

# QS CONNECT



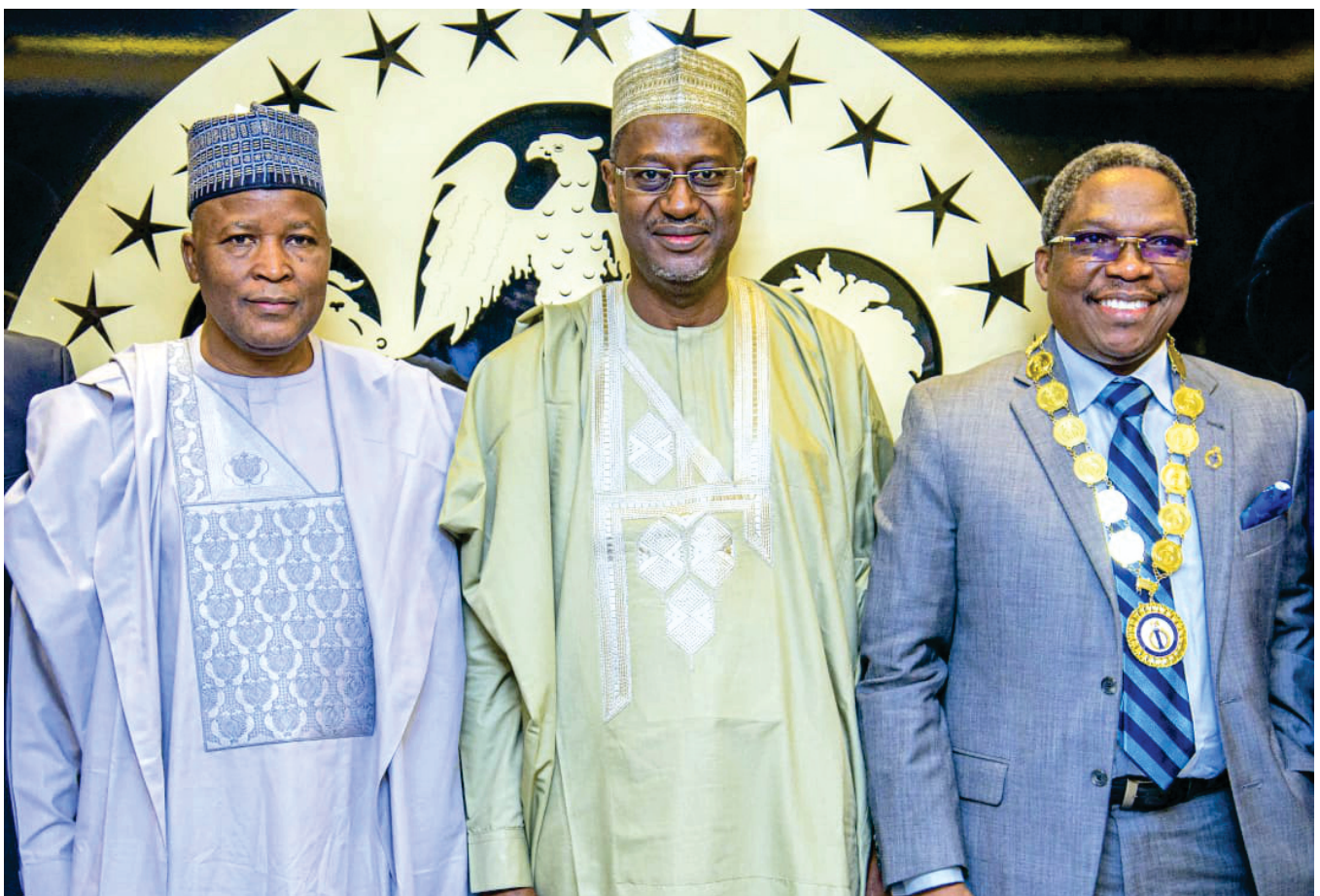
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Applications of Artificial Intelligence in Sustainable Infrastructure



International Cost Management Standard (ICMS)



QS  
TRAILBLAZER

QS Dr. George-Kelly,  
D. Alabo  
FNIQS, RQS, FASP



# editorial

## The End of Another Era- Exchange of Baton in NIQS

The tenure of the 2021 - 2023 National Executive Council (NEC) of the Nigerian Institute of Quantity Surveyors (NIQS) under the able leadership of QS Michael Olayemi Shonubi, FNIQS, will bow out on Saturday 25th November 2023, at the close of the 2023 Biennial General Meeting, which will hold at the Nicon Luxury Hotel in Abuja.

The exchange of baton in the NIQS will see QS Michael Olayemi Shonubi hand over to QS Kene Christopher Nzekwe, FNIQS as the 27th President of the Institute. The rest of the 2023 - 2025 NEC members will be determined after the NIQS Biennial Elections, which are scheduled to be held immediately after the BGM.

It has been a period that witnessed advocacy, capacity building, and

growth despite the economic woes and hardship the nation was facing. This BGM Edition is the final edition of QS CONNECT for the tenure of the 2021-2023 National Executive Council (NEC). The contents include a compilation of articles related to the BGM theme on Sustainability. The TrailBlazer is QS Dakorinama Alabo George-Kelly, FNIQS, the Honourable Commissioner of Works in Rivers State, who is also a past Secretary, Marketing and Corporate Affairs (SMCA) of our noble Institute. Other features include the NIQS Foundation focus, News from the Chapters, Bits and Pieces, etc.

I thank all the sponsors and donors who have given financial and material support towards the success of the 30th Biennial Conference and General Meeting. Space will not permit me to mention them individually.

Before I round up this Editorial, I want to seize this opportunity to thank the QS CONNECT Editorial Team and the members of the Marketing and Corporate Affairs Committee 2021-23 for the immense support and contributions to the success of the last two years. I also want to thank the entire members of NIQS for the opportunity given me to serve them over the past two years.

I also appreciate the President, QS Michael Olayemi Shonubi, FNIQS, and the entire NEC 2021-2023 members for the camaraderie shared during the period.

As we all move on to new endeavours, may the Almighty continue to bless all our endeavours. God bless the NIQS! God bless Nigeria!! Amen!!!

**QS Aderonke Oyelami, FNIQS**  
Editor-in-chief

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Members are to note that Annual Subscriptions fall due on the 1st day of January of every year in accordance with the Constitution.

After payment, scan and send the teller to the Secretariat by email ([finance@niqs.org.ng](mailto:finance@niqs.org.ng)) to enable us update our records. Remember to also indicate the purpose of the payment and write your names (surname first, no initials) and membership / file number.

# Big Data: Prospects and Challenges to Sustainable Infrastructure Management

by Dr. Patience Tunji-Olayeni

Department of Building Technology Covenant University

@ The NIQS (OYO STATE CHAPTER) WORKSHOP/AGM 28.09.2023

## Outline

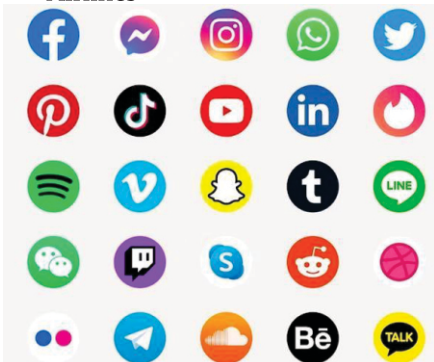
### Swamped by Data

- Big Data
- Prospects of Big Data for Sustainable Infrastructure Management
- Challenges of Big Data in Sustainable Infrastructure Management

### Final Words

### Swamped by Data

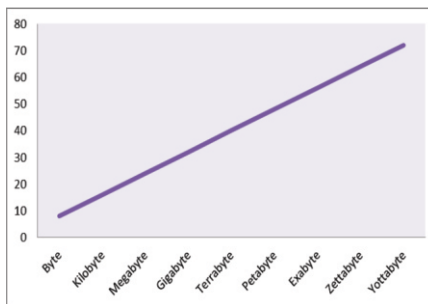
- 328.77 million terabytes of data is generated daily globally.
- Digital Media Giants Such as Facebook, Google, Amazon, Microsoft store and share at least 1200 Petabytes of Data daily.
- People share more than 8000 Photos on Snapchat every Second.
- Think about
- Instagram
- Youtube
- Telegram
- Business transaction
- Mobile Phones
- Emails
- Whatsapp
- Schools
- Airlines



## Data Capacity

- Byte (8 Bits)

Kilobyte	(1,024 Bytes)
▪ Megabyte	(1,024 Kilobytes)
▪ Gigabyte	(1,024 Megabytes)
▪ Terrabyte	(1,024 Gigabytes)
▪ Petabyte	(1,024 Terabytes)
▪ Exabyte	(1,024 Petabytes)
▪ Zettabyte	(1,024 Exabytes)
▪ Yottabyte	(1,024 Zettabytes)



## TYPES OF DATA

- Structured data - well-defined, organized, and easily understood by computer or people. Business information kept in its databases, such as tables and spreadsheets.
- Semi-structured data - combines structured and unstructured data. This type of data usually appears unstructured and defy conventional data model frameworks. For example. CSV
- Unstructured data is data that has no recognizable structure, not organized nor clearly defined. Challenging to handle, comprehend, and evaluate. Unstructured data includes social media comments, tweets, shares, posts, YouTube videos users view, WhatsApp and text messages they send.
- Geospatial data is information on things, occasions, or other features located on or close to the earth's surface. Example, location of a piece of equipment, a building collapse, geographical spread

of building collapse.

- Machine data is information produced by a computer process or application activity without the involvement of a human being. Examples of machine data include call detail records and application log files.
- Open-source data - Open and free data. Eg Google search

## Big Data

- is a voluminous set of information that is difficult to manage using traditional data processing tools.

- is extremely large amount of structured, unstructured, and semi-structured datasets, which is challenging to manage using traditional data processing tools.

- is a complex set of information comprising structured, unstructured, and semi-structured datasets, which is challenging to manage using basic data processing tools.

- It requires additional infrastructure to govern, analyze, and convert into insights.

- When analyzed, big data can provide immediate answers by uncovering hidden patterns & trends, correlations and other insights

## Big Data

### Benefits of Big Data?

- Helps organizations harness their data and use it to identify new opportunities.

- Leading to
  - smarter business moves,
  - more efficient operations,
  - higher profits; and
  - happier customers.
- Businesses that use big data with advanced analytics gain value in many ways, such as:

➢ Reflect on the challenges you are currently facing in your firm/on site, as a principal consultant, management staff, line manager.

**More on the Benefits of Big Data**

- To understand Where, When and

Why their customers buy

- Protect the company's client base with improved loyalty programs
- Seizing cross-selling and upselling opportunities
- Provide targeted promotional information
- Optimize Workforce planning and



➢ Reducing cost: big data analytics helps organizations find more efficient ways of doing business.

➢ Making faster, better decisions: businesses analyze information immediately and make fast, informed decisions.

Developing and marketing new products and services: to develop innovative new products to meet customer needs (what customers need, when they need it)

**Reflection**

- What kind of data is generated during construction:
  - Preconstruction stage
  - Construction stage
  - Post construction stage
  - Occupancy stage





operations

- Improve inefficiencies in the company's supply chain
- Predict market trends
- Predict future needs
- Make companies more innovative and competitive
- It helps companies to discover new sources of revenue

**Accessing Big Data for Sustainable Infrastructure Management**

High level digitalization

- Building Information Modeling (BIM)
- Cloud Computing
- Smart Buildings/Internet of Things (IOT)
- Augmented Reality

**Prospects of Big Data for Sustainable Infrastructure Management**

- Data analytics can enhance the accuracy and reliability of cost estimation in quantity surveying.
- Utilizing historical project data to identify patterns and trends.
- Applying statistical analysis to predict costs based on project parameters.
- Incorporating market data and

industry benchmarks for more accurate estimates.

- Enhancing Cost Control through Data Analytics: Data analytics can contribute to effective cost control in construction projects.
- Real-time monitoring of project costs and budget deviations.
- Identification of cost-saving opportunities and risk mitigation strategies.
- Analysis of cost performance indicators for proactive decision-making.

**Prospects of Big Data for Sustainable Infrastructure Management**

- Resource and Waste Optimization
- Safety Management
- Generative Design
- Clash/Dispute Detection and Resolution
- Performance Prediction
- Visual Analytics
- Social Networking Services/ Analytics
- Facility Management
- Energy Management & Analytics

**Challenges to Sustainable Infrastructure Management**

- Data Security, Privacy and Protection
- Data Quality of Construction Industry Datasets
- Cost Implications for Big Data in Construction Industry
- Internet Connectivity for Big Data Applications
- Exploiting Big Data to its Full Potential

**Final Words**

“As we continue to navigate the rapidly changing world around us, it is paramount that quantity surveyors and cost management professionals keep pace with the digital and AI revolution. By embracing data and technology, these professionals can unlock their true potential and play a significant role in shaping the future of their industry.” James Garner (FRICS) Senior Director & Global Head of Data, Insights & Analytics at Gleeds, UK

# Sustainable Buildings Inside Obafemi Awolowo University

## FACULTIES OF LAW, SOCIAL SCIENCES, ADMINISTRATION, EDUCATION & AJOSE LECTURE THEATRES

Architect: Arie Sharon

Year Built: 1963 - 1965

Sustainable Features

1. Uneven terrain necessitates terraces and ramps
2. Jutting rooflines and roofed walkways
  - Afford protection to building materials (wall insulation) from both sun and downpours in the rainy season.
3. An upside-down pyramid building design
  - Promotes air circulation below the building

The sustainable features in the Faculties of Social Sciences, Law, and Admin include the inverted pyramidal structure of the buildings. Upper floors provide sunshades for lower floors. Also, the open space at the ground level allows for aeration and good ventilation to all the upper floors. These two features provide cooling effects and minimal dependence on the use of mechanical cooling devices and thereby a substantial reduction in energy use. In addition, the lecture rooms and offices have good fenestration, allowing maximum use of daylighting without dependence on electricity during the day. This again promotes sustainability by providing a substantial reduction in energy use.

The design of the Ajoye lecture theatre is such that the walling provides sun shading devices, and generous fenestration also allows for abundance of daylighting. The carefully thought-out design, therefore, provides a substantial reduction in the demand for electrical lighting during the day as well as mechanical ventilation.



FACULTIES OF LAW, SOCIAL SCIENCES, ADMINISTRATION, EDUCATION & AJOSE LECTURE THEATRES

## ASSEMBLY HALL (NOW ODUDUWA HALL)

Architect: Arie Sharon

Year Built: 1972 - 1976

Sustainable Features

1. Organic forms in white against a darker concrete.
2. Concrete columns and striated surface treatments.
  - ☑ Surface treatments help protect and consolidate the built heritage against material damage, reducing repair and replacement costs.
3. Building integration with surrounding palm trees via numerous green spaces
  - ☑ Keeps the building and neighbourhood area cool and reduces dust and noise pollution.



## NATURAL HISTORY MUSEUM

Architect: Patrick Ehinmowo and his firm Platform Concept Ltd.

Commissioned: 2011 (Broached in 1971)

Sustainable Feature

1. More emphasis on the humanities building designs with geometric design
  - ☑ Reduces energy consumption for heating and cooling systems up to 81% (The effect of building a geometric shape and orientation on its energy performance in various climate regions)



NATURAL HISTORY MUSEUM



# COURTESY VISIT OF THE NEC MEMBERS TO THE MINISTER OF HOUSING & URBAN DEVELOPMENT, ARC. AHMED DANGIWA HELD ON 17TH OCTOBER, 2023 AT ABUJA



The Minister of Housing & Urban Development, Arc. Ahmed Dangwa welcoming NIQS President and other NEC members to their Headquarters.



NIQS President, QS Olayemi Shonubi, FNIQS and the Deputy President, QS Kene Nzekwe, FNIQS at the event as the President deliver his speech.



NIQS President, Minister of State, Housing & Urban Development and the Minister of Housing & Urban Development in a discussion during the visit



The Minister receiving the 2023 BGM invitation letter from the NIQS President



NIQS President signing the visitor's register



The President handing over NIQS corporate gift pack to the Minister



Cross section of some NEC members and officials of the Ministry during the visit



The President and the Minister in a group photograph with NIQS delegates, also the SSA on Projects to the Honourable Minister of Housing & Urban Development, Hon. QS Abubakar Yahaya Kusada, FNIQS

# Applications of Artificial Intelligence in Sustainable Infrastructure

By: Aminat Akinyemi Ayoola  
Academic Director, Robotics And Artificial Intelligence Nigeria

## INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is the ability of machines (computer, robot) to perform tasks associated with intelligent beings.

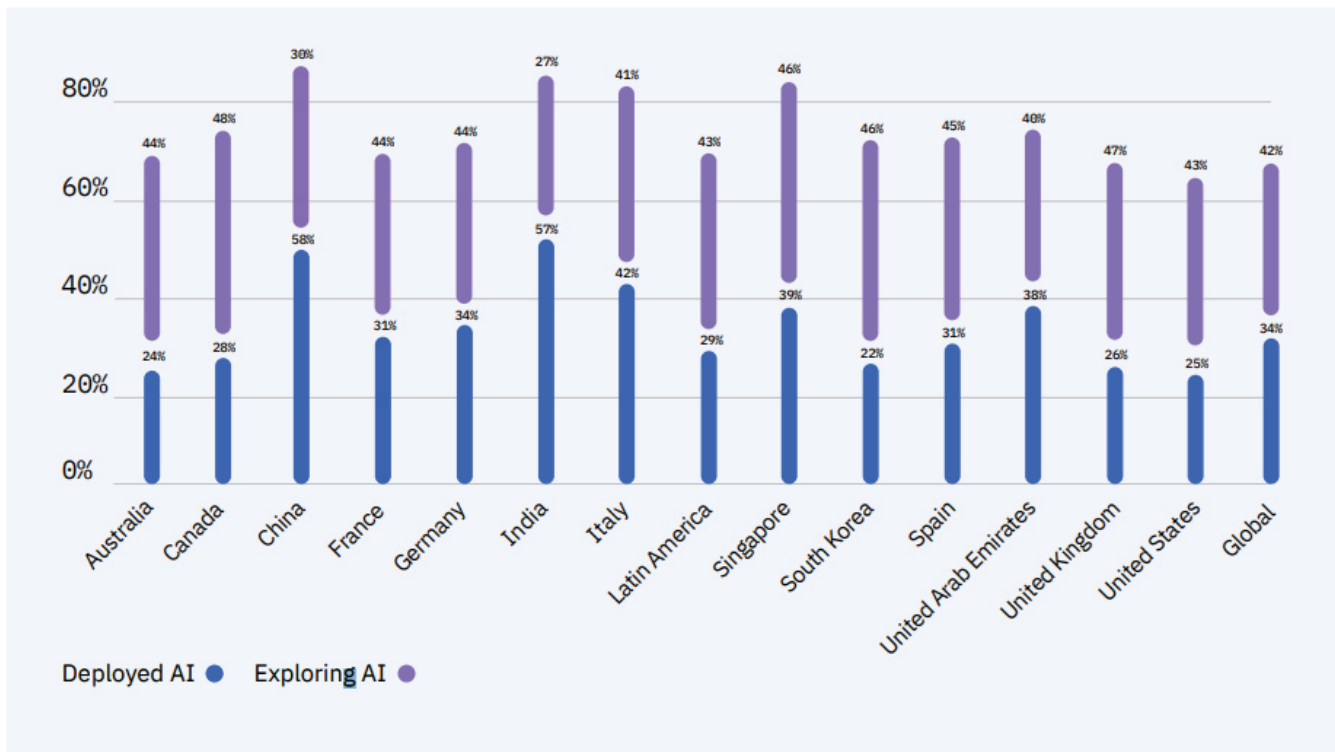
AI has been incorporated in every country and sector because it can be used to analyze large amounts of data to identify patterns

## WHY SUSTAINABLE INFRASTRUCTURE?

It is critical to achieving global climate targets, Sustainable Development Goals (SDG), and a strong and resilient global economy. Investing in sustainable infrastructure is more important now than ever before, as the world faces a climate crisis, a global economic slowdown, and the need to address

## APPLICATIONS OF AI IN SUSTAINABLE INFRASTRUCTURE

- Infrastructure design and planning
- Predictive maintenance
- Traffic management
- Energy management
- Water management
- Security
- Personalised infrastructure experience



## INFRASTRUCTURE

Infrastructure, from transport systems to power-generation facilities and water and sanitation networks, is crucial for social change and development. It provides the services that enable society to function and economies to thrive. Sustainable infrastructure delivers long-term economic, social, and environmental benefits.

inequalities that disproportionately affect the most vulnerable people.

- According to a 2021 report from the U.N. Office for Project Services:
  - 79% of global greenhouse gas emissions are related to infrastructure.
  - 4% growth in global GDP by 2030 is possible with clean energy investments.
  - 92% of SDG targets are achievable through infrastructure investment.

## INFRASTRUCTURE DESIGN AND PLANNING

AI algorithms can analyze various design parameters, such as materials, layouts, and structural components, to optimize the use of resources. It can suggest designs that minimize waste, reduce energy consumption, and maximize the efficiency of the infrastructure. Generative AI can simulate climate scenarios and design infrastructure that is resilient to changing environmental conditions.

- It can generate adaptive designs that can withstand extreme weather events, sea-level rise, and other climate-related challenges.

▪ <https://urbanistai.com/>

#### **PREDICTIVE MAINTENANCE**

- AI algorithms, through data collection and analysis, can predict equipment failures and maintenance needs, reducing downtime, and preventing costly breakdowns.
- This extends the lifespan of infrastructure assets and reduces resource waste.

#### **ENERGY MANAGEMENT**

- AI-powered systems can optimize energy consumption in buildings and transportation networks.
- Smart grids can balance supply and demand of energy which helps cities manage their energy resources more efficiently.

AI-controlled HVAC systems can reduce energy consumption in buildings.

#### **WATER MANAGEMENT**

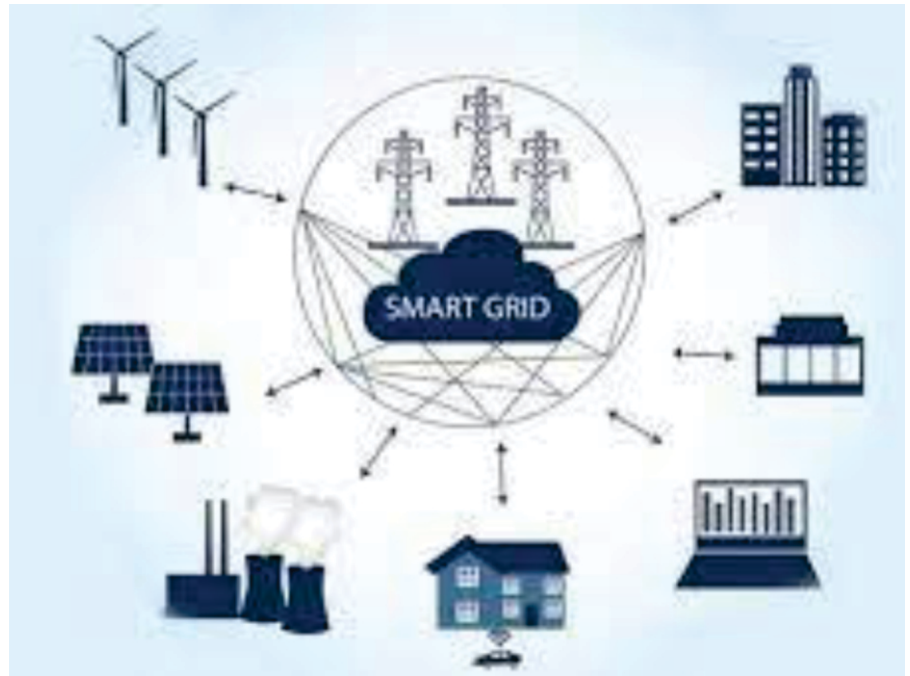
- AI can optimize the distribution of water in urban areas by predicting demand patterns, identifying leaks, and managing pressure in the water distribution network.
- AI can optimize wastewater treatment processes by monitoring and controlling variables such as chemical dosing, flow rates, and treatment efficiency.
- Smart irrigation systems, can adjust watering schedules based on weather conditions and soil moisture levels.

#### **TRAFFIC MANAGEMENT**

- AI can improve traffic flow by optimizing traffic signal timing and rerouting vehicles based on real-time data.
- This reduces congestion, lowers emissions, and enhances the efficiency of transportation systems.

#### **SECURITY**

- AI-powered video analytics can analyze surveillance footage to detect unauthorized access, unusual activities, or security breaches in real-time.
- AI can enhance access control



systems by implementing biometric authentication, facial recognition, and behavior analysis for identity verification.

- The use of drone based computer vision for securing critical infrastructure like pipelines, rail lines etc

#### **PERSONALISED EXPERIENCE**

- AI can also be used to create more personalized services for citizens such as personalized recommendations for transportation, housing, healthcare and education.

#### **BENEFITS OF AI IN INFRASTRUCTURE MANAGEMENT**

- Improved Efficiency
- Cost Reduction
- Smart cities
- Better Decision Making
- Environmental Impact Reduction

#### **CASE STUDIES**

- Early warning for resilient grids by Siemens: this detects a high-impedance fault by analyzing changes in the power flow of the grid. Such faults are incredibly hard to detect simply because the lost power is so small that traditional systems don't pick them up as critical.

#### **CHALLENGES FOR DEPLOYING AI**

- Data availability and quality
- Interdisciplinary collaboration
- Regulatory and compliance issues
- Cost
- Data privacy and security
- Acceptance and adoption
- Silo AI: The AI-driven cooling performance analysis significantly improved energy efficiency and decreased fuel consumption, lowering the city's heating network temperature by 3 degrees Celsius.

#### **CONCLUSION**

- In summary, AI's ability to process data, make predictions, and optimize systems makes it a powerful tool for revolutionizing sustainable infrastructure.
- By harnessing AI technologies, we can create infrastructure systems that are more resilient, efficient, and environmentally responsible, contributing to a more sustainable future.

# Importance of BIM to Sustainable Infrastructure Management

Prof. Henry Odeyinka

Department of Quantity Surveying Obafemi Awolowo University, Ile-Ife

## ORDER OF PRESENTATION

- The need for Sustainable Infrastructure Management
- Sustainability Assessment Methods
- BIM as a tool for Sustainable Infrastructure Management
- Dimensions of BIM
- BIM for Sustainability and Sustainability BIM Tools
- Benefits of using BIM to improve Sustainability of Infrastructure
- Examples of Projects where BIM was used to improve Sustainability

## The need for Sustainable Infrastructure Management

- The construction sector is highly accountable for several impacts on the environment
- Up to date, the sector is known to be responsible for 40% of the EU energy demand
- The sector is also known to be responsible for 36% carbon emissions with its attendant impact on the ozone layer
- It is also known for 50% of raw material consumption
- The scientific community has already proved the environmental impact of infrastructure
- As a result, authorities and the general society are now demanding more sustainable buildings and infrastructures.

## Infrastructure Life Cycle

- Planning
- Design
- Construction
- Operation and Maintenance
- Refurbishment and Demolition

## Infrastructure Life Cycle Impacts

- Most infrastructure environmental impacts are a consequence of decisions made in the early design stages
- This makes it extremely important to carefully select materials with low carbon impacts
- The importance of targeting early

design stage has been recognised as an avenue for reducing infrastructure's life cycle environmental impact and thereby improving sustainability.

## Infrastructure Sustainability Assessment

- Different methods and tools have been developed to evaluate infrastructure's environmental performance
- Building Sustainability Assessment (BSA) methods
- Life Cycle Assessment (LCA) tools

## Building Sustainability Assessment Methods

- Building Research Establishment's Environmental Assessment Method (BREEAM) [UK based]
- Code for Sustainable Homes (CSH) [UK based]
- Leadership in Energy and Environmental Design (LEED) [US based]
- Green Star [Australian based]

## Table 1: BREEAM Award Classifications

Award	Threshold
Outstanding	85%+
Excellent	70-84%
Very Good	55-69%
Good	45-54%
Pass	30-44%

*Note: BREEAM projects which achieve less than 30% of the maximum potential score are unclassified.*

## Table 2: CSH Award Classifications

Award	Threshold
Level 6	90%+
Level 5	84-89%
Level 4	68-83%
Level 3	57-67%
Level 2	48-56%
Level 1	36-47%

*Note: CSH projects which achieve less than 36% of the maximum potential score are unclassified.*

## Table 3: LEED Award

### Classifications

Award	Threshold
Platinum	80%+
Gold	60-79%
Silver	50-59%
Certified	40-49%

*Note: LEED projects which achieve less than 40% of the maximum potential score are unclassified*

## Table 4: Green Star Award Classifications

Award	Threshold
Six Star	75%+
Five Star	60-74%
Four Star	45-59%
Three Star	30-44%
Two Star	20-29%
One Star	10-19%

*Note: The Green Building Council of Australia only certifies buildings that achieve a rating of Four, Five or Six Stars.*

## Life Cycle Assessment

- Energy use
- Fabric maintenance
- Services maintenance
- Replacement
- Decoration
- Cleaning
- Etc.

## BIM as a Tool for Sustainable Infrastructure Management

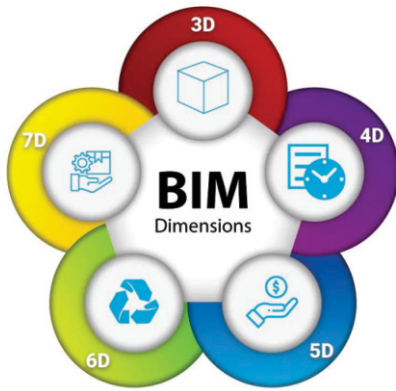
▪ Building sustainability assessment (BSA) and life cycle assessment (LCA) yield vast amount of data which will normally be managed manually

▪ BIM tools provide an opportunity to manage the vast quantity of data to perform BSA and LCA.

▪ BIM is a digital model of a physical building that contains information about its components and how they work together. This information can be used to improve the sustainability of a building in several ways.

## DIMENSIONS OF BIM

BIM Dimensions: 3D, 4D, 5D, 6D, 7D



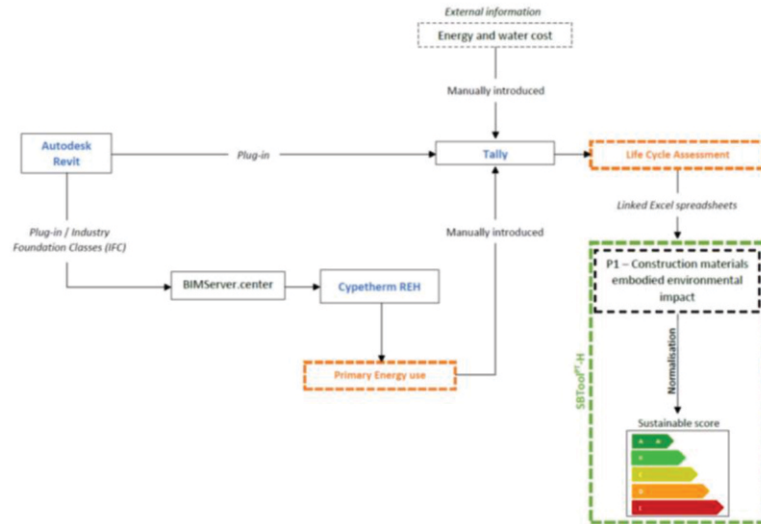
- 3D BIM: the spatial representation of the physical elements of a building or infrastructure project
- 4D BIM: Adds the dimension of time to the 3D model, incorporating scheduling and sequencing information
- 5D BIM: Combines the 3D model with cost data, allowing for accurate cost estimation and budgeting
- 6D BIM: Includes sustainability and energy analysis, enabling the evaluation of environmental performance
- 7D BIM: Integrates facility management information, such as operation and maintenance manuals, warranties, and asset management data.

### Benefits of 6D BIM

- **Enhanced Project Visualization**
  - o Stakeholders are able to visualise the entire project lifecycle
  - o Facilitates better understanding and collaboration among team members.
- **Improved Time and Cost Management**
  - o By incorporating scheduling and cost data, 6D BIM enables accurate estimation and forecasting throughout the project lifecycle
- **Enhanced Sustainability and Energy Efficiency**
  - o 6D BIM empowers project teams to assess the environmental impact and energy performance of a building throughout its lifecycle.

o By simulating and analyzing energy consumption, carbon emissions, and operational costs, stakeholders can make informed decisions to optimize sustainability and energy efficiency, ensuring long-term environmental benefits.

### Sustainability BIM Tools



### Benefits of Using BIM to improve Sustainability of Infrastructure

- BIM can be used to help identify opportunities for energy efficiency improvements
  - o By analyzing data such as building orientation, thermal mass, and envelope leakage, BIM can help pinpoint areas where energy consumption can be reduced.
- BIM can be used to optimize daylighting in a building
  - o By simulating different window layouts and orientations, BIM can help find the configuration that admits the most natural light while minimizing solar heat gain.
- BIM can be used to select construction materials with a lower environmental impact
  - o By evaluating the embodied energy and global warming potential of different materials, BIM can help choose products with a smaller ecological footprint
- BIM can be used to assess the feasibility of renewable energy systems
  - o BIM can help determine whether a particular site is suitable for solar panels or wind turbines by modelling factors such as solar exposure, wind speed, and

- BIM can be used to monitor the performance of sustainable building systems after they've been installed
  - o BIM can help verify that sustainable buildings operate as intended by tracking energy use, water consumption, and waste generation.

### Examples of Projects where BIM was used to enhance Sustainability

#### Istanbul New Airport

one of the world's largest airports and one of the most sustainable. The airport was designed using BIM (Building Information Modelling) and features several sustainable design elements, including a rainwater harvesting system that collects and recycles rainwater for use in toilets and irrigation, a greywater treatment plant that recycles water from sinks and showers for use in landscape irrigation, and a solar power system that offsets the airport's energy consumption by 10%.

#### The Baku National Stadium

The Baku National Stadium, located in Azerbaijan is another excellent example of how BIM can be used to create more sustainable buildings. The stadium was built using BIM

software and was designed to be as energy efficient as possible. The stadium's roof is made of ETFE (ethylene tetrafluoroethylene), a highly translucent material that helps reduce energy consumption by allowing natural light to enter the stadium. The stadium also has a rainwater harvesting system that

collects and recycles rainwater for use in the stadium's toilets and irrigation system.

### **Crossrail at Tottenham Court Road is a project in London, UK.**

The project used BIM to create a more sustainable design for the new railway

line. One of the project's main sustainability goals is to reduce energy consumption, and Crossrail is using BIM to help achieve this. The project team uses BIM to model the building envelope's thermal performance and identify opportunities for improving energy efficiency.

### **Istanbul New Airport**



### **The Baku National Stadium**



### **Crossrail at Tottenham Court Road, London**





# CHRONICLES OF NIQS FOUNDATION AT 2 (Continuation)



### Driving Practical Geospatial Solutions: 21st March, 2023.

Through the Director General's keynote speech at the 18th National Conference of Women-In-Surveying, the Foundation showcased its dedication to practical solutions for rising insecurity in Nigeria.



### Advocating for Sustainable Development: 28th & 29th March, 2023.

Strategic meetings with UN-Habitat and the Surveyors Council of Nigeria showcased the Foundation's commitment to partnerships in the built environment and sustainable development.



### Amplifying Voices for Change: 16th May, 2023.

The Foundation represented human rights and sustainability at various events, advocating for "Nigeria: Not A Quick Fix to Insecurity. The Death Penalty as An Ineffective Deterrent to Crime".



### Empowering Staff for Organizational Growth: 22nd May, 2023.

Recognizing the importance of staff development, the Director General organized workshops focused on sustainability and communication strategy, fostering a transformative environment for staff and interns. In just two years, the NIQS Foundation has emerged as a driving force for positive change in Nigeria's built environment and beyond. Through its dedication, strategic partnerships, and impactful initiatives, the Foundation continues to inspire and empower, leaving an enduring legacy of progress and prosperity.



### Nurturing the Next Generation of Entrepreneurs: 22nd July, 2023.

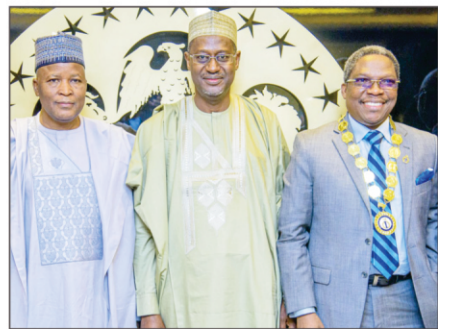
The Foundation's commitment to youth empowerment was evident at the Junior Achievement Nigeria Regional Company of The Year Program. As a special guest and keynote speaker, the Director General emphasized the importance of resilience and determination, inspiring young minds to overcome obstacles and unleash their full potential.



### Empowering Women in Construction: 12th August, 2023.

Continuing its dedication to gender equality, the Foundation hosted another free webinar titled "Unleashing Your Potential: Empowering Women in Construction for Gender Equality in the Built Environment." Industry experts discussed advancing gender equality, mentorship, skill development, and career advancement, fostering an inclusive work environment for women in the construction sector.

# PHOTO MIX



# International Cost Management Standard (ICMS)

QS. Murtala Aliyu PPNIQS, FNIQS

Trustee ICMS (international Cost management standard Coalition)

## Purpose of today's session

### 1. Introduction to ICMS

- Aims
- Target benefits

### 2. Background

- How was it formed?
- Who was involved?

### 3. ICMS standards

- Cost classification
- How it is used

## What are the aims of ICMS?

- Construction cost and other life cycle costs to be consistently and transparently benchmarked
- Causes of difference in costs between projects and constructed assets can be identified
- Properly informed decisions on the design and location of construction projects to be made
- Data to be used with confidence for project financing and investment, programme and decision-making and related purposes

## Who will benefit from ICMS?

- Any party that has a **direct or indirect interest** in construction projects and constructed assets
- Those **investing** in or managing construction projects will benefit significantly
- All **stakeholders** over the life cycle including asset operators and facility managers
  - Financial institutions will have a consistent basis for **assessment** of project funding requirements
  - The **public** will benefit through enhanced, prudent assessments of public projects

## ICMS Coalition

International standards and data for a global construction industry  
Global consistency in presenting life cycle costs

## Coalition organisations

The ICMS Coalition is a rapidly growing partnership of leading organisations from every continent of the world, committed to producing and supporting one shared standard for construction measurement. Starting with meetings at the International Monetary Fund in May 2015, the Coalition created an independent standard setting committee and committed to the vision of one shared and international standard.

## Standards Setting Committee

The Standards Setting Committee comprises of 27 independent experts, from 17 different countries. They've been appointed by the coalition to draft and consult on the new International Construction Measurement Standards.

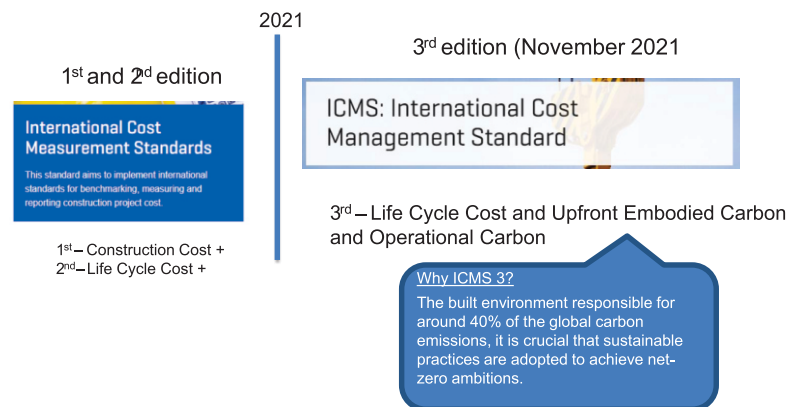
## What do the standards cover?

- High-level cost classification
- Buildings and civil engineering
- Definitions, inclusions and exclusions
  - Four level taxonomy
  - Key cost drivers

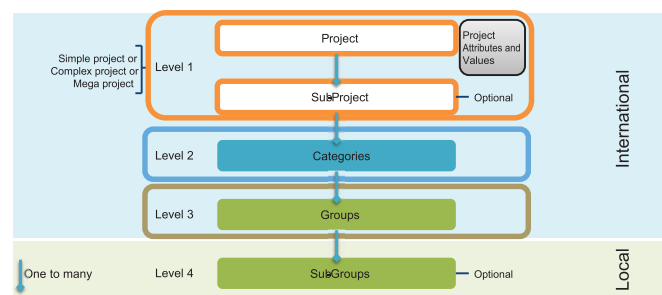
## ICMS Mapping

- Uniclass/Omniclass
- Australian and New Zealand Standard Method of Measurement (ANZSMM)
- Rail Method of Measurement (RMM)
- ICE Civil Engineering Standard Method of Measurement – CESMM
- New Rules of Measurement (NRM)
- Building and Engineering Standard of Measurement (BESMM)

## ICMS Evolution



## Core Classification in ICMS



Generally compatible with the elements of ISO 12006 Building construction Organization of information about construction works 2: Framework for Classification

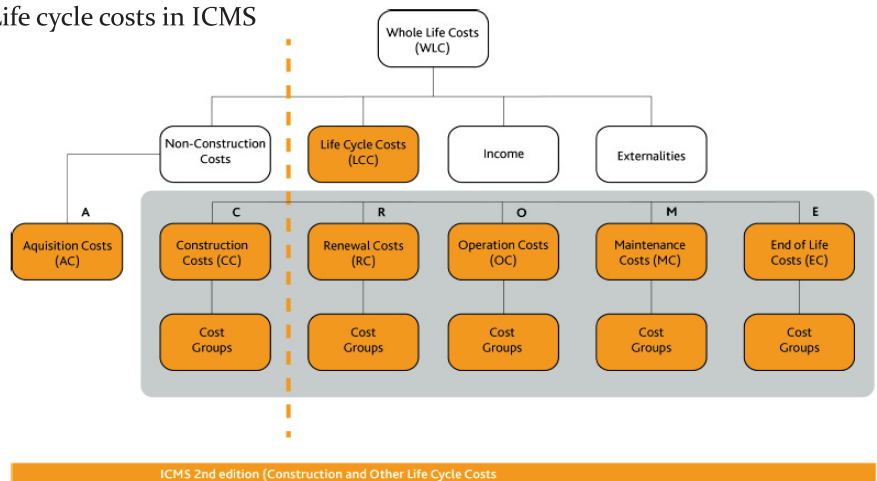
See Section 2.2 for further detail on Level 1

Level 1 – Projects or Sub-Projects (two-digit codes)			
01.	Buildings	11.	Chemical plants
02.	Roads and runways	12.	Refineries
03.	Railways	13.	Dams and reservoirs
04.	Bridges	14.	Mines and quarries
05.	Tunnels	15.	Offshore structures
06.	Wastewater treatment works	16.	Near shore works
07.	Water treatment works	17.	Ports
08.	Pipelines	18.	Waterway works
09.	Wells and boreholes	19.	Land formation and reclamation
10.	Power-generating plants		

- CSI MasterFormat
- UniFormat
- CIQS Elemental Cost Classification
- Method of Measurement for Highway Works (MMHW)

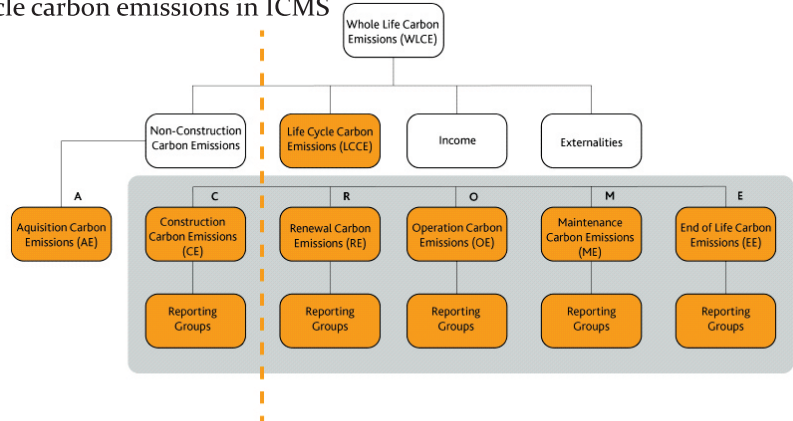


### Life cycle costs in ICMS



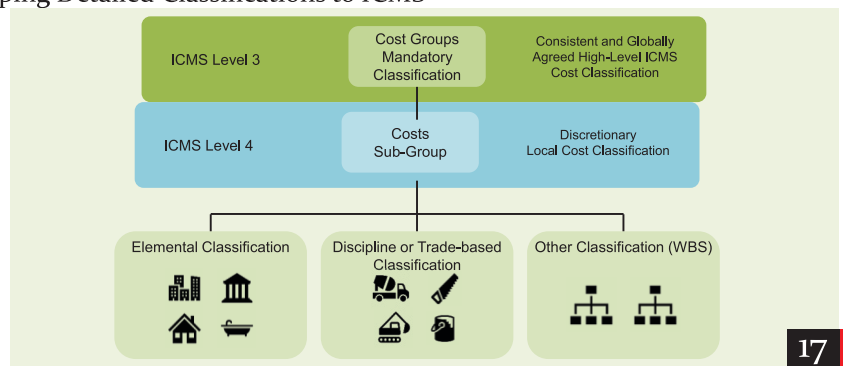
'Occupancy Costs' are considered part of the 'Non-Construction Costs'.

### Life cycle carbon emissions in ICMS



Thus the reporting structures for costs and carbon emissions are identical.

### Mapping Detailed Classifications to ICMS



### Why is now the right time for ICMS 3?

In Q2 2022, the RICS Global Commercial Property Monitor (GCPM) and the Global Construction Monitor (GCM) were used to draw on the expert opinions of around 4,000 professionals on crucial issues relating to sustainability and climate change across the built environment. "feedback suggests that professionals are beginning to embrace digital tools and technologies to complete

sustainability-related analysis for their projects. These tools are reportedly being used predominantly to assess energy needs and costs, but **have not been utilized as much to reduce embodied carbon** or to measure the impact on biodiversity.”  
Ann Gray, RICS President-Elect

The 2022 report asks what are the keys to accelerating decarbonisation. By far and away the primary needs identified are for consistent, respected standards, relevant skills, and trusted information on low-carbon products.

**Demand for green buildings rises globally**  
An industry challenge?

**Governments and clients demand ICMS**

**An industry challenge?**  
Many of us are in unfamiliar territory

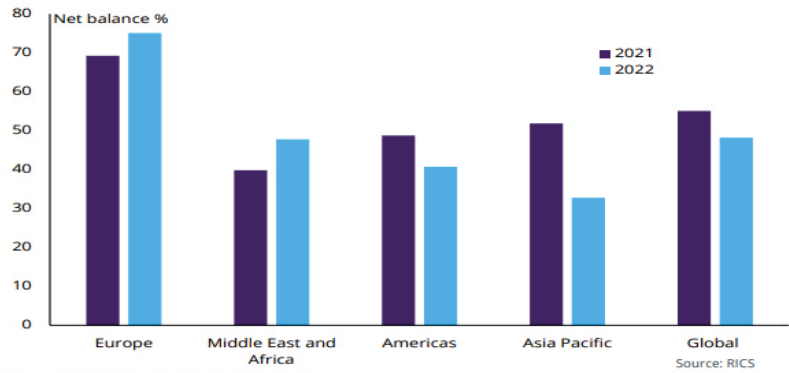


Figure 1 RICS Sustainable Building Index

Globally, around 55% of contributors note that occupier demand for green/sustainable buildings has risen over the past 12 months

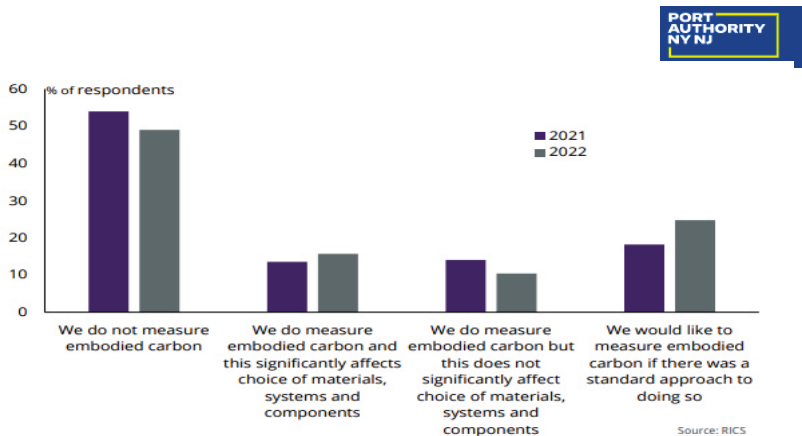


Figure 12 Currently, do you measure embodied carbon emissions on your projects and, if so, how significantly does this affect the choice of materials, systems and components?

## An industry challenge?

**It is necessary that tools, databases and standards need to continue to evolve and collaboration is key**

To take advantage of new and emerging technologies as well as to address policy changes and additional environmental and social challenges, industry standards and tools will need to be developed further. Collaboration, knowledge and data sharing across the industry will be crucial. ICMS 3, BECD and the carbon assessment methodology are all notable examples. This can also help overcome the barrier of a lack of existing case studies and relevant demonstration projects focusing on carbon management in the industry.

**The industry must upskill its professionals**

Ensuring that professionals have adequate knowledge of climate and environmental issues is key. Training programmes will also have to be developed to help professionals make the most of the latest standards, professional statements and tools.

**Research and further studies on low carbon materials are needed**

The crucial issue of high costs and low availability of low carbon materials and components could be addressed by further studies on the climate impact of existing building materials and research on possible technology solutions.

International Cost Management Standards  
[www.icms-coalition.org](http://www.icms-coalition.org)

# Overview of Sustainable Infrastructure Management

Being a Paper delivered at the **WORKSHOP / ANNUAL GENERAL MEETING** of the **NIGERIAN INSTITUTE OF QUANTITY SURVEYORS (NIQS) OYO STATE CHAPTER** by **QS OLANIYAN, FOLORUNSO SAMUEL**  
HND, B.Sc (Hons), M.Sc, MMP, MICI Arb., FNIQS, RQS

## INTRODUCTION

The whole concept about sustainability stands on a tripod.

- a) Social
- b) Economic and
- c) Environmental

Infrastructure is considered socially sustainable when it:

- is inclusive – it serves all, not just a select few – and
- contributes to enhanced livelihoods and social wellbeing.

Infrastructure becomes economically sustainable when it:

- does not burden governments with unpayable debt or
- does not impose painfully high costs on users but
- helps to create jobs and
- boosts the Gross Domestic Product (GDP).

- creates opportunities to build capacity among local suppliers and developers and
- strengthens livelihoods.

Infrastructure is environmentally sustainable when it:

- limits pollution at all stages of a project's life cycle and
- conserves natural resources (NCE 2016 p22).

Infrastructure systems form the backbone of every society. It provides essential services as support for vital human capabilities; thus, an ever-increasing number of decisions are being made regularly that guide patterns of development for now and future generations.

## DEFINITION OF SUSTAINABLE INFRASTRUCTURE

The term “sustainable infrastructure” is defined by various stakeholders as a set of objectives, principles and criteria applicable to infrastructure projects for enhancing their utility in promoting sustainable development. In this context, the term 'sustainable' refers to social, economic and environmental issues.

The Inter-American Development Bank (IDB) defines sustainable infrastructure as infrastructure projects that are planned, designed, constructed, operated, and decommissioned in a manner to ensure

economic, financial, social, environmental (including climate resilience) and institutional sustainability over the entire life cycle of the project (IDB 2018 p13).

In order to operationalise infrastructure sustainability, IDB further translates this definition into practical and measurable criteria across the four dimensions listed above. These criteria are expected to be made applicable “to all project components including elements such as access roads, transmission lines and raw material extraction areas that are necessary for delivering the project” (IDB 2018 p13).

Based on the above definitions, it can be concluded that sustainable infrastructure is generally approached from social,

consideration for economic, social and environmental implications.

The concept of Sustainable Development is a 20th century phenomenon. This has shifted the focus from pure economic development to sustainable development.

Economic development focusses on immediate economic well-being of the community while Sustainable development ensures that projects remain environmentally and socially sustainable.

In order to assess infrastructure on the basis of sustainability, stakeholders have established various principles, criteria and approaches to define projects in terms of their economic, environmental and social sustainability. For example, the International Institute for Sustainable Development (IISD) describes sustainable infrastructure assets as those with:

- Lower carbon and environmental footprints
- Protect natural ecosystems
- Prove resilient to changing climates

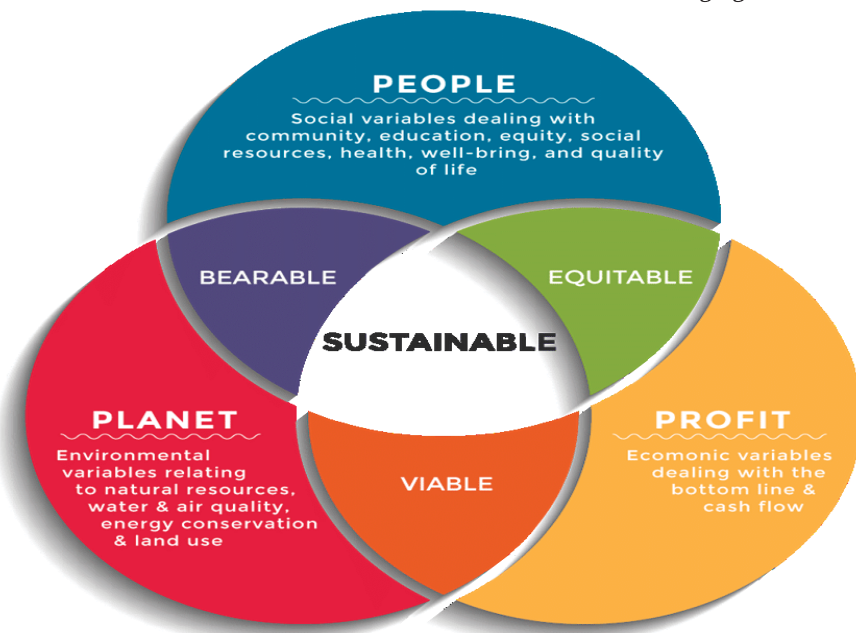


Figure 1: Interconnection of the Elements of Triple Bottom Line

economic and environmental perspectives – often described as the “triple bottom-line” (Hammer & Pivo, 2016).

## The Concept of Sustainable Infrastructure

Sustainable infrastructure focusses strongly on large-scale infrastructure projects. These infrastructure projects include roads, buildings, energy, communication, water, etc. They play a significant role in recent development strategies for poverty reduction and economic development with due

- Optimize the use of natural ecosystems and their “infrastructure services”
- Move beyond compliance on core labour standards and human rights
- Trigger technological and industrial innovation
- Increase investment in education and research and development (R&D)
- Increase employment
- Demonstrate financial viability
- Attract domestic investors and other businesses
- Increase foreign direct investment
- Bring value for money for taxpayers and

investors

According to the Asian Development Bank (ADB, 2009), the basic principles underlying sustainable infrastructure include:

- a) promoting low-carbon development and minimizing impacts on local environments (e.g., renewable energy)
- b) advancing solutions that help communities deal with the unavoidable impacts of climate change (e.g., climate-resilient infrastructure)
- c) improving the access of poor people to education, health, and basic social protections, as well as to markets and productive assets;
- d) emphasizing gender equality and the empowerment of women; and
- e) improving the transparency and efficiency of public resource management (e.g., controlling wasteful public spending and corruption).

The World Bank Sustainable Infrastructure Action Plan 2009–11 (World Bank, 2008) outlines the role of sustainable infrastructure as:

- enhancing access in developing countries to the core infrastructure sectors: transport, energy, water and information and communication technologies (ICT) for development;
- maximizing the effectiveness of infrastructure “through a focused approach to complex cross-sectoral issues (such as the role of infrastructure in climate change mitigation and adaptation efforts, the role of public private partnerships (PPPs) in the provision of infrastructure services, and new ways to provide infrastructure support for rural-urban integration and development);
- focusing on both social and environmental objectives as well as economic and financial aspects and
- ensuring affordability with good governance (World Bank, 2008 pv)

At approximately US\$2.3 trillion per year, global capital infrastructure investment is now at an all-time high. One estimate suggests that US\$94 trillion of capital investment will be required by 2040 for both new and replacement infrastructure which is more than the value of the world's existing infrastructure which is approximately US\$50 trillion. (Thacker, Adshhead, et al. 2020)

Given the huge potential for investments, it is therefore necessary to employ the principles of sustainable development in infrastructure decision-making. To ensure that the right infrastructure is built, policy makers need to establish long-term visions for sustainable national infrastructure systems.

## OBJECTIVES OF SUSTAINABLE INFRASTRUCTURE

The objectives of sustainable infrastructure are to:

- a) reduce, or completely avoid depletion of critical resources like energy, water, raw materials,
- b) prevent environmental degradation caused by facilities and infrastructure throughout their lifecycle,
- c) promote economic growth and
- d) create built environments that are comfortable and productive (Hartenberger, Lorenz & Lützkendorf, 2013; Oni, 2015; Wong, 2016).

## BENEFITS OF FUNCTIONAL INFRASTRUCTURE

A functional infrastructural system involves providing essential services to the people. These services are:

- Water
- Energy
- Waste management
- Transport and
- Telecommunication

It protects people from hazards such as:

- floods
- the pathogens (organisms causing diseases) in sewage and other wastes.

Infrastructure also enables people to access other services such as:

- healthcare
- education
- participation in the economy, by accessing markets and workplaces and
- serves as aid for essential factors of production (electricity, water and access to labour)

## ADVERSE SIDE OF DYSFUNCTIONAL INFRASTRUCTURE

Infrastructure systems do not only just have beneficial impacts. The social and environmental impacts of infrastructure can be profoundly harmful—both directly during construction, within and beyond the lifetime of assets. This can manifest in different ways including but not limited to the following:

- during construction of infrastructure, people may become displaced even though employment is generated,
- it can expose people to hazardous working conditions. Fossil-fuel power stations (non-renewable energy sources such as coal, natural gas, crude oil, etc.) are responsible for harmful air quality and greenhouse (such as carbon dioxide, water vapour and methane) gas emissions.
- fragmentation and destruction of habitats (homes, territories) particularly when constructing transport infrastructure (roads, railways, airports, ports and inland waterways)

- provides access that enables over-exploitation of natural resources.
  - It can also increase vulnerability to natural and human-made hazards and
  - leaves an unsustainable burden of debt
- In addition, a deficient and an unreliable infrastructure system limit:
- the productivity of businesses
  - effectiveness of public services
  - costly efficiency of infrastructure services
  - add to production costs and
  - undermining business competitiveness.

## Management of Sustainable Infrastructure

A number of tools have been developed for management of sustainable infrastructure. These include but not limited to:

- Artificial Intelligence (AI)
- Building Information Management (BIM)
- Digital Construction
- Big Data.

The application of these tools of management to the development of sustainable infrastructure will be treated in fuller details by other speakers in this workshop.

## CONCLUSION

The basic requirement from this paper is to set the pace for other papers that will be delivered hereafter. From the above, it has been established that development of sustainable infrastructure involves consideration of implications with respect to their economic, social and environmental concerns.

As Quantity Surveyors, we have a duty to collaborate with other professionals in the built-up environment to ensure that for every project, particularly those with large content, we duly consider the basic principles of sustainability while advising our clients; particularly government and other decision makers. This will further enhance the quest for value for money.

According to Letchmiah (2015), sustainable construction presents new challenges as well as important new opportunities to Quantity Surveyors. The big question is how well prepared are we to embrace these new challenges and opportunities of sustainable construction?

I believe that this question will be answered by other speakers who will lead us into available tools and schemes that will sharpen our professional skill in this regard.

Thank you for listening.



## QS DR. DAKORINAMA ALABO GEORGE-KELLY (DAX)

### Early Life and Education

Born on 23rd December, in the early seventies to late Evangelist Alabo Kelly George, an Air Force radar specialist who later became a Baptist clergy/evangelist, farmer, businessman, and Deaconess Mary Alabo George, a nurse and charity worker at the time in Military Hospital in Benin City. He hails from Abalama & Buguma in Asari-Toru Local Government Area of Rivers State.

He attended the YWCA Nursery School, Benin City; Airforce Primary School, Makurdi; the Kalabari National College (KNC), Buguma; and the Rivers State University of Science & Technology where he was first admitted to study Engineering in 1992 but switched to Quantity Surveying in 1994, he graduated with a B.Tech in Quantity Surveying in 1999. He obtained a post-graduate diploma in Civil Engineering from the Rivers State University of Science & Technology; a Masters' degree in Quantity Surveying from the Enugu State University and Ph.D. in Construction Management from the Nnamdi Azikiwe University in Anambra State in 2021.

His love for service started in his childhood. As a teenager, he served as a Royal Ambassador in the Baptist Church, and as a student at KNC, he co-lead the School Press Club, School Debating, French, and JETS (Science) teams. With his father as prime coach, he emerged top at several local and regional Science and Mathematics competitions. Dax had a regimented and organized childhood. His aggressive home training prepared him for the task of leadership ahead. As the son of a (military) farmer, he learned responsibility and accountability very early in life. He took turns with his brothers as manager of his father's large livestock and crop farms. It was hard work integrated with intensive learning. He nurtured seedlings from plume to harvest.

During the dry season, it was his duty to ensure that the make-shift irrigation system constructed locally by the family using the basic principles of physics was fully functional. His father's farm was also a practical demonstration farm for agriculture and science, not just for Dax and his brothers, but for students in the community who were willing and passionate about learning.

At a very young age, he understood the meaning of community service. His father's living room was a free after-school Mathematics and Physics preparation centre for the community. His father backed his message of education in the community with the needed hard work, because students needed electricity to study, he rallied community elites for the funding and establishment of a mini community library and an electrification project. Before the community health centre was built, rooms in their home became the emergency clinic wards and the community maternity centre. For over two decades, his mother committed her life to rural Medicare for women. Dax understands the needs of the rural Rivers people – who are predominantly farmers, fishermen, and petty traders.

Prepared by his very unique experience and exposure to equity and community service, he couldn't just become a regular student. When he got admitted into the Rivers State University of Science



QS Dr. George-Kelly, D. Alabo, FNIQS, RQS, FASP

and Technology in 1993, he started teaching Engineering Mathematics to his peers and built large fellowship of students who trusted his authenticity for leadership. A few years later, in 1998/1999, he was elected as the National President of the National Union of Rivers State Students (NURSS), after a term as Vice President of the Union the previous year. He championed the organization and effective decentralization of the Union and engaged the state government so constructively that Governor Peter Odili accepted to fully budget for and pay bursaries to Rivers students. He coordinated the most comprehensive national bursary payment to all Rivers students in all universities and polytechnics in Nigeria. He graduated and moved on.

### Professional Career & Business

Dr. Dakorinama Alabo George is a distinguished world class chartered Quantity Surveyor and Cost Engineer; highly experienced in Project Management, Cost Planning, Project Risk Management, Civil Engineering, Value Engineering and Cost Engineering.

While he was undertaking the compulsory National Youth Service Corps scheme, the just newly founded Niger Delta Development Commission (NDDC) was kicking and needed in their service brilliant quantity surveyors, planners, and civil engineers. He sat for the Commission's employment examination and emerged tops over 4000 candidates, and selected and employed on merit amongst the few, as a full technical staff in the Project Monitoring Directorate and the Directorate of Utilities, Infrastructural Development and Waterways (UIDW), serving under very talented planners and nationally renowned engineers like Engr. Eshedagho, Engr. PMM Asigo and QS N. Ahiaikwo.

Dax understood his job wasn't just a public service designation but an opportunity to pursue real and rapid change in impoverished communities in the Niger Delta. At different times he served in the Directorate of Project Monitoring & Supervision and the Directorate of Environmental Protection and Control where he developed an interest in sustainable coastal engineering, highway engineering and foundation engineering.

Having successfully managed hundreds of quality projects and contributed to the streamlining of effective project management and design framework in the

Commission in electricity, water, and civil infrastructure, it was time to dominate his profession.

In 2006, Dax registered for the Test of Professional Competence Examinations of the Nigerian Institute of Quantity Surveyors (NIQS). He emerged the OVERALL BEST in the federation, becoming one of the youngest and most sought after chartered quantity surveyors in the country, and winning the CAP PLC AWARD and honoured by the institute at their 2006 national biennial convention, for his exceptional performance and expertise, and understanding of diverse mechanics of civil infrastructure development from water, electricity, renewable energy, bridges, highways, and buildings - (becoming the first non-South-Westerner to achieve the feat).

Winning the Overall Best Award in his charter examinations opened wider doors for Dax. He received several offers from multinational oil & gas companies and construction giants across the country, but his interest in the development work in the Niger Delta remained his overarching focus. He believes that shared prosperity can only be achieved with the advancement of the quality of life of the poor and sustained developmental progress of our communities. So, he continued with the NDDC. But his star status within the industry continued to attract lucrative local and international consultancy opportunities from some of the most reputable multinationals in the country, which opened a door of fortune for him.

While at the NDDC, Dax did not accept the status of a regular employee, though he very diligently delivered his work, he also fought for equity in the distribution of projects. With an eye, always for disadvantaged communities, especially those communities that didn't have highly placed political solicitors.

He worked as a public servant for NDDC from 2002 to 2017. As a Principal Manager (Infrastructure) in NDDC, he initiated, planned and managed over 500 Civil Engineering and Building projects. He received an award of meritorious service from the NDDC upon his exit and retired voluntarily. He is currently a pensioner of NDDC.

Cumulatively the project management portfolio of his career stands at over \$5 Billion both in public and private sectors.

After finally leaving the NDDC in 2017, he established diverse business interests in Engineering & Project Management consulting, Livestock Agriculture and Property Development.

### Professional Qualifications & Membership

He is a corporate member of several professional bodies including the Nigerian Institute of Quantity Surveyors (NIQS) where he is a Fellow of the Institute, Quantity Surveyors Registration Board of Nigeria (QSRBN), Association for the Advancement of Cost Engineers (AACE) Int'l, USA, Institute of Strategic Management of Nigeria (ISMN), etc. He is a patron of the Women Association of Quantity Surveyors in Nigeria (WAQSN). He is the immediate past Secretary Marketing & Corporate Affairs (SMCA) of the NIQS.



# BITS & PIECES



NIQS President, QS Olayemi M. Shonubi, FNIQS, at the 2023 BGM Press Conference held at the NIQS Secretariat, Abuja recently




Cross section of participants at the 2-Day Workshop of the Association of Quantity Surveyors in Public Service (AQSPS) held on 10th & 11th November at NIQS National Secretariat, Abuja



Recently at the NIQS Niger State Chapter General-Election Meeting where new Senate members were elected

**CONDOLENCES**  
TO THE



**QS FAMILY**  
*May their souls rest in peace.*

The President of the Institute,  
**QS Olayemi Shonubi, FNIQS**  
on behalf of the National Executive Council (NEC)  
regrets to inform members of the passing unto glory  
of the following dedicated members:

1. QS DR MUSBAU SHOGO, MNIQS – 11th October, 2023



CROSS RIVERS CHAPTER

**COURTESY/ADVOCACY VISIT TO THE HON. COMMISSIONER OF JUSTICE,  
CROSS RIVER STATE, BARR. EDEDEM ANI  
HELD ON 25TH OCTOBER, 2023 AT CALABAR**



CROSS RIVERS CHAPTER

**COURTESY/ADVOCACY VISIT TO THE HON. COMMISSIONER FOR  
EDUCATION, CROSS RIVERS STATE, SENATOR STEPHEN ODEY  
HELD ON 17<sup>TH</sup> OCTOBER, 2023 AT CALABAR**





CROSS RIVERS CHAPTER

**COURTESY/ADVOCACY VISIT TO THE MINISTRY OF SPORTS DEVELOPMENT  
HEADED BY HON. AGNES ATSU HELD ON 18TH OCTOBER, 2023 AT CALABAR**



CROSS RIVERS CHAPTER

**COURTESY/ADVOCACY VISIT TO THE HON. COMMISSIONER,  
CROSS RIVER STATE MINISTRY OF LANDS, CHIEF FRANCIS EKPEYONG  
HELD ON 17TH OCTOBER, 2023 AT CALABAR**





# 2-DAY WORKSHOP ON THE THEME – 'HIGH COST OF CONSTRUCTION PROJECTS IN NIGERIA: ISSUES AND WAY FORWARD' HELD ON 10TH & 11TH OCTOBER, 2023 AT MERIT HOUSE, MAITAMA, ABUJA



FCT Chapter Chairman, QS Wasiu Igbalaye, FNIQS giving the welcome speech at the beginning of the event



NIQS President ably represented by the Secretary General, QS Rotimi Ojelade, FNIQS giving his opening remark



Chairman of the Occasion, SSA on Projects to the Honourable Minister of Housing & Urban Development, Hon. QS Abubakar Yahaya Kusada, FNIQS delivering his address



Chapter Chairman, QS Wasiu Igbalaye, FNIQS, past President, QS Mohammed Abba Tor, FNIQS and the Event Chairman, Hon. QS Abubakar Yahaya Kusada, FNIQS during the event.



Group photograph of dignitaries at the opening ceremony of the workshop



Cross section of members, invited dignitaries and media men during the workshop



Panel section with the resource persons. L/R: QS Jemilat D. Eneyamire; QS Ayodele Faley; QS Rasheed Abdulkadir Shehu; QS Dr M Abdullahi; QS Esosa Nosa-Ugbobor



Cross section of members at the opening ceremony.



The Chairman, some senior members in a group photograph with some resource persons and members at the end of the workshop



# 2023 ANNUAL FAMILY PICNIC

HELD ON 2ND OCTOBER, 2023 AT NDUBUISI KANU PARK, LAGOS





**NASARAWA CHAPTER**

**2-DAY BIENNIAL GENERAL MEETING ON THE THEME – 'QUANTITY SURVEYING TRANSFORMATION: FROM MEASUREMENT TO MANAGEMENT'**  
HELD ON 10TH & 11TH NOVEMBER, 2023 AT LAFIA



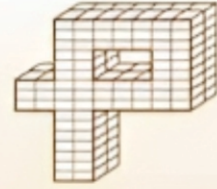
**NIGER CHAPTER**

**INVESTITURE OF THE 9TH CHAIRMAN & INAUGURATION OF SENATE MEMBERS OF NIQS NIGER STATE CHAPTER**  
HELD ON 26TH OCTOBER, 2023 AT MINNA





## PRO-PLUS CONSULTANCY & PARTNERS



Reno Mattress Shoreline Protection, Old GRA, Port Harcourt

Justice Mary Odili  
Judicial Institute,  
Rivers State

Nigeria Labour Congress, Rivers State Chapter Building

Classroom Blocks  
(Dr. Nabo Graham Douglas  
Campus), Nigeria Law School,  
Rumusuma, Port Harcourt

Nigeria Law School, Port Harcourt

Reno Mattress Shoreline  
Protection, Ogburn-Nu-Abali  
Sandfill Area, Port Harcourt.

3 Bauchi Street / Rumuigbo Street Junction, Old G.R.A, Port-Harcourt.

*We Consult and we Construct*