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CSIC Workshop on
Big Data – The Art of the Possible

d-EAM©

Digitalising Enterprise Asset Management

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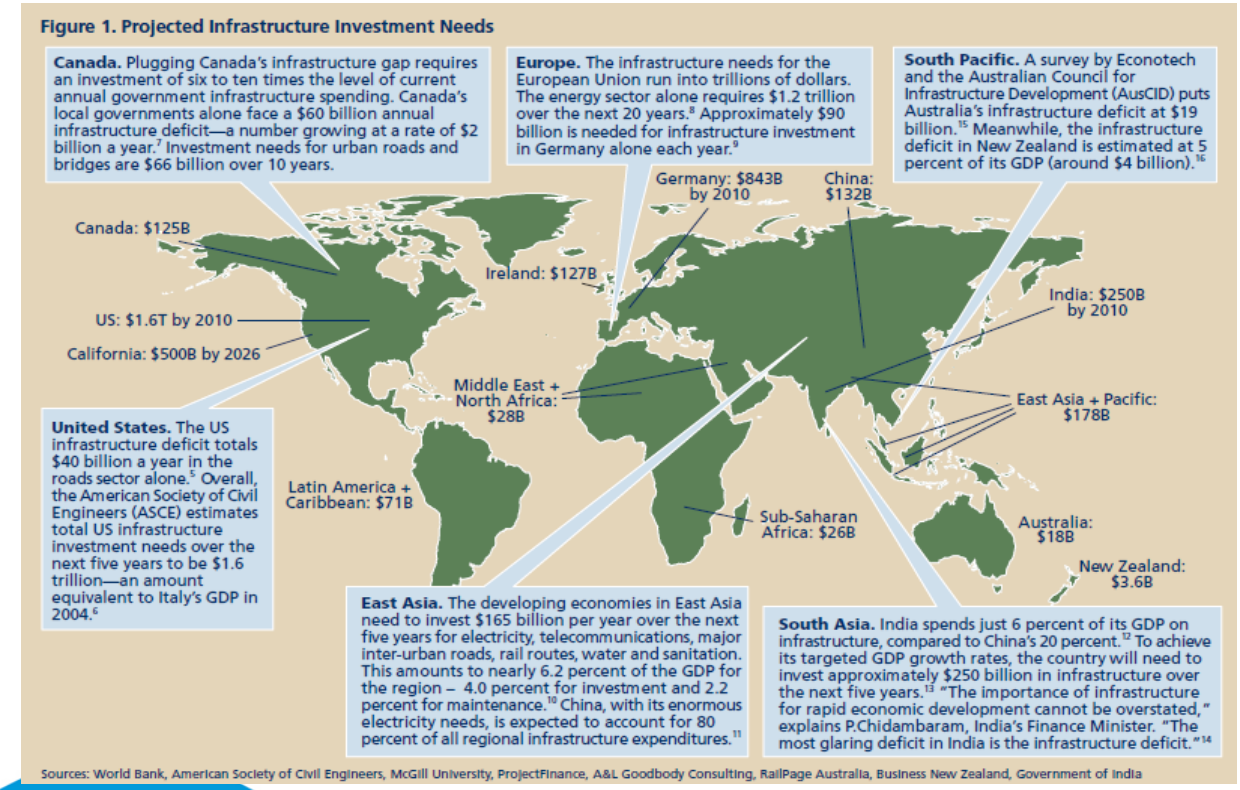
Plan Design Enable

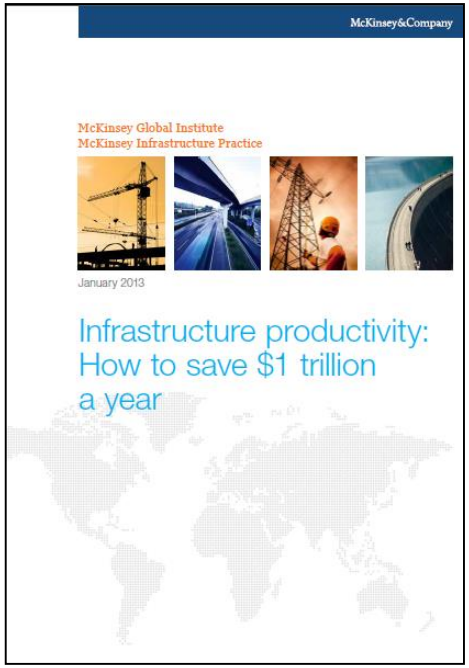
Outline

- Why digital-Enterprise Asset Management?
- What is d-EAM?
- What are the practical applications?
- What are the benefits?

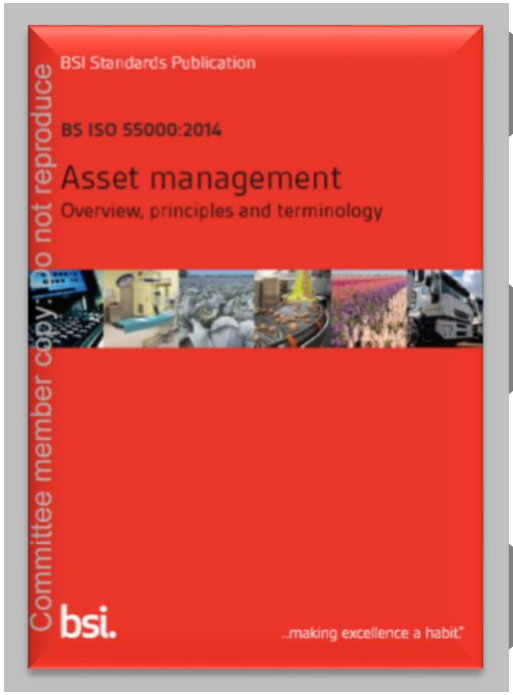
Infrastructure deficit – A global crisis

- Sustained underinvestment in infrastructure over several decades has resulted in a massive backlog requiring trillions of $ recovery fund around the world.
- $57 trillion global infrastructure investment needed in 2013-30 ($3.2 trillion/year) to sustain current service levels and meet future demand (~ 3.5% of GDP); but excludes recovery of backlog (McKinsey Report)
- $101 billion per annum wasted in USA due to road congestion





What is Asset Management?



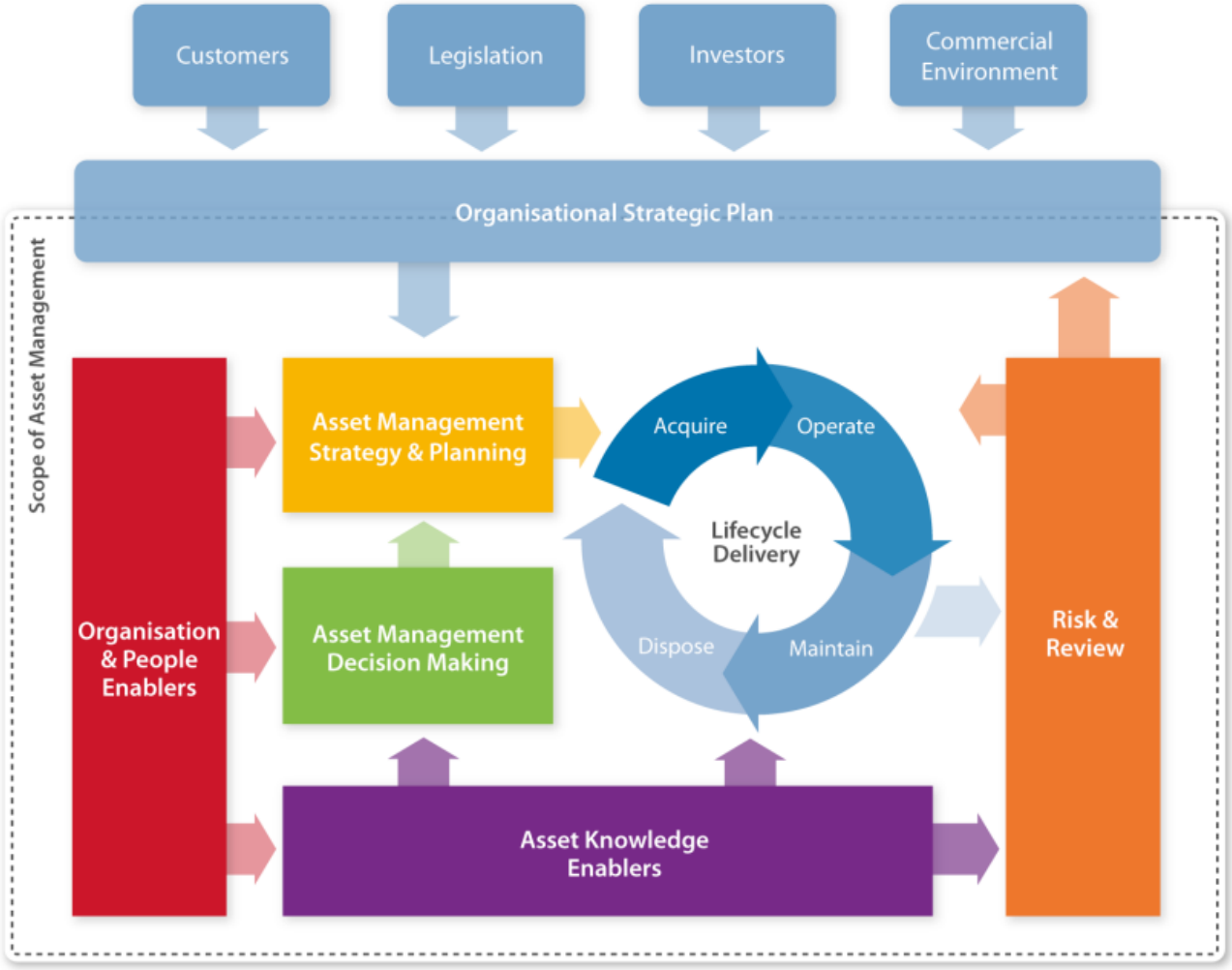
Asset
an item, thing or entity that has potential or actual value to an organization

Asset Management
coordinated activity of an organization to realize value from assets

Asset Management System
set of interrelated or interacting elements of an organization to establish AM **policy** and AM **objectives;** and **processes*** to achieve those objectives

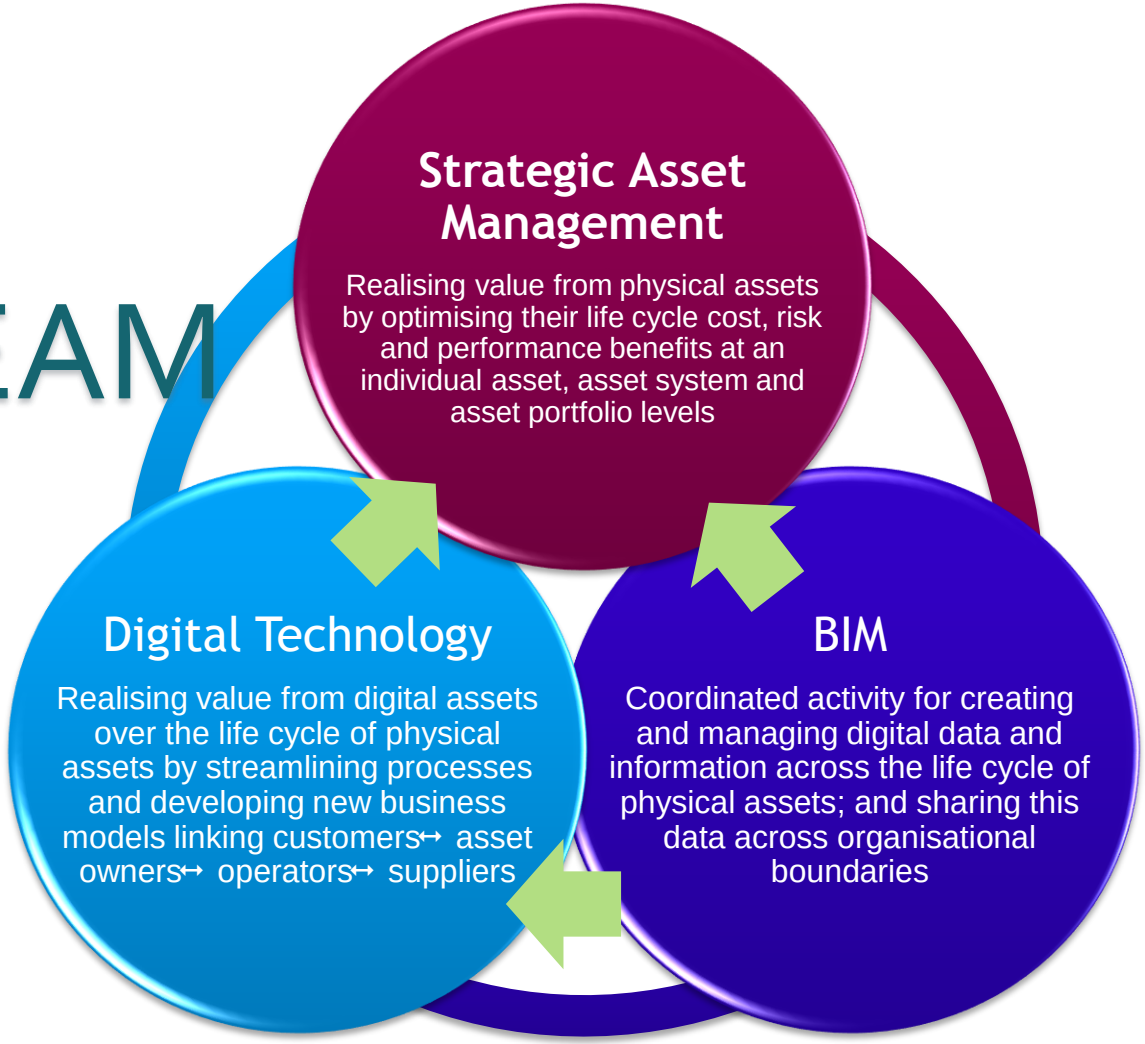
****processes include people, resources, processes, information and technology***

The IAM Framework for Asset Management



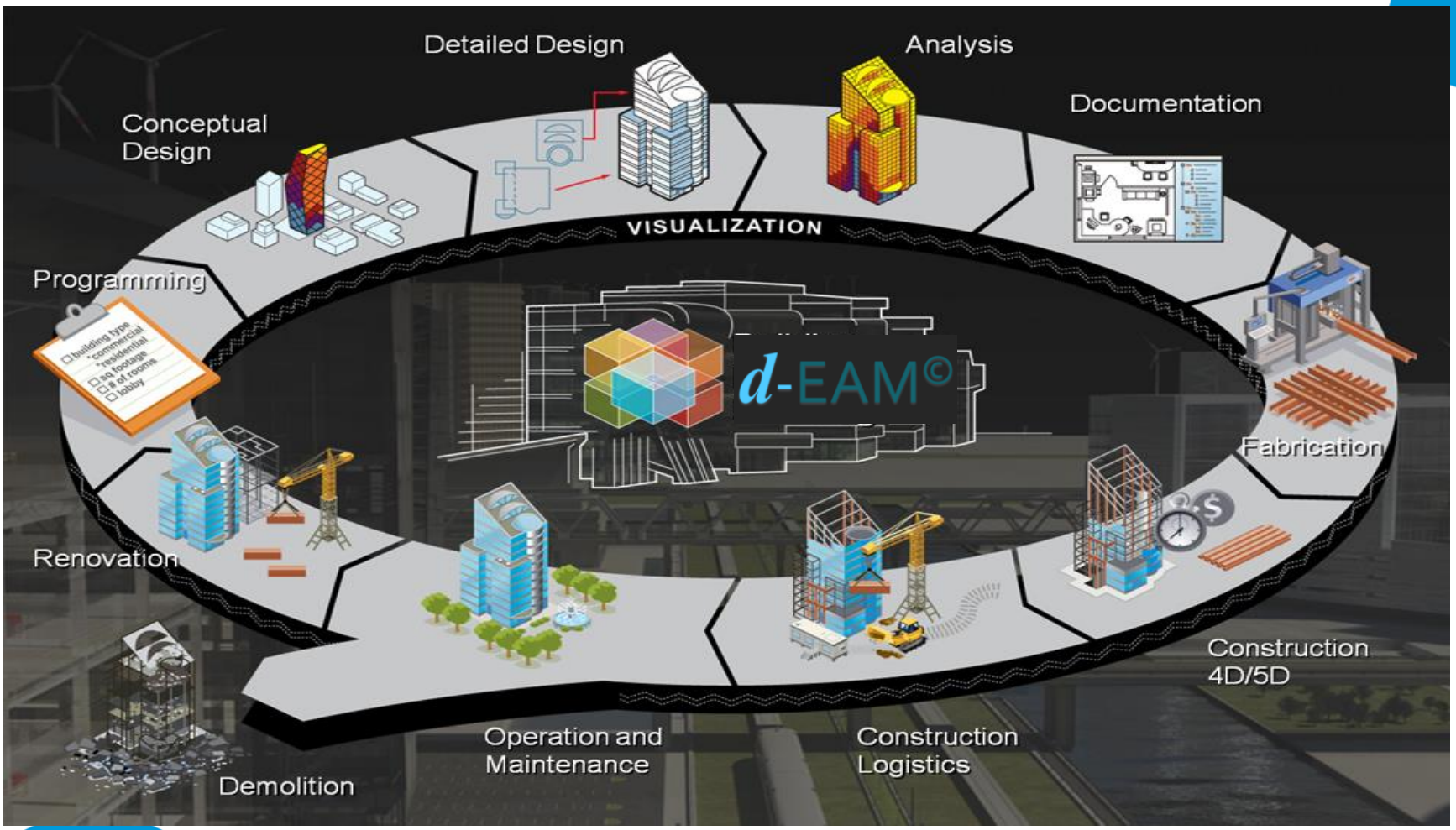
What is digital-Enterprise Asset Management?

d-EAM



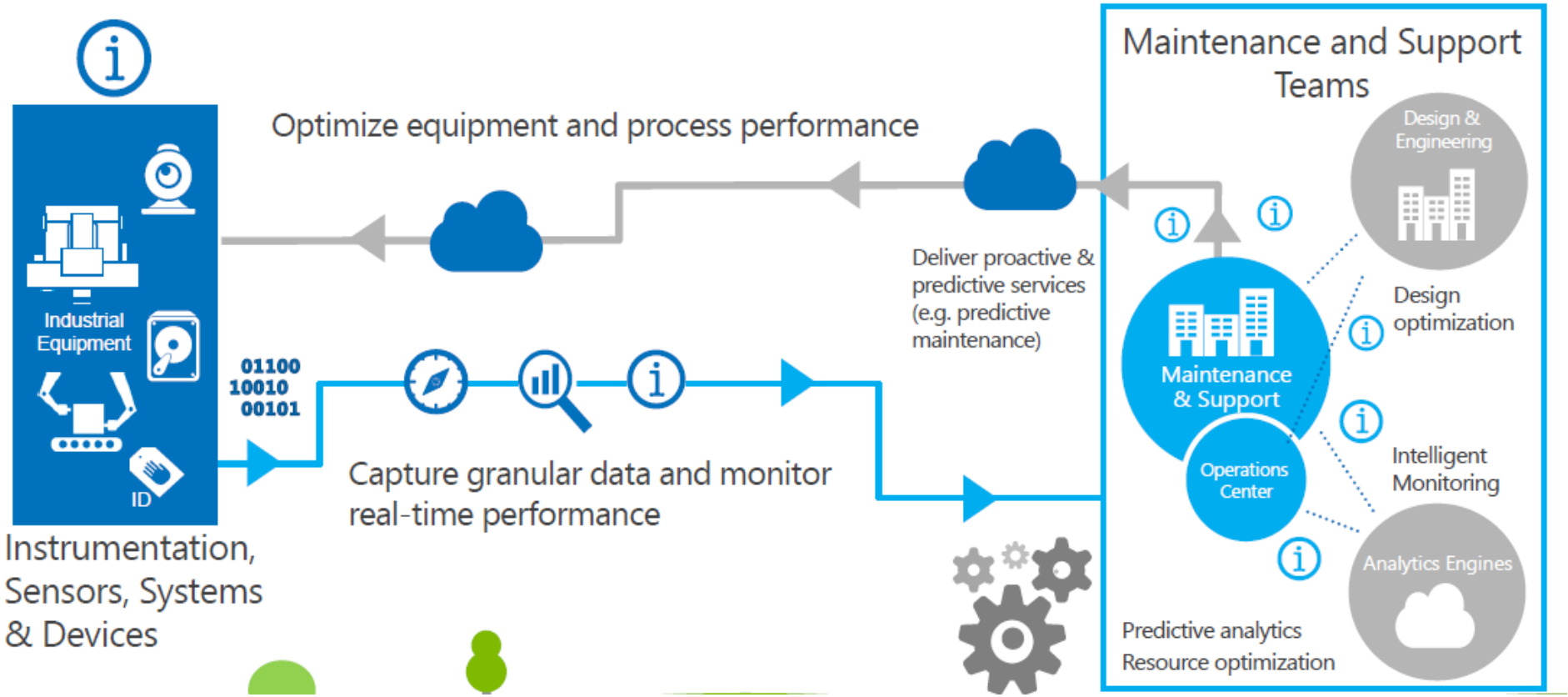
Life cycle of an asset involves planning, design, construction, operation, maintenance, renewal and disposal stages

d-EAM: digitally enabling the life cycle management of assets



Courtesy: Autodesk

IoT and Big Data for Asset Management

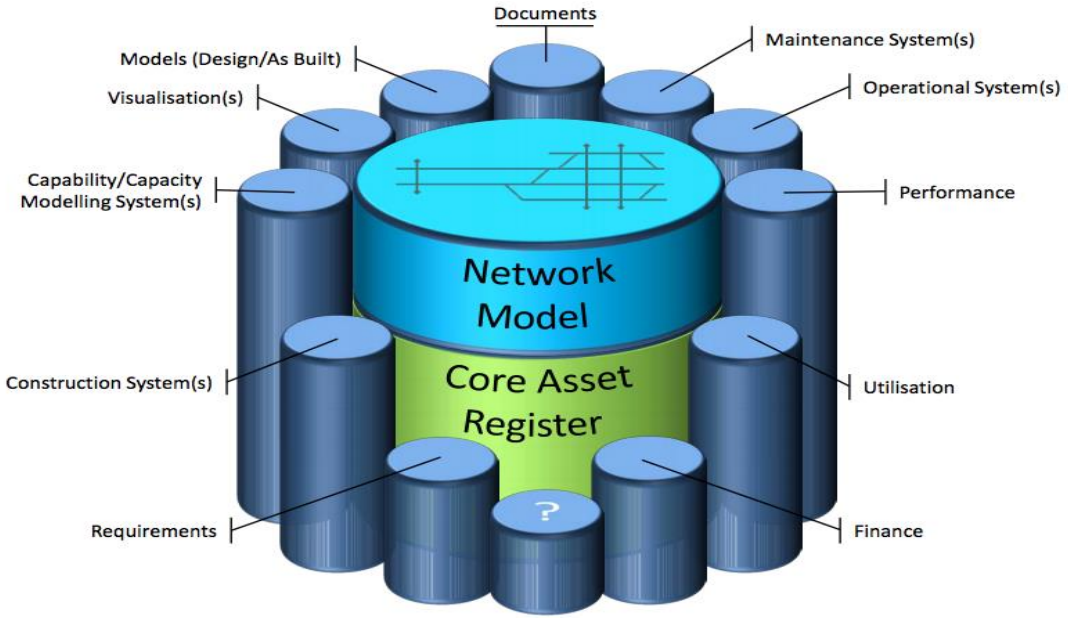


Source: David Epp, Microsoft, Bentley's Year-in-Infrastructure 2014 conference

Need for information

- Asset management relies critically on reliable and rich information about assets, their condition, utilisation, performance, capability, cost, risk etc.
- Data needs to be gathered systematically over the whole life of assets and analysed to generate information to support decision making.
- All data needs to be consistent, quality assured and readily accessible.

➲ *BIM provides the means for collecting and managing data and information over the life cycle of built assets*



How does BIM enable Asset Management?

- BIM is the process, enabled by technology, for better information management through the life cycle of assets.
- It delivers value by underpinning the creation, collation and exchange of intelligent structured & unstructured data.
- BIM offers an integrated collaborative working environment for sharing information across multiple stakeholders.
- If exploited correctly, this can lead to significant efficiencies and improved value to be derived over the whole life of assets.

Case Study: High Speed 2 BIM & Digital Implementation

Strategy & Planning	Data & Information	People, org & culture	BIM Systems & Protocols
BIM Policy BIM Strategy BIM Benefits Mapping BIM Capability Model Business Requirements Roadmap & Implementation Plan	Define data and information requirements Specify information delivery into contracts Develop 'to be' data and process architectures Develop CDE processes Develop information management processes	Define BIM roles & responsibilities Develop upskilling strategy, plan & system Define maturity & competency models Engage with stakeholders and manage change	Develop BIM systems architecture Develop functional requirements Assess gaps in 'as is' and recommend technology roadmap Develop a strategy & plan for adopting open data protocols & standards

Digital-enhanced Asset Management: Network Rail's Digital Railways Programme

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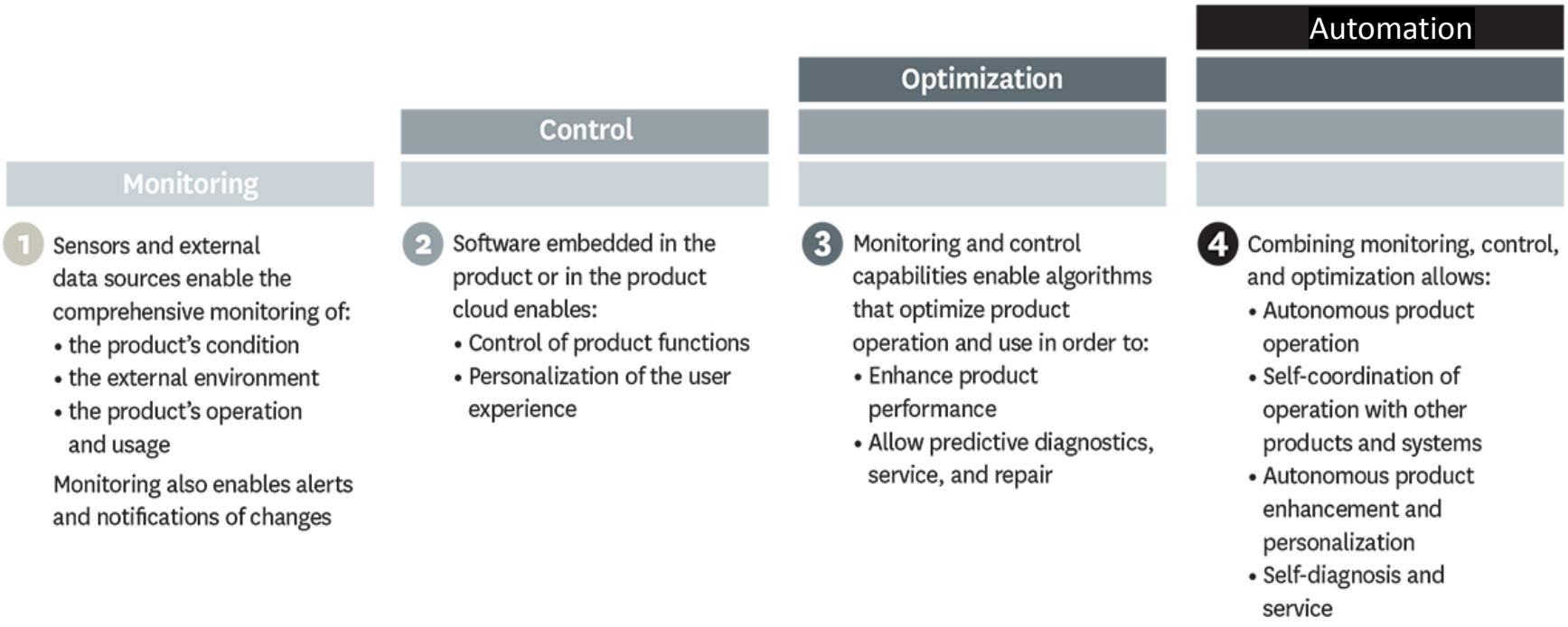
Enhanced value through d-EAM



Source: M Porter & J Heppelmann, Harword Business Review, 2014

Benefits of digital-EAM

Benefit Potential		Evidence
PERFORMANCE	Improved performance (capability, reliability, availability, condition, etc): (~ 15% to 30%)	Network Rail, UK (2006-10): • 27% reduction in cost, & • 30% performance gain Network Rail, UK (2010-14): • 27% reduction in cost Hong Kong MTR • Train operating costs reduced by 20% • Train reliability: MTBF improved from 1000km to 3500km between failures Oil company: • 50% reduction in operating costs & • 15% increase in production output. Scottish Power • 10% reduction in capital expenditure • 20% reduction in O&M costs • 22% increase in plant availability • 25% reduction in forced outages London Underground, UK: • 15% reduction in Opex by early renewals
	Improved customer satisfaction : (~ 20% to 30%)	
	Increase in revenue/output: (~ 15% to 20%)	
COST	Reduction in whole life cost of ownership: (~ 30% to 40%)	
RISK	Risk reduction: (~30% to 40% reduction in financial losses)	
SUSTAINABILITY	Financial	
	Economic Environmental Social	

Summary

- Enterprise Asset Management is a strategic and holistic approach to realising value from built assets over their life cycle.
- Digital technology enables real time monitoring, control and automation of asset operation and maintenance and business model integration of the ecosystem partners managing assets.
- BIM provides the means for collecting and managing data and information over the life cycle of built assets.
- Digitalising whole life asset management through rich data on built assets, combined with real time monitoring through IoT and Big Data can provide substantial benefits in terms of improved performance, reduced costs and risks.
- digital-EAM also enables digital public services in a SMART City.

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For further Information

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