

Asset Management Point of View

Innovative Infrastructure 101: Building Asset Management Capacity in Rural Communities

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Topics requested to discuss

1. Overview of asset management and its value to all communities (including small and rural ones)
2. Presentation of the maturity model for asset management as a way for communities to situate themselves on a path of improving practice
3. Talk about the steps to moving forward on this curve – different practices, tools, etc.
4. Possibility of mapping Canadian communities onto the maturity model to get a sense of national picture

The Planet is becoming smarter...



Smart traffic systems



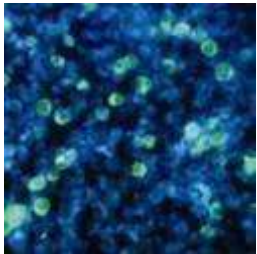
Smart oil field technologies



Smart cities



Smart energy grids



Smart water management



Smart supply chains



Smart buildings



Smart regions



A smaller, flatter, faster and "smarter" planet



INSTRUMENTED



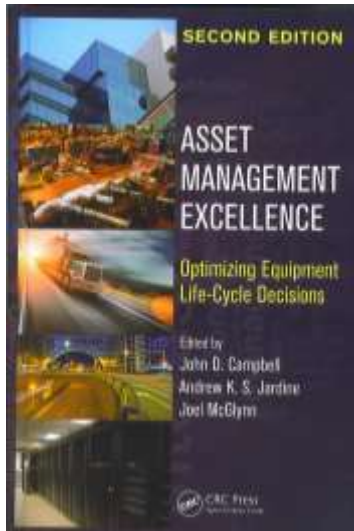
INTERCONNECTED



INTELLIGENT

...hence Asset Management becomes ever more important...

Asset management is a discipline related to managing an enterprises assets over their lifecycle from design, build, procurement, operation, maintenance, modification, and disposal.



Asset Management ¹

systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organizational strategic plan



How does a Smarter City/Building deliver value?

Governance and Business Strategy



- Comply with Fed/State regulations and company or organization goals.

Real Estate Portfolio Management



- Lease and contract administration
- Strategic portfolio planning
- Budgeting and forecasting expenses

Capital Project Management



- Capital planning
- Construction/remediation estimates
- Project management

Energy and Environmental Management



- Energy use tracking and benchmarks
- GHG measurement
- Regulatory compliance

Space and Facilities Management



- Space utilization
- Capacity planning
- Move, add, change request

Data Center Infrastructure Management



- Space, power and cooling optimization
- Move, add, change
- Cable management

Building Process Integration



- Connect disparate systems to enable the transfer of business information to and from various technologies.

Operations Management



- Asset management
- Work order management
- Contracts management

Service Management



- Facilities service desk
- Contracted services management
- Customer billing

IBM's Asset Management Center of Excellence Capabilities

More than 1000 EAM Consultants



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Asset Management Center of Excellence

MRO Dynamic Inventory Optimization
Supply Chain Network Design



Asset Classes
Asset Management Pyramid
Asset Management Lifecycle Model
Maturity Models
Best Practices

Support Leading ISVs



Maintenance Assessments
Inventory Optimization Tools
RCM2 Practitioners
Total Life-cycle Asset Management
Condition Based Monitoring Strategy

IBM.maximo **TRIRIGA**
Industry Solutions Verticals

IBM Offerings in Asset Management

Opportunity Workshops
RCM Training/Facilitation
Accelerated Solutions Strategy
EAM Assess/Strategy
EAM Optimization
Package/Solution Selection
Maintenance Parts Strategies
Solution Implementations

Asset Management Centric Training

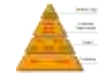
- Physical Asset Management (UofT Certificate Program)
- Maintenance Leading Practices
- Reliability Centred Maintenance (Introduction, Facilitator Training for RCM2)
- Maintenance Parts Excellence Program (UofT, Maintenance Masters Series)
- Maximo / Tririga Fundamentals and Systems Training



Physical Asset Management
 Understanding your maintenance business priorities

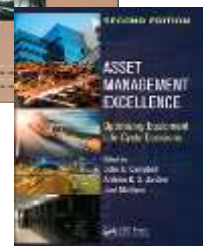
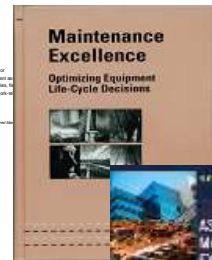
- When properly executed, Physical Asset Management can significantly increase an organization's bottom line by reducing maintenance costs, increasing the economic life of capital equipment, reducing complex failures, increasing the reliability of systems and components, and reducing the number of systems and components.
- Physical Asset Management Certificate program, provided in concert with the University of Toronto, provides participants with the tools and methodology to achieve maintenance excellence in their organizations.

The cornerstone of this training is the maintenance excellence pyramid. It supports the principle embedded in the approach that successful maintenance organizations implement the right type of the physical asset maintenance program based on the asset's value. The pyramid is based on the book, "Optimizing Equipment Life Cycle Decisions: Optimizing Equipment Life Cycle Decisions" edited by John Campbell and Andrew K. S. Jardine.



Who Should Attend

The ideal audience for this course is all disciplines of plant operations, facility management, maintenance professionals who is responsible for maintaining and managing the physical equipment in their plant. Site operations facilities and plants from chemical, oil and gas, utilities, oil operations and manufacturing. Participants should have an undergraduate degree or relevant work experience in maintenance management operations.



Reliability-Centered Maintenance (RCM II)
 The ultimate tool for developing world-class physical asset reliability

RCM II is an evidence-based practice that enables you to get more out of your physical assets in terms of Equipment Reliability, Productivity, Customer Service, Safety, Environmental Protection and Energy when you follow the tenets of Proactive Maintenance, Predictive Maintenance and Condition Monitoring.

RCM II is the most comprehensive practice available for conducting condition-based maintenance (CBM) and condition-based repair (CBR).

RCM II is consistent with the ISO 55001 standard. One of the primary priorities of the ISO standard is to improve the overall performance of your physical assets. In addition to the highly detailed and rigorous practice currently described by the equipment reliability industry, this group of leading edge users of RCM II, working under the auspices of the ISO, is working to extend the addressability of the asset management practice to include the RCM II for the RCM II.

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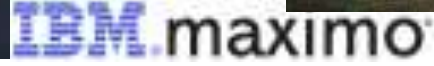
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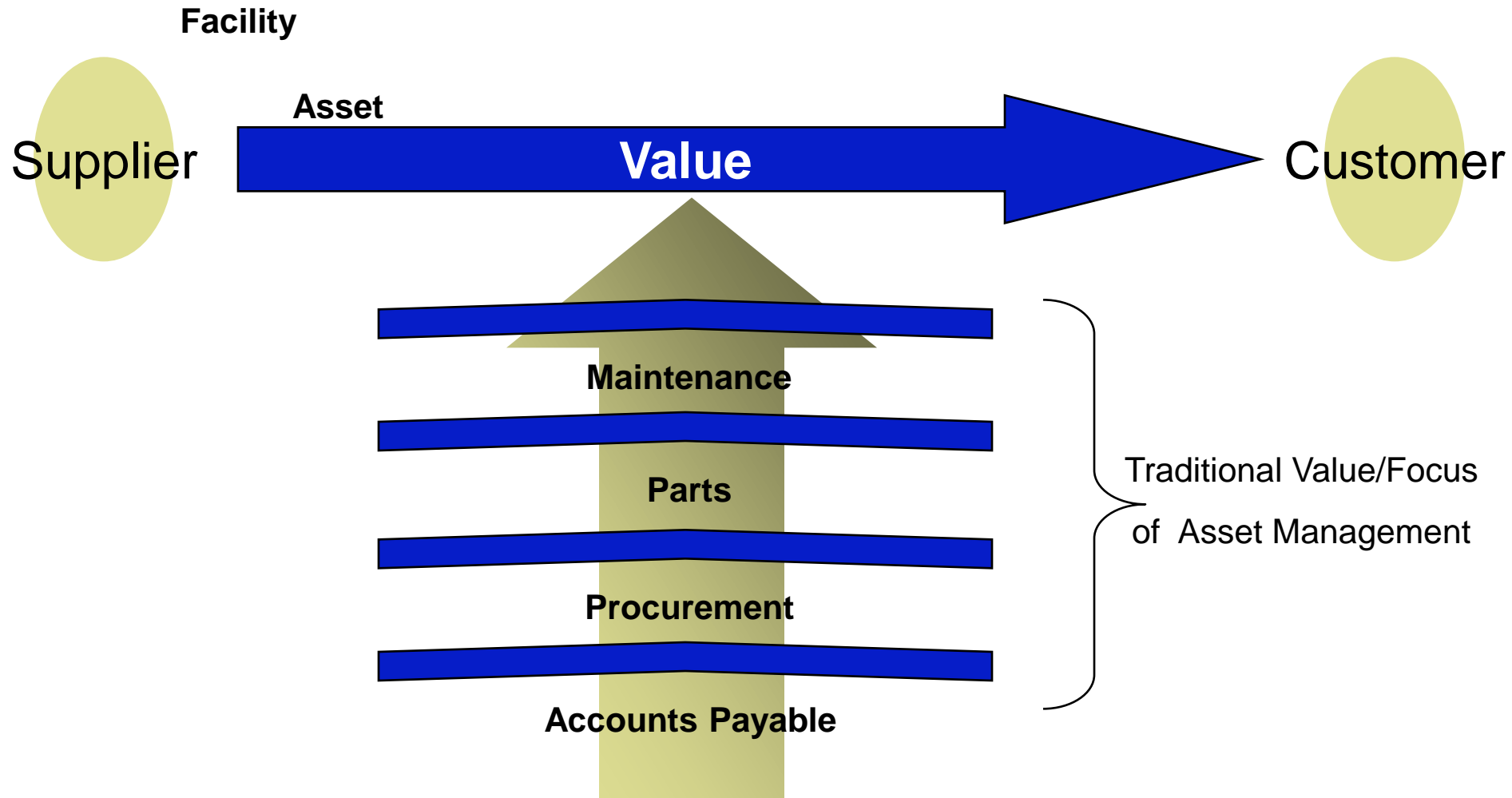
Attending this RCM II course is an excellent way to learn why RCM II is, how it works in practice, determine your state of physical assets and what makes it work, and how to properly understand and maintain RCM II for general implementation with your organization.

Attendees include anyone who has responsibility for:

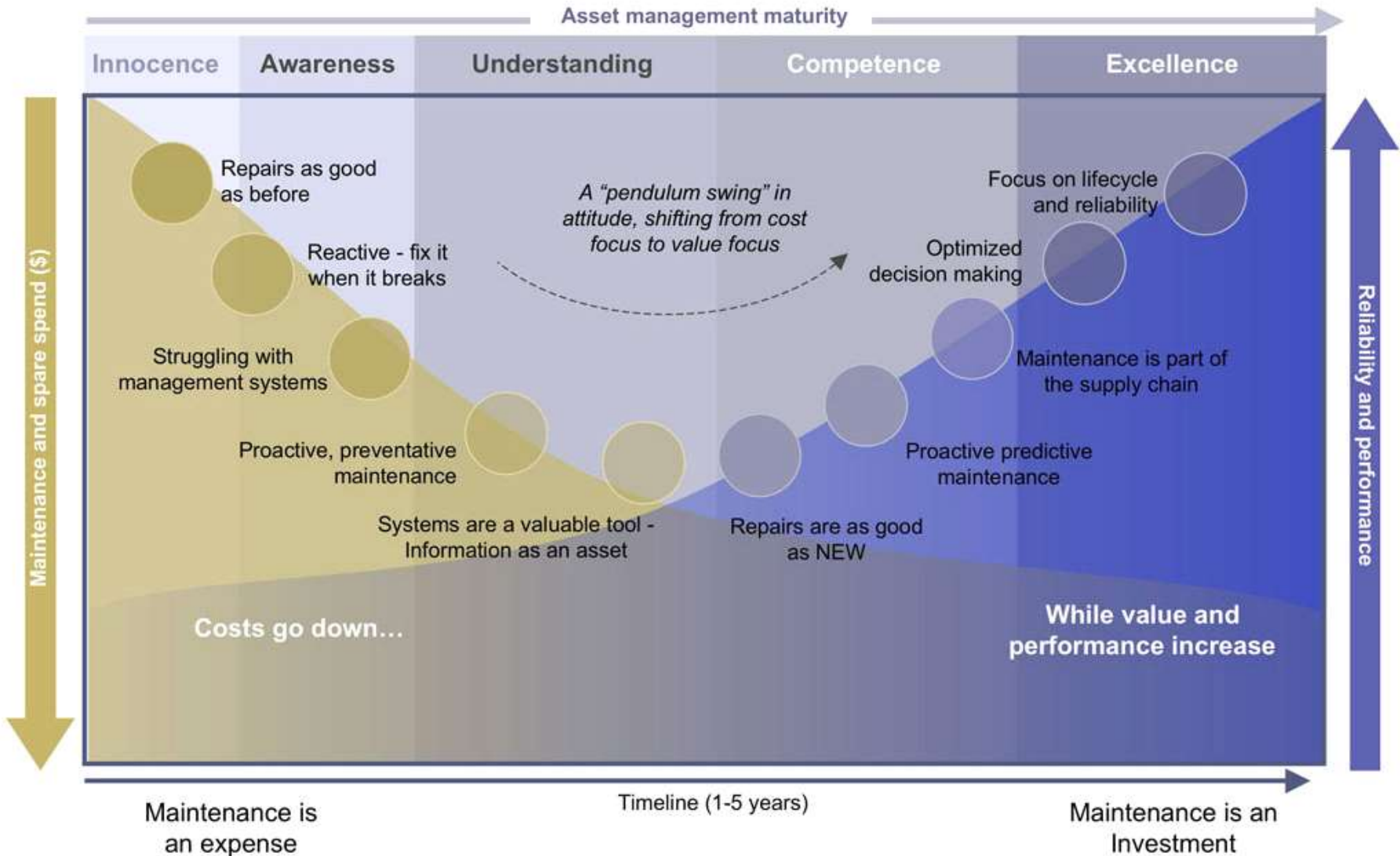
- Maintenance management (equipment, maintenance management)
- Asset condition management (condition management)
- Safety or environmental integrity
- Asset reliability or performance
- Asset with an interest in asset integrity and performance



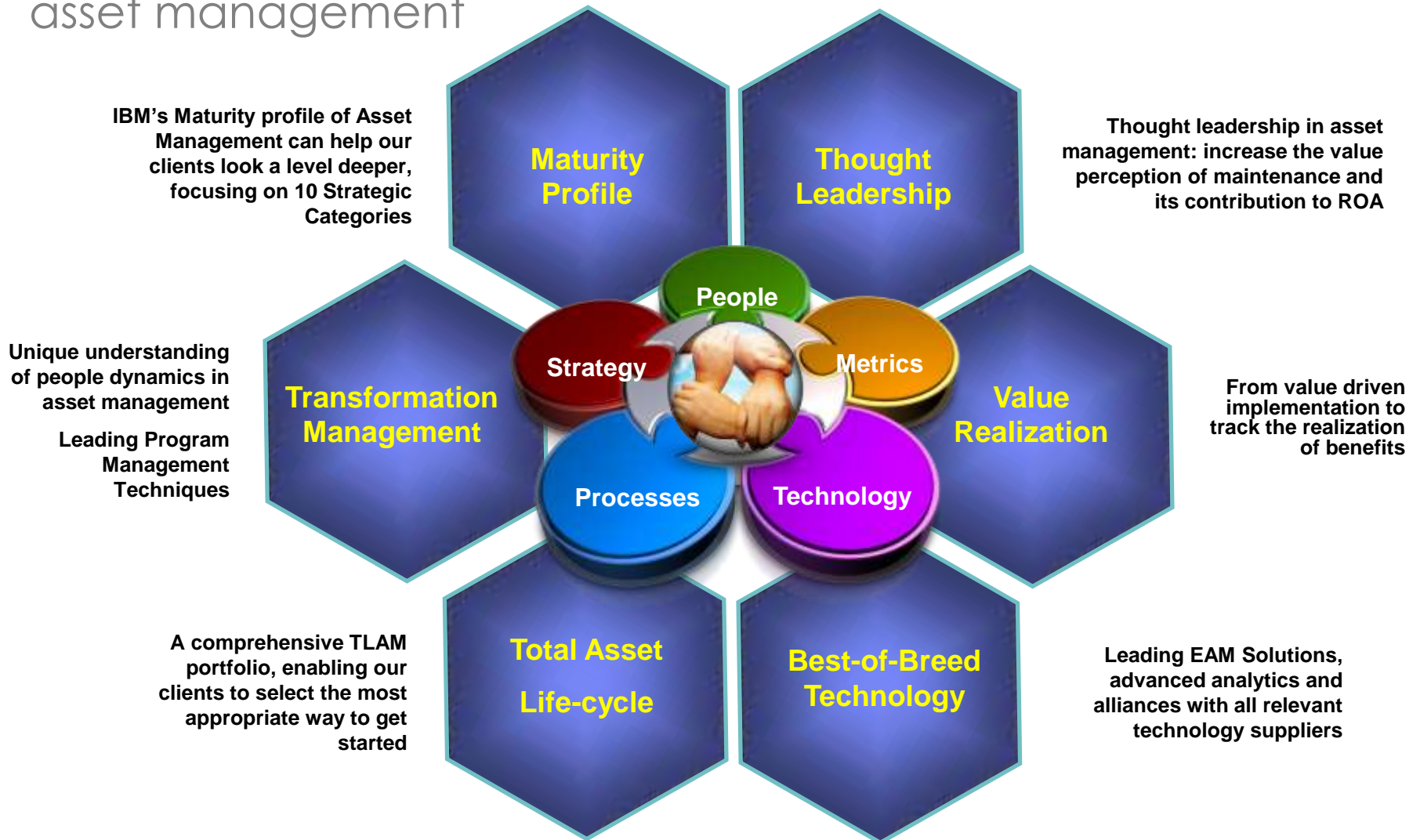
The Traditional Value of Asset Management



IBM has helped leading companies around to globe to travel the Maturity Path from Innocence to Excellence

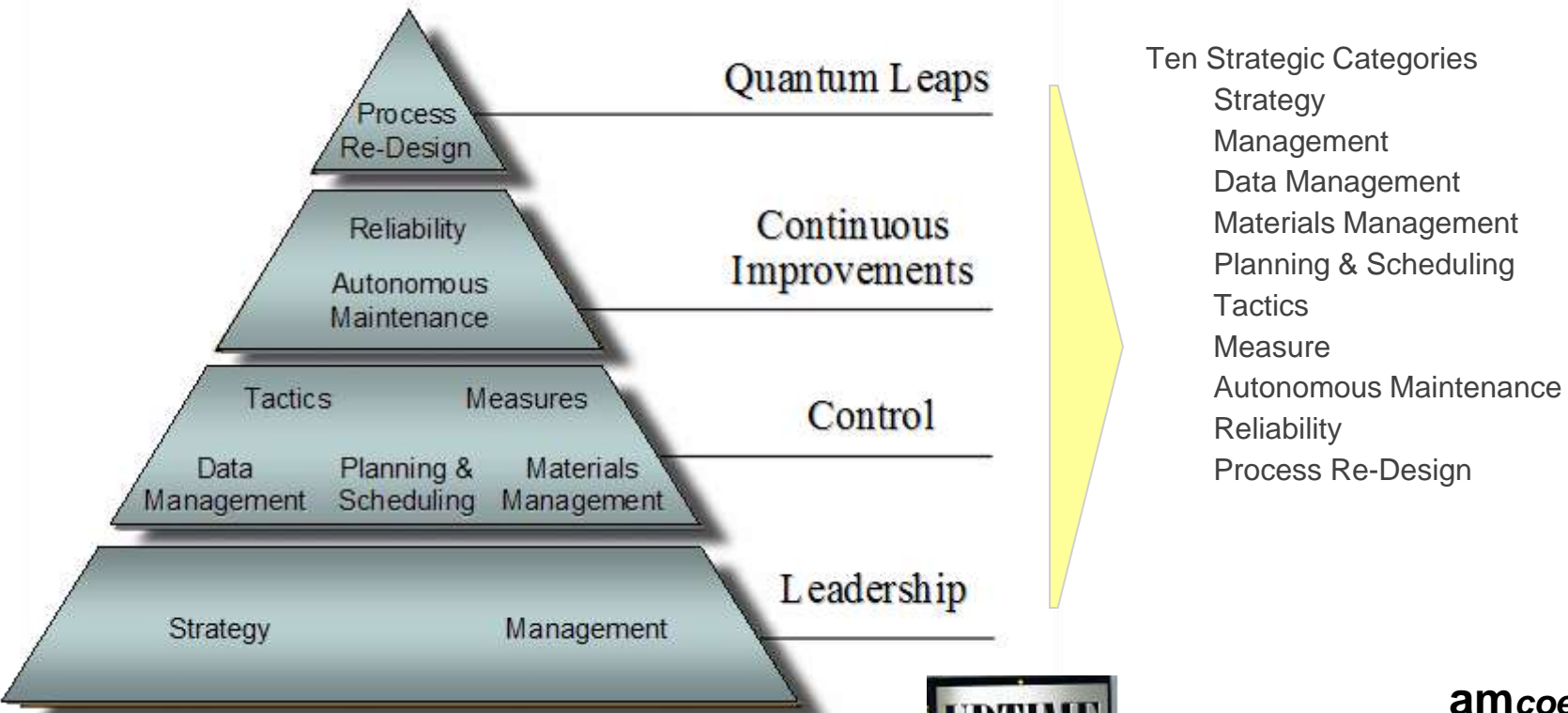


IBM Approach for Smart Asset Management – comprehensive methodology and unique capabilities to achieve excellence in asset management





IBM's Maturity Profile for Asset Management can help our clients look a level deeper, focusing on 10 Strategic Categories



Asset Management Center of Excellence Pyramid



amcoe
Asset Management Center of Excellence

Maintenance Maturity Model



1. Strategy
2. Organization/Management
3. Data Management
4. Maintenance Tactics
5. Materials Management
6. Planning and Scheduling
7. Key Performance Indicators
8. Reliability Center Maintenance
9. Autonomous Maintenance
10. Process Re-design

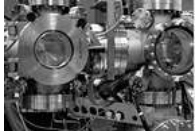


Rating Levels	VI Innocence	IV Awareness	III Understanding	II Competence	I Excellence
1.Strategy	Mostly Reactive Breakdown Maintenance	Prevent Maintenance Improvement Program	Annual Improvement Plan	Long Term Improvement Plan	Established and Communicated Maintenance and Asset Strategy
2. Organization / Management	Highly Centralized	Partly Centralized for Some Trades	Decentralized Mixed Trade Teams	Some Level of Multi-Skilled Staff	Multi-Skilled Independent Trades
3. Data Mgmt / IT	Manual or Ad-hoc specialty Systems	A "System" that Allows for Some Scheduling and PartsTracking	Fully Functional Asset Mgmt. Stand Alone System	Fully Functional Asset Mgmt System linked to Financials and/or Inventory Systems	Fully Integrated to common databases Data Standards in Place
4. Maintenance Tactics	Annual S/D Inspections Only	Time Based Inspections	Time and Use Based Inspections Some - NDT	Some CBM Some Prev. Maint. Few Surprises	All Tactics Based on Analysis
5. Materials Management	*Absence of storeroom management practices	*Some storeroom controls *Lack of performance measurements *Turns less than 1.0	System computerized Stock levels set – no Maint. Input. Lead time and Safety Stock Levels set – Rare;	*Alliances developed *(Free Issues) *Streamlined processes *Material Delivery Process Established *Automatic Matching of Invoices *Compurtized inventory control system	*Service levels 95%+ *On line material requisitioning *Turns exceed 1.5
6. Planning and Scheduling	Little or No Formal Planning, Scheduling, or Engineering Support	Some Troubling Shooting Support Inspection Scheduling	Maintenance Planning Group Established Ad-hoc Engineering	Solid General Planning and Scheduling Job Planning with Engineering Support	Long Term Major Project Planning for both Maintenance and Engineering
7. Performance Measures	No Systematic Approach. Maint. Cost Not Available	Some Downtime / Reliability Records Maint. Costs Not Segregated	Downtime by Cause Maintenance Costs Available	Mean Time to Failure / Repair Records Available Separate Maintenance Costs	OEM Benchmarking Full Cost Database
8. Reliability Centered Maintenance	No Failure Records	Collect s Failure Data but make little use of it	Failure DB Established. Used for Analysis	Some FMECA used	RCM Program in Place Risk and Root Cause Analysis Program
9. Autonomous Maintenance	Directed Workforce No Teamwork Maint & Production relationship strained	Directed Workforce No Teamwork Good cooperation of Maint. And Production	Directed Workforce Some Teamwork Maint./ Production cooperation at working level	Self Directed teams Maint. / Production cooperation at all levels. Team work at organization levels	Decentralized teams Business based decisions Excellent cooperation with Maint. / Production Teamwork a hallmark of entire organization
10.Process Redesign	Processes not documented. Some procedures available High Reactive Work Percentat	Some processes documents. Moderate amount of procedures available High PM Workload	Processes Documented Planning and Scheduling disciplines are prevalent Medium amount of Reactive and PM Workload	Processes documented Evidence of periodic review. Procedures well documented and organized	Processes documented and coordinated with support areas (Inv. / Purc) Evidence of regular review cyc © 2013 IBM Corporation

Real Estate and Facilities



Plant and Production



Infrastructure



Mobile Assets



Information Technology



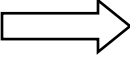
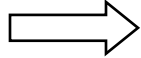
Maturity Profile

Analyze your Maintenance maturity and prioritize opportunities

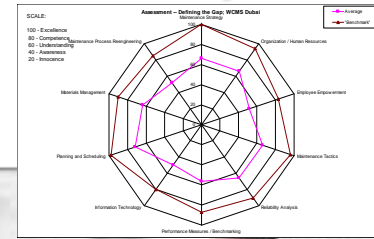
Standard



Your Company

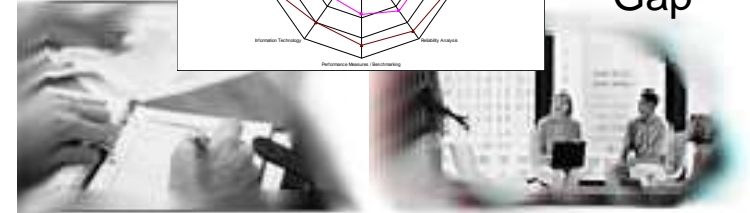


Analyze



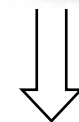
Trend

Gap



Questionnaire

Interview



Strategy

AMcoe Pyramid

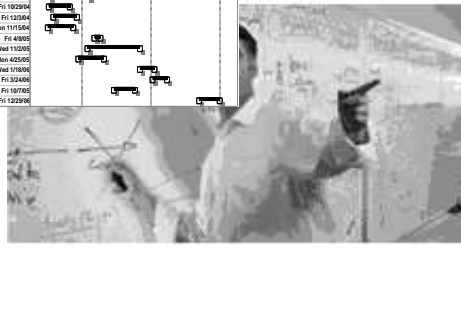
Maintenance Staff

Prioritized Initiatives

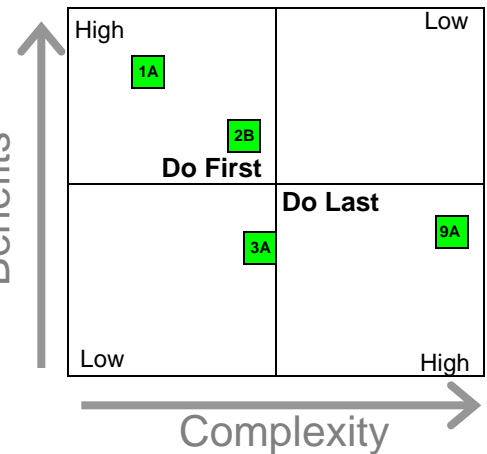
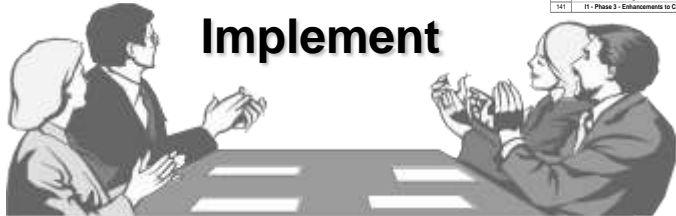
- Governance Model
- Prioritized Initiatives
- Benefits Determination
- Budget by Initiative

Plan

ID	Task Name	Start	Finish
1	Genesis Corporation - Asset Management Implementation Plan	Fri 5/21/04	Fri 1/22/06
2	Project governance	Fri 5/21/04	Fri 7/16/04
12	MM1 - Assign corporate contracts to Corporate Purchasing	Tue 6/15/04	Mon 1/13/05
16	MM2 - Centralize MRO purchasing	Mon 7/19/04	Fri 1/15/05
24	O3 - Implement a hybrid organizational structure	Tue 6/15/04	Tue 8/24/04
33	O2 - Conduct a maintenance skills needs analysis	Tue 6/15/04	Mon 1/18/05
39	MMS - Hire three HVAC technicians	Tue 2/15/05	Mon 6/20/05
43	O1 - Formalize maintenance training in each area	Tue 1/14/05	Mon 3/14/05
46	I1 - Implement CMMS Prod	Mon 6/28/04	Fri 1/22/05
67	MM4 - Implement a recognized catalogue naming convention	Mon 8/24/04	Mon 1/27/05
73	P2 - Define work history details to be recorded by technicians	Mon 6/14/04	Fri 3/24/05
78	P1 - Implement consistent work management processes	Mon 7/19/04	Fri 2/4/05
90	MM7 - Implement warranty tracking	Fri 7/30/04	Fri 1/29/05
94	IT - Implement a balanced set of key performance indicators	Mon 6/21/04	Fri 1/22/05
102	MM3 - Establish a virtual central warehouse	Mon 7/19/04	Mon 1/15/05
111	S2 - Implement process to involve maintenance in new equipment	Mon 3/7/05	Fri 4/8/05
116	IT - Implement Reliability Control Maintenance	Mon 10/18/05	Wed 1/13/06
123	MM1 - Identify critical spares	Tue 1/21/04	Mon 4/25/05
128	E1 - Identify Operator maintenance tasks	Thu 11/19/05	Wed 1/18/06
133	S1 - Implement Lifecycle Costing (LCC)	Mon 10/18/05	Fri 3/24/06
139	I1 - Phase 2 - Integration of CMMS Prod to Ban	Mon 6/20/05	Fri 1/17/06
141	I1 - Phase 3 - Enhancements to CMMS Prod	Mon 9/11/06	Fri 1/22/06



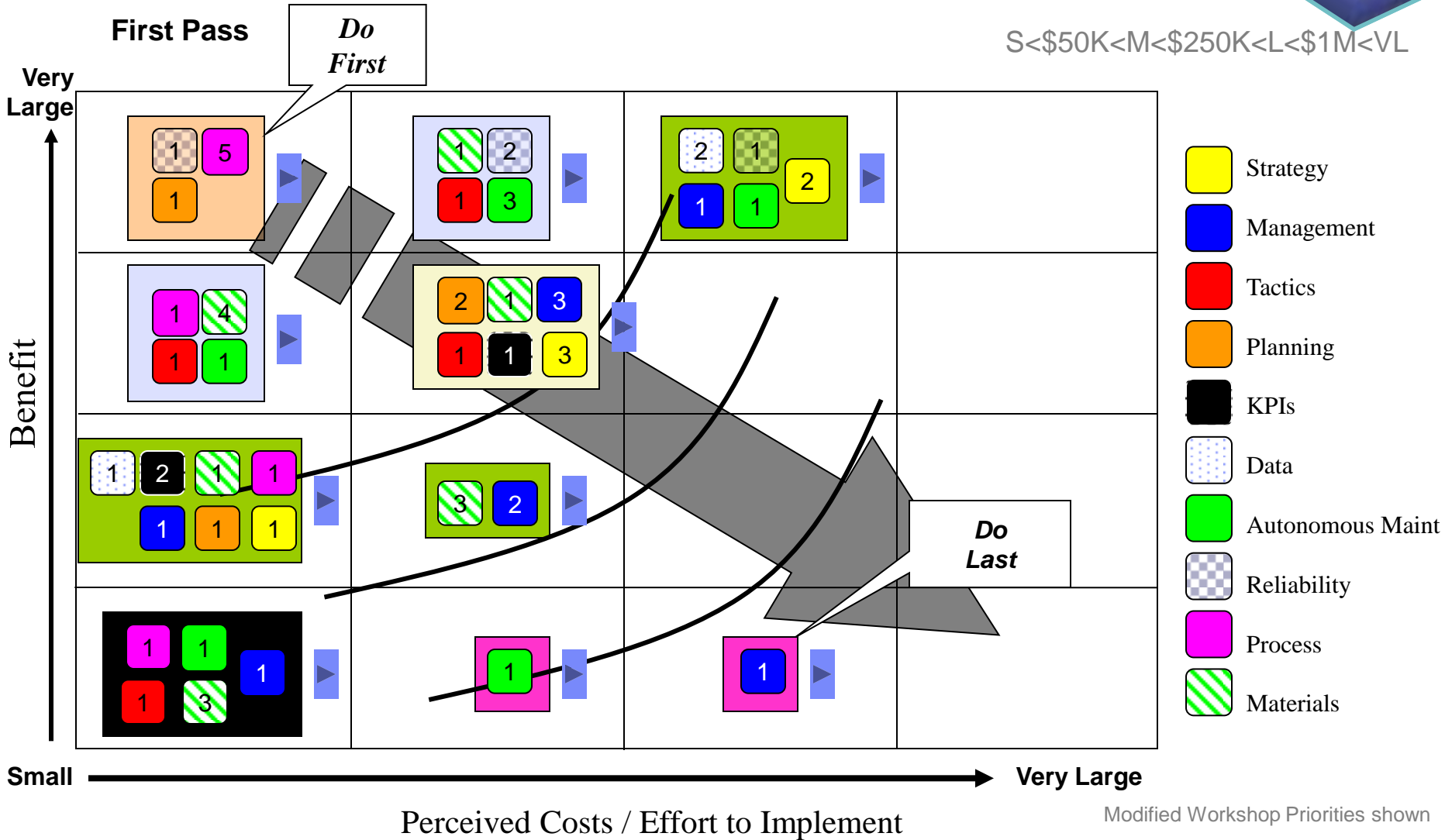
Implement





Example: Opportunities for 'a Client' - Cost vs. Benefit Assessment

$S < \$50K < M < \$250K < L < \$1M < VL$





Value Realization: typically there are four initial areas that drive ROA – Driving costs down while we drive production, safety, environmental and regulatory compliance up

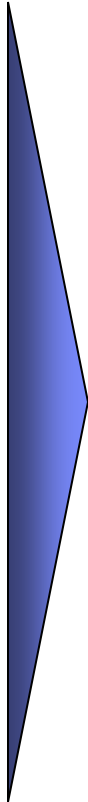
High Value Areas

Effective planning and scheduling of work

Spares & support materials management driven by planning & scheduling activity

Proactive definition of what maintenance should be done to manage reasonably likely failures

Process Automation and Optimization



Key to Success

Mindset

From traditional thinking to scientific, business-based thinking

Integration

Maintenance Planning and inventory must work as one

Eliminate Barriers

Cooperative approach among production, operations and engineering

Strategic Approach

Leading a well planned and managed change program

Knowledge

Understanding best practices in planning, scheduling, proactively identifying maintenance requirements



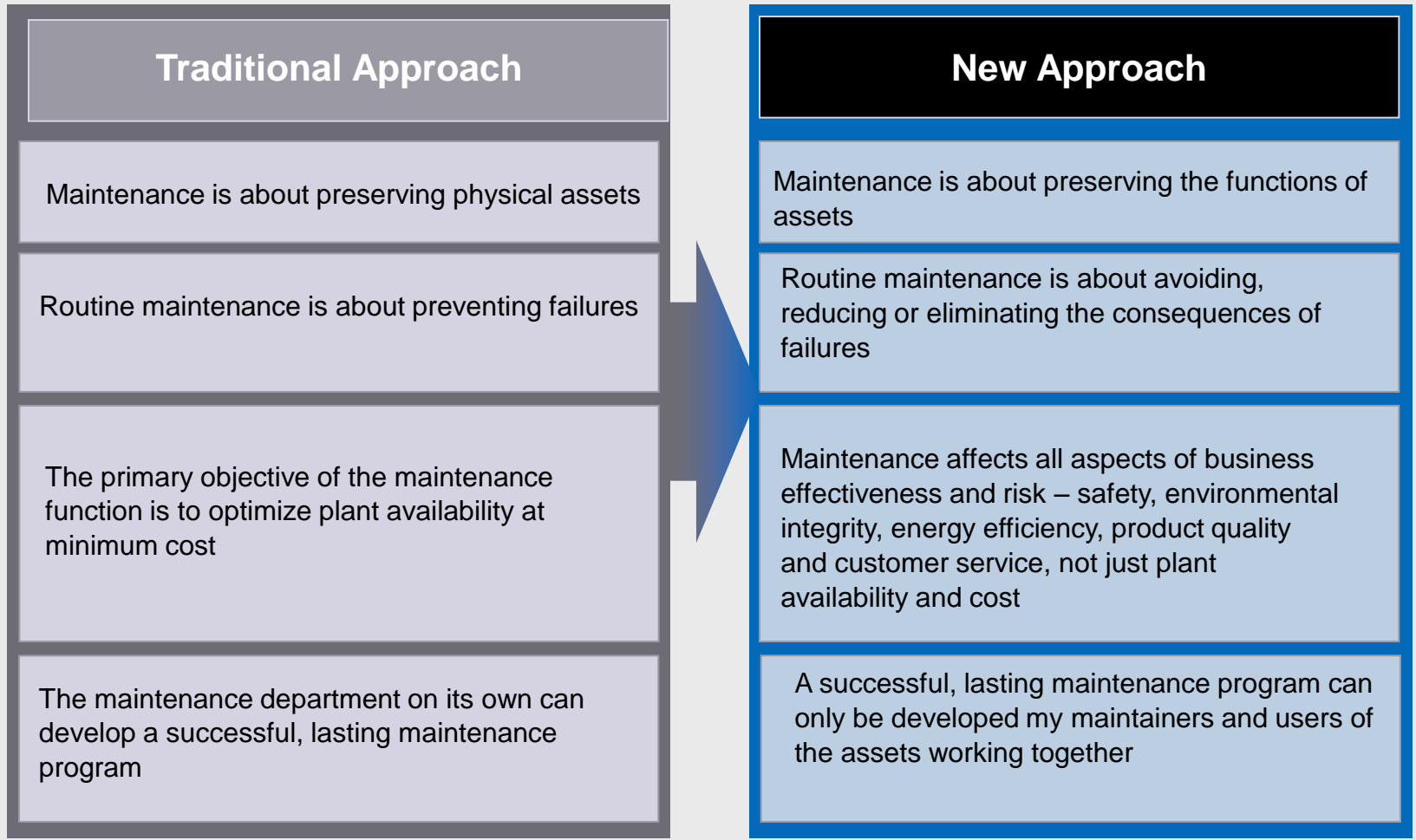
IBM's asset intensive clients have benefited from our Value Realization approach

Business Scenarios	ROI Points	Customer Examples
Labor Utilization	Up 10-20%	<ul style="list-style-type: none"> A major US railroad saved US \$5M by better tracking labor to specific work
Asset Utilization	Up 3-5%	<ul style="list-style-type: none"> A large OEM reduced overhaul process time from 56 days to 21 days
Equipment purchases	Down 3-5%	<ul style="list-style-type: none"> A fleet management company saved US \$9.5M by meeting 100% availability
Warranty recoveries	Up 10-50%	<ul style="list-style-type: none"> A consumer products company increased warranty recovery 50%
Inventory needs	Down 20-30%	<ul style="list-style-type: none"> A large passenger railroad was able to identify US \$18M in excess or obsolete inventory
Inventory carrying costs	Down 5-20%	<ul style="list-style-type: none"> A nuclear power conglomerate reduced inventory value and associated carrying costs by 26%
Material Costs	Reduced 10-50%	<ul style="list-style-type: none"> A rail maintenance service company reduced costs 20% by optimizing material purchases.
Purchasing labor	Reduced 10-50%	<ul style="list-style-type: none"> A fleet management company reduced purchasing staff by 20%



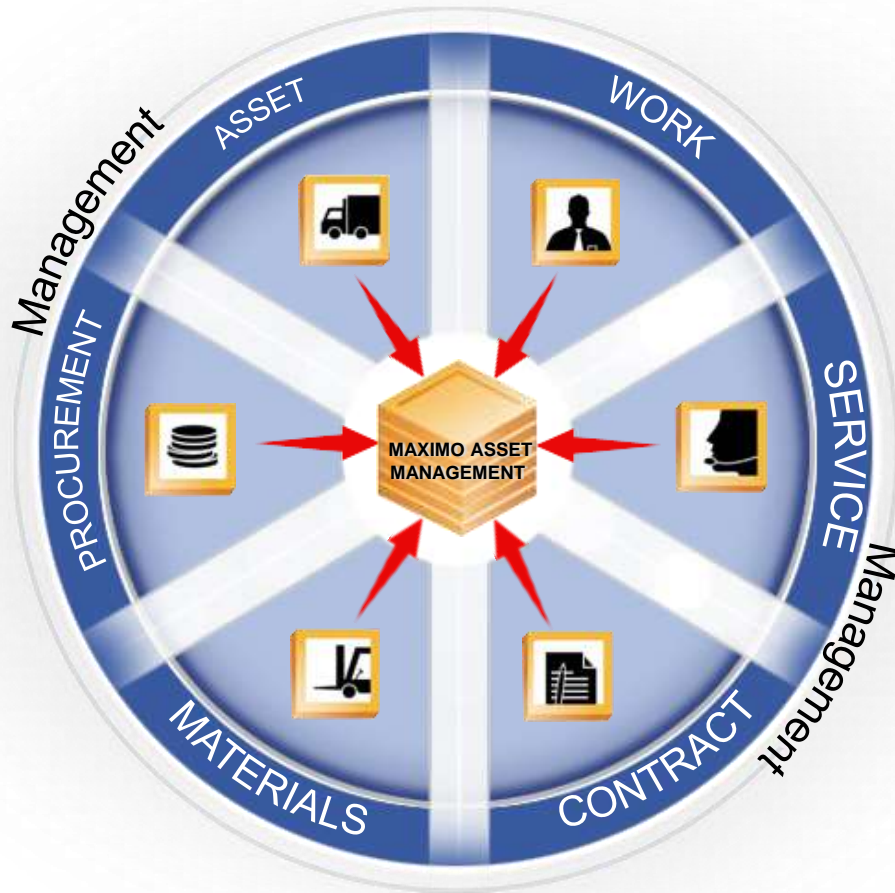
Thought leadership in asset management: increase the value perception of maintenance and its contribution to ROA

Maintenance Philosophy Related Issues





Maximo is a Complete Asset and Service Management Solution



Asset Management

Facilities, Operations, IT, Fleet
Assets, Locations, Failure Reporting, Condition Monitoring, Meters

Work Management

Preventive, Corrective, Projects, Emergency, Safety Plans
Work Hierarchies, Planning, Status, Assignments, Actual Metrics

Procurement Management

PR's, PO's, Receipts, Invoices

Materials Management

Items, Storerooms, Inventory, Reorder, Issues, Returns

Contract Management

Master, Purchase, Warranty, Lease/Rental, Labor Rate

Service Management

Self Service Requests & Status
Platform for asset owners, asset managers and service providers

Next Generation Architecture

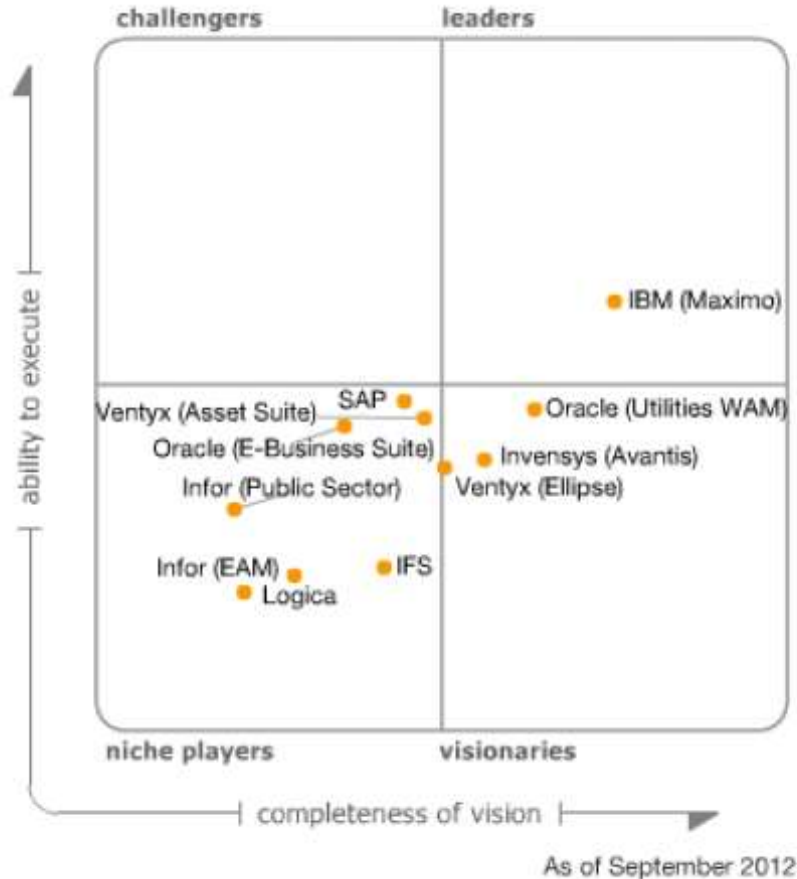
J2EE Platform
Standards-based
Service Oriented Architecture (SOA)



Gartner has recognized IBM as a leader in The Magic Quadrant for Delivery Utility Enterprise Asset Management

Magic Quadrant for Delivery Utility Enterprise Asset Management
 Kristian Steenstrup
 September 20, 2012

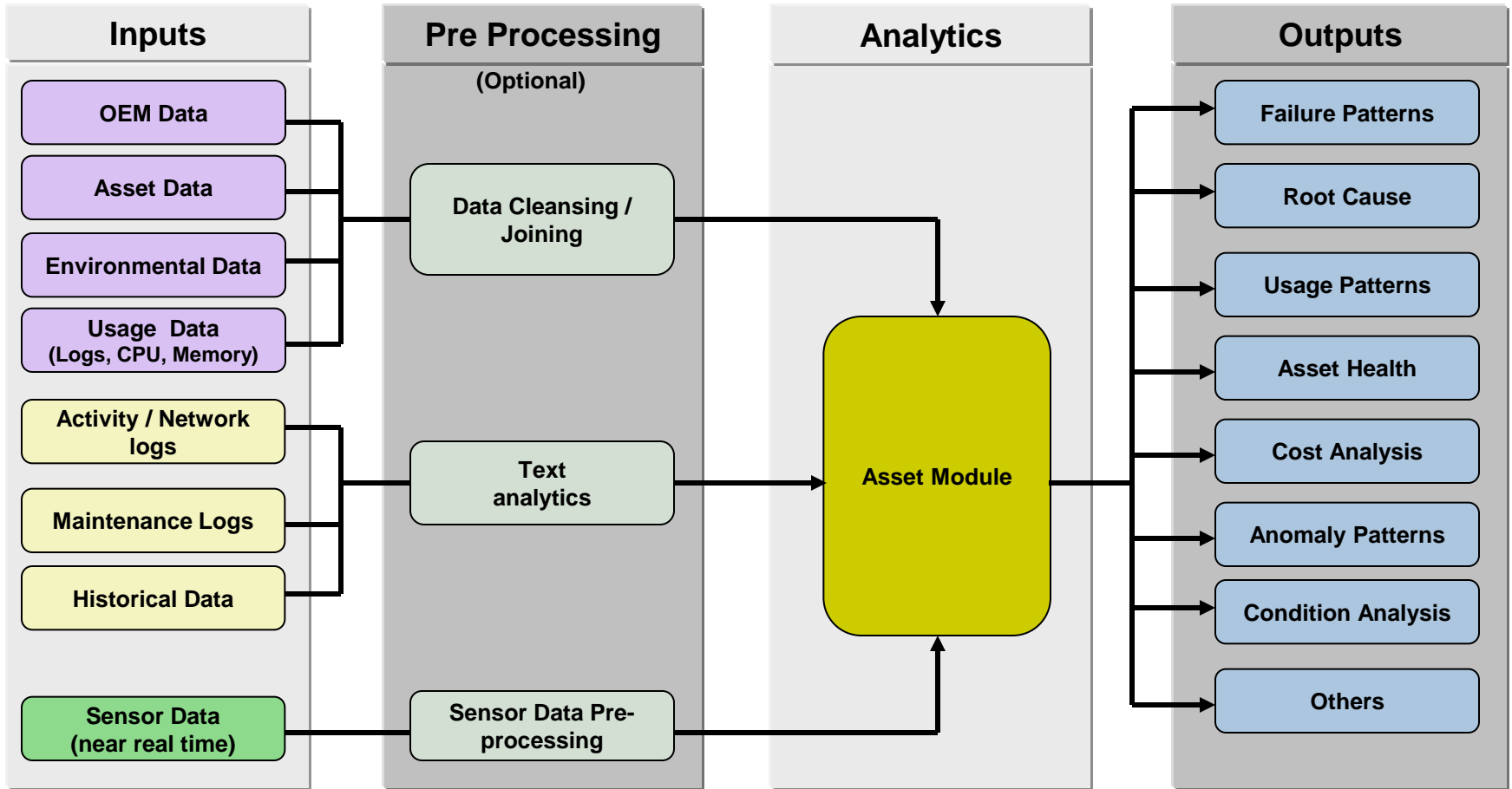
This Magic Quadrant graphic was published by Gartner, Inc. as part of a larger research note and should be evaluated in the context of the entire report. The Gartner report is available upon request from IBM. G00230880



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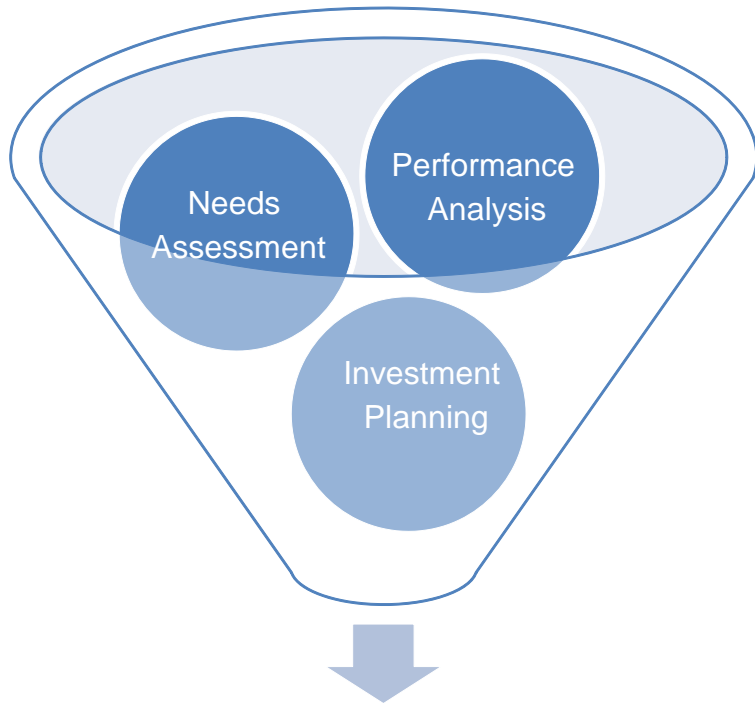


Advanced Analytics for Asset Performance Optimization A3PO Module Solution Framework





Total lifecycle planning uses three key assessment engines : performance analysis, needs assessment and investment planning to enable a comprehensive assessment of operations and capital needs



Total Lifecycle Planning



- Annual programs (eg snow cleaning, leaf pickup)
- Reactive maintenance (road repair, water main breaks, street light problems)
- Predictive / proactive maintenance (eg: inspections, hydrant flush)



- Asset replacement based on age, condition or failure
- Federal funding, regional expansion, new development, private-public partnership
- Improving quality of service
- Constant average asset life



- Asset lifecycle costing and analysis
- Optimal allocation of O&M vs Capital money
- Integrated asset management



Analytical modeling is the key decision enabler at each of the three lifecycle phases in Planning Analytics for Asset Lifecycle Management (PALM)

Performance Analysis

Needs Assessment

Investment Planning

Asset condition assessment

- Current condition of asset
- Unified condition across all asset classes
- Condition forecasting

Remaining service life forecast

- Survival curve by asset
- Remaining service life
- Expected future failures

Repair vs. rehab vs. replace vs. run-to-failure

- Alternative prescription / intervention mapping by application time
- Expected performance improvement

Impact of O&M vs. capital work

- Future O&M and capital costs
- Prescription costs and performance impact

Budget Scenario Analysis

Project Budgeting

Project Bucketing

DB2 Spatial

Need Identification & Prioritization

Custom Engine

Impact of O&M VS. Capital work

SPSS

ILOG

Repair Vs Rehab Vs Replace Vs Run-to-Failure

DB2 Spatial

ILOG

Remaining Serv. Life Forecast

SPSS

Asset Condition Assessment

DB2 Spatial

SPSS

Needs identification & prioritization

- Block level cross asset end-of-life synchronization
- Identify capital planning candidates for next 1 – 30 year
- Identify O&M candidates and expected cost
- Long term sustainability analysis
- Predictive maintenance plan

Project bucketing

- Identify project groups by:
 - Spatial proximity
 - Prescription type (??)
- Contractor capacity (??)

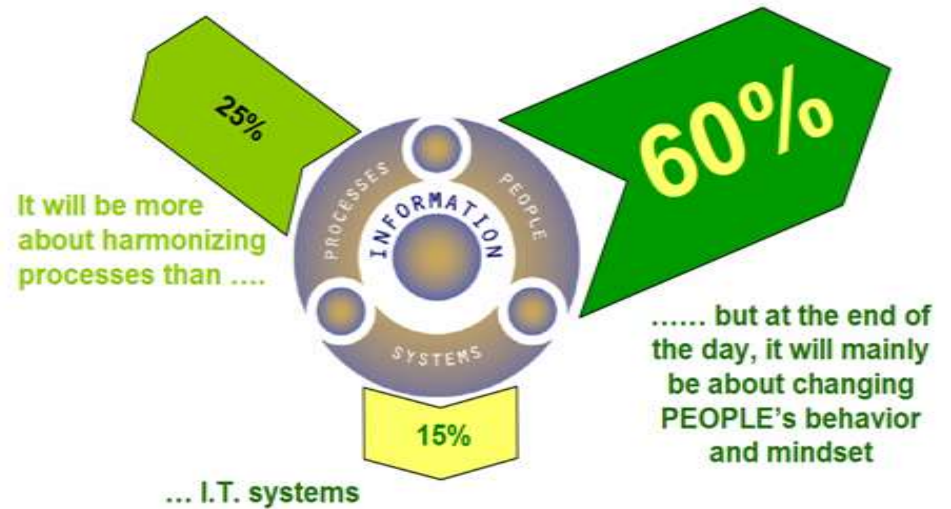
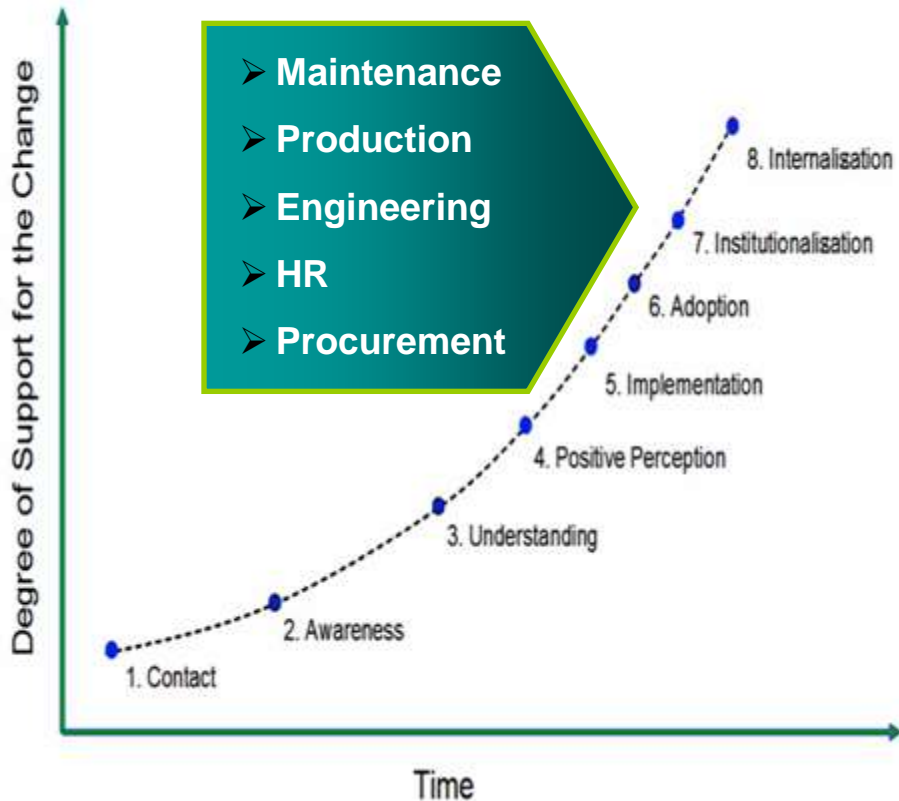
Project budgeting

- Apply alternative funding sources
- Build an optimal budget based on best projects to be executed

Budget scenario analysis

- Analyze multiple scenarios based on

Technology and processes are important, ultimately successful transformation is about engaging people in the change



The 8 critical success factors provide a sustainable approach

Compelling need for change

A clearly defined problem or a compelling opportunity

Justification for the investment

Clarity of direction

Clearly understood long-term goals and scope of change

Vision linked to supportive actions and accountability

Visible and committed leadership

The implementation has a high-level executive sponsor or sponsoring group

The executive committee shares the same goals as the front-line managers

An effective project office team

Targeted, effective communications

Individual needs are met

Consistency in the messages

Effective two-way communications in existence

Successes being leveraged

Complete and open communication

Enterprise wide learning taking place

Disciplined project management

Consistent milestones established

Roles and responsibilities clearly defined and made visible

▪ Measurable goals

–Effective project goals in existence

–Performance tied to compensation

▪ Broad-based participation

–An enterprise wide culture change being considered

–Skills available to implement the change

–The current management style is effective for the change

▪ Single program focus

–Related activities effectively aligned and coordinated




What is a Formula for Smarter Asset Management?



Maturity Profile

- Understand where you are in your Maintenance Maturity
- Prioritize opportunities and execute a formal program



Total Asset Life-cycle

- Consider all aspects of TLAM in Asset planning
- Leverage RCM2 to effect optimal costs across the life-cycle



Thought Leadership

- Increase the value perception of maintenance and its contribution to ROA
- Apply Leading practices in Asset Management



Best-of-Breed Technology

- Aligned with your maintenance maturity: leverage leading EAM Solutions, advanced analytics relevant technology
- Start with a leading CMMS solution – Maximo



Value Realization

- Target opportunities that positively effect Asset created value and maintenance costs
- Apply a formal benefits realization approach to reaching the target value



Transformation Management

- Apply strong transformation Management disciplines to change
- Lead the change with your people to ensure success

Extensive Experience: with 300+ clients across many industries, our experience covers all aspects of asset management

Mtce Strategy and development engagements

Some IBM Clients

- 

Assisted WEB Aruba in maintenance maturity assessment and developed a transition strategy. Assisted in P&S and RCM programs and Change Mgmt
- 

Assisted Barbados Light and Power in maintenance maturity assessment and developed a transition roadmap to assist in their Maximo upgrade
- 

Partnered with City of Cambridge in a mutual development of a data analytics solution in Life-cycle Asset Management
- 

Partnered with DC WASA in maintenance maturity assessment and developed a data analytics solution in Life-cycle Asset Management
- 

Assisted City of Timmins Works in maintenance maturity assessment workshop and developed a transition roadmap including metrics

Strategy	People	Process	Metrics	Technology
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	

Asset management excellence, anywhere in the world with unmatched depth and breadth of practitioner skills

Expertise

- Deep cross-industry expertise
- Serving clients with EAM expertise, 16+ yrs
- Majority of staff is certified on latest version of Maximo and/or has an Asset Management background
- Industry and technical experts for infrastructure and integration solutions

Assured delivery

- Aligned closely with Software Development and Lab Services
- Delivery Excellence Tiger Team, templates, sustained with Maximize Methodology™
- Proprietary 'add-ons' to accelerate value
- Asset Management Center of Excellence (AMcoe), enhanced IP, and proven BVAs

Scale

- History of complex multi-site, multi-geo implementations across broad range of industries
- Utilize our global integrated enterprise
- The largest EAM consultancy in the world organized by 18 integrated management teams directing 730 industry, solution, and technical experts sustained by the Maximize Methodology™



Revised content reflects current EAM strategy and technology enhancements. Published Nov. 2010. ISBN #: 9780849303005

Delivered right, on time, the first time
At a competitive price
And prepared for future functionality



IBM Global Business Services

Food for Thought

1. Are you getting the optimal '**value**' and 'return on asset' across your asset life-cycle?
2. Where are you in your over-all Asset Management Maintenance **Maturity**?
3. Are you leveraging **thought leadership** and appropriate **technologies** today and for your organization's **future**?
4. Are you **leading** your transformation with full staff buy-in and participation?

Smarter Cities / Towns Informal Survey

WIP

- 1 – Innocence
- 2 – Awareness
- 3 - Understanding
- 4 – Competence
- 5 - Excellence

- 1 – Manual
- 2 – Real Time / Event Integration
- 3 - Data Modeling and Business Intelligence
- 4 – Enterprise Visual Decision Support
- 5 - Enterprise Automated Controls

Smarter Cities Attributes	Asset Management Maturity in Smarter Cities					IT Sophistication in Smarter Cities				
Governance and Business Strategy	1	2	3	4	5	1	2	3	4	5
Energy and Environmental Management	1	2	3	4	5	1	2	3	4	5
Building Process Integration	1	2	3	4	5	1	2	3	4	5
Real Estate Portfolio Management	1	2	3	4	5	1	2	3	4	5
Space and Facilities Management	1	2	3	4	5	1	2	3	4	5
Maintenance and Operations Management	1	2	3	4	5	1	2	3	4	5
Capital Project Management	1	2	3	4	5	1	2	3	4	5
Asset Life-cycle Management and Investment Forecasting	1	2	3	4	5	1	2	3	4	5
Service Management	1	2	3	4	5	1	2	3	4	5

amcoe

Asset Management Center of Excellence

Maintenance Maturity Model

1. Strategy
2. Organization/Management
3. Data Management
4. Maintenance Tactics
5. Materials Management
6. Planning and Scheduling
7. Key Performance Indicators
8. Reliability Center Maintenance
9. Autonomous Maintenance
10. Process Re-design



Rating Levels	VI Innocence	IV Awareness	III Understanding	II Competence	I Excellence
1.Strategy	Mostly Reactive Breakdown Maintenance	Prevent Maintenance Improvement Program	Annual Improvement Plan	Long Term Improvement Plan	Established and Communicated Maintenance and Asset Strategy
2. Organization / Management	Highly Centralized	Partly Centralized for Some Trades	Decentralized Mixed Trade Teams	Some Level of Multi-Skilled Staff	Multi-Skilled Independent Trades
3. Data Mgmt / IT	Manual or Ad-hoc specialty Systems	A "System" that Allows for Some Scheduling and PartsTracking	Fully Functional Asset Mgmt. Stand Alone System	Fully Functional Asset Mgmt System linked to Financials and/or Inventory Systems	Fully Integrated to common databases Data Standards in Place
4. Maintenance Tactics	Annual S/D Inspections Only	Time Based Inspections	Time and Use Based Inspections Some - NDT	Some CBM Some Prev. Maint. Few Surprises	All Tactics Based on Analysis
5. Materials Management	*Absence of storeroom management practices	*Some storeroom controls *Lack of performance measurements *Turns less than 1.0	System computerized Stock levels set – no Maint. Input. Lead time and Safety Stock Levels set – Rare;	*Alliances developed *(Free Issues) *Streamlined processes *Material Delivery Process Established *Automatic Matching of Invoices *Compurtized inventory control system	*Service levels 95%+ *On line material requisitioning *Turns exceed 1.5
6. Planning and Scheduling	Little or No Formal Planning, Scheduling, or Engineering Support	Some Troubling Shooting Support Inspection Scheduling	Maintenance Planning Group Established Ad-hoc Engineering	Solid General Planning and Scheduling Job Planning with Engineering Support	Long Term Major Project Planning for both Maintenance and Engineering
7. Performance Measures	No Systematic Approach. Maint. Cost Not Available	Some Downtime / Reliability Records Maint. Costs Not Segregated	Downtime by Cause Maintenance Costs Available	Mean Time to Failure / Repair Records Available Separate Maintenance Costs	OEM Benchmarking Full Cost Database
8. Reliability Centered Maintenance	No Failure Records	Collect s Failure Data but make little use of it	Failure DB Established. Used for Analysis	Some FMECA used	RCM Program in Place Risk and Root Cause Analysis Program
9. Autonomous Maintenance	Directed Workforce No Teamwork Maint & Production relationship strained	Directed Workforce No Teamwork Good cooperation of Maint. And Production	Directed Workforce Some Teamwork Maint./ Production cooperation at working level	Self Directed teams Maint. / Production cooperation at all levels. Team work at organization levels	Decentralized teams Business based decisions Excellent cooperation with Maint. / Production Teamwork a hallmark of entire organization
10.Process Redesign	Processes not documented. Some procedures available High Reactive Work Percentat	Some processes documents. Moderate amount of procedures available High PM Workload	Processes Documented Planning and Scheduling disciplines are prevalent Medium amount of Reactive and PM Workload	Processes documented Evidence of periodic review. Procedures well documented and organized	Processes documented and coordinated with support areas (Inv. / Purc) Evidence of regular review cyc © 2013 IBM Corporation

Real Estate and Facilities



Plant and Production



Infrastructure



Mobile Assets



Information Technology



Questions?



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