

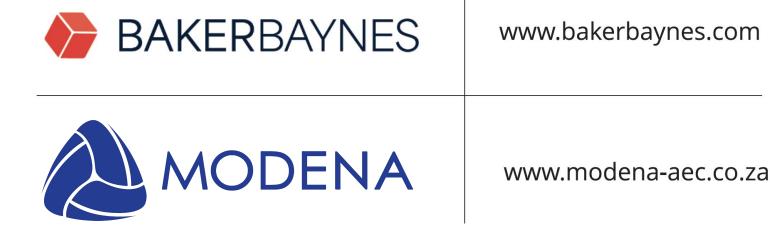
28 July 2023 Welcome to **The Future of Work** Building Information Modelling



General Arrangements

Headline Sponsors

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Supporting Sponsors

BIM COMM

UNITY

AFRICA

AGILE Business Technology









TotalCAD SOLUTION CENTRE G GRAPHISOFT I DISTRIBUTOR











BIMHarambee 2023
Youtube Live Stream



BIM

. Africa

Harambee

POPIA

THIS SESSION IS BEING RECORDED

General Arrangements

Coffee and refreshments (cash)

- Artisans coffee stand outside Lecture Room 3-3
- Vida-E Cafe in the basement/courtyard
- **5 minute walk** to Artisan and Pure Cafe restaurants on campus ask Boukunde students for directions!

Restrooms

• **Unisex restrooms** @ opposite side of lecture rooms next to architecture studios, on every floor

Emergency Exit

• **Ground** and **Basement** @ north, east and west of building.









Program & Activities

Department of Architecture, University of Pretoria Campus | 27, 28 July 2023

Friday 28 July - My BIM Journey

AECO Student + Young Professional Session



Matthew Marshall

SAPOA PropTech Committee

Machiel Odendaal

Technology Manager, Modena AEC and Infrastructure

Richard Matchett

Digital Lead, Zutari

Richard Matchett Rudd van Deventer

Director, Spaceworx

Shameemah Davids

Digital Lead - Europe, AECOM



SAPOA PropTech in South Africa

The future of the SA property market through technology: how the real estate sector is engaging technology to bring the built environment into a digital age and delivering a range of positive outcomes for stakeholders.

09:15 What is BIM? No, really?

BIM workflows, core concepts and definitions

09:30 Boukunde Live-BIM

Outcomes from the live scan-to-BIM of Boukunde and connecting to how BIM is the future of building.

15 mins comfort break

10:30 State of the South African Digital Built Environment

Before we "smart city," we need to BIM. Current environment and possibilities BIM Mandate and ISO 19650 (with National Annex)

11:00 What opportunities are there for BIM Professionals?

How do I start my BIM journey as a young professional?

11:30 Q & A with industry professionals



09:00

2023 BIM | The Future of Work | 27, 28 July 2023

BIMHarambee 2023 Survey



POPIA

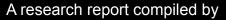
THIS SESSION IS BEING RECORDED



Educator Session South African Property Association

MATTHEW MARSHALL SA

SAPOA PropTech COMMITTEE



REdimension





SAPOA SOUTH AFICAN PROPERTY OWNERS ASSOCIATION

Proptech: shaping the future of the South African property market through technology

How the real estate sector is engaging technology to bring the built environment into a digital age and delivering a range of positive outcomes for stakeholders

SAREIT

In accordation with:

A research report compiled by: REdimension

CAPITAL

Proptech

Shaping the future of the South African property market through technology

In association with







AFRICA PR * PTECH FORUM



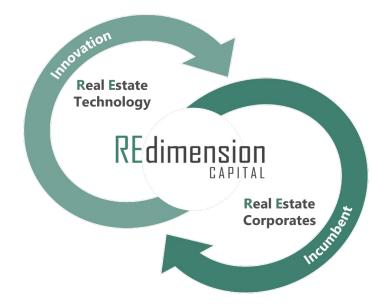
An investment manager targeting investment into innovative technologies that have the power to improve the way properties are experienced, managed and developed

We are strategically aligned with forward-thinking investment partners, creating an ecosystem of mutual value, accelerating technology adoption and driving sustainable outcomes

BIM

Africa

Harambee



REdimension Capital is a licensed financial services provider in terms of the FAIS Act (No: 52205)



SAPOA Proptech Sub-committee

Goal 1

Use technology to drive increased industry profitability; improve industry customer experiences; and reduce risk

Goal 2

Establish the South African real estate industry as one the top five most progressive and innovative in the world

Goal 3

To educate, inform and support SAPOA members in order to make better tech-related decisions and be inspired and excited about the opportunities and solutions presented by technology

Established with the support from a range of industry bodies in order to provide a cohesive proptech voice in working towards its stated goals







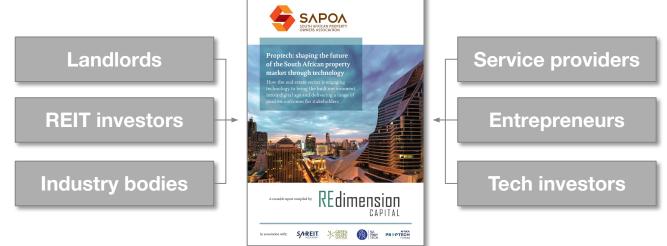
REdimension

CAPITAL

A comprehensive overview of the proptech market in South Africa







The report encompasses two years of research and engagement across a broad range of stakeholders to the South African proptech landscape





Report structure



Property Technology Landscape and Impact on The Built Environment

Funding and Transactional Activity

The South African Proptech Landscape

SAPOA Proptech Committee

The State of Technology Adoption in The SA Real Estate Market

Executive Interviews



REdimension

[1map

Data analytics

AI & digital innovation

agama

nuru

Management software

XPELLO Cattorney realtor hub estoteard

Fåtti

for

Future retail

osensor

CAPITAL

South African proptech landscape



SAPO/





The state of technology adoption in the SA real estate market



A survey conducted in late 2022, instituted by the SAPOA Proptech Committee

94% of respondents expecting technology to have at least a mild impact74% anticipate the impact to be more significant

83%

respondents said that up to 60% of their process were still manual

39%

respondents which believe it optimal to have an in-house approach to developing technologies

48%

respondents did not have, or were not aware of, a specific technology / innovation strategy

"As a highly fragmented market, it was not surprising to see respondents indicating that their biggest challenge with the proptech sector is education on the market and lack of in-house skill to support implementation."





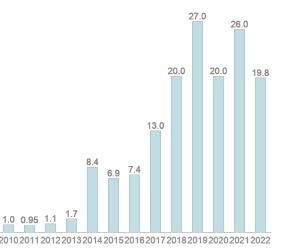
The state of technology adoption

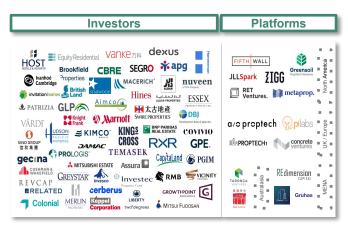


in the SA real estate market

Global funding into real estate technology

Select dedicated proptech funds and their investors





Increasing transactional activity within the South African sector including new funding rounds and founder exits





Dedicated industry bodies





PR PTECH









Executive contributors









Proptech: shaping the future of the South African property market through technology

How the real estate sector is engaging technology to bring the built environment into a digital age and delivering a range of positive outcomes for stakeholders





www.sapoa.org.za/proptech-report/



Thank you

REdimension



Student & Young Professional What is BIM?

MACHIEL ODENDAAL

MODENA AEC & INFRASTRUCTURE

vaal No, really?

A short history of BIM

- Charles "Chuck" Eastman (Father of BIM)
- Initiated the concept of 3D with Information
 - Improved Communication & Collaboration
 - Increase Accuracy and Efficiency in the design & Construction processes.
 - Reduced costs and improved quality of buildings





So, What the is BIM?

It's not just Buildings

 Most common ideas are that BIM is focused on Buildings because it stands for "Building" Information Models – let's rephrase it for anything that will be 'built' meaning 'building' an information model.

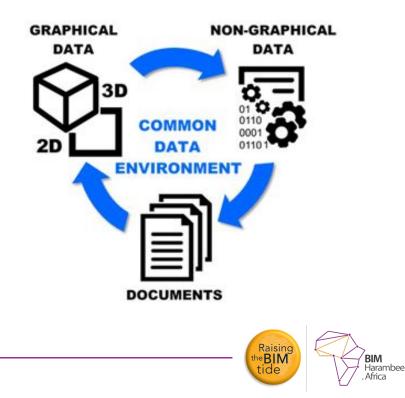
BIM refers to all built assets

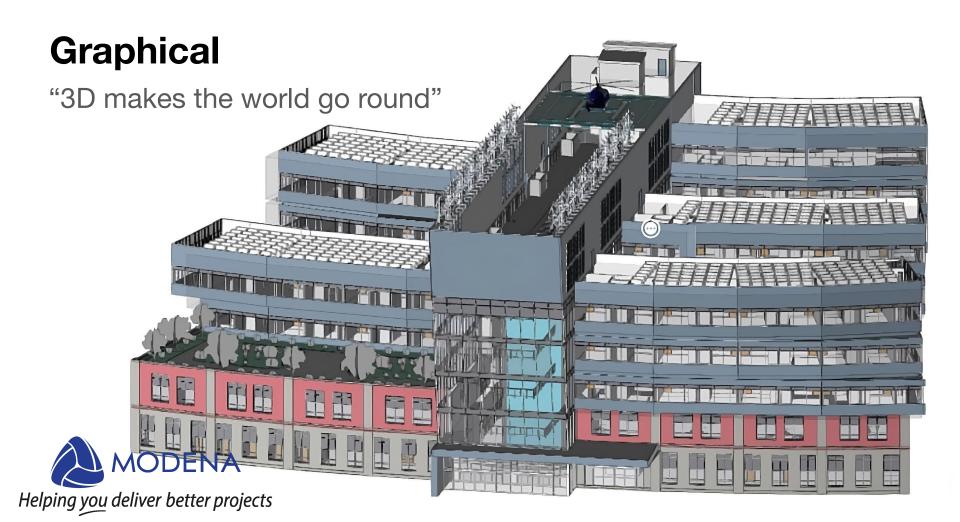
Photo by Scott Blake on Unsplash

It's more than models

- There is more than Digital Models
- The SANS 19650 (ISO) talks about:
 - O Graphical (3D)
 - O Non-Graphical (Meta-data)
 - O Documents







non-Graphical

"More relevant data, more relevant uses"

77



Turbine [892512]		2]
_=	 Constraints 	
1	Work Plane	
A - Ja	Schedule Level	Level 6
	Offset from H	0.0 mm
	Default Elevat	1219.2 mm
	 Dimensions 	
	Mass Floors	
E	Gross Volume	11 m ³
	Gross Floor Ar	0.0 m ²
	Gross Surface	13.8 m ²
	 Phasing 	
	Phase Created	Phase 1
	Phase Demoli	None
	Installation P	
	Warranty Dura	0
	▼ Text	

Documents

"Complementing the dataset"

- Supplementing Graphical & non-Graphical info.
- Providing additional context to what's needed.



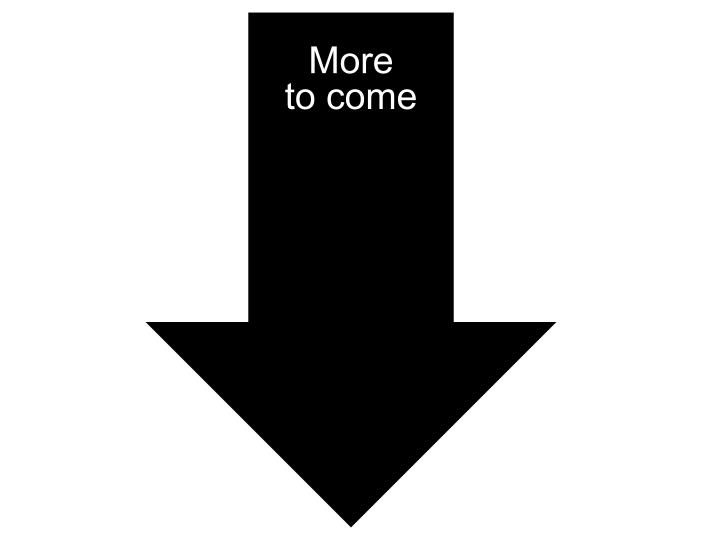


BIM Forms the Base

Benefits of running BIM projects

- Graphical & non-Graphical models can be used in other areas of construction.
- Some use cases are:
 - O Visualizations (Renderings, VR, AR, etc.)
 - O Simulation (Program planning or Costing with a Model)
 - O Analysis (Sustainability, Loads, etc.)
 - O Maintenance (Asset Tracking, Facility Management, etc.)









BIM Workflows Boukunde BIM Outcomes from Thursday

BIMCommunityAfrica + RICHARD MATCHETT, ZUTARI

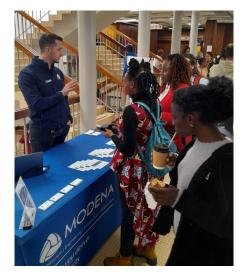


CONGRATULATIONS









- Thank you to all the students who participated in our scavenger hunt
- You will receive more information regarding how to access your free training in the next 10 days
- Winners of one of the 50 power banks have been notified by email





The State of the South African Digital Built Environment **Current environment** and possibilities

RICHARD MATCHETT DIGITAL LEAD ZUTARI

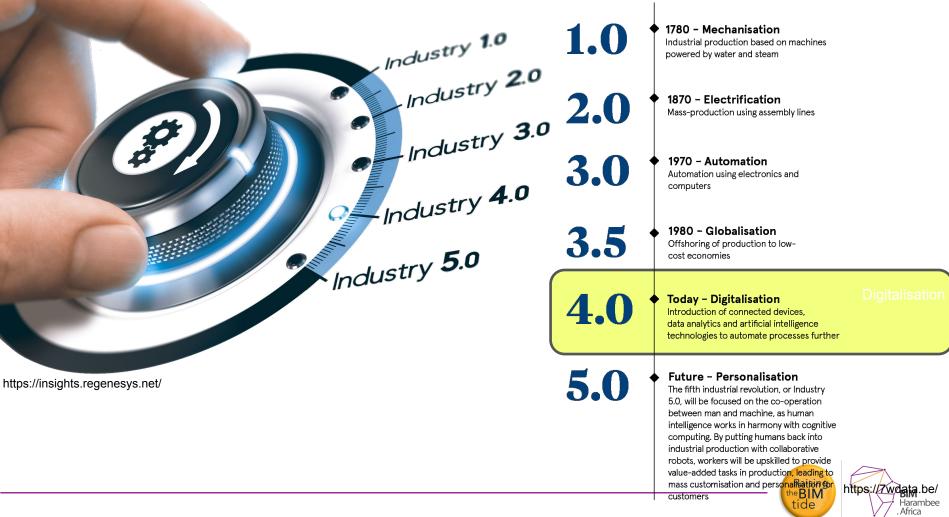


How does the emergence of BIM and Digital Project Delivery influence the Future of Work?

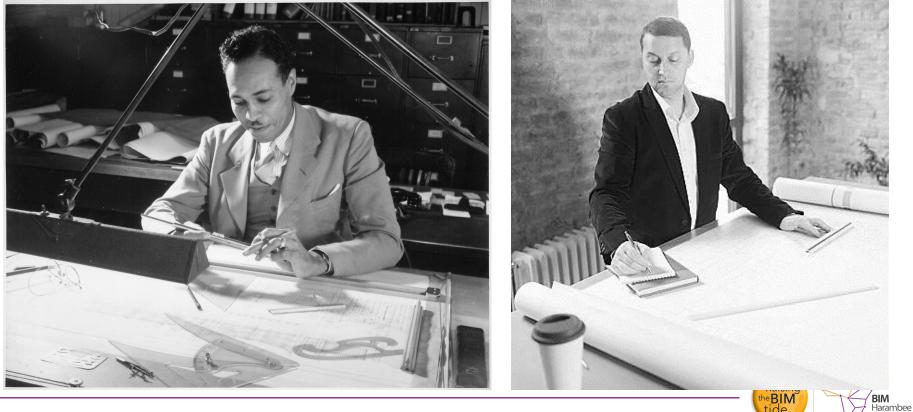
** in the AECO space

"CLEARLY, THE THING THAT'S TRANSFORMING IS NOT THE TECHNOLOGY — IT'S THE TECHNOLOGY THAT IS TRANSFORMING YOU."

- JEANNE W. ROSS OF MIT SLOAN'S CENTER FOR INFORMATION SYSTEMS RESEARCH -



Pre-1990's – Math, science and drawings





Africa

1990's - 2008'ish... 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*





Now – where industry is moving: Digital Project Delivery

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

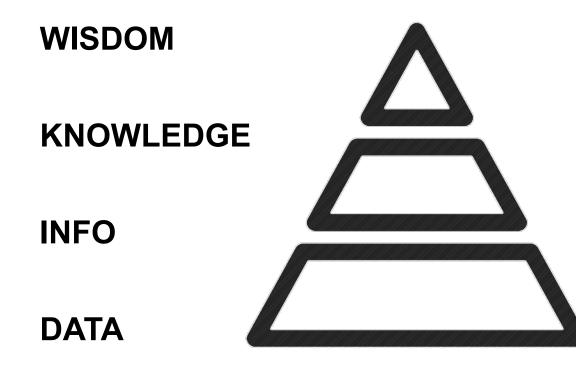
Beyond drawings, into the future of data driven operations

Euture of Work: Euture of Work: Our tools are digital, Our touts are digital. our outputs are digital. the processes are



BIM Harambee

Africa



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





Derive & Attain

KNOWLEDGE

Interpre t

INFO

Process / synthesise

DATA Colle ct

Optimise performance

What information do we need for decisions? How can I optimise my operations? What if...? How could we...? Provide Value

What do you know? How do you collaborate? Sharing ideas, collaborating, avoidance of doubt. How is your facility performing?

Create information

Analyze the data, create meaning, produce new information, design. What facility assets do you have? What does it consist of? What condition is it?

Measure the physical world

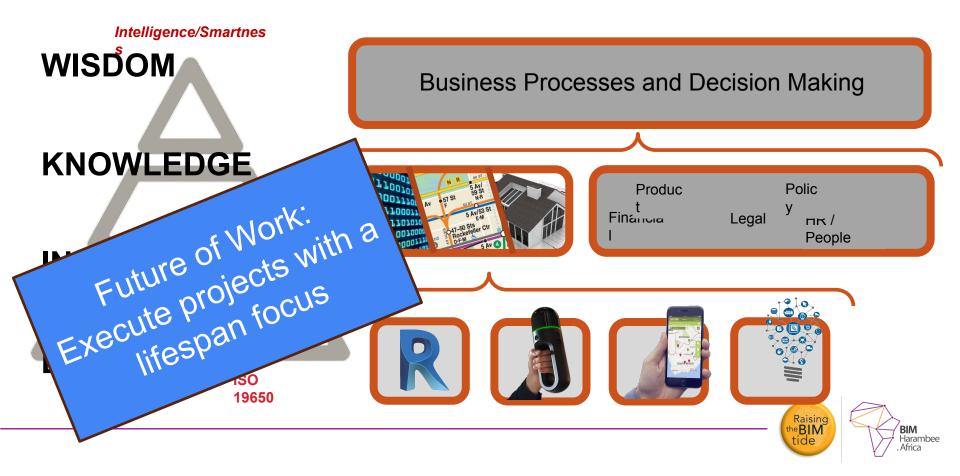
What is



BIM

Harambee Africa

The Value of Digital Engineering for Operations



What is a "Smart City"?

. . .

- IBM defines a smart city as "one that makes optimal use of all the interconnected information available today to *better understand and control its operations* and *optimise the use of limited resources.*"
 - Governance visibility, transparency of processes
 - Service delivery metrics of delivery, condition of facilities
 - Performance utilities (water, power, telecoms, waste, sewer, drainage)
 - Mobility traffic management, public transport, parking management
 - Assets location, condition, age, types
 - Where are the assets? (not 100% sure...)

Where is the information about the assets?

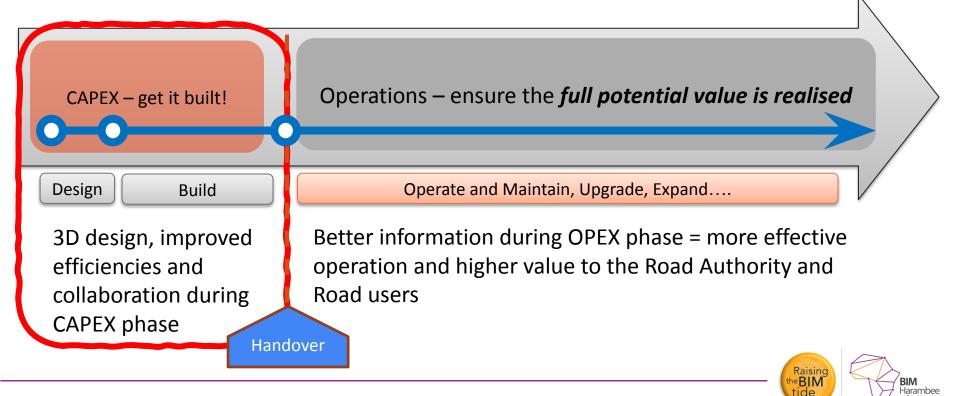
– ("missing" or outdated)



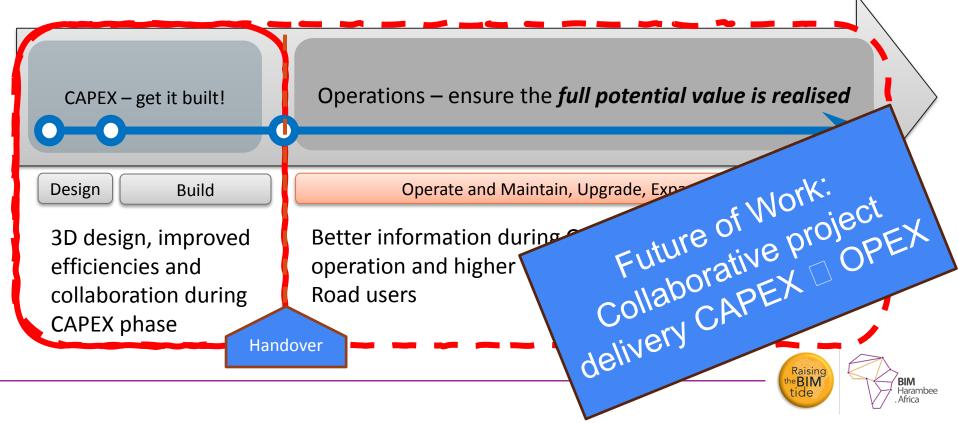


Here's the gap

An asset's lifecycle goes far beyond design and construction



An asset's lifecycle goes far beyond design and construction

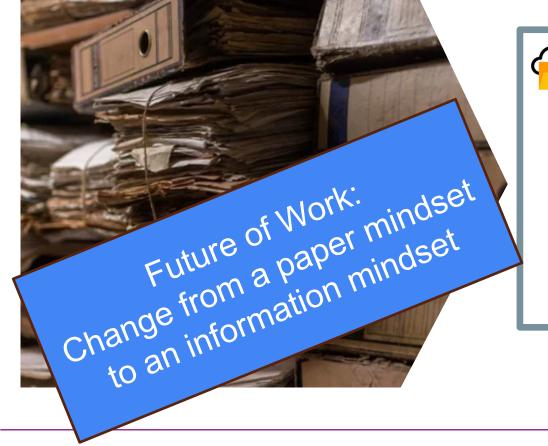


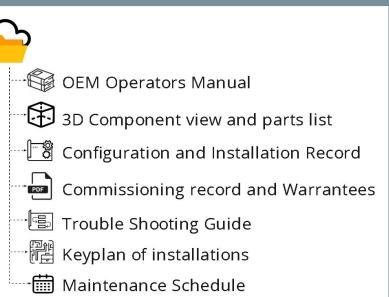


The familiar reality









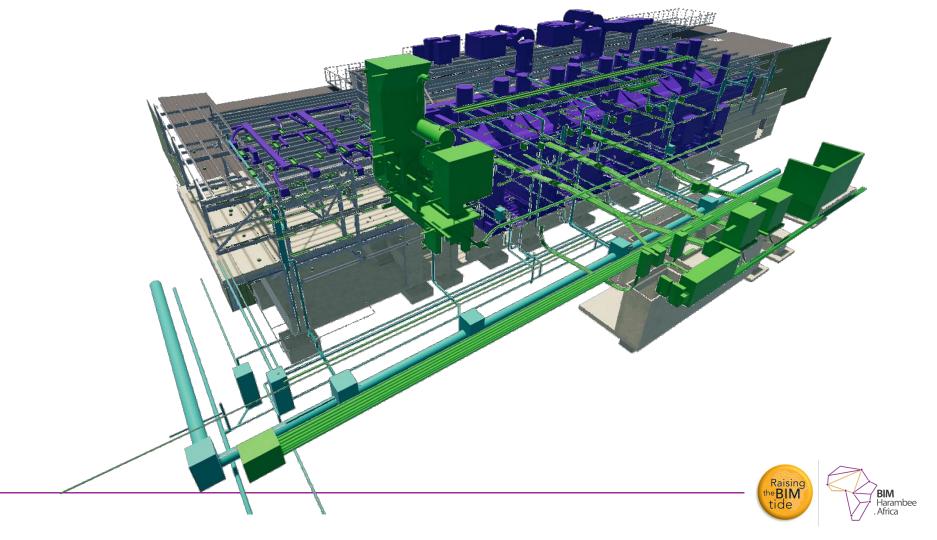


Design Approach

Better Information Management







Category Name = Mechanical Equipment

Family Name = Aur_A_AHU_Packaged Ventilator Type 2

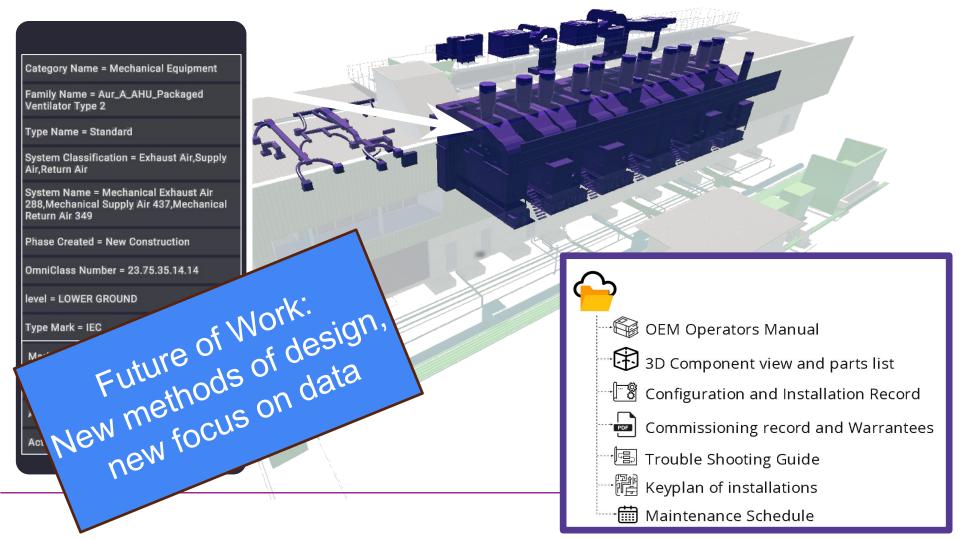
Type Name = Standard

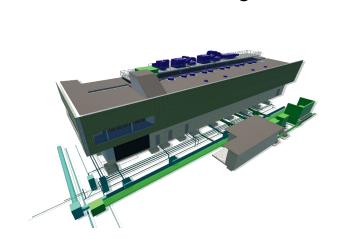
System Classification = Exhaust Air, Supply Air.Return Air

System Name = Mechanical Exhaust Air 288, Mechanical Supply Air 437, Mechanical Return Air 349

Phase Created = New Construction

OmniClass Number = 23.75.35.14.14





3D Modeling

VS

BIM

Key Characteristics



Link Static Documentation 3D BIM and Metadata to Model



Link the project schedule 4D BIM

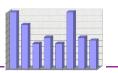


Link the cost estimate and 5D BIM cashflow

3D design collaboration Clash management Interdisciplinary coordination



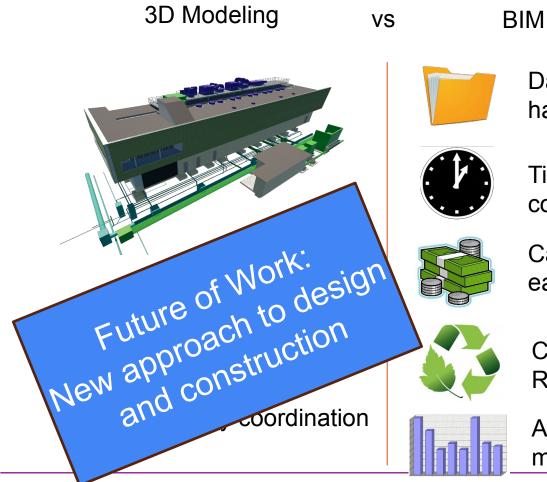
Link sustainability data and ratings



Link performance data



6D BIM



Key Benefits

Data enriched model, handover docs

construction, coordination

Time simulations of

3D BIM

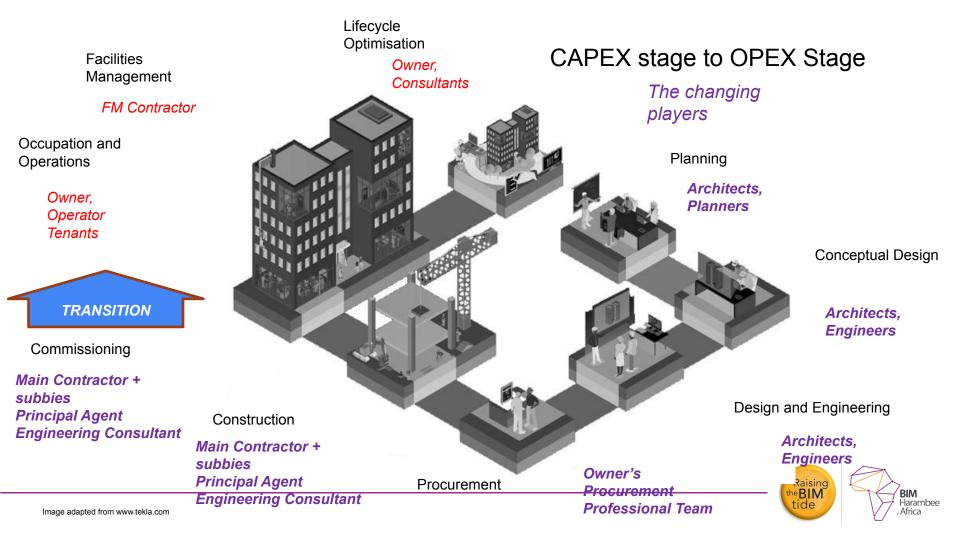
Cashflow visualisation, earned value demonstration 4D BIM

5D BIM

Calculation of Green Star 6D BIM Ratings

Asset performance management





Facilities Management

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



Hand-over **Documentation**

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

Commissionin

Expansion, modification, Repurpose, demolish **Standardise** Specify

info?]

Asset Management

Portfolio Management Data driven decisions

Management of changes

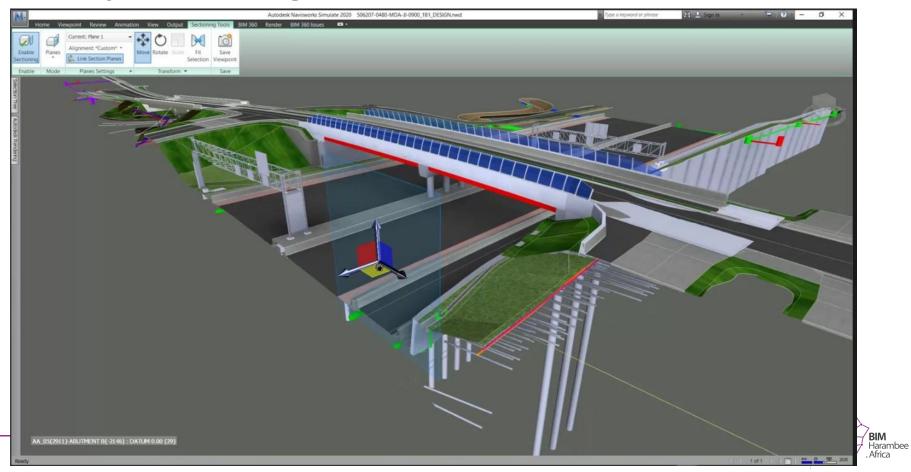
[where is the

Lifecycle Optimisation

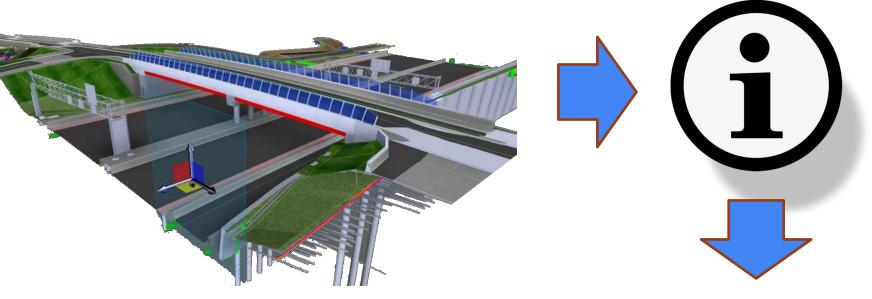
Green Star Ratings **Regulatory requirements** Financial benefit of optimisation

s Design intent changes, queries, ame changes, queries, ame change equipment, material and finis Detailed installation by trades, Utilities buried, covered by landscap s covered by cladding for the state of the st

Not just buildings!!!

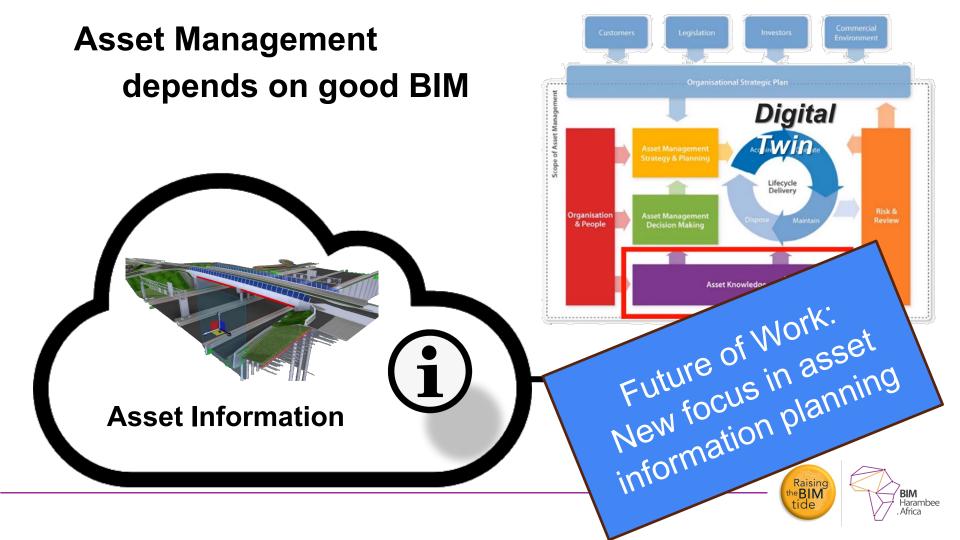


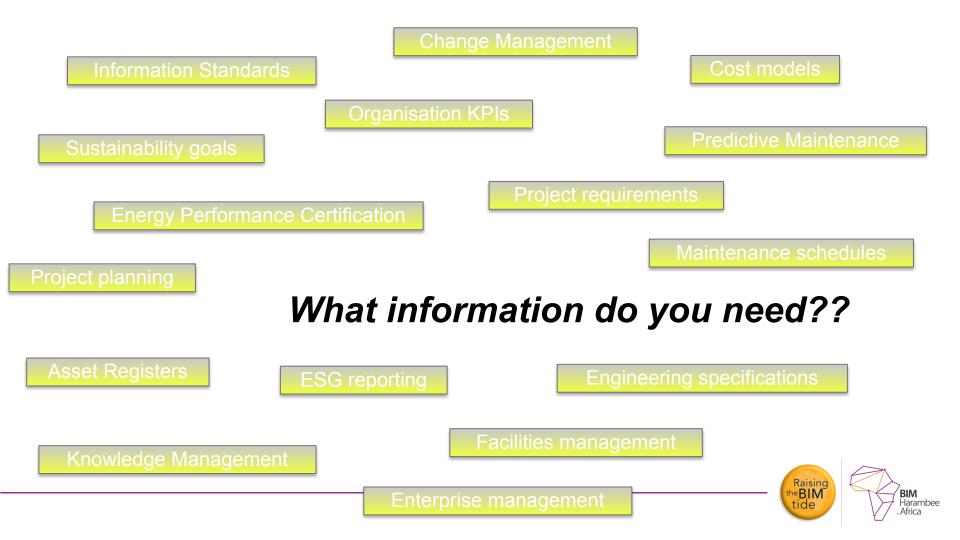
All design info is potential asset info



Asset Information







ISO 19650 in a nutshell

ISO19650 - Standard and Guidance Digital / BIM information management



Based on the BS1192 series

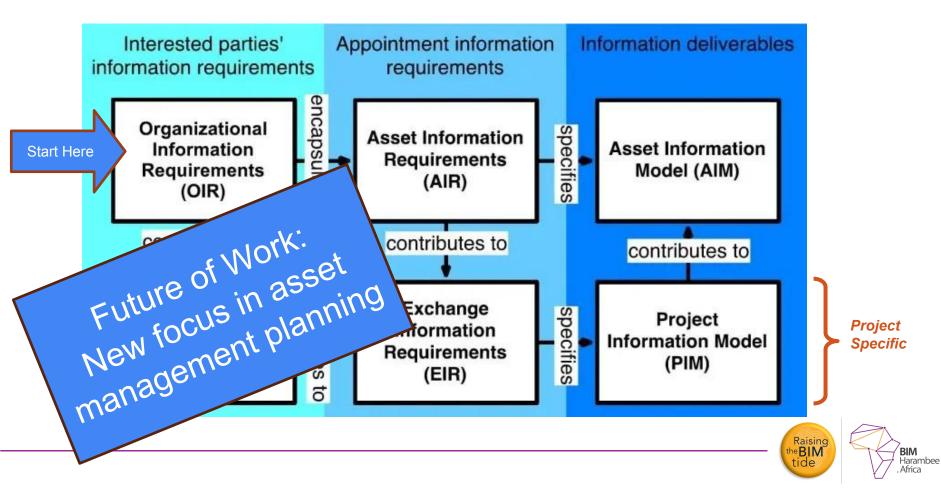
- Define agreed information objectives (owner, operator, employer)
- Integrate the information objectives into the planning and procurement stages
 - Plan and execute the project and create the digital deliverables and construct the physical assets simultaneously



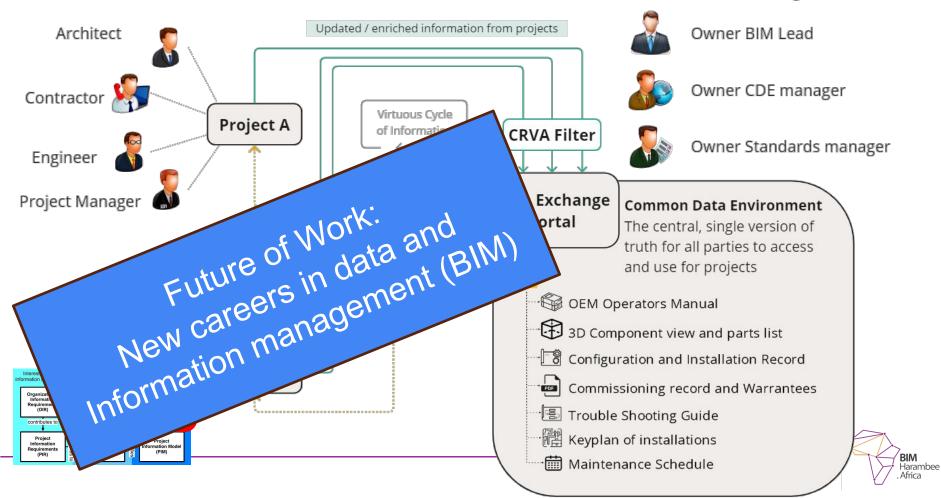
Commission and handover BOTH the physical and the virtual assets.

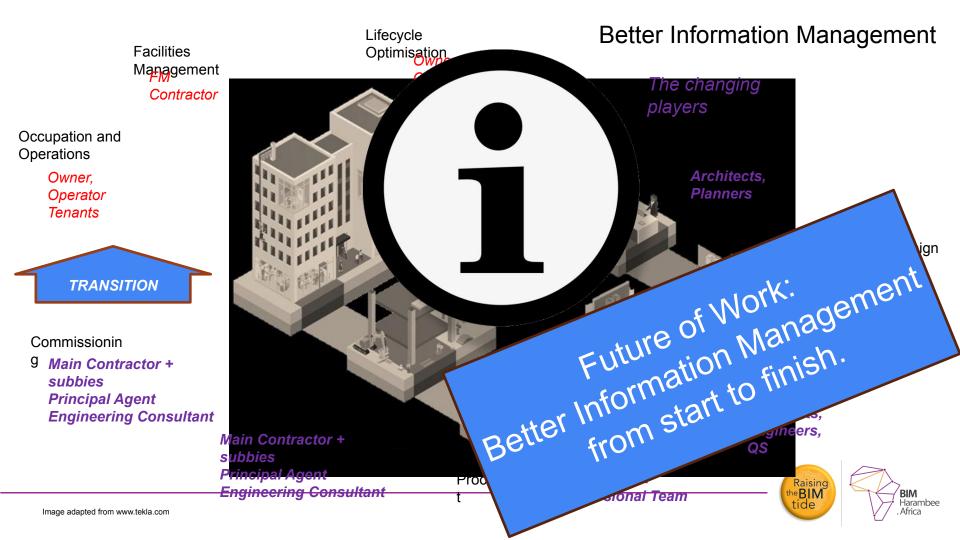


A structured approach to defining Information Requirements



Asset Information Management

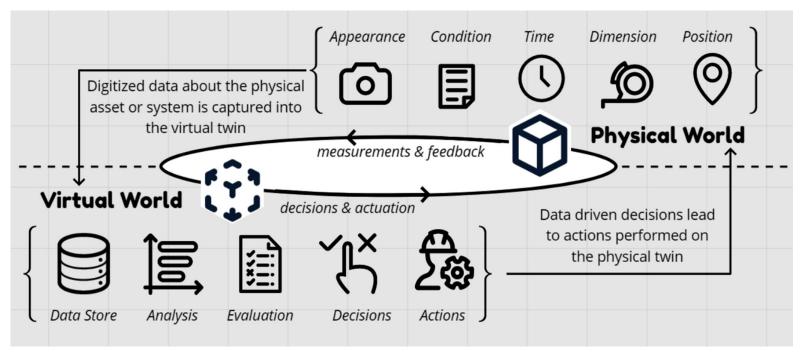




What is a "Digital Twin"?

. . . .

- A cyber-physical system
- A decision support simulation
- A autonomous, self governing asset





How would Digital Twins generate direct value to Real Estate, Infrastructure, Asset, Operations + Business Management



Human — Service Request

- Water main break
- Signal malfunction
- Pothole or Graffiti
- Street light out
- Machine broken
- HVAC broken



Human — Inspections

- Asset identified
- Asset attributes reviewed
- Prior work reviewed
- Schedule and issue crews
- Dispatch



Human — Work Orders

- Fix the thing
- Record information, dates, supervisor, work performed,
- Manage resource utilization, labor, material, equipment



Human — Reports

- Cumulative reports: where, when, how much?
- Lifecycle: where and when can we expect this to happen again or in the future?
- Planning: follow-up inspections and related works
- Archive reports to find histories



Dept Architecture, EBIT, University of Pretoria



How would Digital Twins generate direct value to Real Estate, Infrastructure, Asset, Operations + Business Management

Predict —> React —> Prevent —> Review —> Revisit



Data-Driven — Service Requests

- Add sensors + smart instruments vs human observations
- relatively cheap & retrofitting easy
- Monitor in real time vs after-the-fact
- allows for instant knowledge as opposed to late learning



Data-Driven — Inspections

- Accurate locations already known
- Reduce surveyance time, effort and costs
- Learn before dispatching
- Know what/who to take with
- No double trips, errors, rework
- Instant updates to the system



Human — Work Order

- Fix the thing
- Record live information, dates, supervisor, work performed,
- Manage live resource utilization, labor, material, equipment
- Instant updates to the system

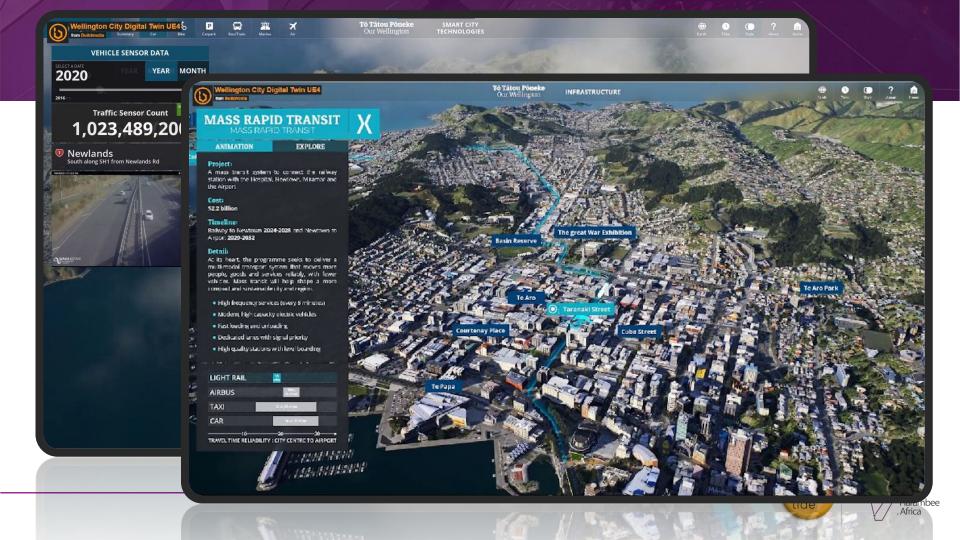


Data-Driven — Reports

- No human effort required.
- Instant reporting and histories

Dept Architecture, EBIT, University of Pretoria







Math, Science and Design are not essentially different

but...

The "why" and the "way" we deliver projects, is.



The State of the South African **Digital Built Environment BIM Mandate & ISO 19650** (with National Annex)

RUDD VAN DEVENTER DIRECTOR SPACEWORX

Why is SANS/ISO 19650 so important?

• Think of SANS/ISO 19650 as a process and methodology for executing a BIM project

 The Methodology has a direct impact on practice and what is done in professionals offices when preparing and sharing documentation

ISO 19650-1 Concepts

ISO 19650-2 Delivery phase

- The Documentation needs to be structured and formatted to enable easy exchange between Parties
- The Parties need terms of reference to manage the exchange of information
- The Information needs to be categorised in the same way across different disciplines and locations
- On Site the contractor needs accurate, up to date construction information that he can use or issue to his subcontractors
- On completion of the Project the client/employer needs accurate information on his new assets, equipment and their maintenance requirement

ISO 19650-3 Operational Phase



Where are we with SANS/ISO 19650 adoption?

- The Facilities Management Community took the lead and sponsored the adoption of ISO 19650 through SABS Technical Committee 267, Facilities Management.
- SANS 19650-1 was gazetted on the 16th of September 2022. This covers the **Concepts and Principles** of **Building Information Management**
- SANS 19650-2 was gazetted on the 5th June 2023. This covers using Building Information Management in the **Delivery Phase** of the assets.
- The public comment period for SANS 19650-3 closed on the 25th of May 2023. This covers the **Operational Phase** of the assets.
- Adoption of the rest of the suite of ISO 19650 Standard will be taken on once the three principal sections are bedded down



Where does the National Annex fit in?

- The international ISO 19650 standards do not exist in a vacuum
- It was accepted by the ISO that every country needs to fit the standard to their own needs and requirements, while implementing conventional practice in the industry
- Each country has their own terminology, methodologies and contracts that they use and are familiar with
- The National Annex is this collection of these local conventions and is part of SANS/ISO 19650-2 *Building Information Management in the Delivery Phase of the assets*
- Avoiding unhelpful litigation



What else is necessary?

- BIM as an advanced construction technology is making headway in the production of construction documentation
- Wider adoption by other consultants and clients is needed to get to the next level of the adoption curve
- We need to move from the AEC Industry to the AECO Industry or Architecture, Engineering, Construction and Operate Industry
- All the Industry Stakeholders, with their differing interests and focus need to become involved in the process through the draughting of National Annex



What is the CIDB up to?

- The cidb is looking to prepare a *Building Information Management Framework* for state work. This protocol will be in alignment with the SANS 19650 standard
- The cidb has the required *Legislative Mandate from the Government* to be able to enable the SANS/ISO 19650 for Government contracts through regulation
- Using existing regulations, projects, identified by their size and/or importance will be required to use BIM
- cidb 'Best Practice: Construction Works Requirements for Digital 2D/3D Collaboration' will be the vehicle



BIM Framework

- The cidb is going to set up an Industry Focus Group to assist with the development of a **BIM Framework**
- The initial requirements will be for contracts Grade 7 and above R 20 mil and above
- The cidb will be working in line with the recommendations set out by the International Organisation for Standardisation (ISO)
- The recommendations will either be part of, or form the National Annex
- The cidb will be working on an open, non-proprietary format for the exchange of information



What does each BIM practitioner need to do to have a successful BIM Project?

- Understand that BIM started as *Building Information Modelling* and needs to become *Building Information Management*
- Care about how they **structure their data** for the others in the Design Team and ensure that it can be utilised by the Construction Team and later handed over to the Operations Team
- Move to an open-source data format like IFC for the exchange of information
- Adopt the conventions that will be part of the National Annex by familiarising themselves with the UK BIM Framework



What can you do today?

- It looks like South Africa will closely follow the UK in the adoption of the SANS/ISO 19650
- There are a lot of Guidance Documents put out by the UK BIM Framework that will assist you in understanding the concept and principles
- Another UK source is the NBS (National Building Specification) with its wide range of documents including:
- Uniclass 2015 set of tables to classify all activities, processes, systems, spaces, elements, etc. in 14 separate interlinked tables

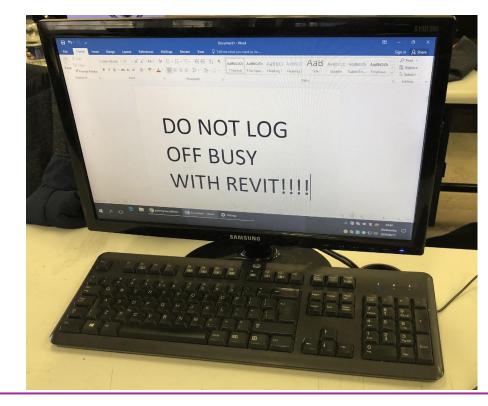




What are the **Opportunities for BIM Professionals**

SHAMEEMAH DAVIDS DIGITAL LEAD AECOM EUROPE

Once Upon a Time...





Secret Socks...



1 – Technical Skills

Digital Technology Proficiency: Stay

up-to-date with the latest digital tools, software, and technologies relevant to the built environment. This could include Building Information Modeling (BIM), Geographic Information Systems (GIS), 3D modeling, virtual reality, and data analytics.

Programming and Coding: Basic

programming knowledge can be immensely helpful in automating processes, creating custom tools, and working with software interfaces.

2 – Adaptability & Continuous Learning

Embrace a **growth mindset** and be **open to learning new skills and technologies** as the industry evolves. The digital landscape is constantly changing, so being adaptable is crucial to stay ahead.





3 – Analytical & Data-Driven Mindset

The ability to **analyze and interpret data** is essential for making informed decisions and optimizing digital processes in the built environment.



4 – Collaboration & Communication

Digital leaders need to **collaborate effectively** with various stakeholders, including architects, engineers, construction teams, and clients. Strong communication skills are vital for conveying **technical concepts to non-technical** individuals.





5 – Innovative Thinking

Think creatively and come up with **innovative solutions to address challenges** in the built environment using digital technologies.

6 – Project Management

Understand project management principles to efficiently plan, execute, and deliver digital projects within timelines and budgets.

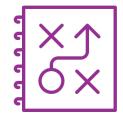






7 – Vision & Strategic Thinking

Develop a **clear vision** for how digital technologies can **transform the built environment** and strategically implement these technologies to achieve organizational goals.



8 – Leadership & Influencing Skills

Inspire and motivate teams to embrace digital initiatives. Influence stakeholders to support and invest in digital transformation efforts.





9 – Problem Solving

Digital leaders must be adept at **identifying problems and finding effective solutions** using digital tools and technologies.



10 – Resilience

The digital landscape can be **challenging** and may face **resistance to change.** Being resilient and persistent in pursuing digital initiatives is essential.





11 – Ethics & Integrity

Digital leaders should **prioritize data security**, **privacy**, **and ethical considerations** when implementing digital solutions in the built environment.



12 – Passion & Curiosity (& Courage)

Having a **genuine interest in digital technology** and its potential impact on the built environment can drive young professionals to excel in this role.





Creating Opportunity

By developing a strong combination of technical expertise, leadership qualities, and the right mindset, young professionals can position themselves as digital leaders in the built environment and contribute significantly to its ongoing transformation



Past, Present, Future

YOU are the designers & engineers of the **future**.



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BIMCommunityAfrica



ALL SPEAKERS

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POPIA

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