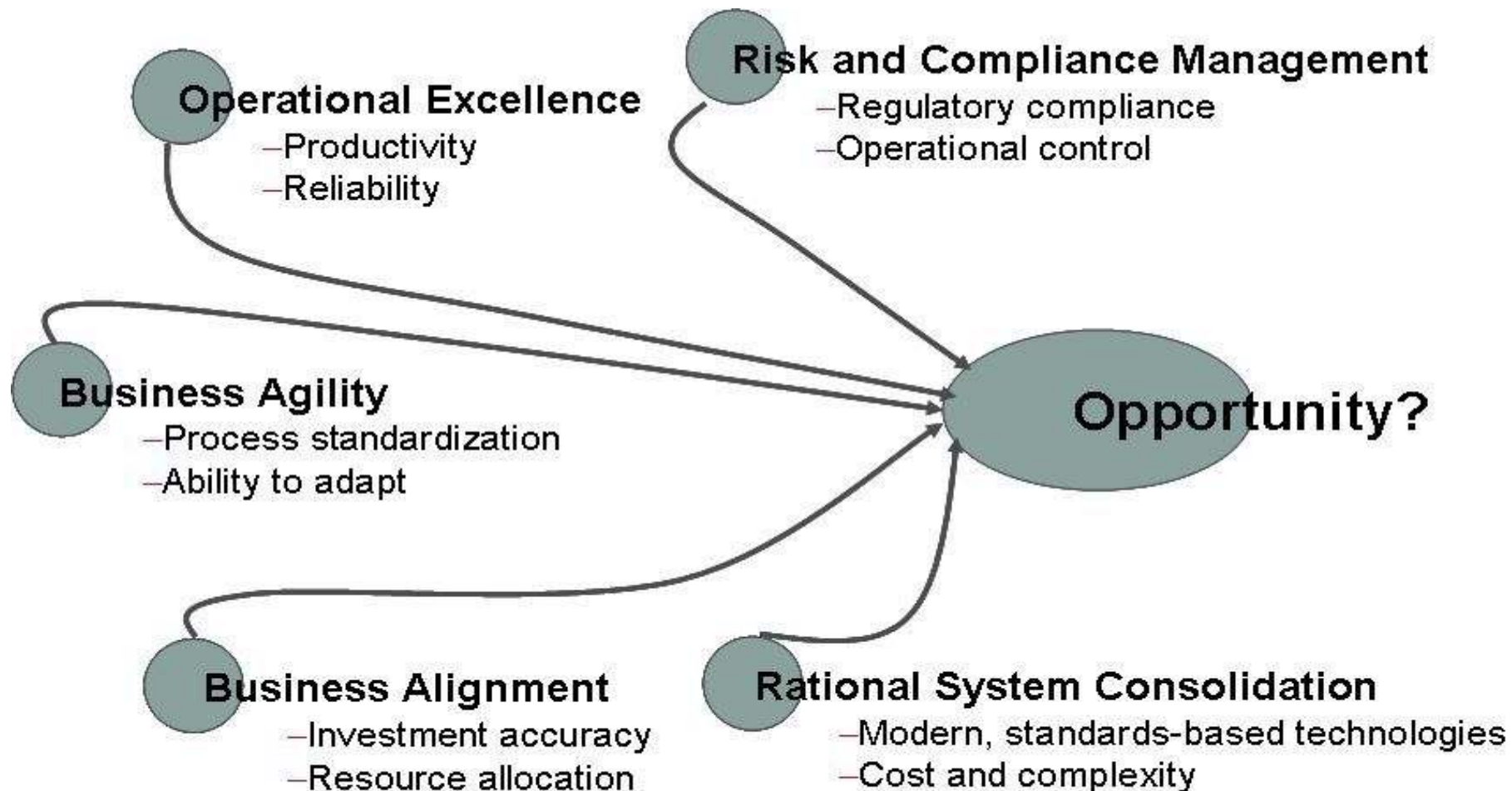
IBM is the Market Leader in Asset Management

- Enterprise Asset Management
- IT Asset Management
- Industry Specific Solutions
 - Nuclear Power, Utilities, Life Sciences, Oil & Gas, Government, Service Providers, Transportation
- Functional Extensions
 - Spatial Asset Management, Linear Asset Manager, Mobile Work Manager, Navigator, Calibration
- Service Request Management
- License Compliance Manager

Segment Leadership

- 1# in EAM Market Share – ARC
- 1# in EAM Market Share – IDC
- Gartner Magic Quadrant for Power Generation
- Gartner Magic Quadrant for Transmission and Distribution
- Gartner Magic Quadrant of Manufacturing
- IDC Short List for Power Generation
- IDC Short List Work and Asset Management for Energy Delivery

The Opportunity for Improvement...





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