- ✓ **Non-profit**

- ✓ **Neutral**

- ✓ **Community Driven**

- ✓ **Passionate about better delivery of projects and achievement of value to users through Better Information Management**

"Your Partner in Enabling Consulting

Consulting Engineers South Africa (CESA)
represents for its members a body that promo
of its standing, provides quality assurance for
over 21 000 staff are members of CESA; thes
multinational, multidisciplinary suppliers of a
design and project delivery services, to many
tend to specialise in selected areas of the proj

Mission Statement:

CESA is committed to the promotion of excellence
on behalf of its members and stakeholders. Throu
continuously improve the quality of life of people
pioneering change in partnering with all key stake
enhance the industry and provide a credible impa

Key Focus Areas:

CESA has identified the following strategic directi
- To drive Sustainable Transformation
- To maintain standards of Professionalism and Quality Management
- Provide Business Support to Members and Clients with emphasis on Procurement
- Build Partnerships with Government and other Stakeholders
- Ensure that good Governance and Integrity prevail within the industry and profession
- Create an awareness among consulting engineers of issues affecting the industry

CESA Member Firms:
- Adhere to Quality Management Systems, a Sustainability Reporting Framework, a Business Integrity Management System (BIMS) and the CESA Code of Conduct

CESA is committed to the **promotion of excellence** in the **consulting engineering** industry on behalf of its members and stakeholders. Through its members, CESA seeks to continuously **improve the quality of life** of people by interpreting the environment and **pioneering change** in partnering with all key stakeholders. In so doing, CESA strives to **enhance the industry** and provide a **credible impact** on all South Africans.

Raising the BIM tide

Raise the BIM Tide

- Conferences to Create Awareness
- Encourage participation and connect people with each other
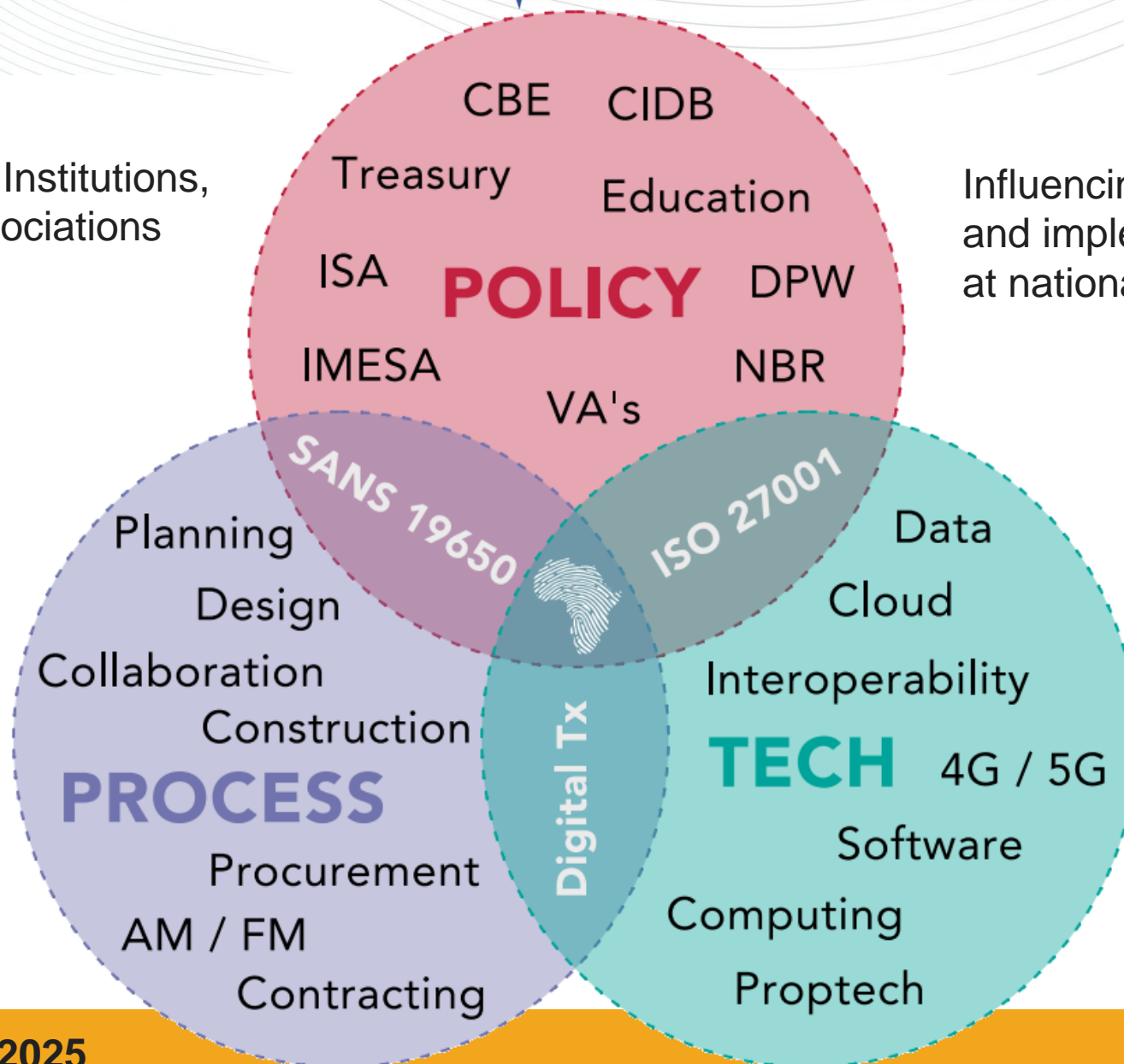- Technical workshops about the practicalities of BIM on all levels

CESA INDABA MARCH 2025

1.0 ◆ **1780 – Mechanisation**
Industrial production based on machines powered by water and steam

2.0 ◆ **1870 – Electrification**
Mass-production using assembly lines

3.0 ◆ **1970 – Automation**
Automation using electronics and computers

3.5 ◆ **1980 – Globalisation**
Offshoring of production to low-cost economies

4.0 ◆ **Today – Digitalisation**
Introduction of connected devices, data analytics and artificial intelligence technologies to automate processes further

Digitalisation

5.0 ◆ **Future – Personalisation**
The fifth industrial revolution, or Industry 5.0, will be focused on the co-operation between man and machine, as human intelligence works in harmony with cognitive computing. By putting humans back into industrial production with collaborative robots, workers will be upskilled to provide value-added tasks in production, leading to mass customisation and personalisation for customers

https://insights.regenesys.net/

https://7wdata.be/

Pre-1990's : Engineering = math, science and drawings
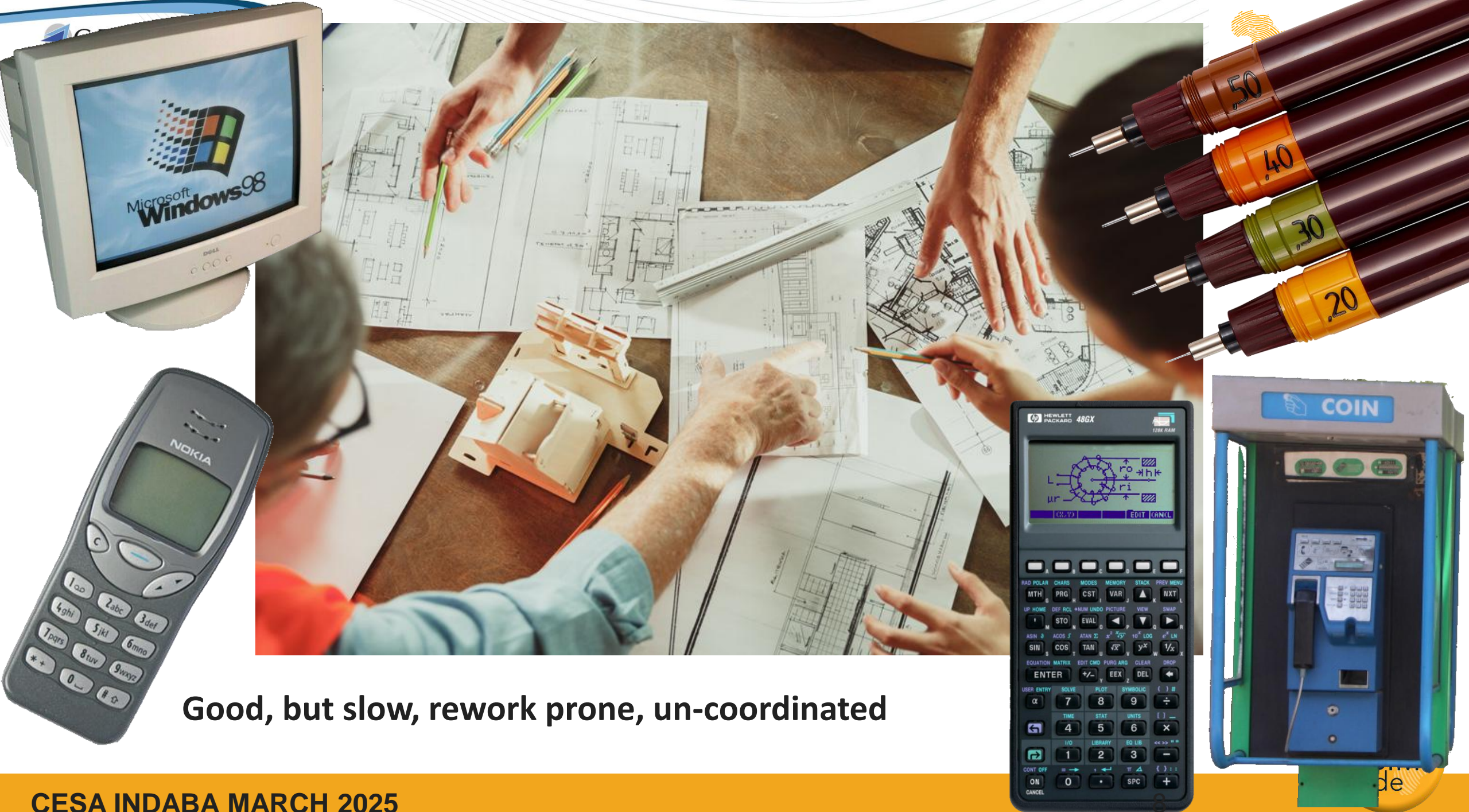
Good, but slow, rework prone, un-coordinated

1990's... CAD – automation of the drawing board

Essentially the same thing, just not on paper with pens, rulers and stencils!

Computers made drafting and tracing **easier and more efficient**, but didn't change the basic principle of creating *DRAWINGS*
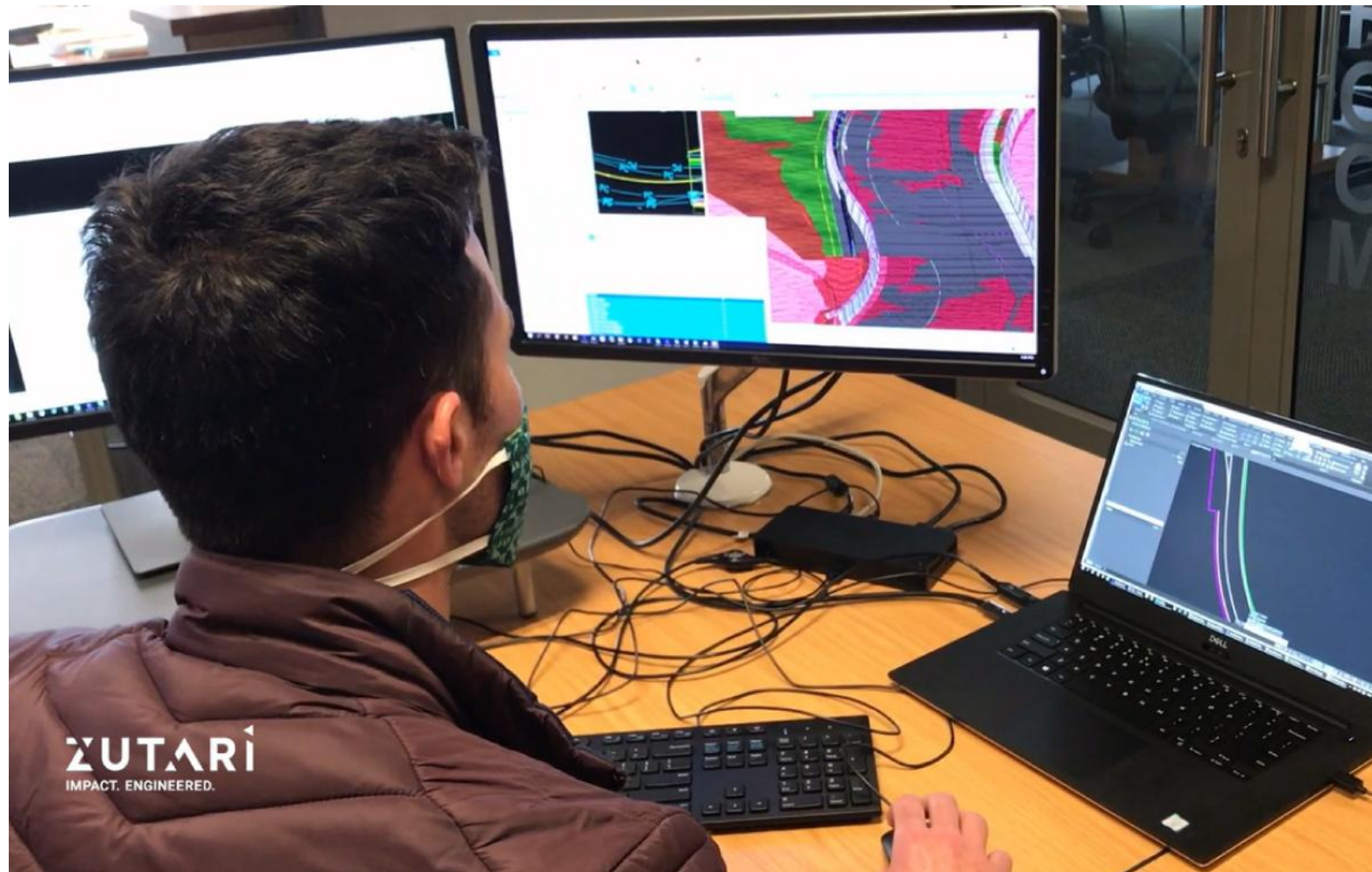
CAD still delivers limited value

Digital Project Delivery → BIM

The proactive adoption of emerging technologies, and the development of our people to use these technologies effectively and reliably.

A deliberate change in focus from producing drawings and reports to
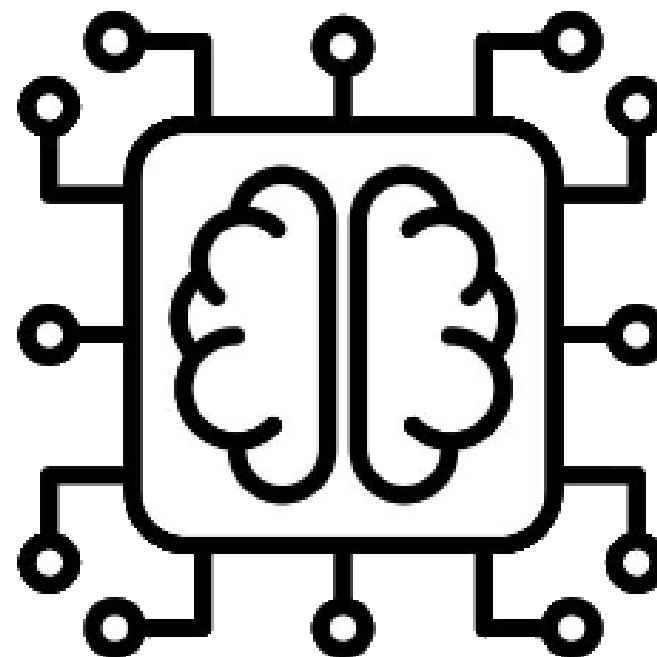
creating information

Key Trends driving the change

5G

TWINS

BIM
Building · Information · Modeling · Documentation · Software · Design

IOT

E S G
ENVIRONMENT · SOCIAL · GOVERNANCE

INSIGHT

KNOWLEDGE

DATA & INFO

Deliver more value

Create / collect / generate better data
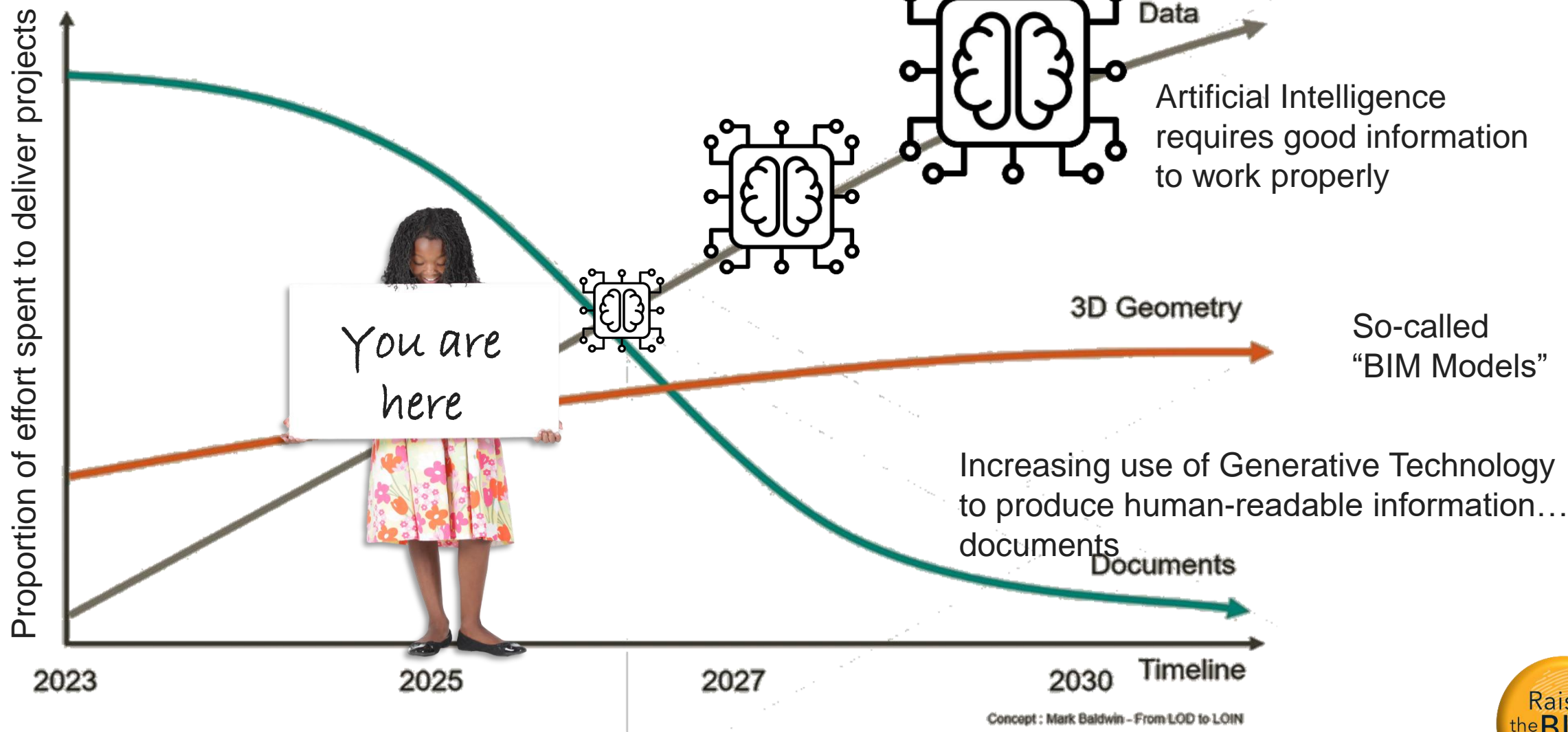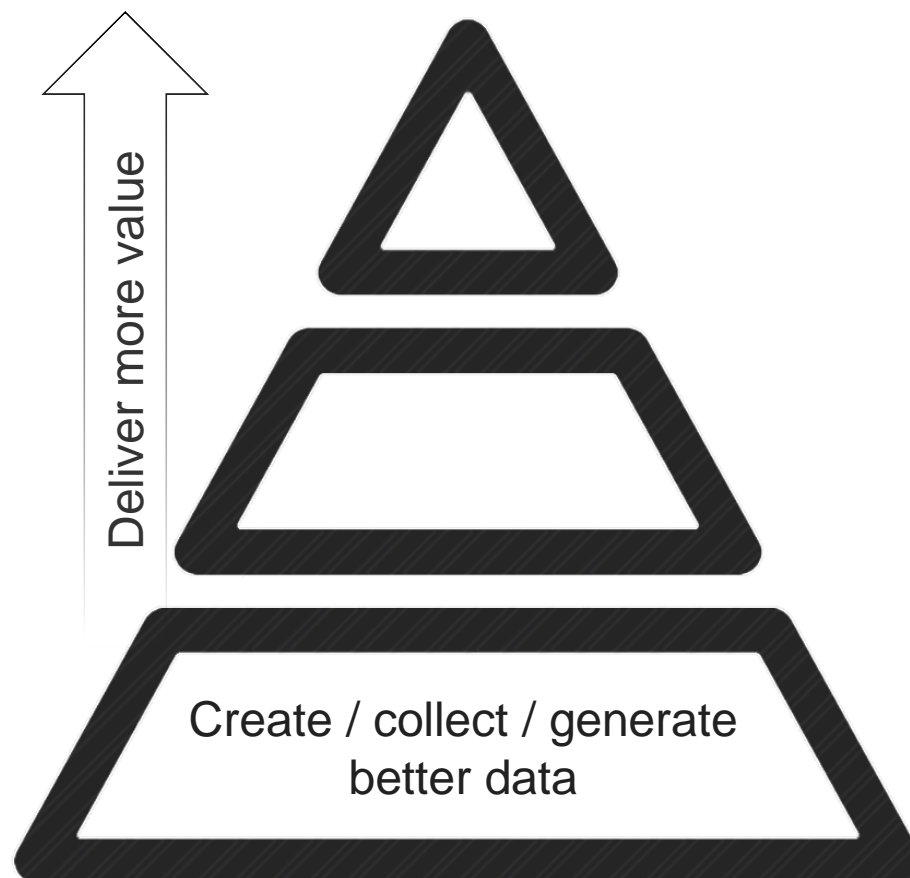
Know-how, experience, insight, understanding and contextualised knowledge

Contextualised, categorised, calculated and condensed data

Facts and figures which relay something specific, but which are not organised

The Value of Digital Engineering for Operations

INSIGHT

KNOWLEDGE

DATA & INFO

SANS 9001

SANS 55000

SANS 21500

SANS 19650

Business Processes and Decision Making

Product   Policy   Operations

Financial   Risk   Legal   HR / People

B I M

Better   Information   Management

Data, 3D Geometry and Documents

ORGANIZATIONAL MANAGEMENT

ASSET & PROJECT MANAGEMENT

INFORMATION MANAGEMENT

DELIVERY PHASE (PIM)

C
B
A

(AIM)
OPERATIONAL PHASE

e.g. ISO 19650

e.g. ISO 55000 & ISO 21500

e.g. ISO 9001

SANS 9001 ensures that project deliverables meet quality standards

SANS 55000 aids in managing equipment, facilities, and infrastructure assets efficiently.

SANS 21500 provides guidance on project management

SANS 19650 enhances collaboration among stakeholders through standardized processes.

Delivery → Follow **SANS 19650** to ensure delivery of

✓ the right information
✓ to the right party
✓ at the right time.

By integrating these standards, organizations can achieve better alignment of their processes, improve project execution and stakeholder satisfaction, and enhance overall operational excellence.

Raising the BIM tide

SANS 19650 in a nutshell

> Define agreed information objectives (owner, operator, employer)

> Integrate the information objectives into the planning and procurement stages

> Plan and execute the project and create the digital deliverables and construct the physical assets simultaneously

> Commission and handover BOTH the physical and the virtual assets.

SANS 19650 is all about information

Lifecycle Optimisation

The Asset Cycle

…and development of information

Facilities Management

Planning

Occupation and
Operations

Conceptual
Design

Commissioning

Design and
Engineering

Construction

Procurement

Raising
the BIM
tide

Lifecycle Optimisation

Owner, Consultants

Facilities Management

FM Contractor

CAPEX stage to OPEX Stage

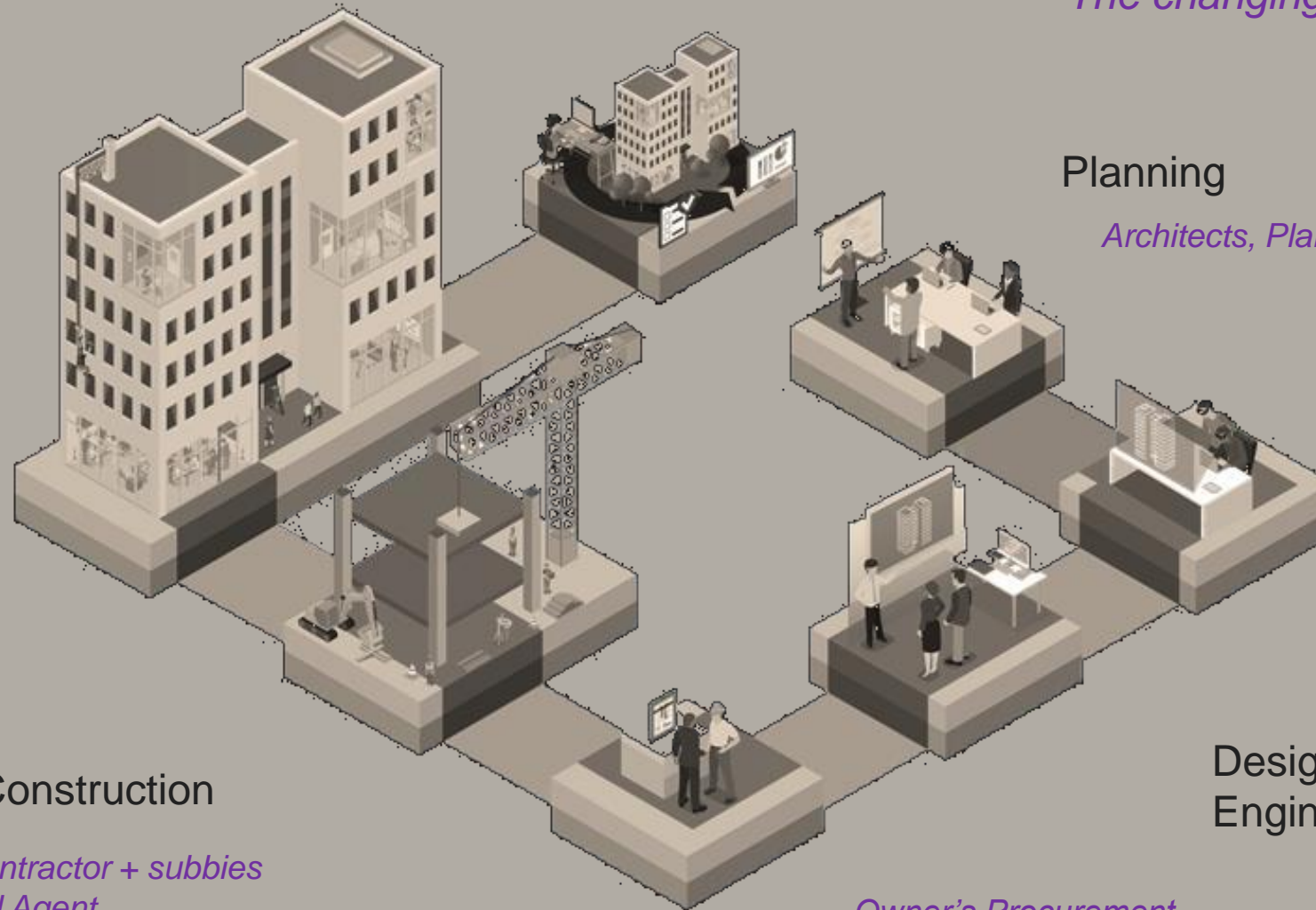*The changing players*

Occupation and Operations

Owner, Operator Tenants

Planning

Architects, Planners

Conceptual Design

Architects, Engineers

TRANSITION

Commissioning

Main Contractor + subbies
Principal Agent
Engineering Consultant

Construction

Main Contractor + subbies
Principal Agent
Engineering Consultant

Procurement

Owner's Procurement Professional Team

Design and Engineering

Architects, Engineers

Image adapted from www.tekla.com

Raising the BIM tide

Facilities Management

FM receives unfamiliar documentation
FM takes over unfamiliar facility
Operations commence
Staff Training, operational readiness

Asset Management

Portfolio Management
Data driven decisions
Management of changes
[where is the info?]
Expansion, modification,
Repurpose, demolish

Lifecycle Optimisation

Maintain Green Star Ratings
Meet Regulatory requirements
Deliver Financial benefit

Occupation &
Commence Operations

TRANSITION

Hand-over Documentation

How can we bridge this gap?

As-Built drawings
2D Layouts
Survey data
Taking over certificates
P&ID of Plant and equipment
OEM Manuals & Warrantees

Supervise, witness, accept

Shop Drawings vs Design intent
Required changes, queries, amendments
Final equipment, material and finishes selection
Detailed installation by trades,
Utilities buried, covered by landscaping and paved areas
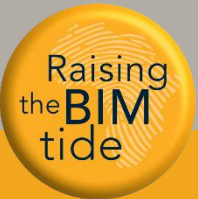Services covered by cladding and ceilings

Commissioning

Construction

Raising
the BIM
tide

B I M
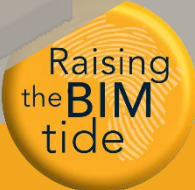
Better   Information   Management

According to SANS 19650

Raising
the BIM
tide

Not just a tech issue, its actually about people and teamwork

Key
Stakeholders

Corporate
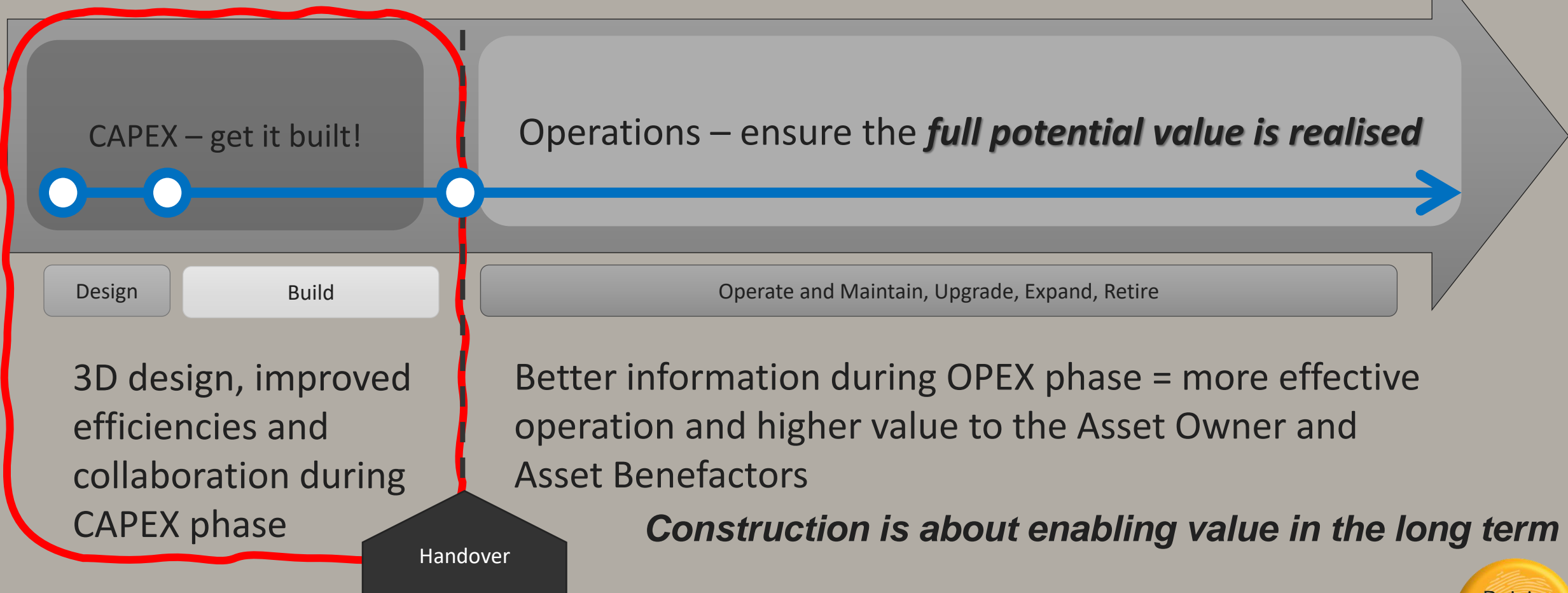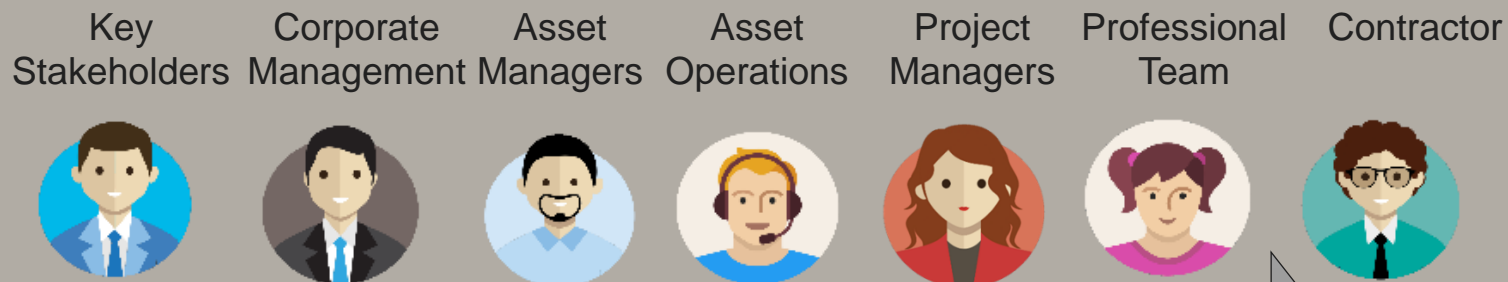Management

Asset
Managers

Asset
Operations

Project
Managers

Professional
Team

Contractor

Raising
the**BIM**
tide

What is Construction about?

Key Stakeholders · Corporate Management · Asset Managers · Asset Operations · Project Managers · Professional Team · Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design · Build

Operate and Maintain, Upgrade, Expand, Retire

Handover

3D design, improved efficiencies and collaboration during CAPEX phase

Better information during OPEX phase = more effective operation and higher value to the Asset Owner and Asset Benefactors

Construction is about enabling value in the long term

Raising the BIM tide

How does the SANS 19650 impact the way we deliver projects?

Key Stakeholders · Corporate Management · Asset Managers · Asset Operations · Project Managers · Professional Team · Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design	Build

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Raising the BIM tide

Key Stakeholders   Corporate Management   Project Managers   Professional Team   Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design   Build

Operate and Maintain, Upgrade, Expand, Retire

3D design, improved efficiencies and collaboration during CAPEX phase

Better information during OPEX phase = more effective operation and higher value to the Asset Owner and Asset Benefactors…

Really?

Handover

Asset Managers   Asset Operations

Raising the BIM tide

Key Stakeholders

Corporate Management

Professional Team

Contractor

Project Managers

Define the Organisational Information Requirements

Project Information Requirements

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Define Asset Information Requirements

Design

Build

Handover

Operate and Maintain, Upgrade, Expand, Retire

Asset Managers

Asset Operations

Incorporate lessons learned and knowledge gained from operations

AIM

Raising the BIM tide

Key Stakeholders   Corporate Management

Project Information Requirements   CDE

Project Managers   Professional Team   Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design   Build
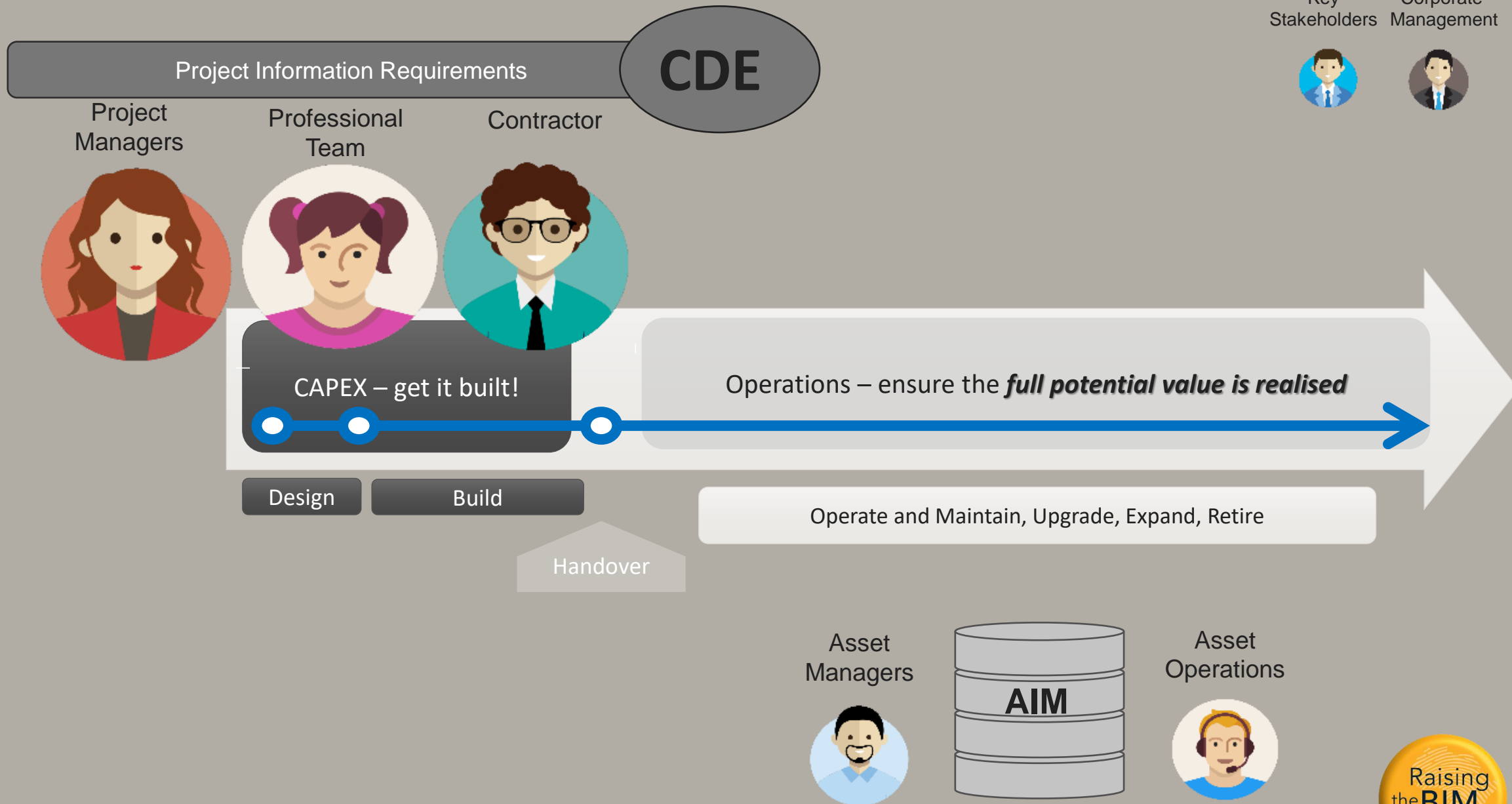
Handover

Operate and Maintain, Upgrade, Expand, Retire
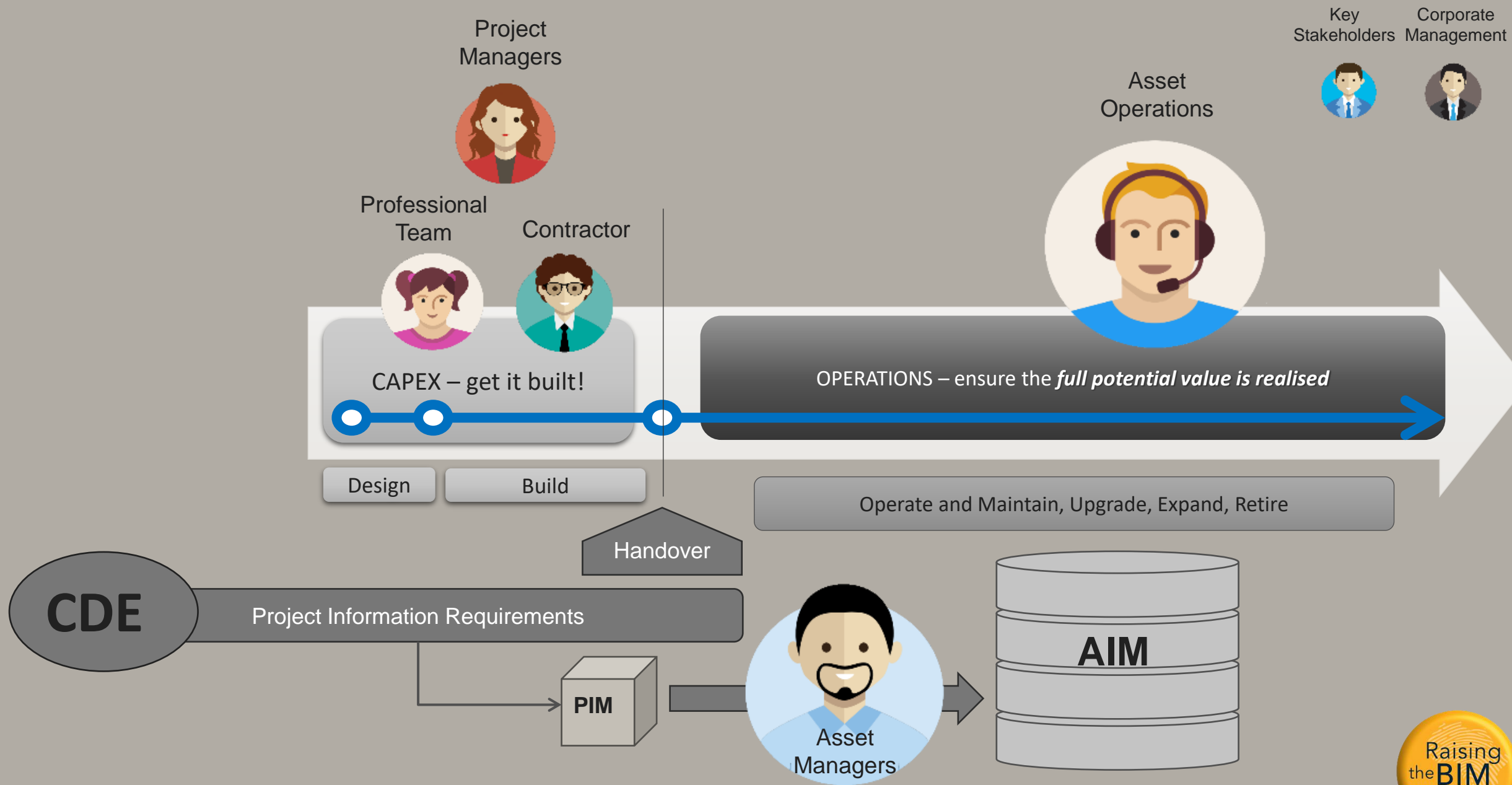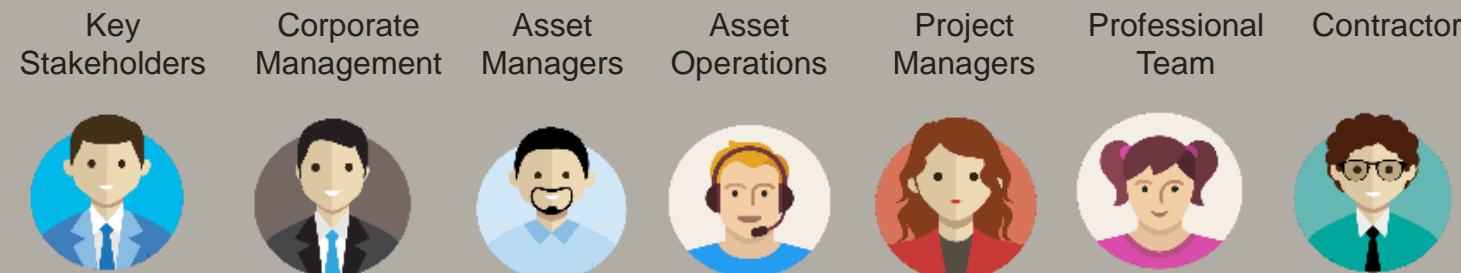
Asset Managers   AIM   Asset Operations

Raising the BIM tide

You need collaborative teams, following collaborative processes

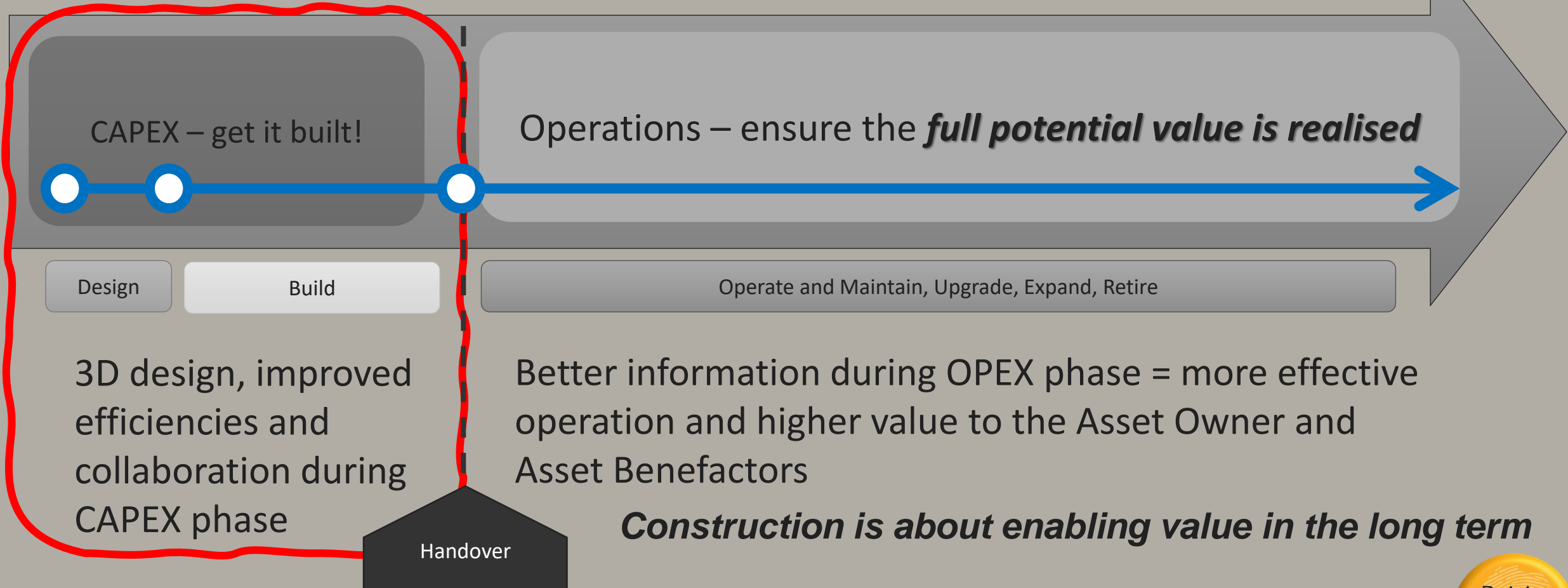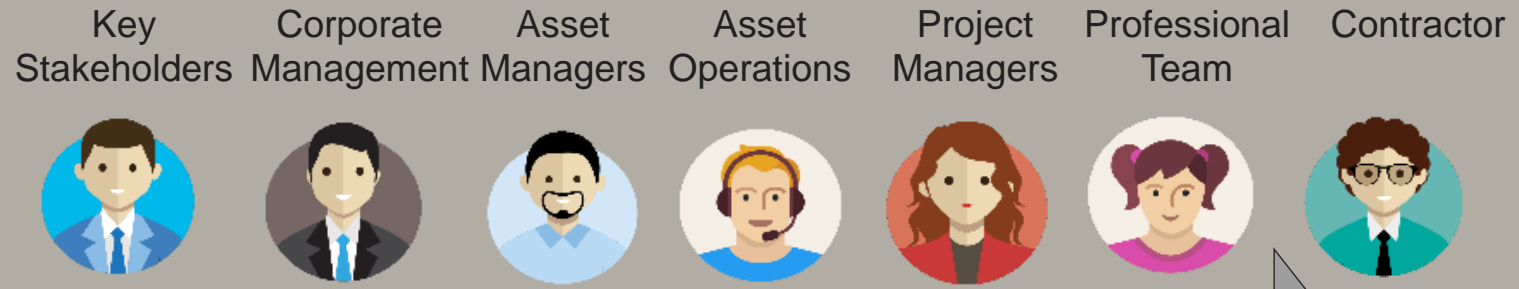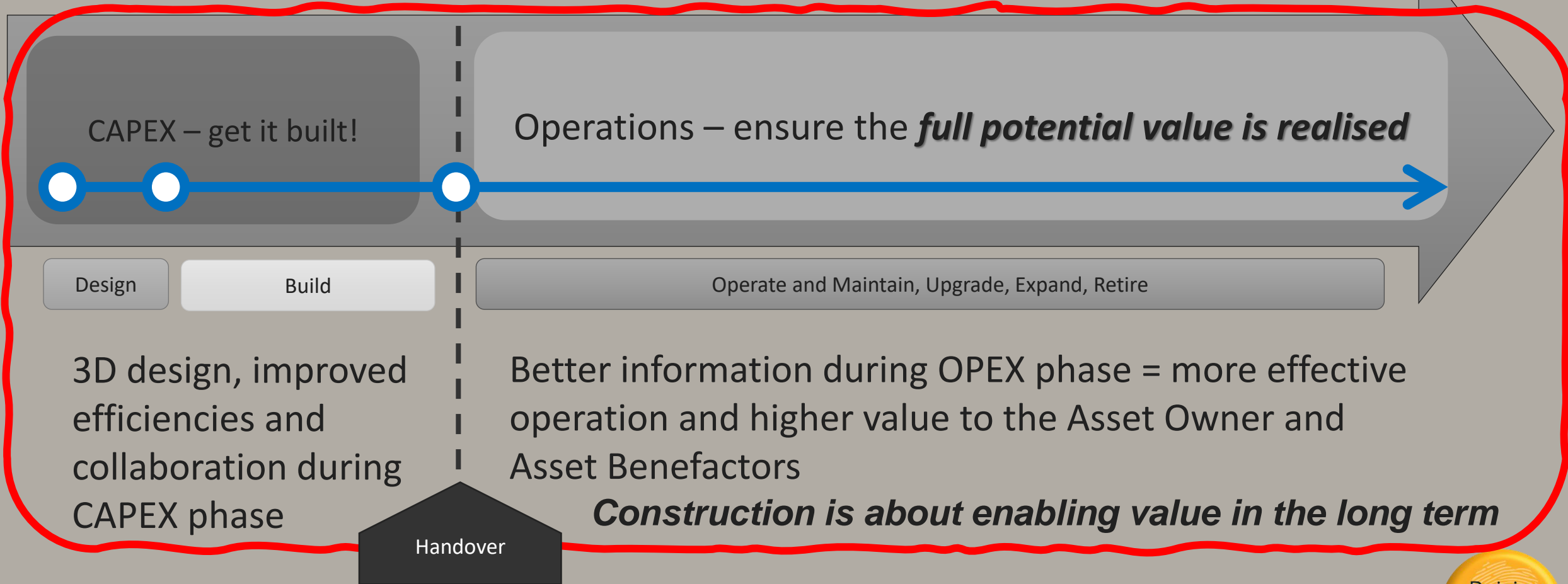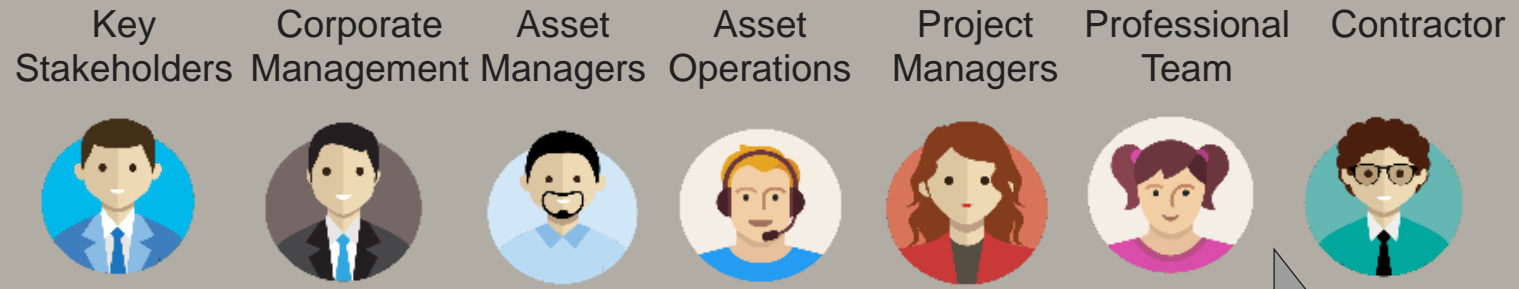|	Key Stakeholders	Corporate Management	Asset Managers	Asset Operations	Project Managers	Professional Team	Contractor
Assessment and Need → OIR, AIR, AIM definition This is where you must define your information requirements, BEFORE the project is procured	●	●	●	●			
Project Initiation → PIR definition → PIM Spec Establish a common understanding of what, why, how, when and who will create information during the project			●	●	●		
Procurement Employer requirements (PIR and EIR) → Issue Tender. Parties respond, Client evaluates and appoints.			●	●	●	●	●
Project Execution Design, construct and install the required assets, *while producing the Project Information Model (PIM)*				○	●	●	●
Handover and Acceptance of the PIM Review and approve, (or reject and return) the PIM in line with the PIM Spec, in parallel with the physical commissioning			●		●	●	●
Integrate PIM into the AIM The PIM is incorporated into the AIM, updating / replacing / supplementing the data, enabling improved operations			●	●			

CDE

the BIM tide

That's how BIM delivers better value

Key Stakeholders • Corporate Management • Asset Managers • Asset Operations • Project Managers • Professional Team • Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design | Build

Operate and Maintain, Upgrade, Expand, Retire

Handover

3D design, improved efficiencies and collaboration during CAPEX phase

Better information during OPEX phase = more effective operation and higher value to the Asset Owner and Asset Benefactors

Construction is about enabling value in the long term

Raising the BIM tide

That's how BIM delivers better value

Key Stakeholders Corporate Management Asset Managers Asset Operations Project Managers Professional Team Contractor

CAPEX – get it built!

Operations – ensure the *full potential value is realised*

Design   Build

Operate and Maintain, Upgrade, Expand, Retire

Handover

3D design, improved efficiencies and collaboration during CAPEX phase

Better information during OPEX phase = more effective operation and higher value to the Asset Owner and Asset Benefactors

Construction is about enabling value in the long term

Raising the BIM tide

Imagine if…

- Information was created with operations in mind.

- Asset Owners had all the information about their assets, from the start of operations.

- Good quality information was available to implement AI for business improvement.

- Decisions were based on good data and insights, rather than "Gut Feel".

- Projects delivered good information consistently as a matter of course.
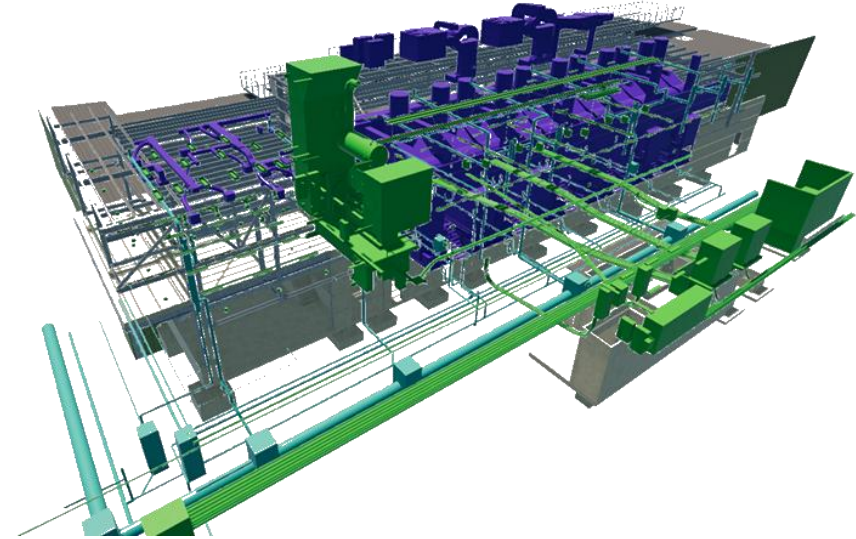
OEM Operators Manual

3D Component view and parts list

Configuration and Installation Record

Commissioning record and Warrantees

Trouble Shooting Guide

Keyplan of installations

Maintenance Schedule

Remember:

Digital Transformation is a collaborative journey.

Let us partner to learn, share and develop new skills, processes and practices.

None of us have all the answers, so lets co-create our digital future together.

Image Generated by OpenAI