

# **Sustainable Campus of the Future: An Asset Management Perspective in South Africa**

## **Assets Reliability and Resilience**

Simphiwe Hashe – SAAMA President

# Outline

	Content
1	University Campus Sustainability
2	Asset Management System
3	Data, Digitisation and Digitalisation of Asset Information
4	Technology Integration
5	Asset Lifecycle Optimisation
6	Data Modeling and Availability
7	Asset Management Knowledge and Penetration

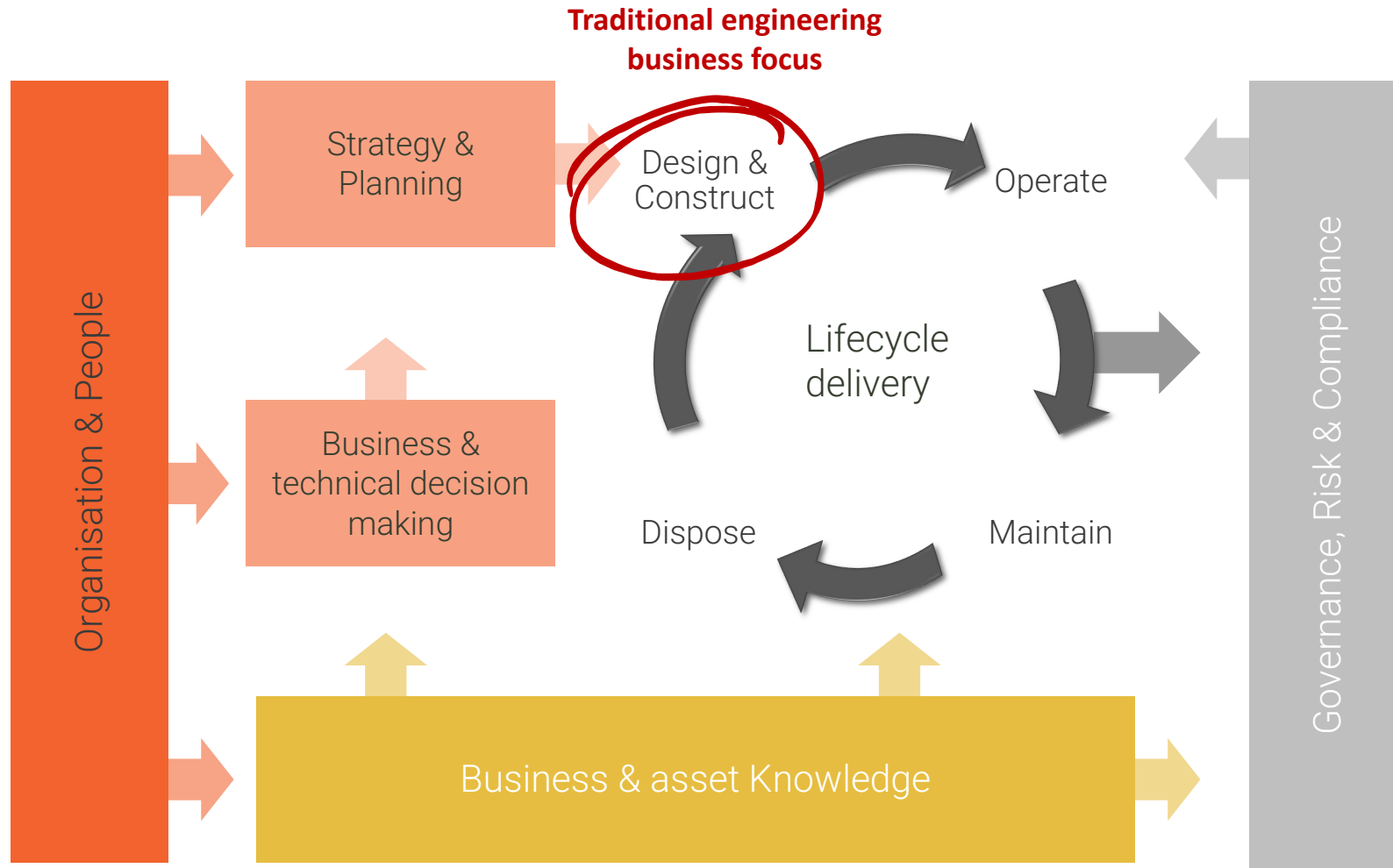
## Campus Sustainability

The concept of a "sustainable campus of the future" envisions a university environment that integrates cutting-edge sustainability practices into its infrastructure, operations, and educational mission. This type of campus would not only reduce its environmental impact but also serve as a model for sustainability in society at large. Some of the Key features of a sustainable campus of the future could include:

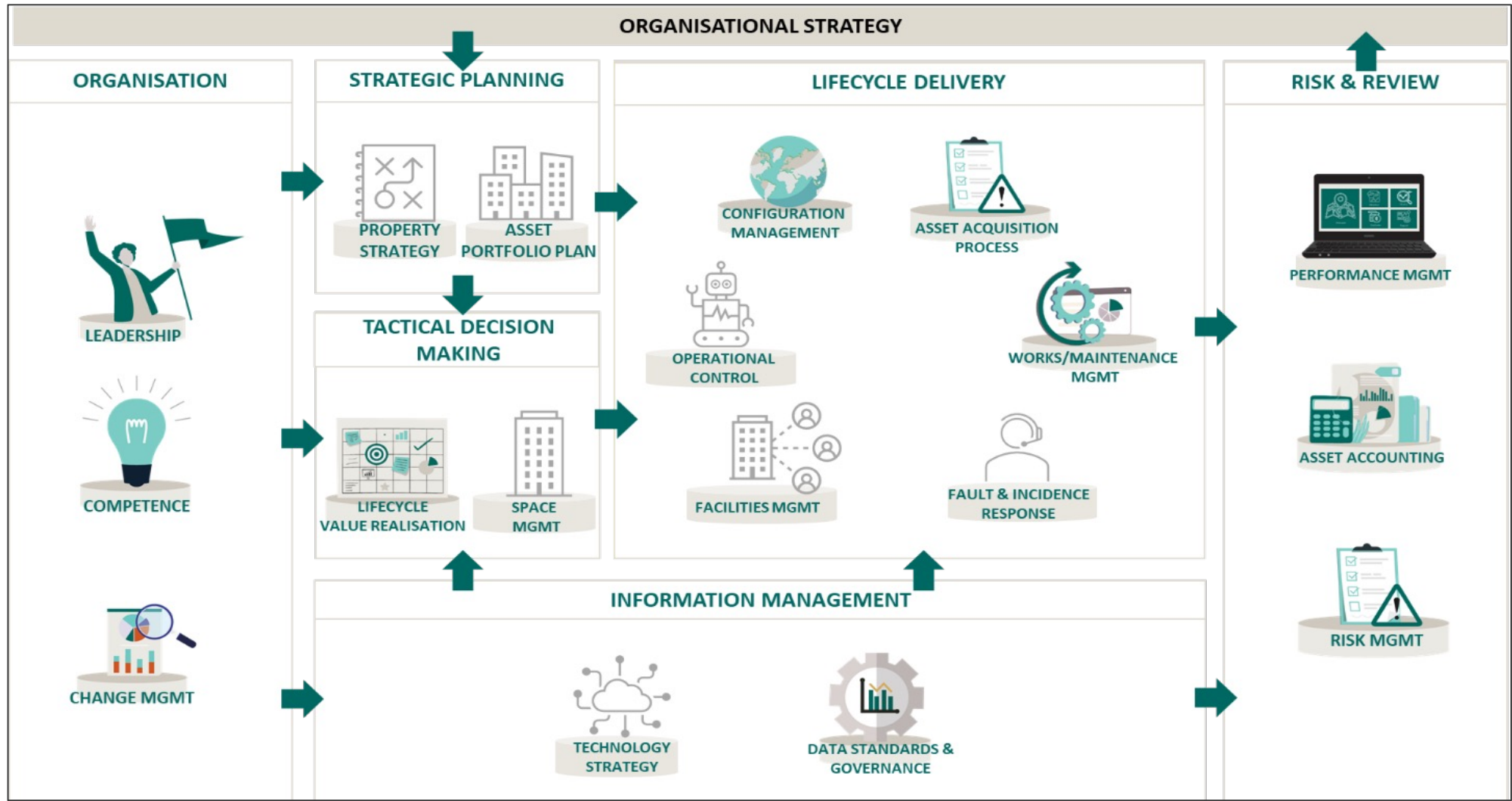
### Key Features:

- Net-Zero Energy Buildings - Buildings on the campus would be designed to be energy-efficient, using advanced insulation, energy-saving technologies, and smart systems to optimize energy use.
- Sustainable Transportation - The campus might feature electric vehicle (EV) charging stations, electric campus shuttles, and autonomous, shared vehicles for on-campus transportation.
- Smart Water Systems - Advanced monitoring systems could detect leaks, track water usage, and automatically optimize water distribution.
- Climate-Adaptive Infrastructure - Buildings and systems would be designed to withstand extreme weather conditions such as heatwaves, flooding, and storms, using materials and designs that promote resilience.

# Asset Management System in an Organisation



# Building Resilience through an Asset Management



# The nature of Emerging Technologies

## DIGITIZATION



The process of making information available and accessible in a digital format.

## DIGITALIZATION



The process of considering how best to apply digitized information to simplify specific operations.

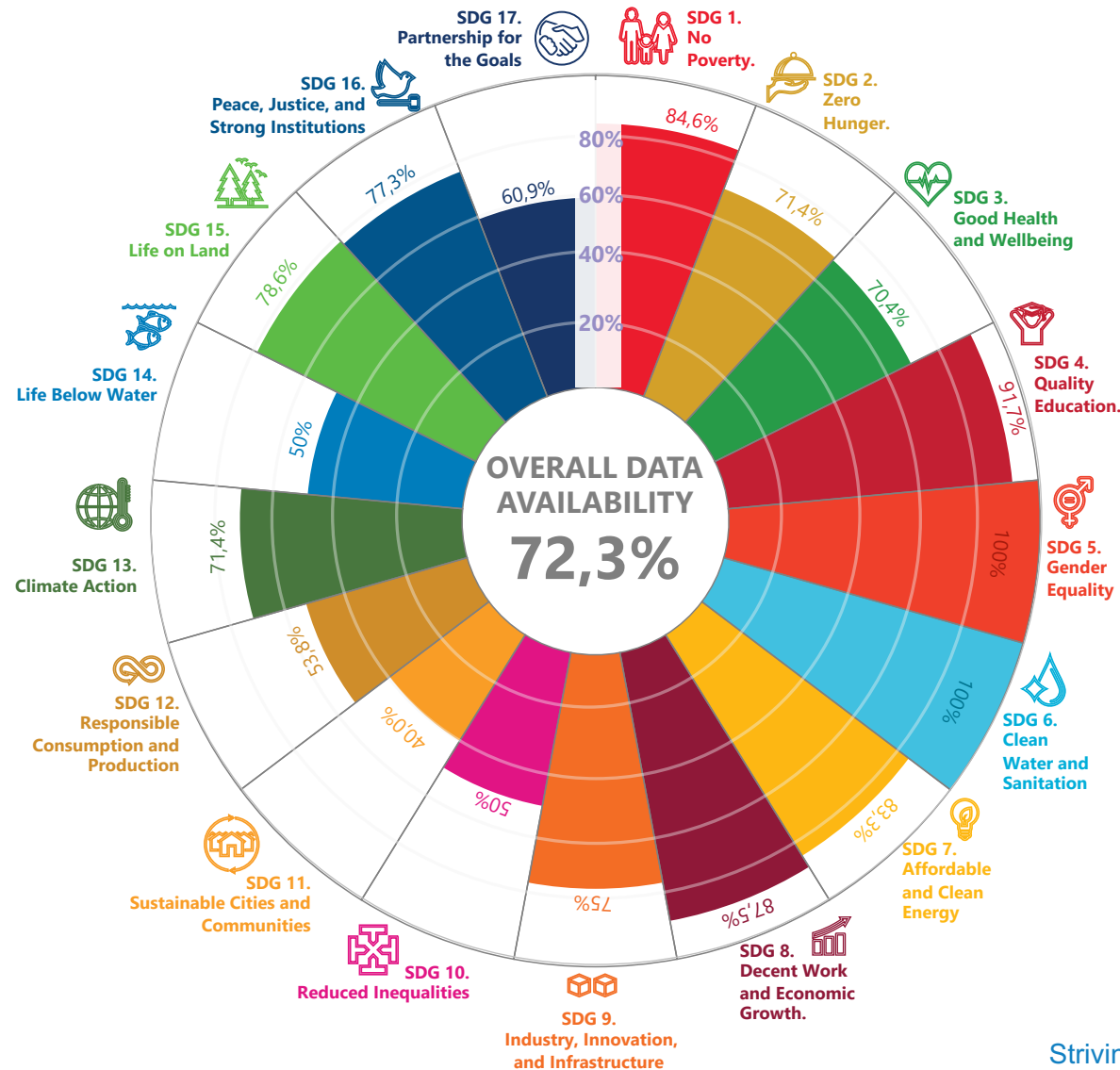
## DIGITAL TRANSFORMATION



The process of devising new business applications that integrate all the digitized data and digitalized applications.

# Data Availability in South Africa towards meeting SDGs

*Data availability varies by Goal*

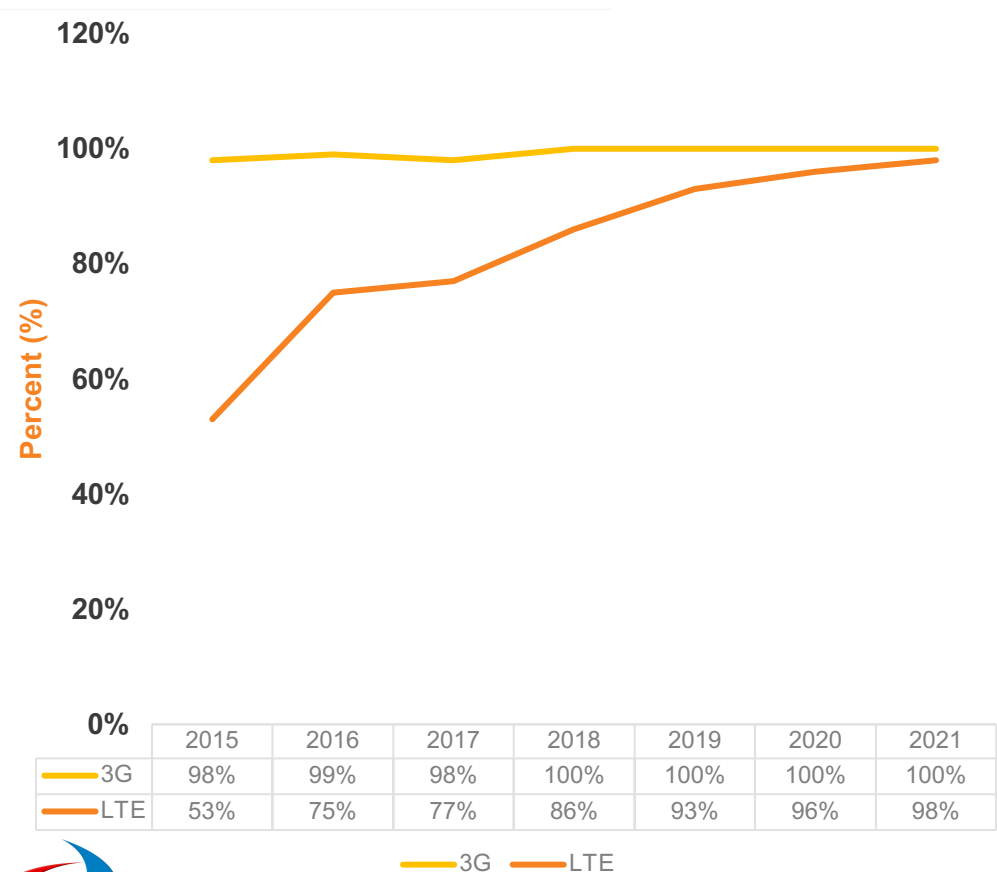


# South Africa's Progress on Goals 9 and 11

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE  
Build resilient infrastructure, promote sustainable industrialisation and foster innovation

Proportion of the population within the range of 3G technology increased to 100.0% in 2021, while the population in the range of Long Term Evolution (LTE) rose to 98.0% in 2021.

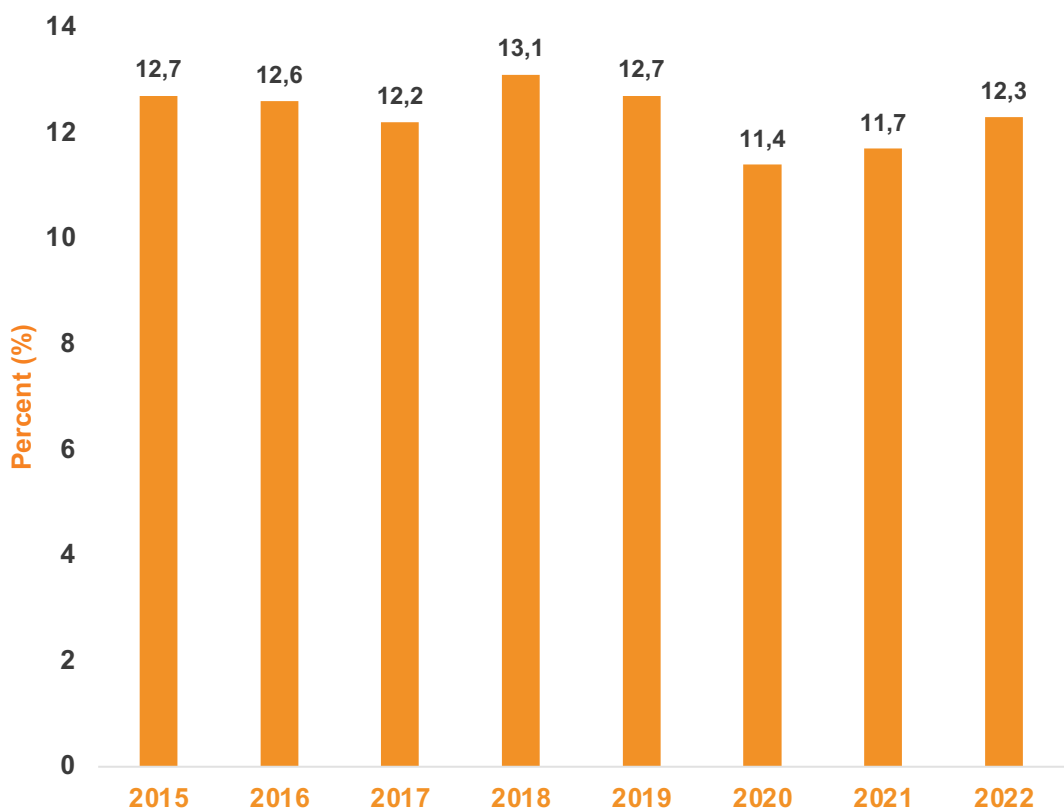
Proportion of population covered by a mobile network



11 SUSTAINABLE CITIES AND COMMUNITIES  
Make cities and human settlements inclusive, safe, resilient and sustainable.

Percentage of urban population living in informal dwellings remained relatively stable between 2015 and 2022. This indicates a need for an improvement to ensure that more people have access to adequate housing and informal dwellings be upgraded.

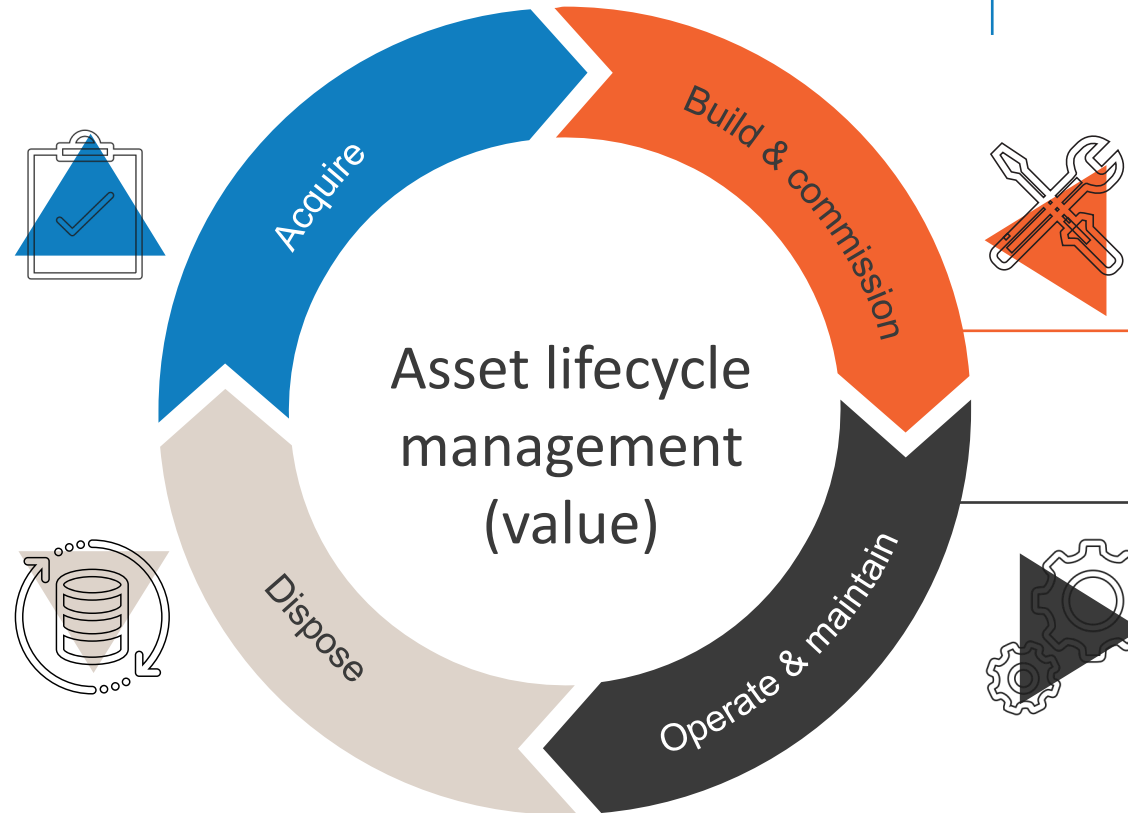
Percentage of urban population living in informal dwellings





# Asset Lifecycle Management

All asset management standards, and guidelines emphasize the need to consider the whole life cycle of the asset when making decisions about the asset. Maintenance is a phase within the asset life cycle



An effective asset management system is necessary to meet and maintain expected service delivery levels.

**Operating and Maintenance Plans, Strategies, Standards & Procedures**  
**Maintenance work management, condition assessments, condition monitoring and predictive analytics**  
**Asset and process performance monitoring**  
**Inventory/Spares management**  
**Remaining life assessments**  
Striving towards Asset Management **Excellence**

# Smart Buildings and campus - Technology

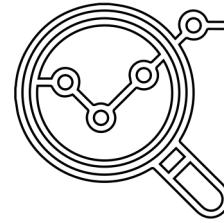
## Upwards reporting

To management to improve operation of building and financial return

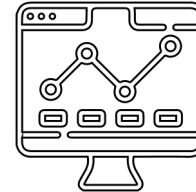
## Downwards reporting

To tenants, staff, occupants, and visitors to improve experience

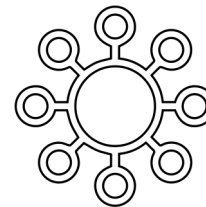
Data /  
Analytics



Communication  
Platform



Network



Edge devices:  
Sensors /  
Gadgets



- **Analysing data, understanding utilization**, asset use and performance – ability to intervene and learn behaviours
- **Integrated software platform** with **access** to all occupants – building a **knowledge** and understanding of **performance**
- **Integrated network** between software, devices
- **Internet-of-Things** WiFi and people tracking, sensors, access cards, face recognition. Number plate recognition, temperature, CO<sub>2</sub>, light levels, space usage, energy, water etc.

# Smart Technology Integration

- **Digital Twins:** The campus could use digital twin technology to simulate and manage energy use, building performance, and even student and staff movements, allowing for real-time adjustments to optimize sustainability.
- **IoT Sensors:** Sensors could monitor environmental conditions, energy use, and resource consumption across campus, enabling precise control and adjustments to minimize waste and energy consumption.
- **Artificial Intelligence (AI):** AI-driven systems would analyze data from various sources to predict energy needs, optimize HVAC systems, and reduce overall resource usage.

Lifecycle Optimisation

Owner, Consultants

Facilities Management

FM Contractor

CAPEX stage to OPEX Stage

*The changing players*

Occupation and  
Operations

Owner, Operator  
Tenants

**TRANSITION**

Commissioning

Main Contractor + subbies  
Principal Agent  
Engineering Consultant

Construction

Main Contractor + subbies  
Principal Agent  
Engineering Consultant

Procurement

Owner's Procurement  
Professional Team

Planning

*Architects, Planners*

Conceptual  
Design

*Architects,  
Engineers*

Design and  
Engineering

*Architects,  
Engineers*



Striving towards Asset Management Excellence

# Facilities Management

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

# Asset Management

*Service delivery to tenants:*  
*Tenant changes required*  
*Management of changes*  
*[where is the info?]*  
*Expansion, modification,*  
*Repurpose, demolish*

# Lifecycle Optimisation

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

## Occupation & Commence Operations

### TRANSITION

## Hand-over Documentation

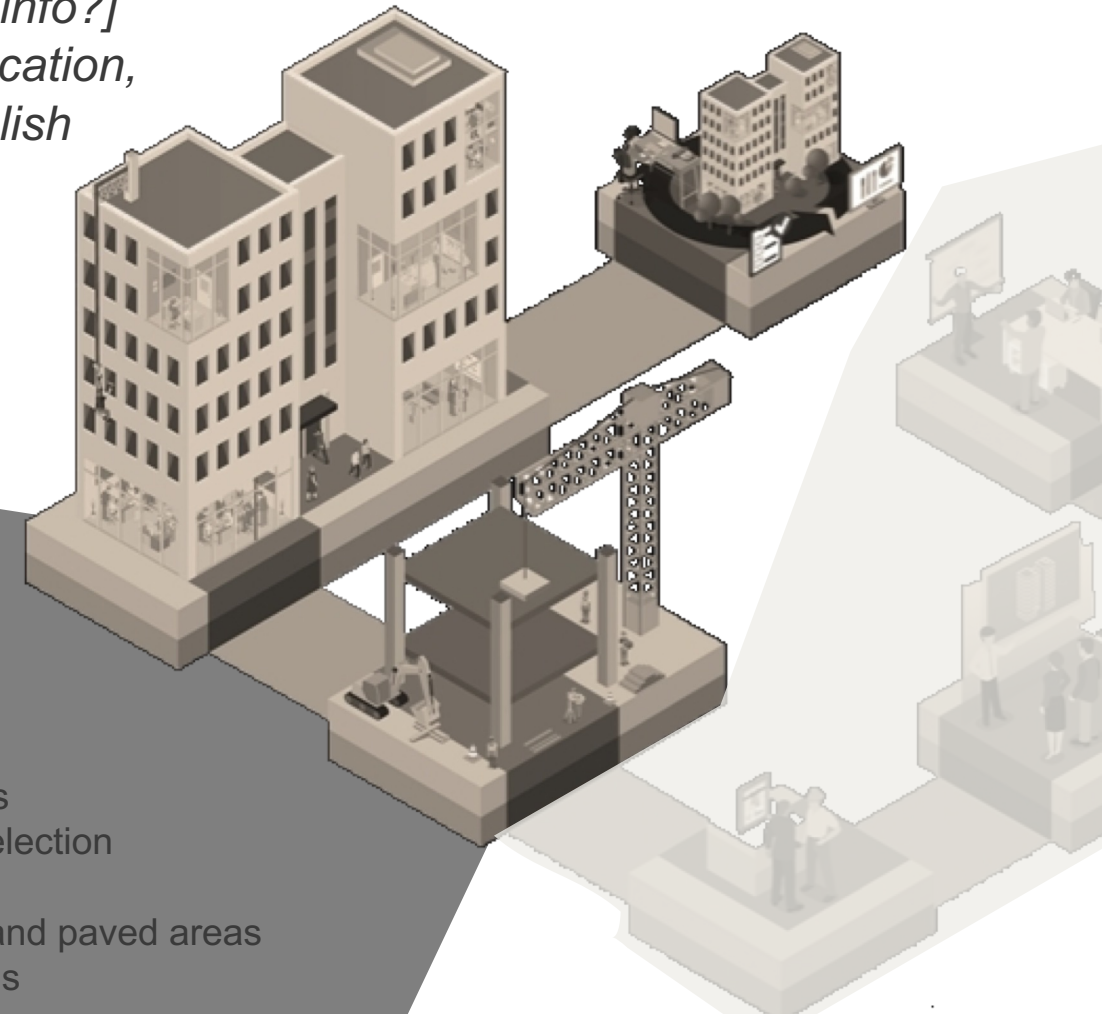
As-Built Records  
2D Layouts  
Survey data and drawings  
Taking over certificates  
P&ID of Plant and equipment  
OEM Manuals & Warrantees

## Supervise, witness, accept

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

## Commissioning

A seamless transition requires an approach towards digitisation and digitalisation of asset information.



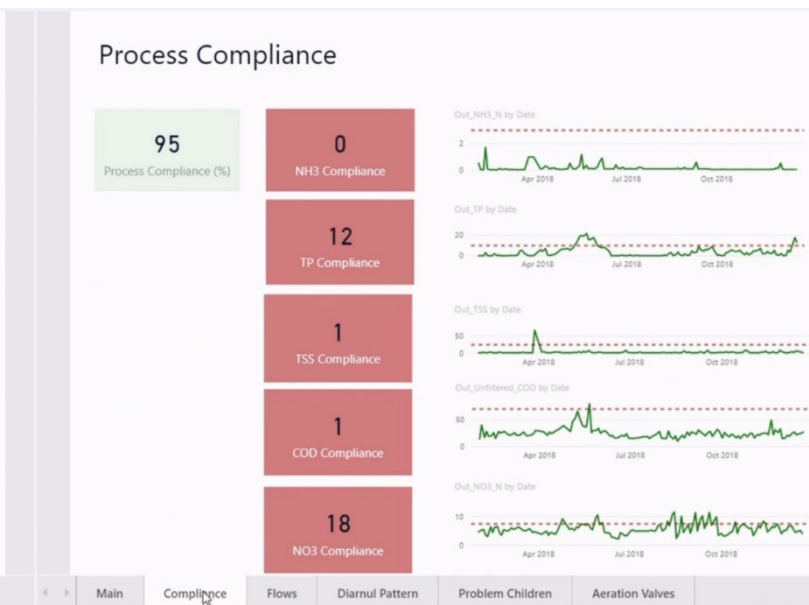
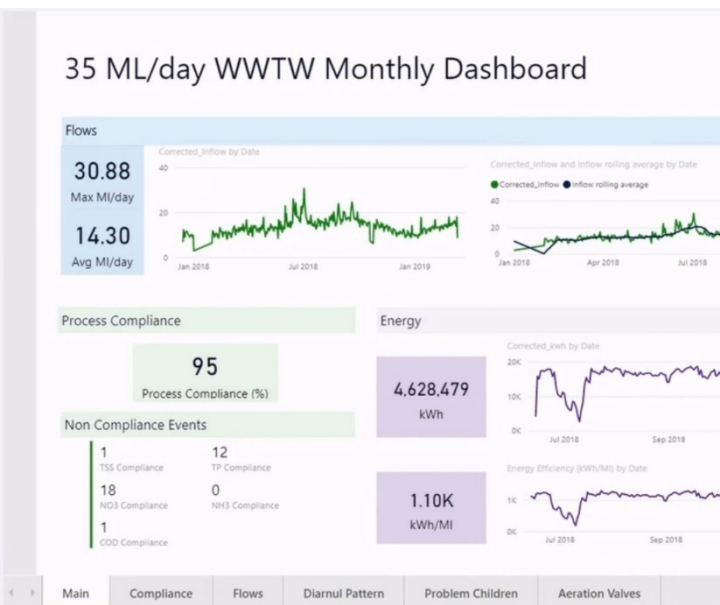
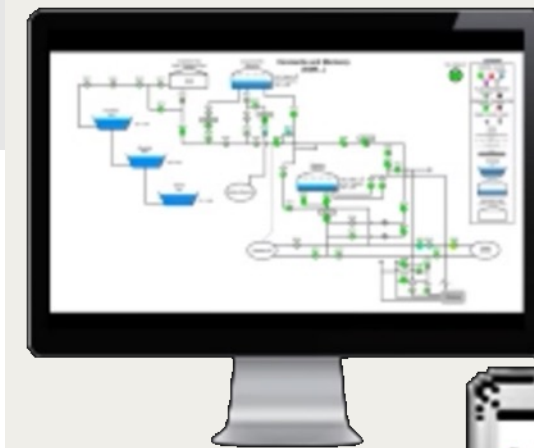
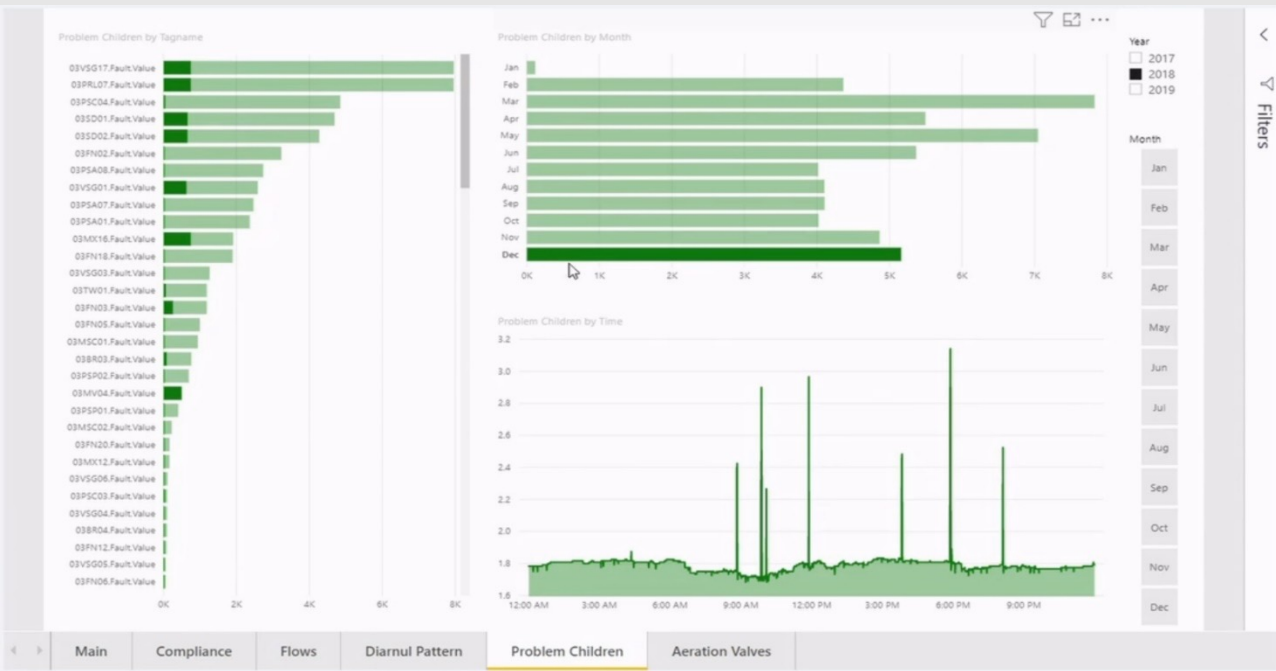
Construction

ing towards Asset Management Excellence

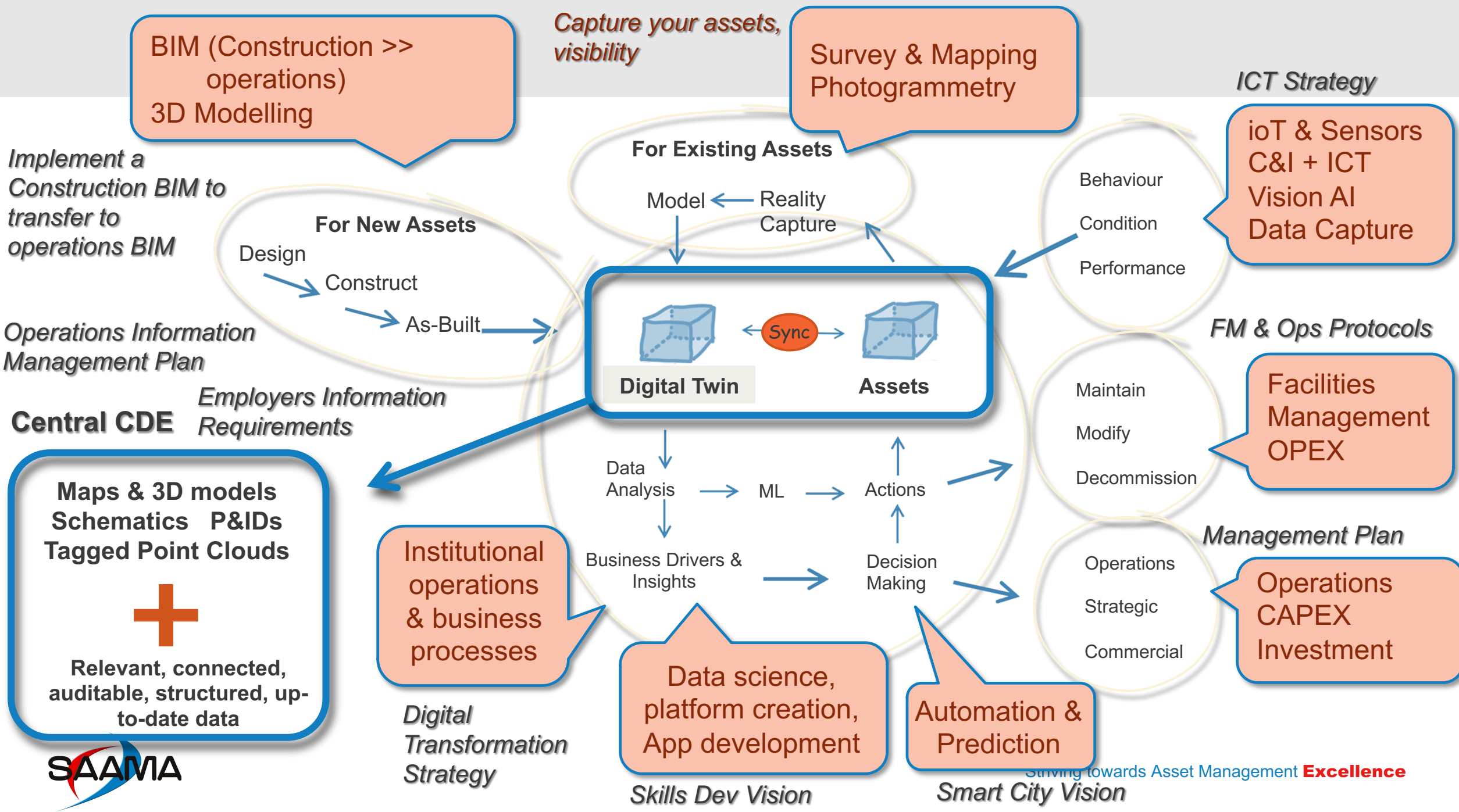


A single building in a development may have a large number of sensors, collecting information about power, water, temperature, occupancy, access control, fire system status... This generates a lot of information. You need a game plan!



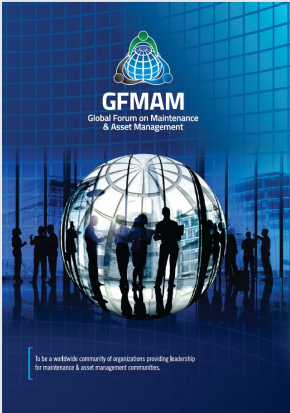






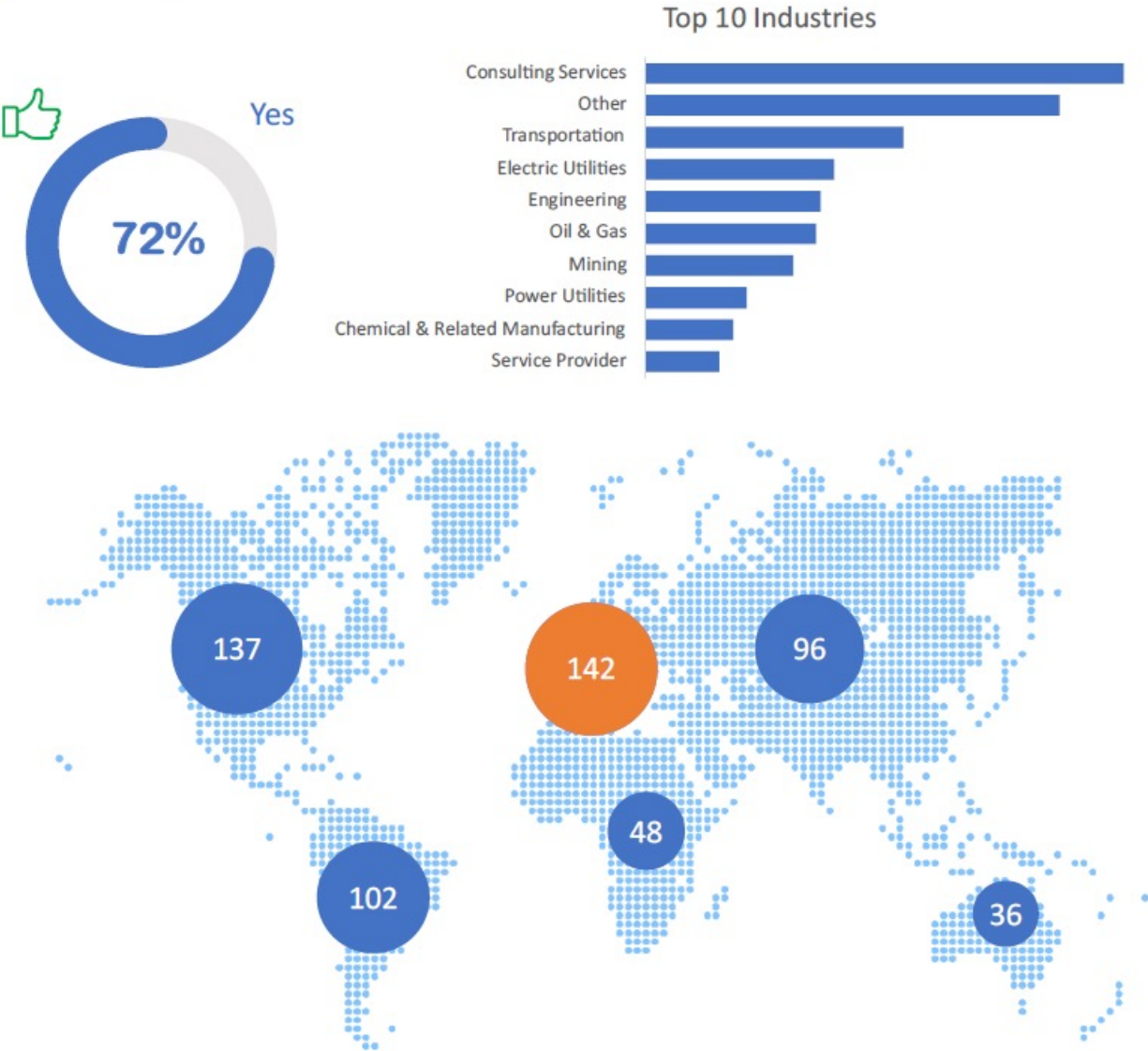


# GFMAM Survey Responses by Category

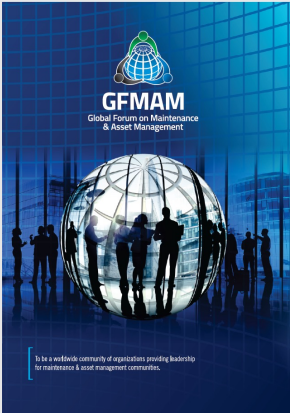


## 1. Knowledge, Experience, and Implementation of Asset Management

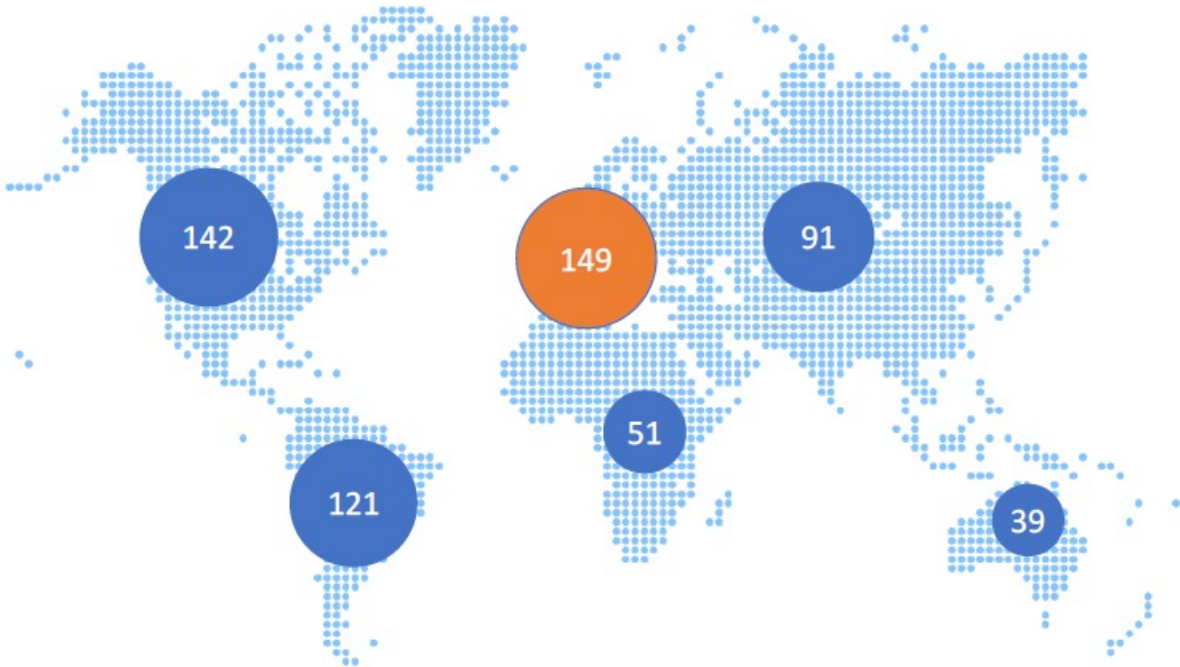
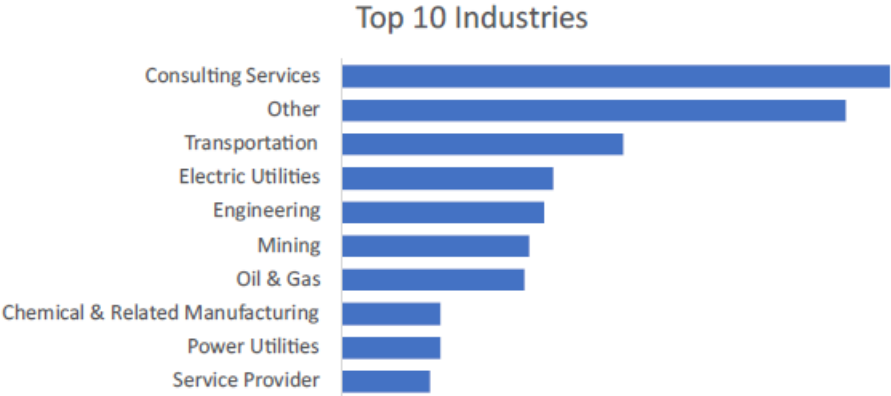
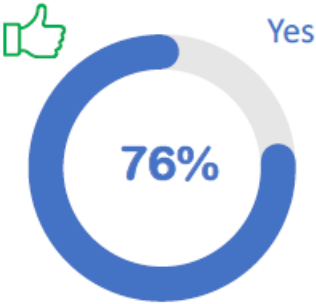
Have you ever implemented an asset management system in an organization?



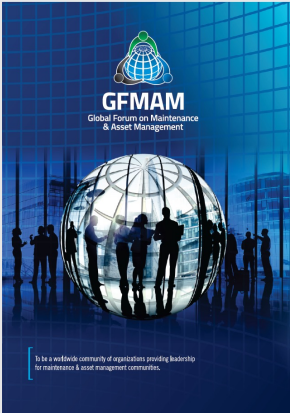
# GFMAM Survey Responses by Category



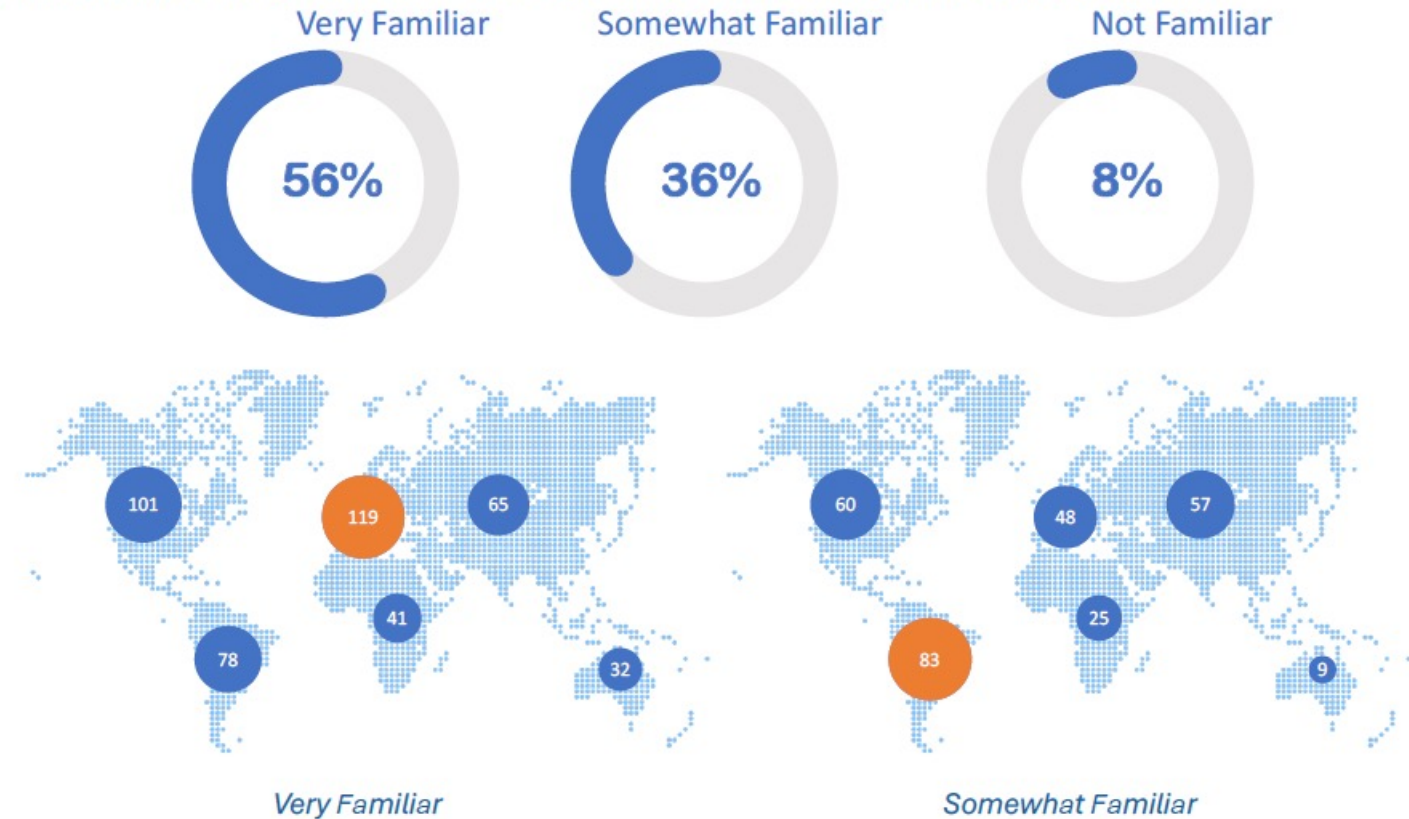
Have you ever been involved in developing an asset management plan?



# GFMAM Survey Responses by Category

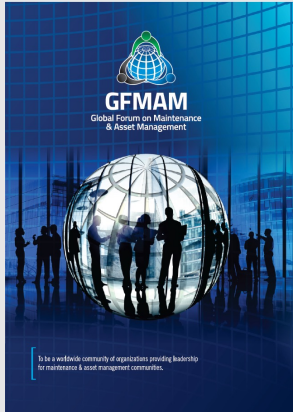


How familiar are you with the concept of whole-life value in asset management?





# GFMAM Survey Responses by Category

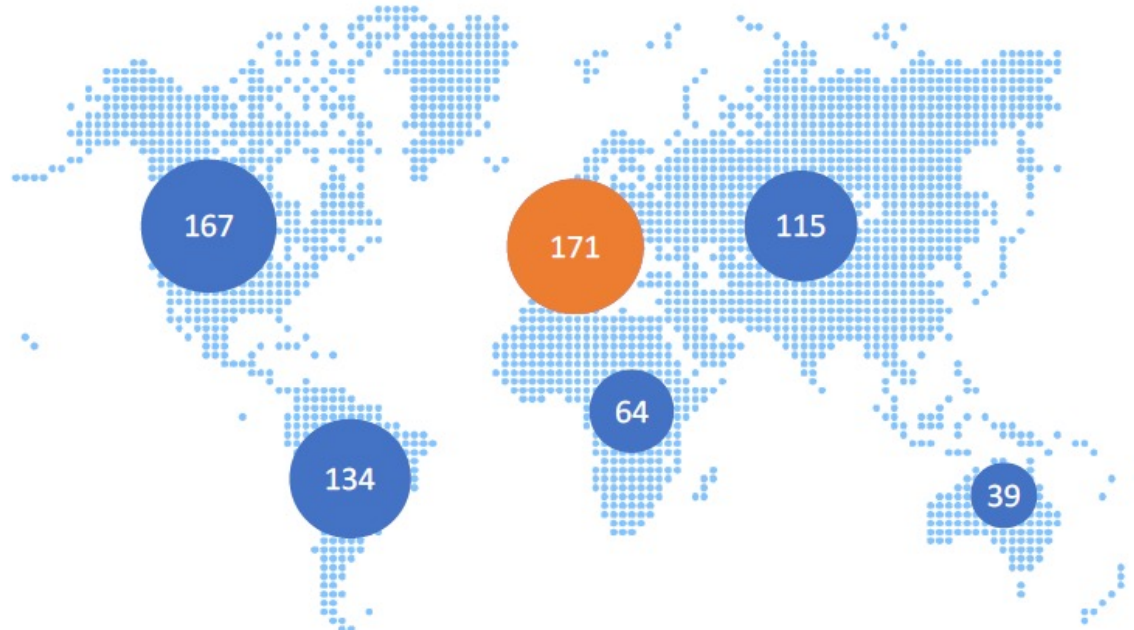
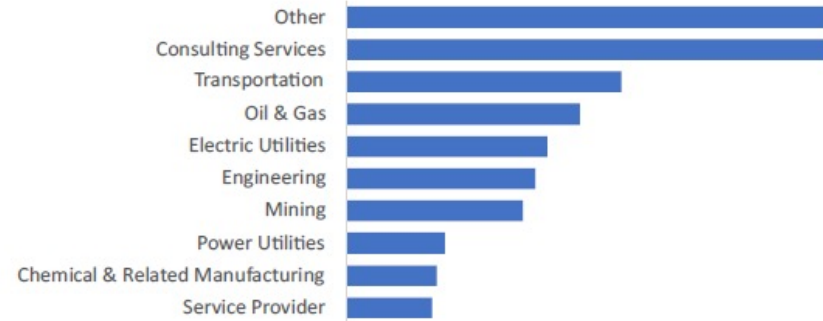


## 2. ISO 55000 Standard Awareness and Familiarity

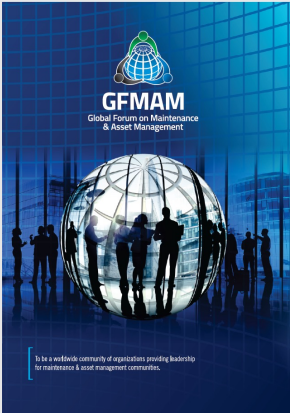
Are you aware of the ISO 55000 standard for asset management?



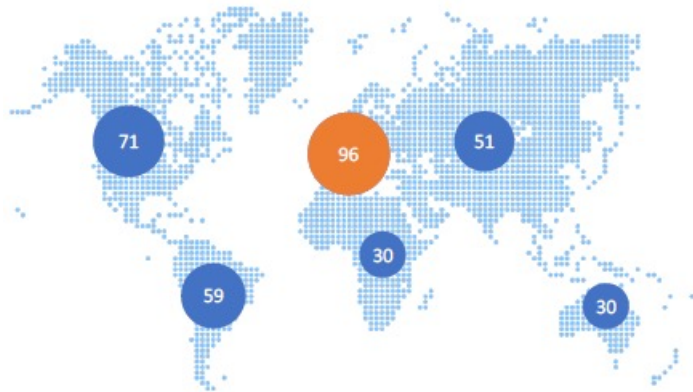
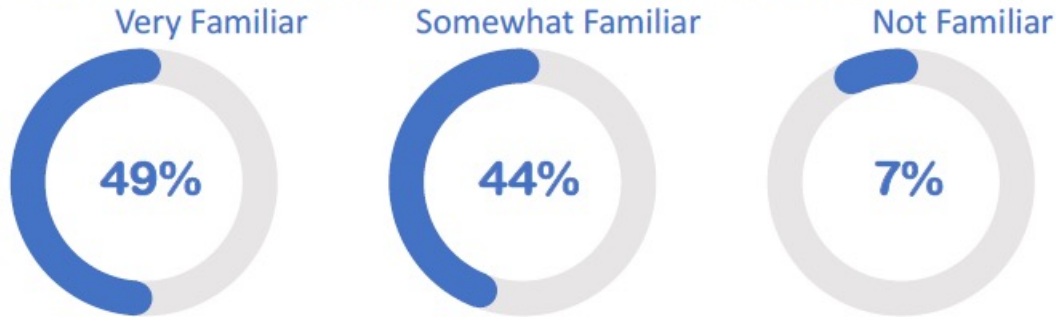
Top 10 Industries



# GFMAM Survey Responses by Category



How familiar are you with the key requirements of the ISO 55000 standard?

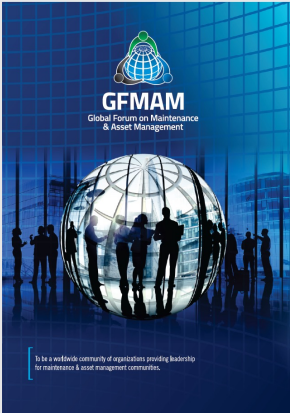


Very Familiar

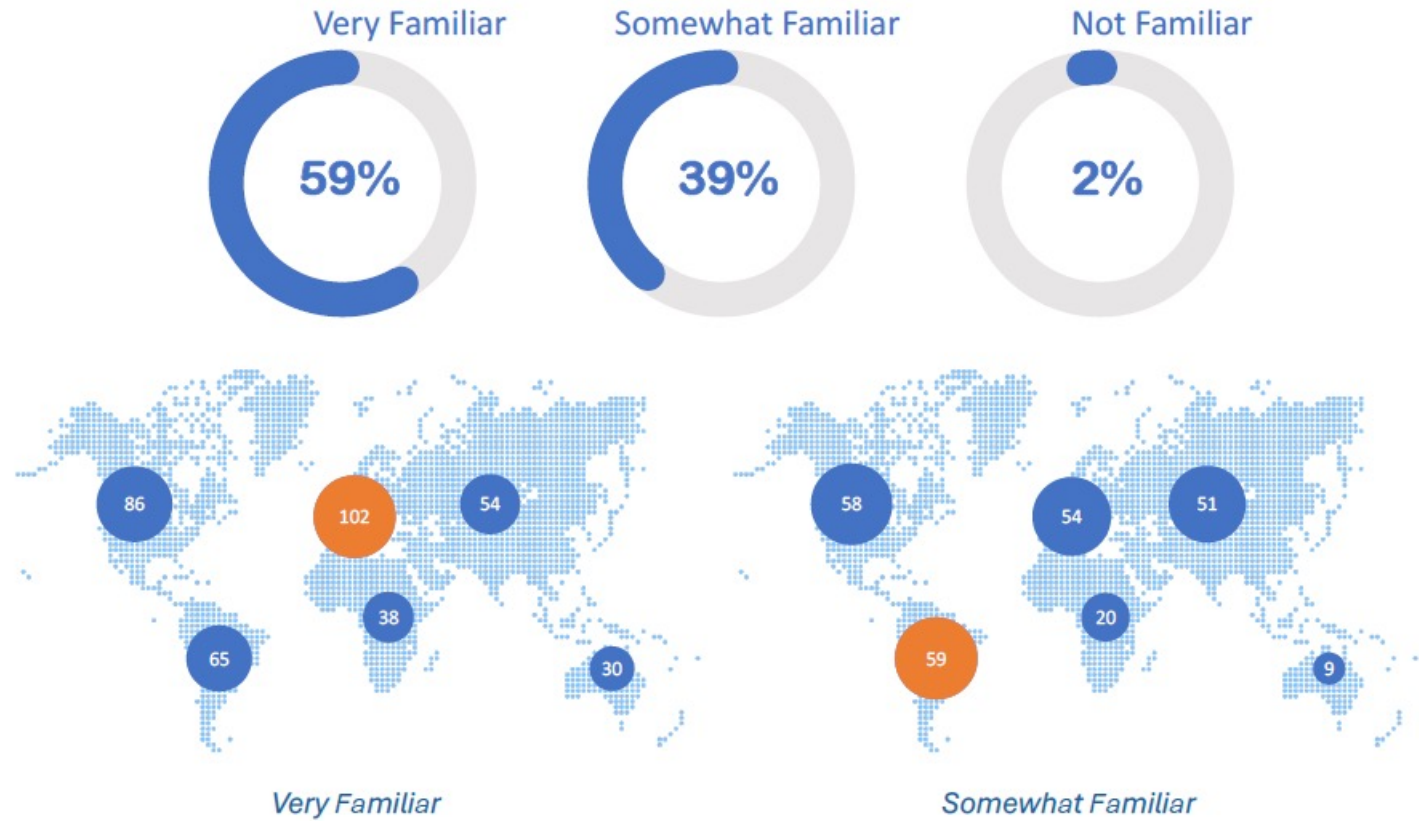


Somewhat Familiar

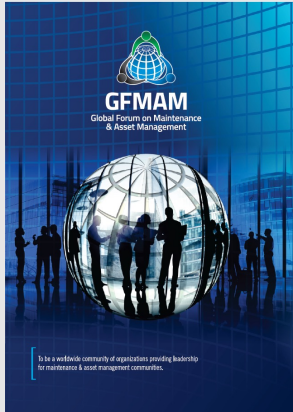
# GFMAM Survey Responses by Category



How familiar are you with the key benefits of implementing the ISO 55000 standard in an organization?

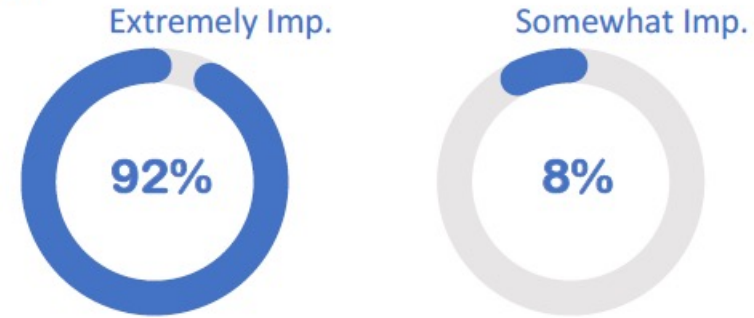


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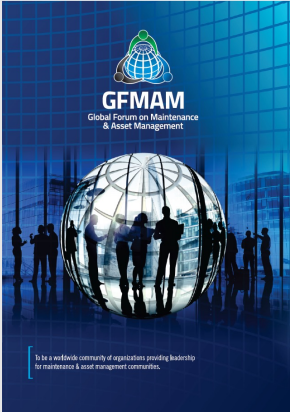
## 3. Organizational Alignment and Risk Management

In your opinion, how important is to align your asset management initiatives against organizational objectives?

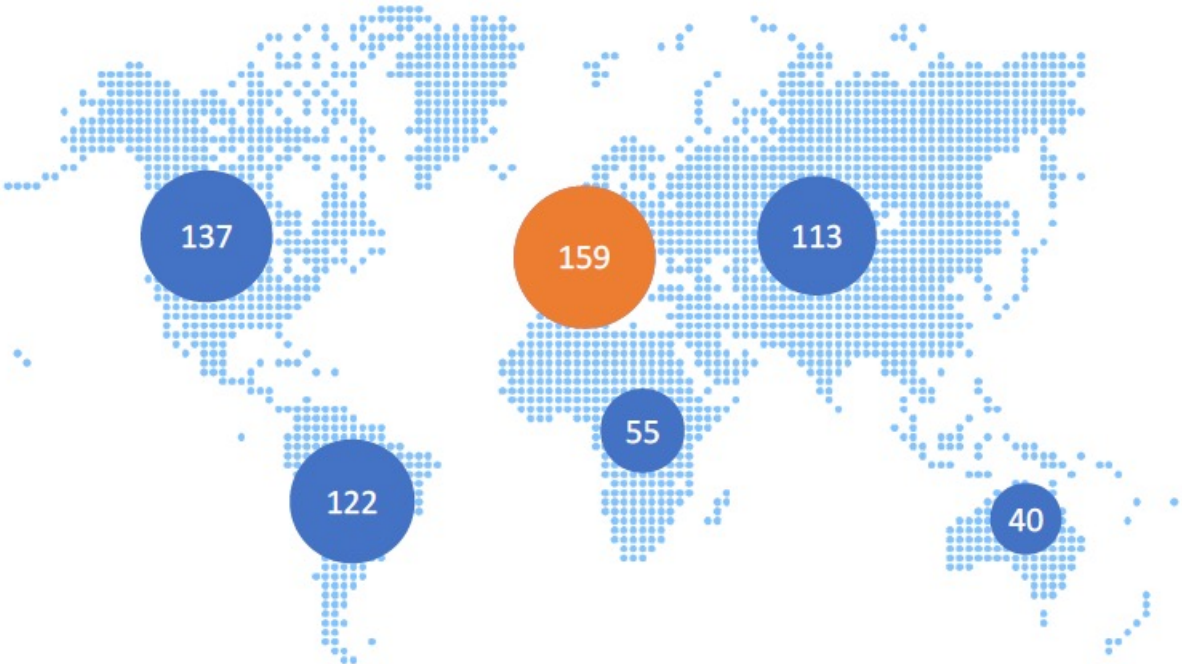
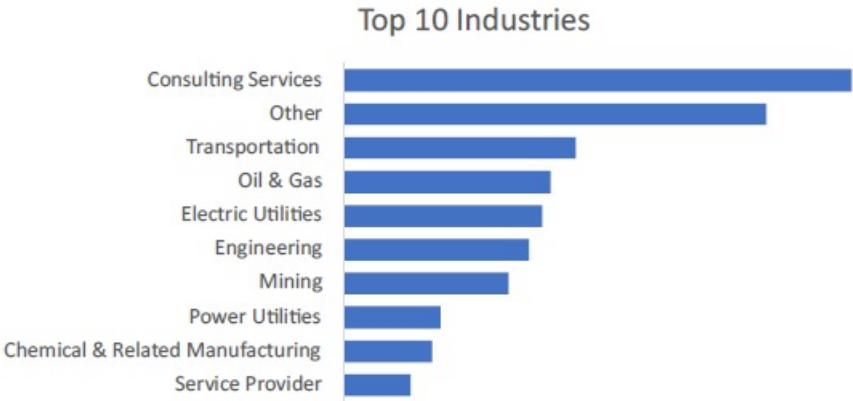
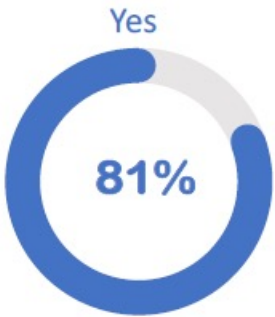




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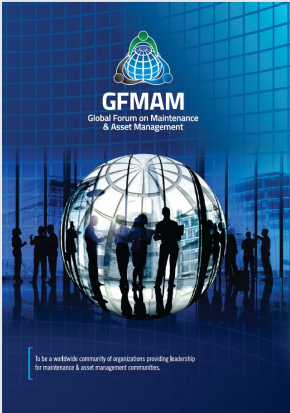


Do you have a risk management component in your asset management program?



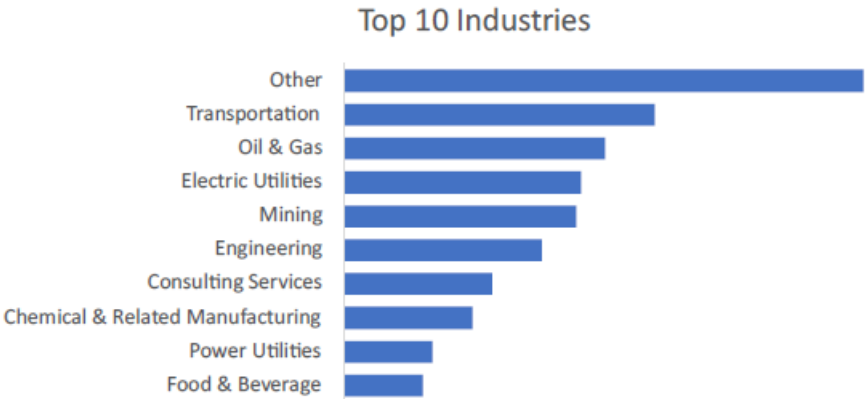
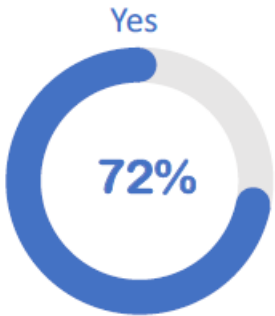


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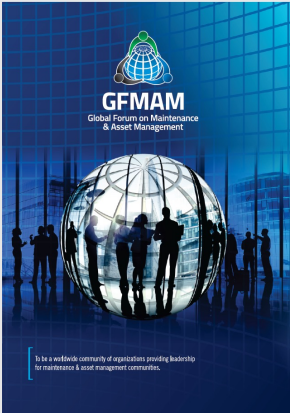


## 4. Employment and Role within the Organization

Do you work for an organization that is an asset owner?

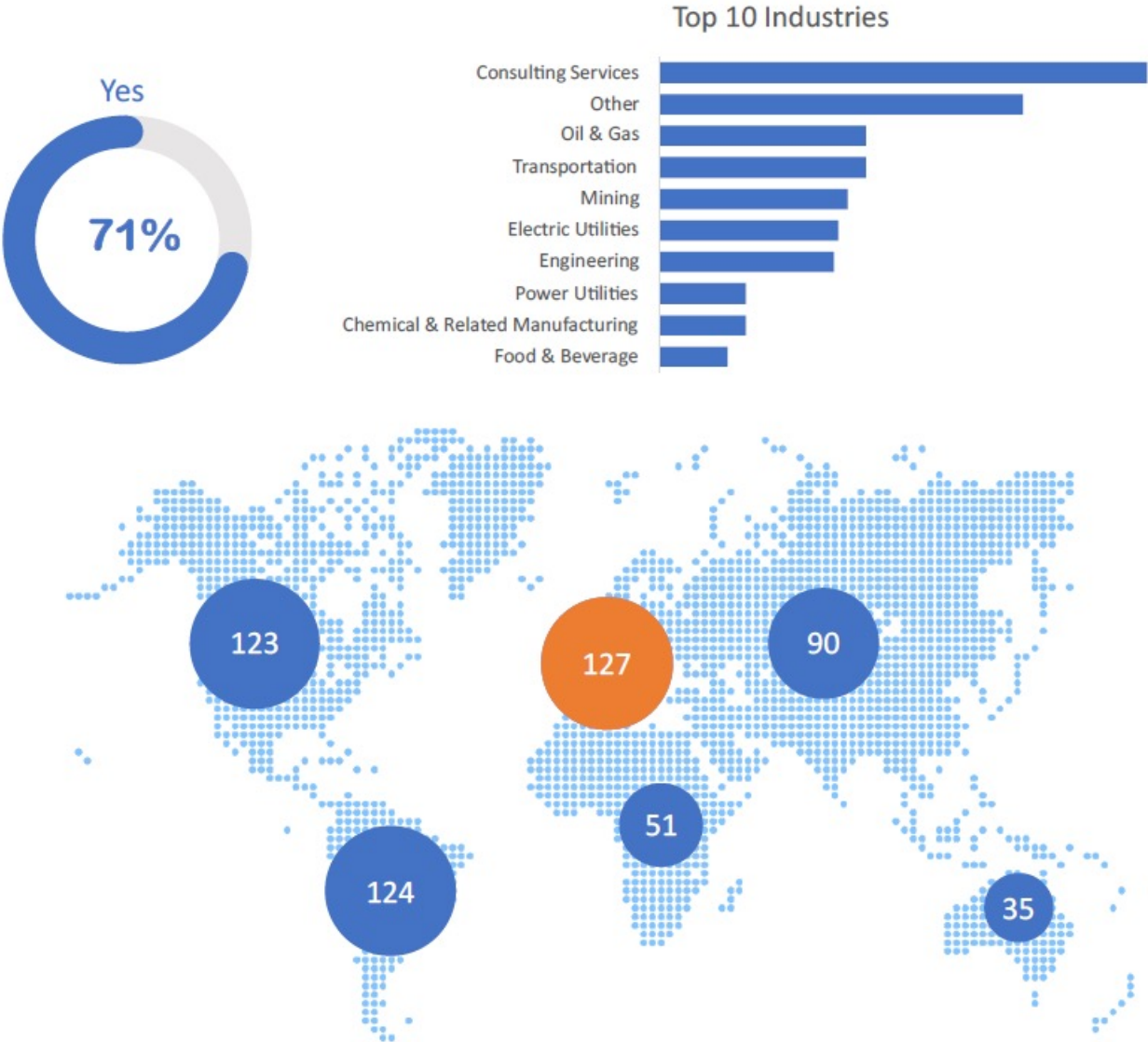


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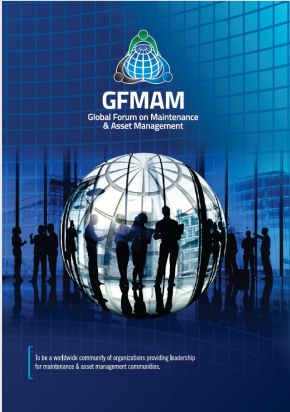


## 5. Assessment and Performance Metrics

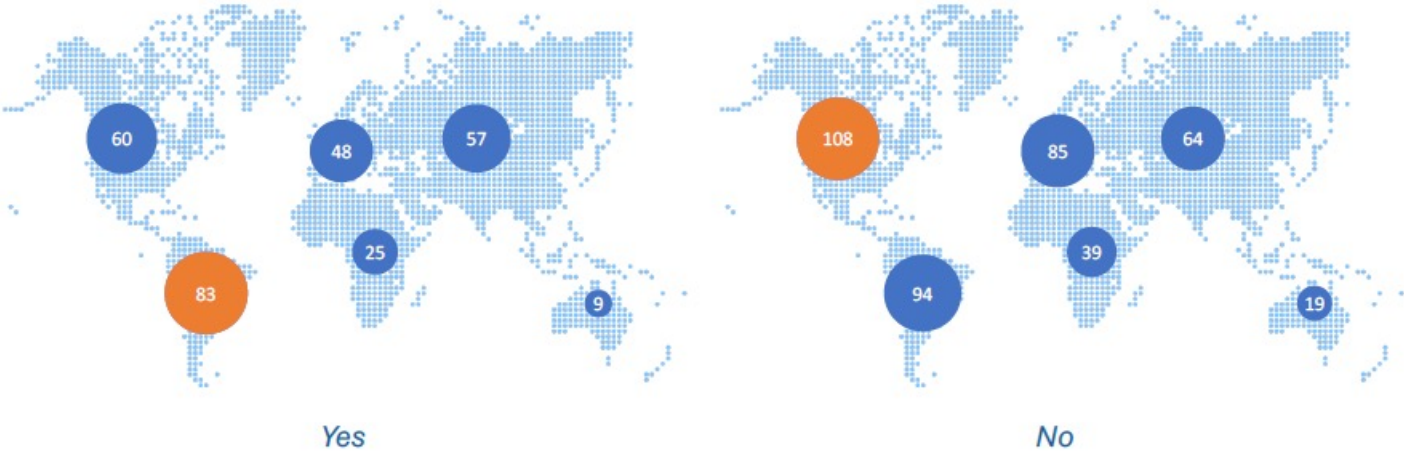
Do you use performance metrics to measure the effectiveness of asset management?



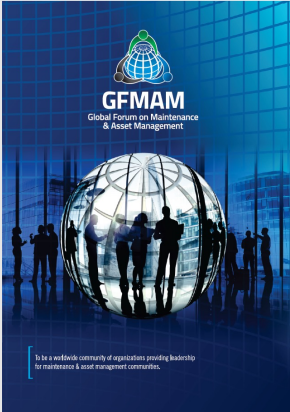
# GFMAM Survey Responses by Category



Has your organization ever had its asset management program assessed?

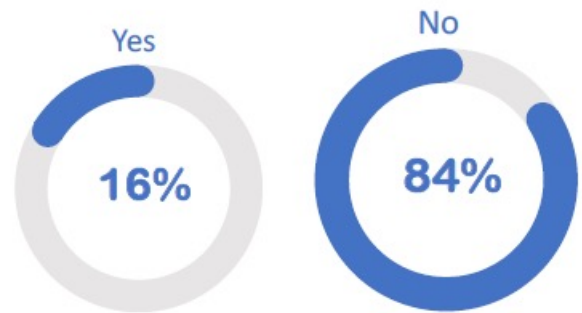


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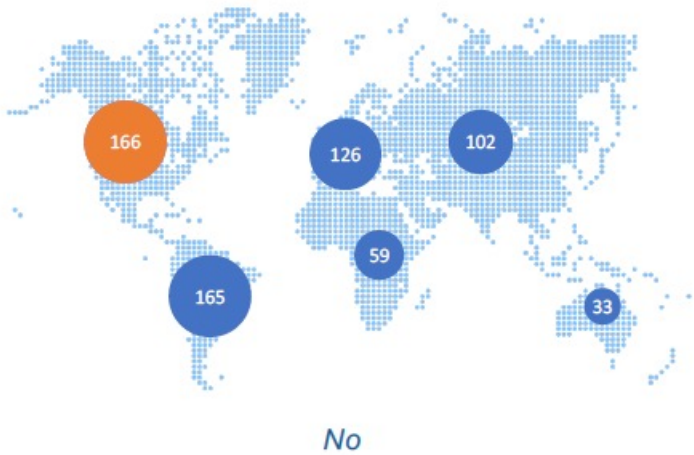
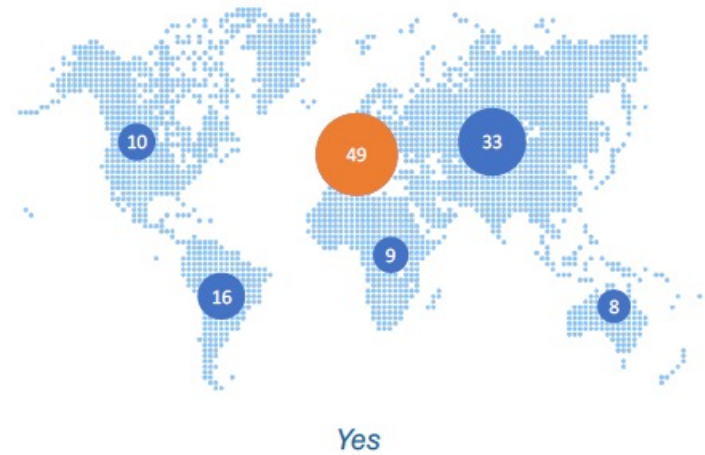
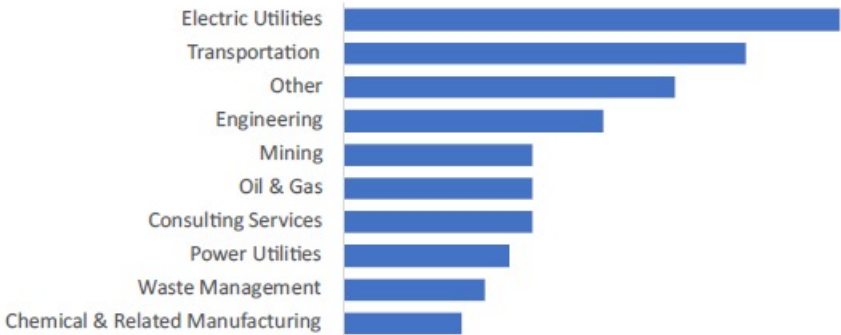


## 6. Certification Status and Future Plans

Is your organization ISO 55000 certified?

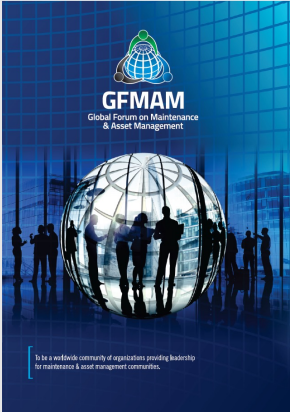


Top 10 Industries with ISO55000 Certification

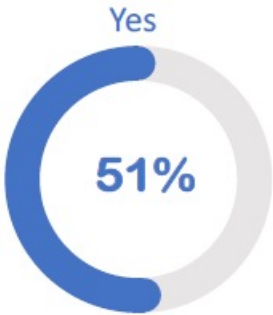




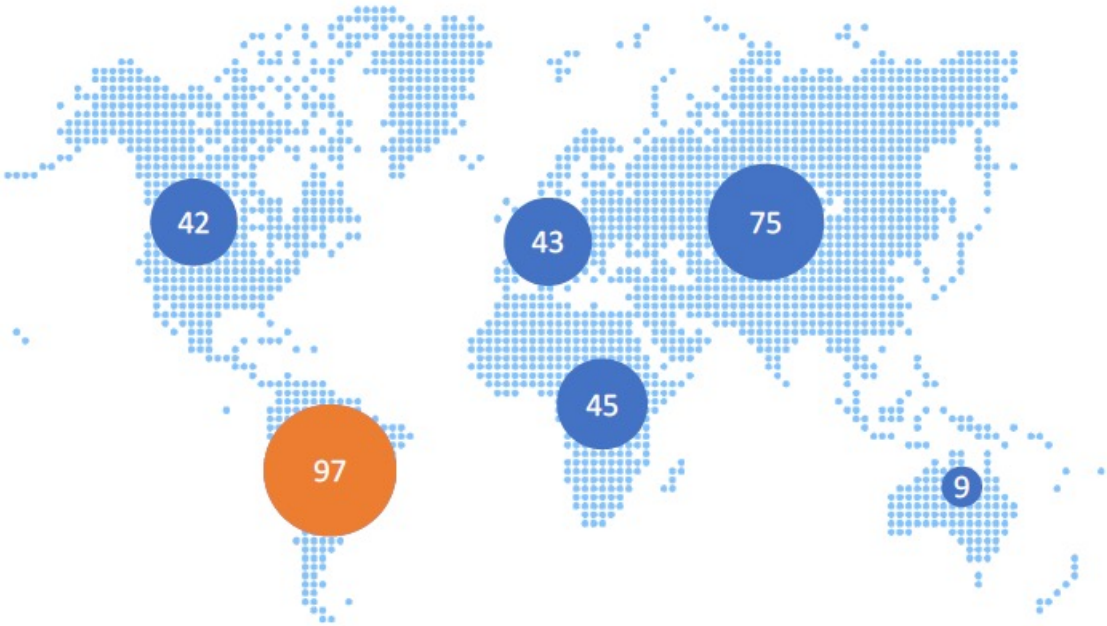
# GFMAM Survey Responses by Category



Do you plan on getting certified in the future?



Top 10 Industries Planning to Get Certified





**Thank you**



Striving towards Asset Management **Excellence**