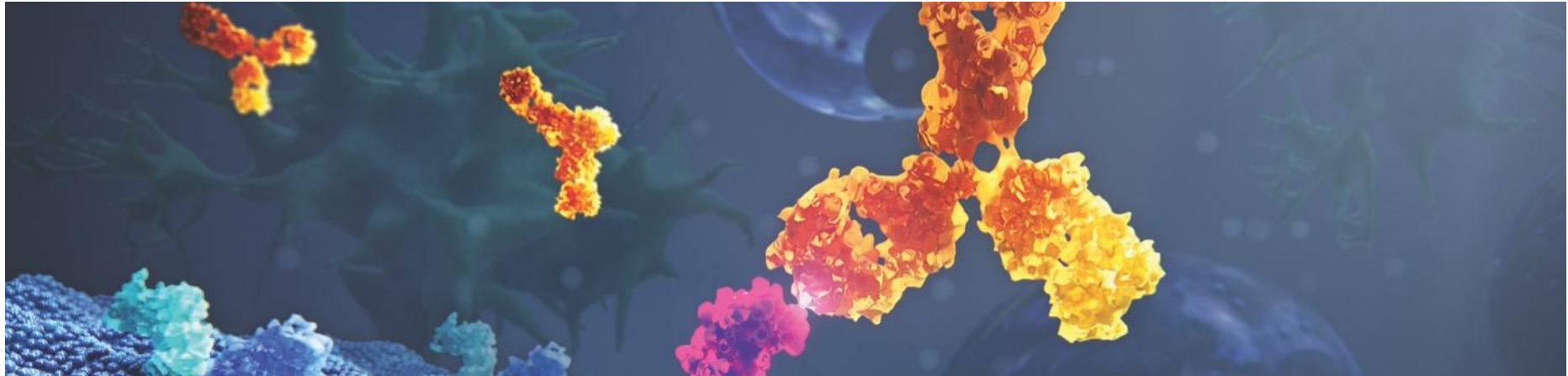


Implementation of a Practical Digital Twin in Biopharma R&D Asset Management

Dr Phil Richardson

IAM Conference – Liverpool 2019

24th June 2019



Introduction:

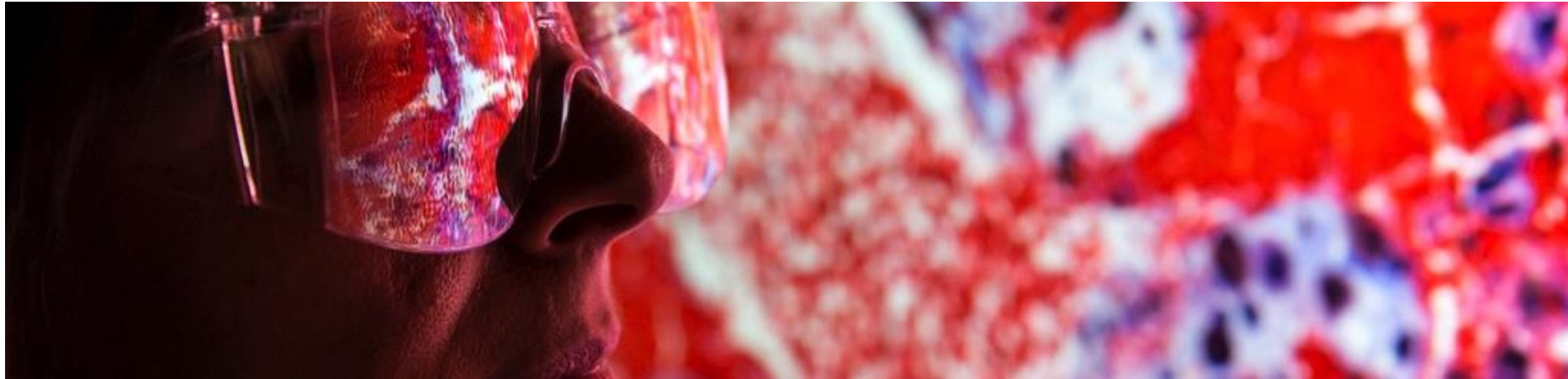
“The highly regulated nature of the pharmaceutical industry has led to the development very robust asset information systems to support R&D processes and the release of medicines to patients. In the rapidly developing world of information technology however these legacy IT systems can often hold back the implementation of a leading-edge Digital Twin. The presentation will describe AstraZeneca’s practical approach to dealing with this conflict with particular reference to their new R&D Site in Cambridge”

Contents

- AZ’s New Cambridge Site
- Digital Twin Scope
- Asset Management Context
- Practical Solutions
- AM Strategy & Digital Twin
- Examples
- Asset Information Service
- Conclusions



Context



AstraZeneca's New Cambridge Site – Asset Context

- Located within the heart of the Cambridge Biomedical Campus
- Brings together AZ and Medimmune small and large molecule research under one-roof
- Close proximity to number of world-class medical research institutes
- Enhanced internal and external collaboration is a core driver for AZ's move to Cambridge
- 54,000 m² of lab, office and amenity space in the iconic R&D Centre
- Large open plan labs, offices and breakout spaces to foster collaboration
- Heavily IT enabled
- Innovative energy & utilities provision from separate Energy & Data Centre
- World-leading sustainability – BREEAM excellent



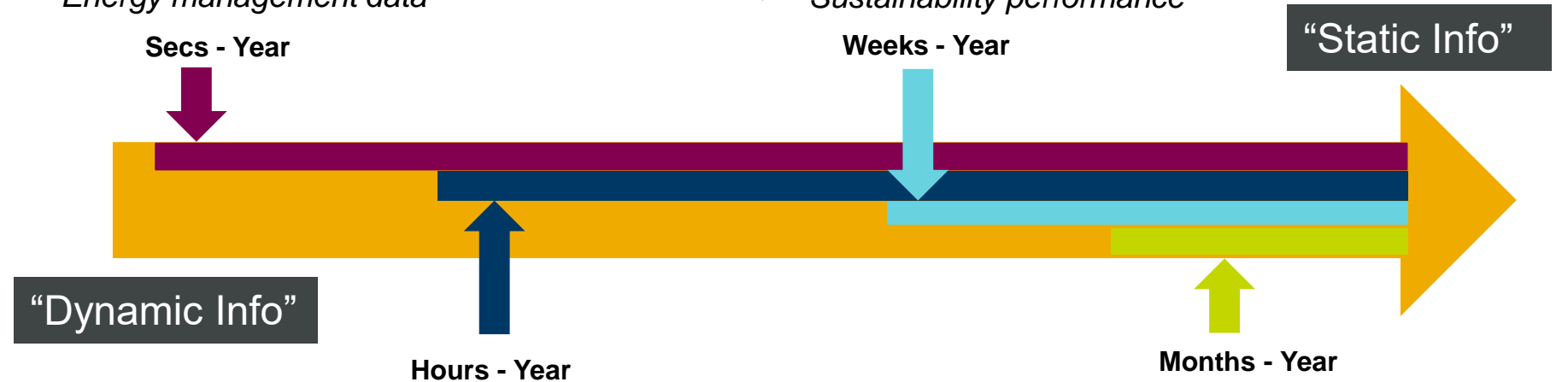
Scope of the Digital Twin

Building Monitoring & Control

- *BMS inputs & set-points*
- *Scientific alarms*
- *Energy management data*

Management Information

- *Asset availability*
- *Compliance performance*
- *Sustainability performance*



Operational Support

- *Maintenance plans*
- *Maintenance reports*
- *Condition based maintenance*
- *CMMS structure*

Asset Record

- *Record drawings*
- *Building Information model*
- *Room data sheets*
- *Plant manuals*



Asset Management Context – AM Objectives

Asset Management Objectives	Asset Management Responses
<p>Putting safety first, appreciating the potential safety risks and delivering operational plans which deliver safe and compliant assets.</p>	<ul style="list-style-type: none"> ▶ Set asset priority according to safety criticality, which underpins all operations and work undertaken. ▶ Maintain communication with customers to flag key risks before they become issues.
<p>Putting our customers at the heart of what we do, understanding their requirements from the assets and how we are enabling 'time for science', with whole life asset plans to support this.</p>	<ul style="list-style-type: none"> ▶ Minimise impact on availability through prioritising work based on risk to productive science. ▶ Set up responsive processes which manage the risk of asset failure, and continuously improve to predict and prevent. ▶ Use data to drive improved service delivery and efficient operations, through collecting and analysing to continuously improve how we manage the assets. ▶ Decisions based on the whole life value of the asset to understand optimum interventions, learning from performance and the value delivered to the business (i.e. seeking value for money whilst achieving customer requirements).
<p>Maintaining a sustainable building that delivers on its design potential and enhances AstraZeneca's reputation as a good corporate citizen.</p>	<ul style="list-style-type: none"> ▶ Embed innovation throughout the team to drive sustainability outcomes through the operations and maintenance of systems that consume and/or generate water, waste and energy.

Extract from the AstraZeneca Cambridge Asset Management Strategy



Life Cycle Practicalities

Life cycle model consisting of five phases:

➤ **Acquire Phase**

- Ensuring Asset Record is captured effectively from the build project

➤ **New Phase**

- Establish asset strategy
- Capture start-up mods in asset model

➤ **Prime**

- Execute Asset Strategy
- Sustain asset record

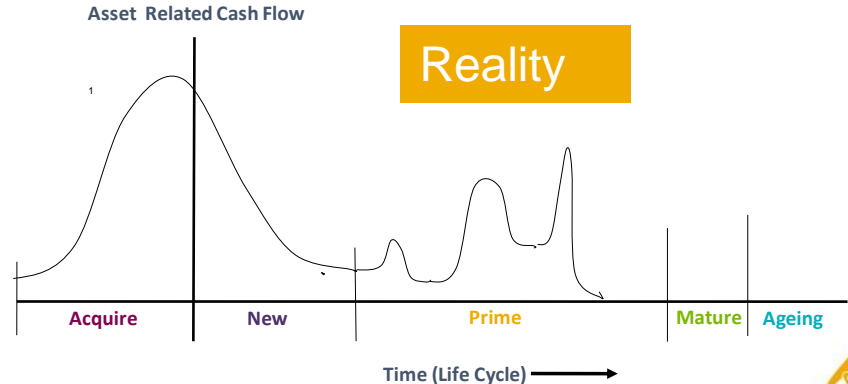
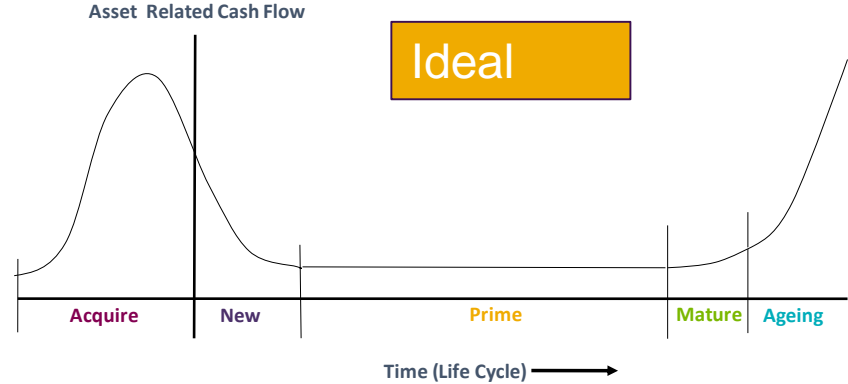
➤ **Mature**

- Use asset info to support risk strategy including financial planning

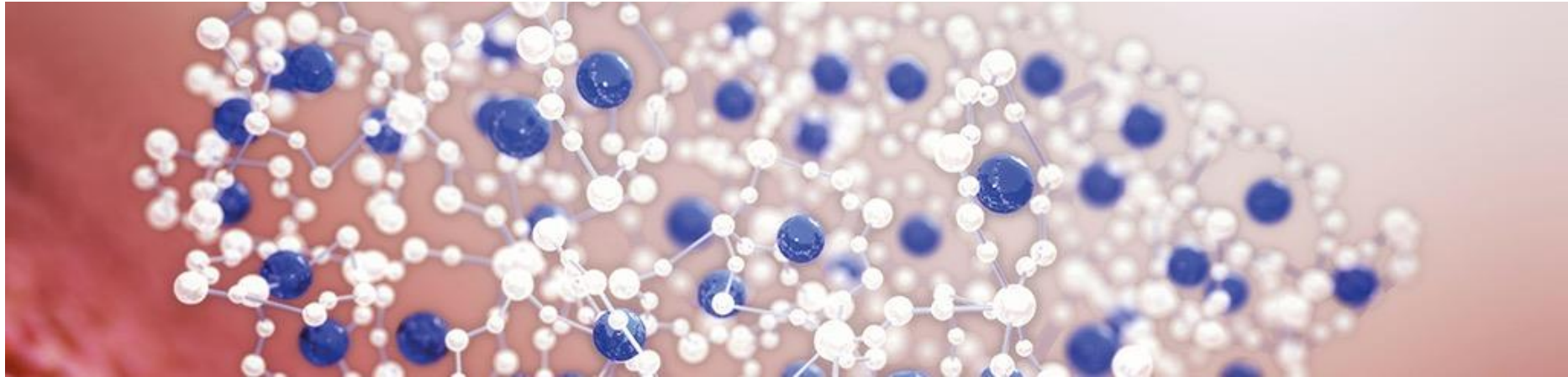
➤ **Ageing**

- Prepare for asset refurb or exit

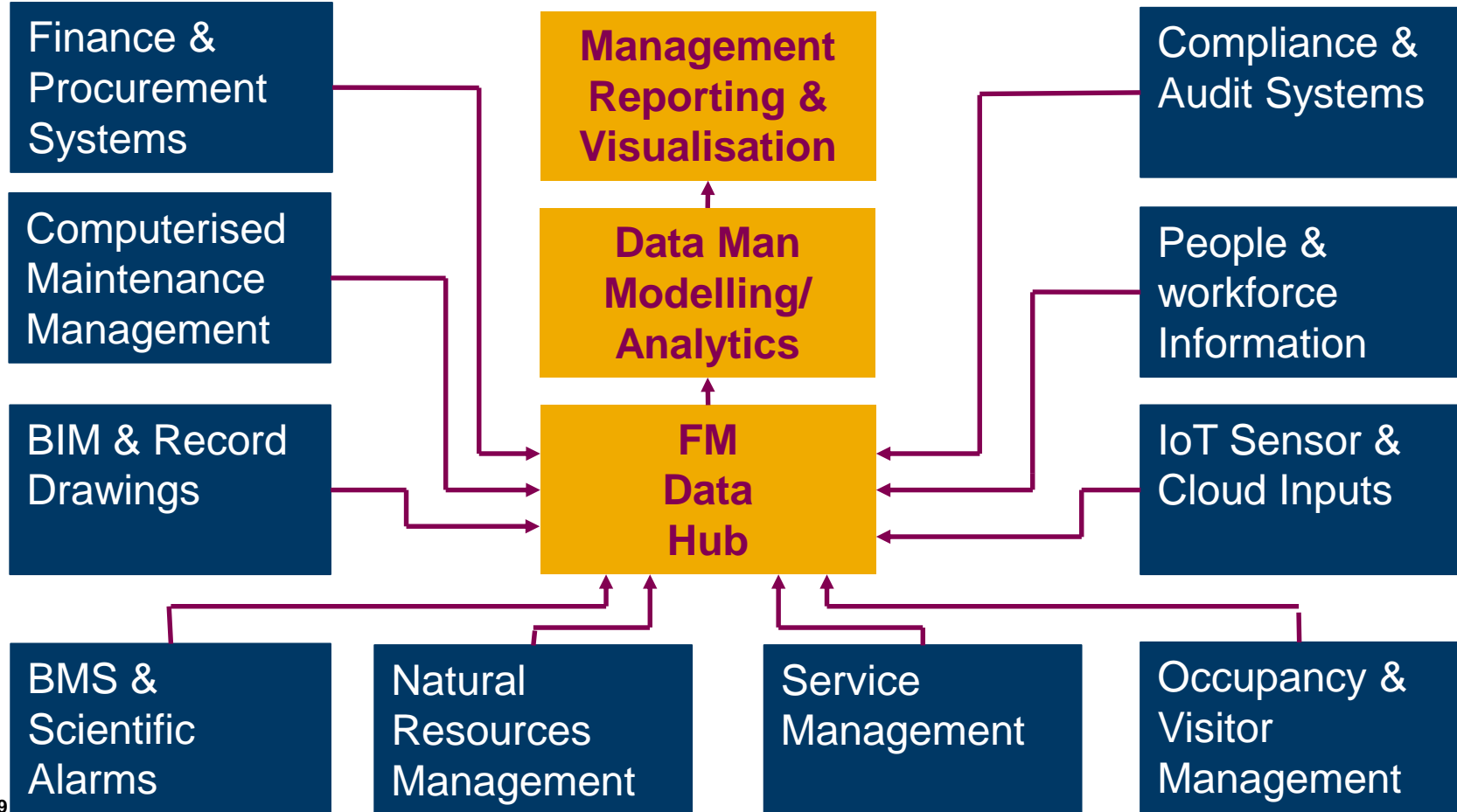
In reality very few facilities transition smoothly through the simple cycle “Change is the new Business as Usual”



Practical Digital Twin

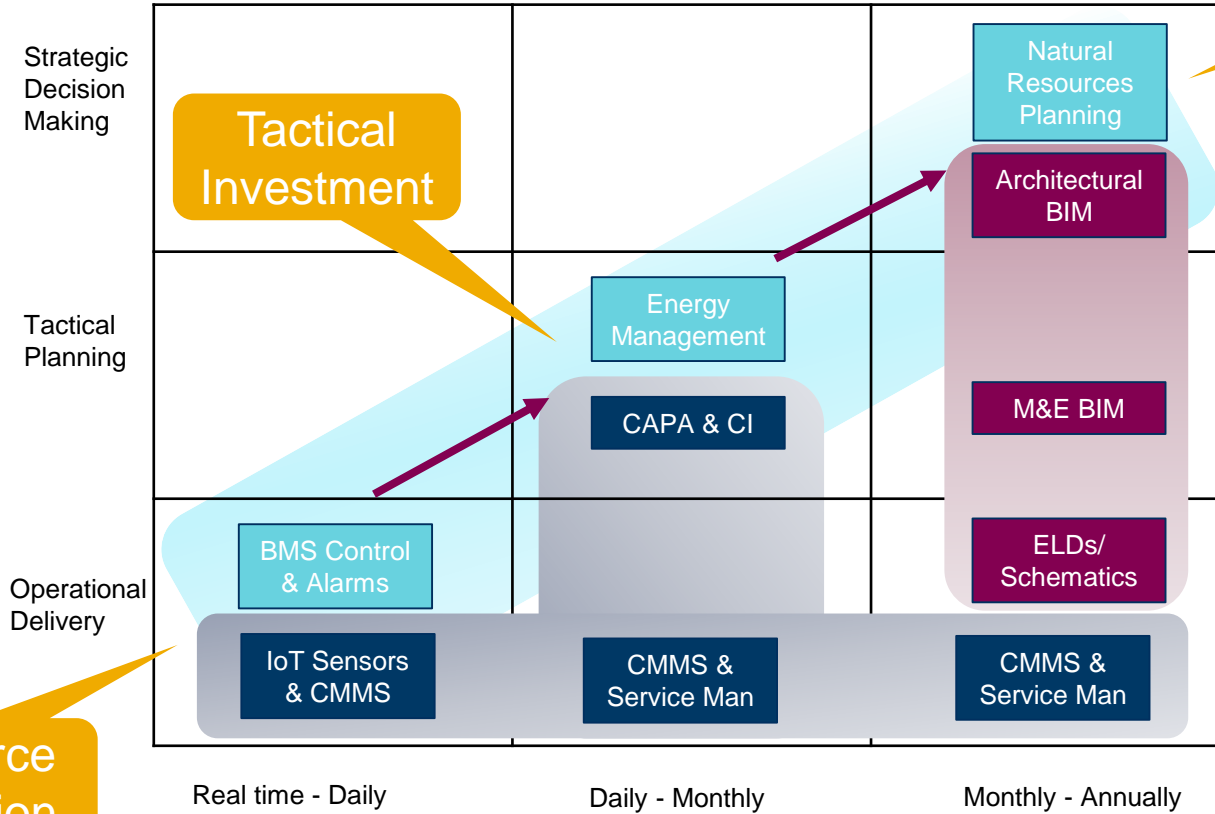


Practical Solution – ‘Master Data & Digital Clone’



Digital Twin for AM Planning & Investment

Asset Strategy Alignment



Strategic Investment

Resource Allocation

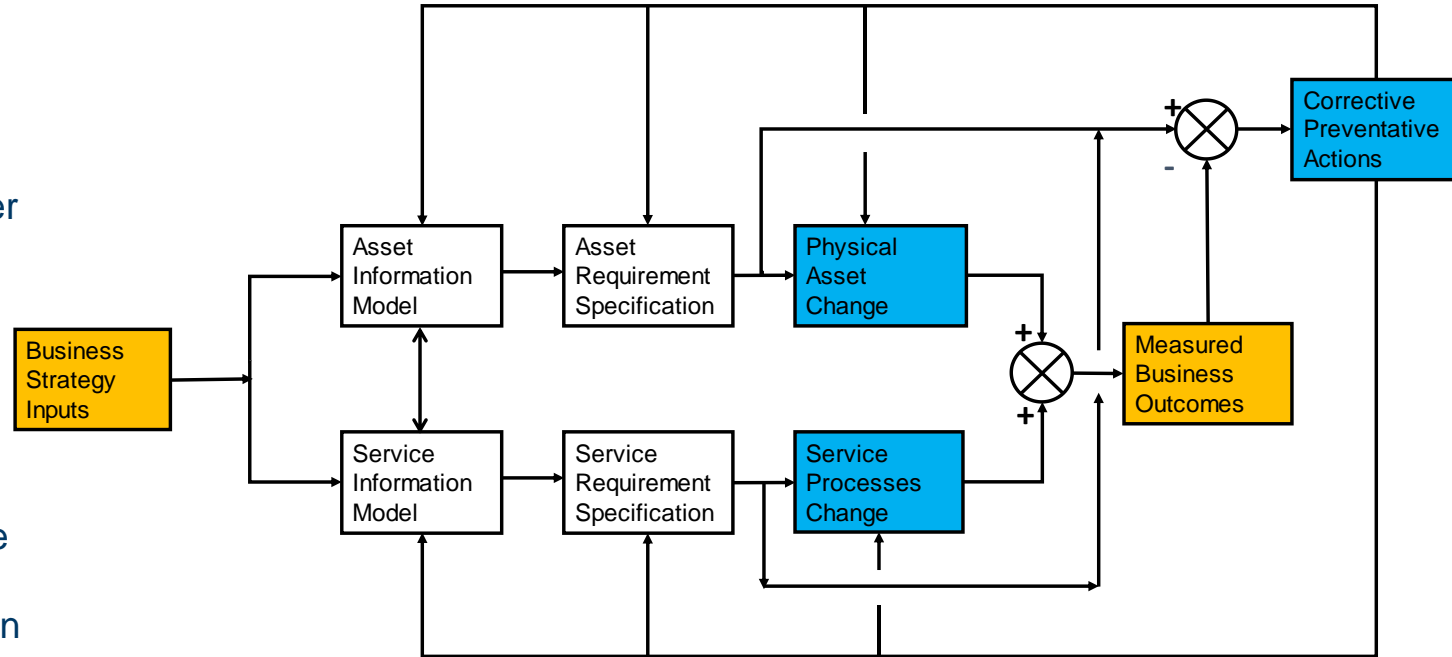
	Record Info: Drawing Man system & BIM
	BMS Info: BMS & Ground Source HP
	CMMS: SAP Plant Maintenance

Information Refresh Frequency



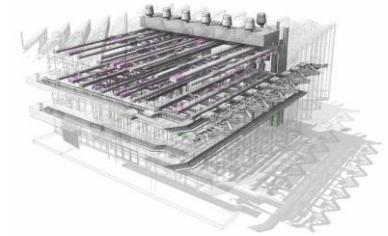
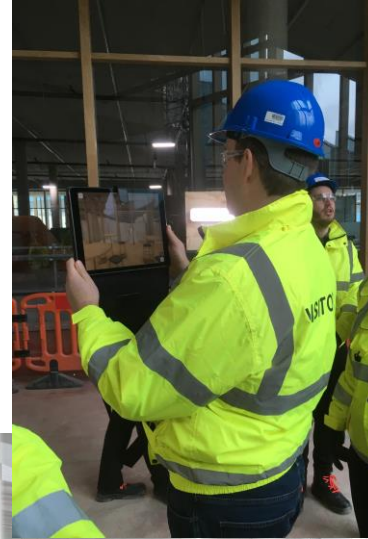
Digital Twin – Link to Asset Management Strategy

- Purpose is to take Business inputs and convert to required Business outcomes
- Keep this aligned over time by updating the Asset Information Model (*The digital twin*) to improve forecasting
- Use data/measured outcomes to compare with inputs and act to eliminate the deviation
- Use of Change control and CAPA Process to drive the (re)alignment of the 'Real' and 'Virtual' states



BIM Practicalities

- The core drawings for use in operational R&D Asset Management are the schematics
- There is a question around how to best establish a BIM-enabled Capital Projects Service
- Systemisation of the Models inline with the CMMS asset structure will be a 'big win' – master data though will be the CMMS
- 3D visualisation important for 'stakeholder buy-in' to capital modifications in particular....
- Also has proven invaluable for maintainability studies
- The architectural model will form the master data for Real Estate information - feed to the strategic digital twin



Asset Information Management - Service Considerations

❑ Asset Information Management Service (Kano):

- 'Basics': Asset Record Information, CAPA, Change control
- 'Value': Operational building monitoring & control
- 'Excite': Digital Twin – IoT/Analytics, etc.

❑ Can one provider do 'whole scope'?

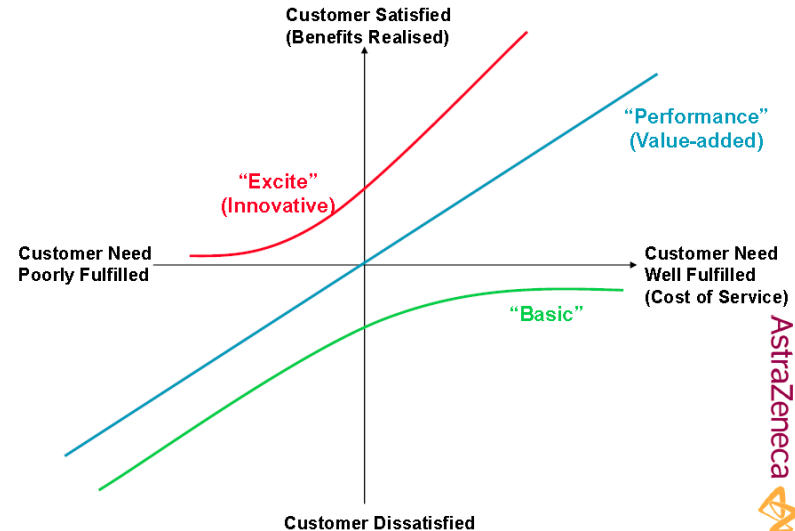
❑ Internal Competency

- Outsourced model – AZ Governance Org
- Data scientists

❑ Supply Base Competency

- Maintaining BIM
- Incorporating IoT Cloud Analytic Services

Kano Model & Customer Satisfaction



Conclusions



Conclusions

- Have to ensure the 'Basic' Asset Record Management Service is secured to support license to operate and protect the patient
- In practical terms, retaining existing master data systems and combining these with a 'cloned' data-hub allows us to move quickly...
-but approach is to ensure we don't preclude longer term digital-aspirations through implementation of ill-directed, short-term solutions.....
- Early agreement of a Data strategy is therefore key
- So: Legacy tools might not be ideal in terms of leading edge digital Twin but they do provide a stable launch platform, trusted by the customer and with well understood functionality and robustness



Thanks & Qs

Thanks to:

- Kate Jarritt & Arup AM Team
- Simon Wilson & AZ Asset Info Team
- Tom Stanway & AZ AM Team

Any Questions?.....



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