Fostering innovation on infrastructure projects in emerging challenges

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About the Speaker

Qualifications
▪ B.Sc. (Hons) Building Economics

Memberships
▪ Royal Institution of Chartered Surveyors (RICS) (Cand.)
▪ Institute of Surveyors of Uganda

Regional Experience
▪ Uganda: 11 years
▪ Rwanda: 2 years

Experience in Infrastructure Projects
▪ Cost Management
▪ Contract Administration
▪ Procurement
▪ Project Management
About the Speaker

Qualifications
- B.Sc. (Hons) Quantity Surveying
- Advanced Diploma in Professional Practice in Contract Management
- Google Foundation Data Analytics Certificate

Memberships
- Associate Member with Chartered Institute of Arbitrators (CIARB)
- Graduate member with ISU (Institution of Surveyors Uganda)
- Royal Institution of Chartered Surveyors (RICS) (Cand.)

Regional Experience
- Uganda: 3 years, 9 months
- Kenya: 2 months

Experience in Infrastructure Projects
- Cost Management
- Stakeholder Engagement
We are an independent professional services company specialising in programme management, project management, cost and commercial management and advisory across the real estate, infrastructure and natural resources sectors.

With 111 offices in 45 countries and over 6000 employees, we draw on our extensive global and industry experience to manage risk while maximising value and performance during the construction and operation of our clients’ assets.

Our Africa team comprises of more than 300 employees, working across ten offices in eight countries. We have been supporting both local and global clients in Africa for over 30 years.
Infra Brief
Infrastructure - Subsectors

- Aviation
- Ports and Maritime
- Rail
- Roads

- Generation
- Renewables
- Transmission and distribution

- Communication
- Environment and waste
- Water

- Defence and Aerospace
- Transport
- Power
- Utilities
The Need for Infrastructure

Infrastructure represents, if not the engine, then the "wheels" of economic activity

- Underpins economic and social activity thereby catalysing growth and development
- Urbanisation drives demand for water, power, transportation and technology infrastructure.
- Trend to urbanization placing stress on existing infrastructure
- Government commitments are made to infrastructure investment
- Emerging and mature markets seeking support on planning, funding and execution
- Maturing investment asset class
- Growth in preventative spend and post disaster recovery infrastructure in response to climate-related disasters.
- Climate change is also spurring investments in water resources, renewable energy and clean technologies.
- Goal 9 of the U.N.’s Sustainable Development (SDG) - Industry, Innovation, and Infrastructure is to: “Build resilient infrastructure, promote sustainable industrialization, and foster innovation.”

“The world needs $94 trillion in infrastructure investment by 2040, according to the G20-backed Global Infrastructure Hub. Such a massive undertaking provides a rich environment for infusing both entrepreneurship and innovation into the infrastructure sector”
Infrastructure – Emerging Challenges

1. Impact of COVID – 19
   
   **Business**
   - Redefining of business and funding models plus lockdowns and job losses have reduced revenues for infrastructure projects.
   - Reduced revenues / budgets - Affordability pressure due to financial burden on Government-pays PPPs.

   **Personnel**
   - Limitation of personnel movement.
   - Ability to retain specialist skills for any future remobilisation.

   **Supply Chain**
   - Supply chain disruption – re-routing, delays, disputes and knock-on impact.
   - Security of the supply chain – Business closures.

   **Policy**
   - Compliance with regulatory commitments – MoWT SOPs.

   **Programme**
   - Disruption of project programmes: Completion state of each project - when is the most suitable point is to stop.

2. Climate change
   
   - SDG 13 (Climate action) is to: "Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy”.

3. Financing gaps/risks

4. Poor policy
   
   - Corruption.
   - Political influence.
   - Inefficiency of labour force.
   - Absence of incentives Poor accountability.
   - Less political concern given to the sustainability of urban infrastructure.

**Compensation Events**
- Claims for Extension of Time and associated costs due to SOPs.

Successful infrastructure development requires inclusive planning, disciplined oversight, transparency, rigorous review and tight control of budgets.
Infrastructure – Quantity Surveying Perspective

Opportunities for Quantity Surveyors on Infrastructure Projects

- Commercial and Cost Management
- Conflict avoidance and dispute resolution
- Contract administration
- Cost planning
- Due diligence
- Insurance
- Procurement and tendering
- Project financial control and reporting
Innovation - Infrastructure Projects
Innovation in Infrastructure

Policy Innovation
1. UN Sustainability Goals
2. Sufficient flexibility so as to cater to future needs and future technological advancements.

Financial Innovation
1. Through Public Private Partnership (PPP).
2. Promotion of more infrastructure debt financing
3. Tax exemptions and other financial incentives

Technological Innovation
1. During design and planning stage: BIM, 3D Printing
2. During Construction: Mobile connectivity, smart grids, pre-fabrication
3. During operation and maintenance: Drones, sensory maintenance

Innovation: a new method, idea, product, etc.
Cultivating an innovation culture for the infrastructure sector

**Technological and Digital Advancement**

1. Infrastructure development at the design and planning stage.
2. Actual construction e.g. New building materials, new and more efficient methods of construction, pre-fabrication and others.

**Upskilling of Professionals.**

Construction companies need to ensure that they have the skills, knowledge and systems in place to build the associated infrastructure.

**Regulatory Systems must be ready for change**

Systems need to have various regulatory frameworks required and infrastructure

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1. Technological and Digital Advancement
2. Upskilling of Professionals.
3. Support from Regulatory Systems
Benefits of Innovation in infrastructure

1. **Addressing skills shortages**
   - Increasing use of robots and automation
   - Moving to off-site construction techniques such as pre-casting, pre-fabricating and pre-assembly

2. **Better collaboration**
   - Online collaboration platforms

3. **Improved health, safety and quality**
   - Improved accuracy and reduced human error by increasing automation
   - Equipment with embedded sensors will also increasingly enable updates to be sent alerting teams to the fact that they need maintaining or repairing

4. **Increase in sustainability**
   - The development of new building materials which work more in harmony with the environment, have a lower carbon footprint and are more durable, meaning less wastage and less frequent replacement or upgrading

5. **Faster and more efficient execution of works**
   - By using 3D and 4D printing, and self-transforming objects which self-assemble
Challenges of incorporating innovation into the infrastructure industry

1. Availability of funds and upfront capital
   - Training people
   - Procuring the technologies
   - Payment for associated regulatory licences

2. Lack of collaboration
   - Innovation ecosystems are required to boot innovation.

3. Statutory Regulations to support and facilitate the change
   - Enforcing the applicable Statutory Regulations on infrastructure as a way to support innovation

4. Projects to support capital investment in innovation.
   - Investors will invest in projects with good Return on Capital

5. Data Processing and Privacy
   - Processing and using the data in real time will get more difficult.
   - Demands for regulation around privacy are likely to escalate.

Innovation is a wide concept that includes improvements in processes, products or services.
How is Innovation Employed in Infrastructure – Case Studies
Case Study: Staying Big or Getting Smaller

Source - Energy Atlas 2018: Figures and Facts about Renewables in Europe
Case studies

The Development Of Kabaale International Airport In Hoima, Uganda

Impact

Financial Innovation: Funding from United Kingdom Export Finance, Standard Chartered Bank UK, GoU (PPP)
Policy Innovation: Tax exemptions from project
Technological Innovation: Highly mechanised. Monitoring Environmental Social Action Plans

Development of Infrastructure at Kampala Industrial and Business Park, Namanve

Impact

Financial Innovation: Funding from United Kingdom Export Finance, Standard Chartered Bank UK, GoU
Policy Innovation: Tax exemptions from project
Technological Innovation: Proposed utilisation of BIM, prefabrication and pre assembly of units
Case studies

**Entebbe International Airport**

**Impact**

**Financial Innovation:** Loan from the Export-Import Bank of China for the phase one and a grant from Government of South Korea for the NAVAIDS and AWOS

**Technological Innovation:** Utilisation of BIM, upgrading NAVAIDS and AWOS

**Jinja Industrial Park**

**Impact**

**Financial Innovation:** Funding from Trademark East Africa

**Technological Innovation:** Proposed utilisation of BIM, prefabrication and pre-assembly of units
Case studies

**Nexus Green**

**Impact**

**Financial Innovation:** Funding from United Kingdom Export Finance, Standard Chartered Bank UK, GoU

**Policy Innovation:** Tax exemptions from project

**Technological Innovation:** Green Energy