

**Project Controls Expo UK - 13<sup>th</sup> November 2019**  
Emirates Arsenal Stadium, London

# **Role of Innovative Project Management Tools in the delivery of a Megaproject**

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**Maged El Hawary** – Managing Director  
**Tamer El Gohari** – VDC & Innovation Manager  
**Mohamed Nagi** - Digitalization & BI Manager

**Analytica (ASGC Group)**



# About the Speakers

**Maged El Hawary**  
Managing Director



- More than 20 years of experience in the field of Construction Industry at GCC& North Africa.
- Certified Consultant in Construction Management- Egyptian Syndicate of Engineers
- Guest Lecturer - Heriot Watt University
- President of ACEI-UAE June-2014 to May 2016

**Tamer El Gohari**  
VDC & Innovation Manager



- VDC established expert with more 10 years of experience in UAE, GCC & Egypt.
- Specialized in the 4D/ 5D simulation, construction project management solutions and integrated reporting systems, besides innovation management
- 4D BIM section editor for BIM Arabia Magazine

**Mohamed Nagi**  
Digitalization & BI Manager



- 10 Years of construction experience within UAE & Egypt.
- Experienced in construction planning, project controls, integrated reporting systems, construction digitalization and business intelligence & automation
- Lead within ASGC digitalization & Business Intelligence Committee

# About Analytica Management Solutions

Analytica Management Solutions is the Controls arm of ASGC group with a focus on project controls services and construction digitalization and technology solutions that caters to the group companies and the outside market.

Analytica offers unique construction management and consultancy services spiraling out of mixing a contractor's experience and the project management consultancy service.

Spinning off a major middle-east-based contractor; Analytica is offering unique, award-winning and tested services cemented by the deep-rooted local experience.

Analytica is adding new dimensions to management solutions through offering agile, smart & innovative services catering to all client needs while relying on track-record experience, technology expertise and an established and award-winning team that worked on transforming ASGC in the past few years

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# Industry 4.0



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# Industry 4.0

## 4<sup>th</sup> Industrial Revolution: The Age of Cyber Physical Systems (CPS)

In 2013, the Industry 4.0 concept was officially presented (GTAI 2014)

## 3<sup>rd</sup> Industrial Revolution: The Information Age

Introduction of electronic and ICT systems for automation

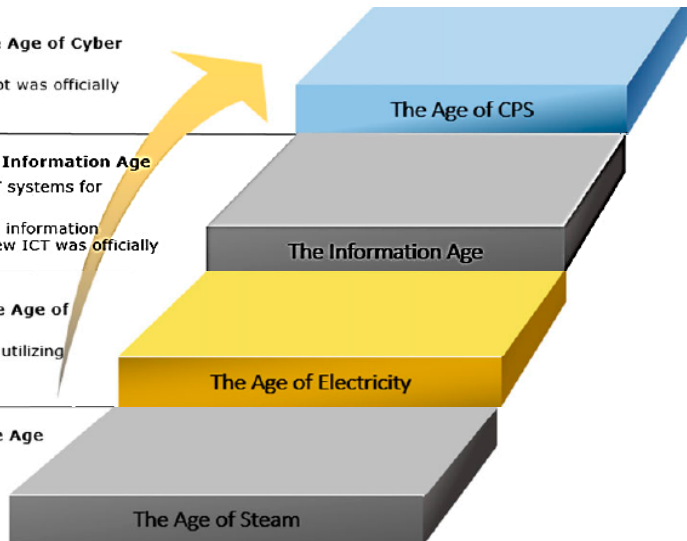
In 2005, the concept of industrial information integration based on emerging new ICT was officially presented (Xu 2011)

## 2<sup>nd</sup> Industrial Revolution: The Age of Electricity

Introduction of mass production utilizing electrical power

## 1<sup>st</sup> Industrial Revolution: The Age of Steam

Introduction of mechanical manufacturing systems utilizing water and steam power



# Industry 4.0



# Industry 4.0



The future will be characterized by smart devices delivering increasingly insightful digital services everywhere.

This is called ...

**Intelligent Digital Mesh.**

# Industry 4.0

## Intelligent



AI Foundations



Intelligent Apps  
and Analytics



Intelligent Things

**Intelligent:** How AI is in virtually every existing technology and creating entirely new categories.

**Digital:** Blending the digital and physical worlds to create an immersive world.

## Digital



Digital Twins



Cloud to the Edge



Conversational  
Platform



Immersive  
Experience

## Mesh



Blockchain



Event-Driven



Continuous Adaptive  
Risk and Trust

**Mesh:** Exploiting connections between expanding sets of people, businesses, devices, content and services.

Trends under each of these three themes are a key ingredient in driving a **continuous innovation process** as part of the continuous next strategy.



# Industry 4.0

## Intelligent



Autonomous Things



Augmented Analytics



AI-Driven Development

## Digital



Digital Twin



Empowered Edge



Immersive Experience

## Mesh



Blockchain



Smart Spaces



Privacy and Ethics



Quantum Computing

# Innovation

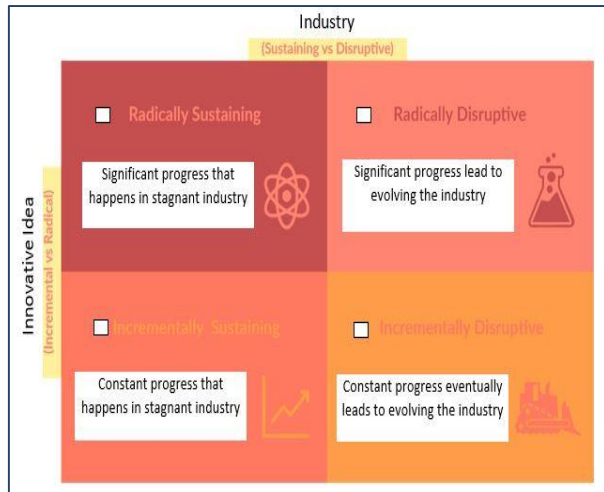
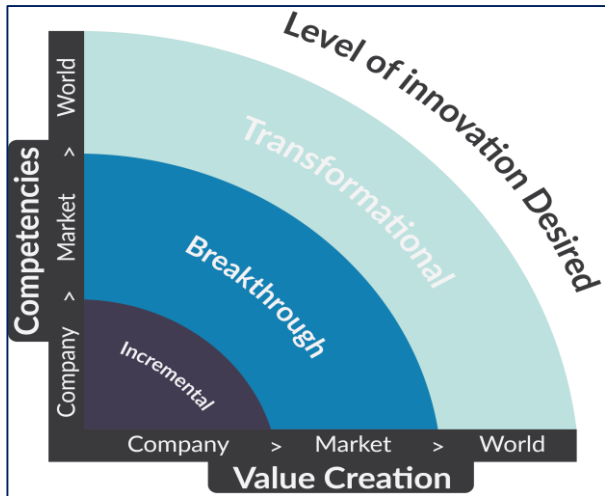


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# Innovation

Innovation is the implementation of a **new or significantly improved solution** for the company. It could be a **product** (goods& services), **process** or **organizational or marketing method**. With the objective to refocus their **competitive position**, increase **performance**, or **knowledge**.

# Innovation



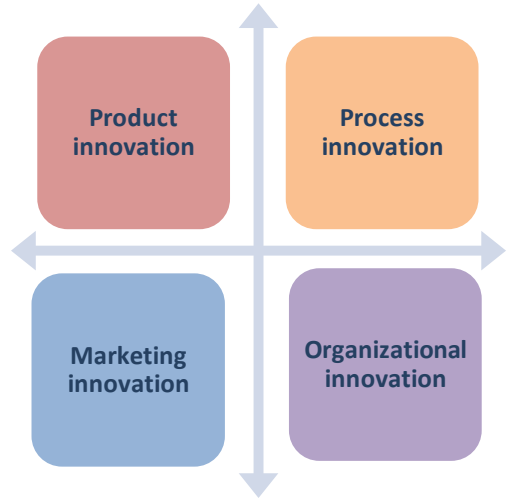
# Innovation

**Product innovation:** A good or service that is new or significantly improved.

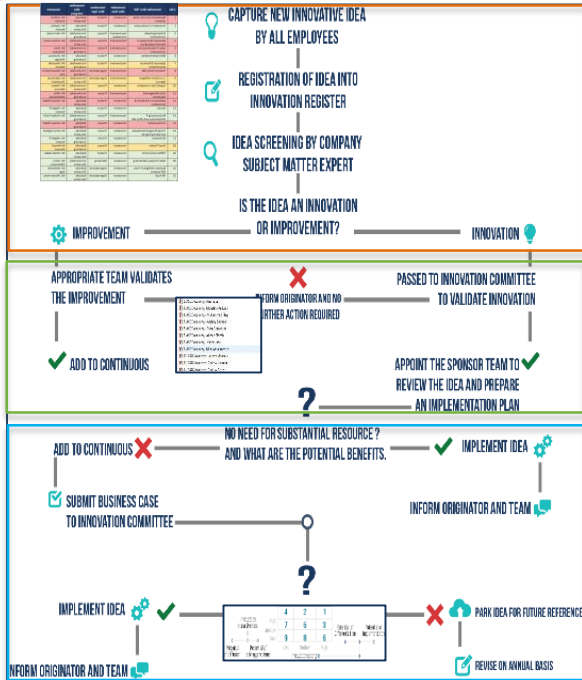
**Process innovation:** A new or significantly improved production or delivery method.

**Marketing innovation:** A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

**Organizational innovation:** A new organizational method in business practices, workplace organization or external relations.



# Innovation

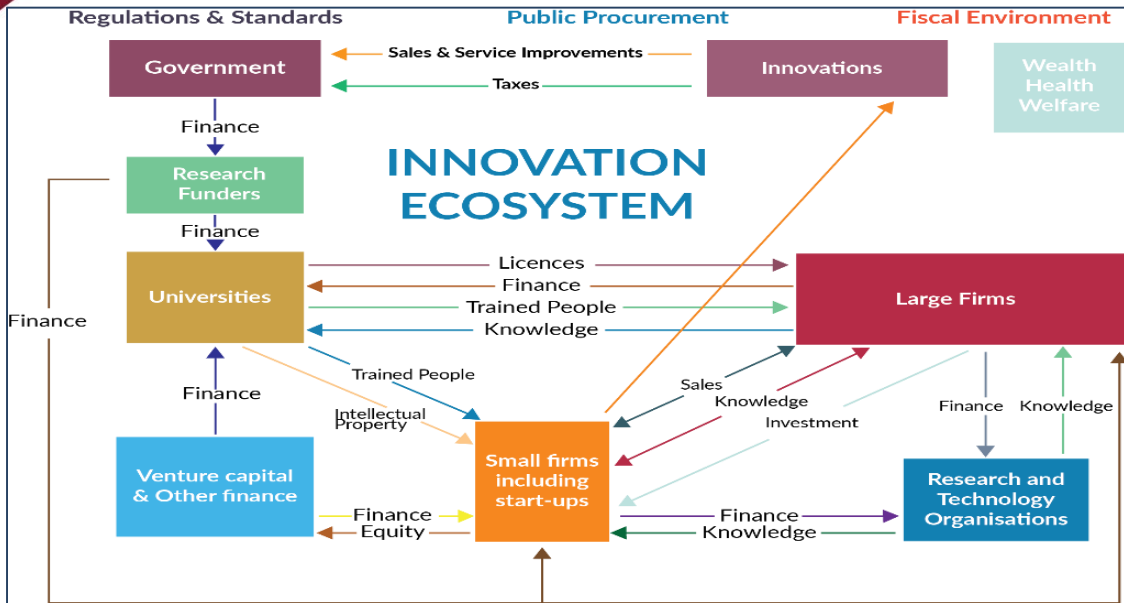


1. **The Initiation Stage** (Innovation Pre-proposal report)

2. Then, the **Implementation Stage** (Innovation implementation proposal report)

3. Finally, **The Evaluation Stage** (Innovation evaluation report)

# Innovation



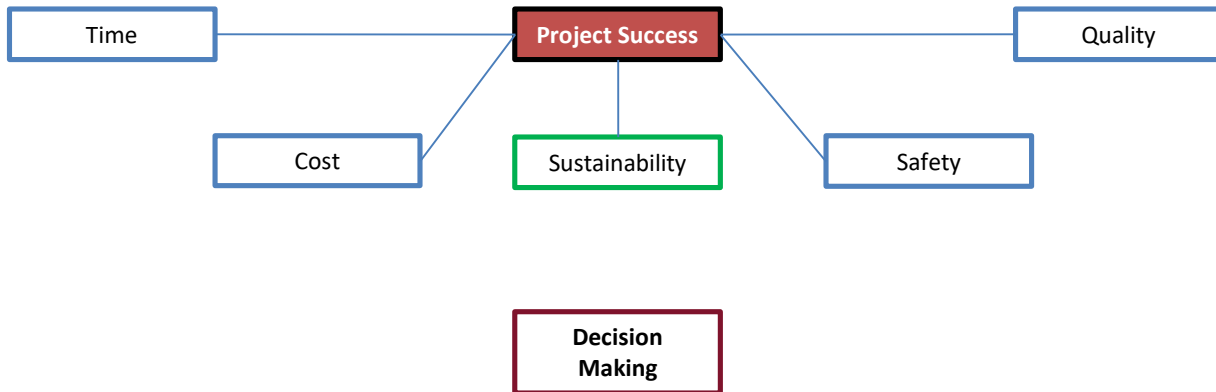
# Project Controls in Megaprojects



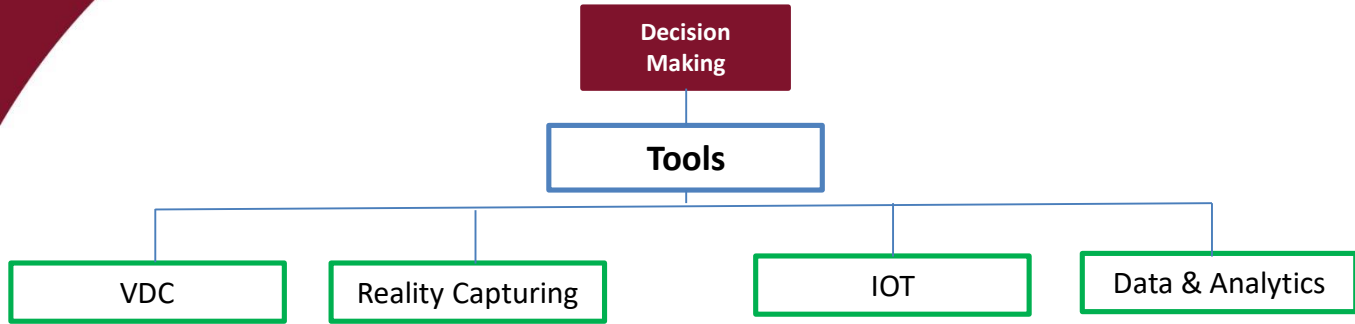
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# Project Controls in Megaprojects



# Project Controls in Megaprojects



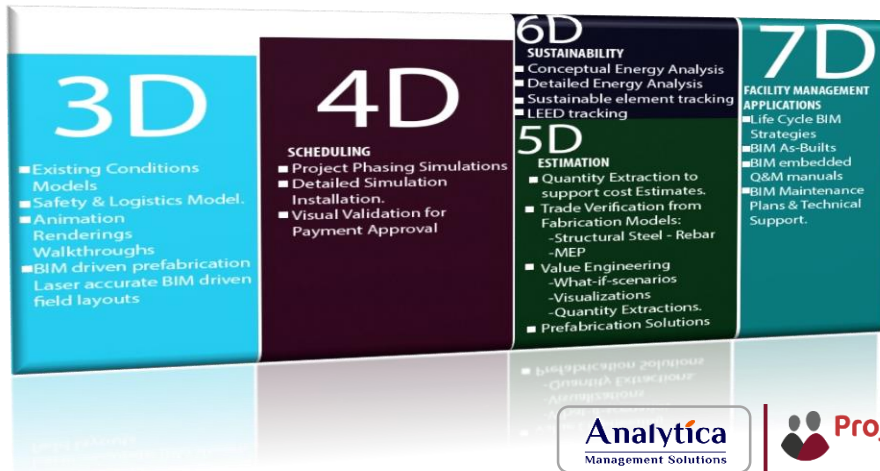
# Virtual Design & Construction



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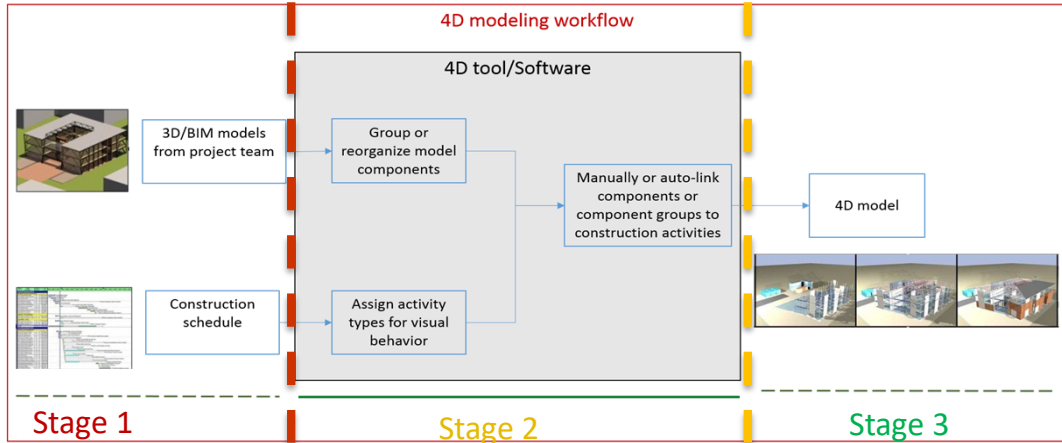
# Virtual Design & Construction

BIM is a process involving the generation and integration of digital representations includes the physical and functional characteristics of construction project.

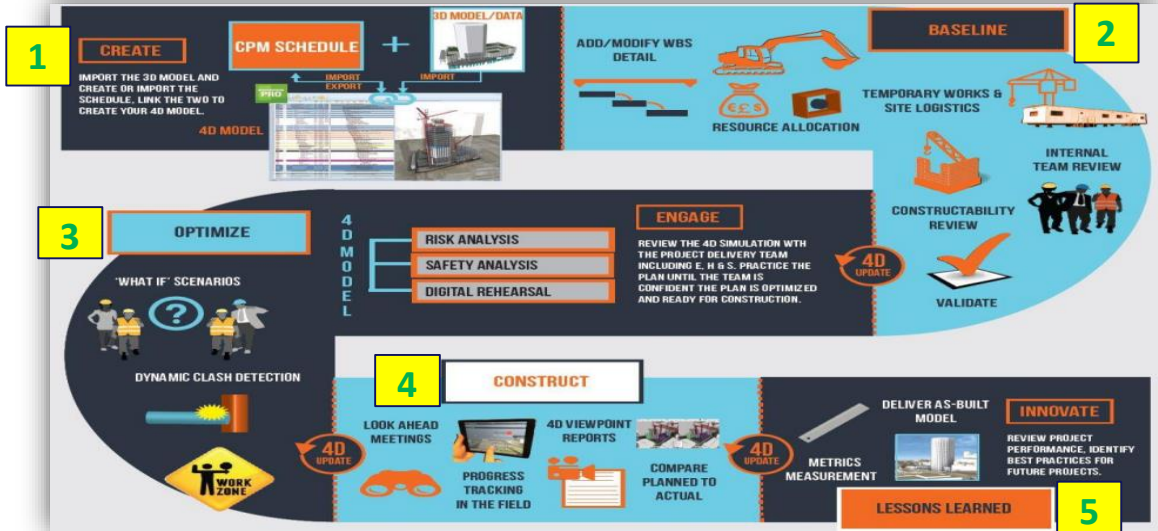


# Virtual Design & Construction

**4D Modeling:** Simulating the planning sequence of construction activities and space requirements on a building site ( **Visualization of the construction schedule**).

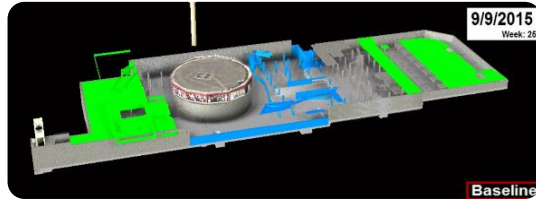


# Virtual Design & Construction



# Virtual Design & Construction

## 1. Initiation Stage



# Virtual Design & Construction

## 1. Initiation Stage

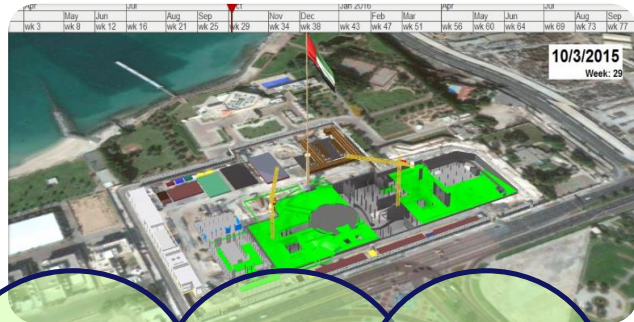


Etihad Museum - Dubai



# Virtual Design & Construction

## 2. Baseline Stage



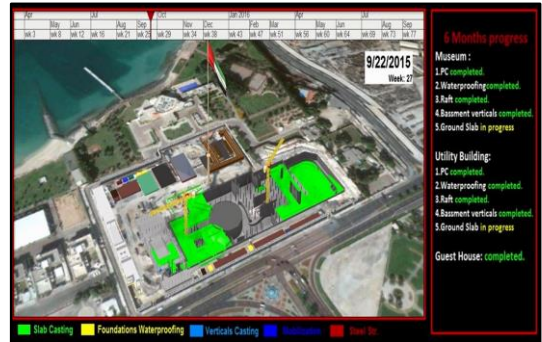
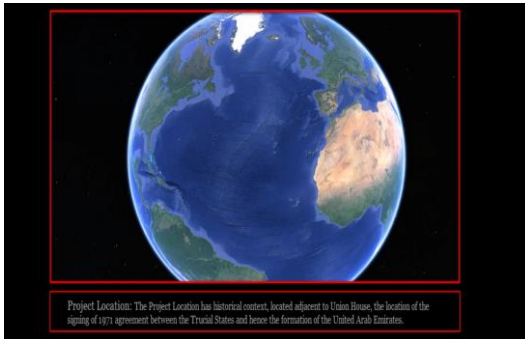
Zone/Move  
Management

Construction  
methodology  
simulation

Site  
Coordination/  
Logistics

# Virtual Design & Construction

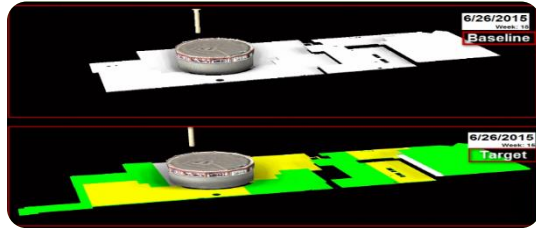
## 2. Baseline Stage



Etihad Museum - Dubai

# Virtual Design & Construction

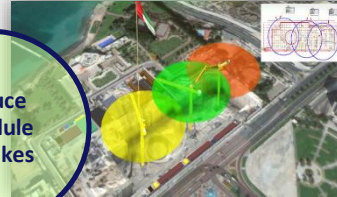
## 3. Optimize Stage



Crane and safety analysis

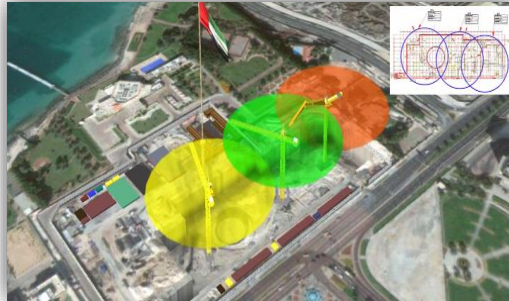
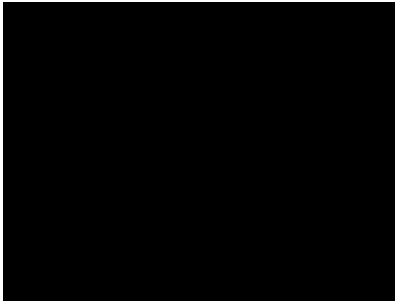
Value engineering / What if scenarios

Reduce schedule mistakes



# Virtual Design & Construction

## 3. Optimize Stage : Cranes Study



Etihad Museum - Dubai

# Virtual Design & Construction

## 4. Construct Stage

**CONSTRUCT**

LOOK AHEAD MEETINGS

PROGRESS TRACKING IN THE FIELD

4D VIEWPOINT REPORTS

COMPARE PLANNED TO ACTUAL

4D UPDATE

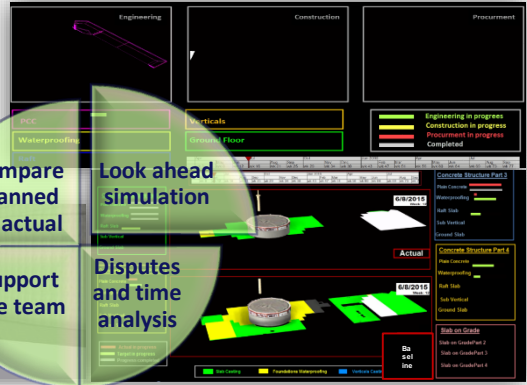
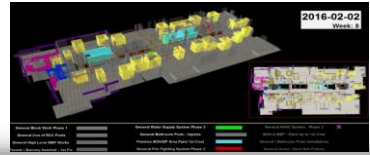


Compare planned to actual

Look ahead simulation

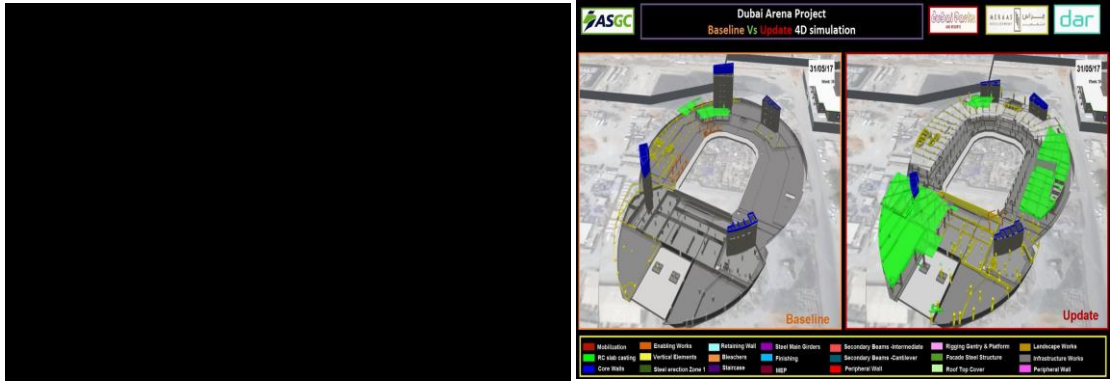
Support site team

Disputes and time analysis



# Virtual Design & Construction

## 4. Construct Stage : Baseline Vs Actual



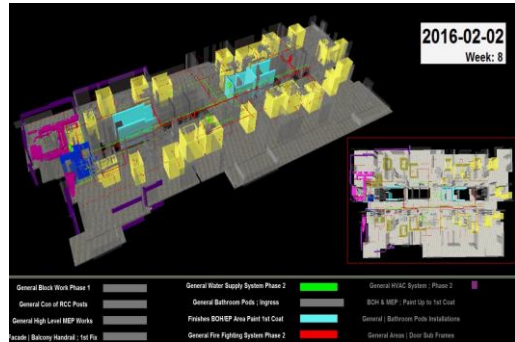
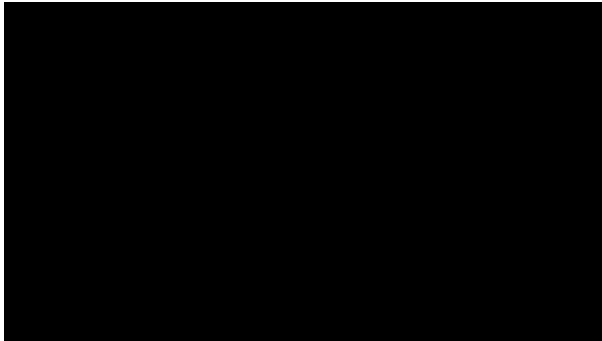
Coca-Cola Arena



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# Virtual Design & Construction

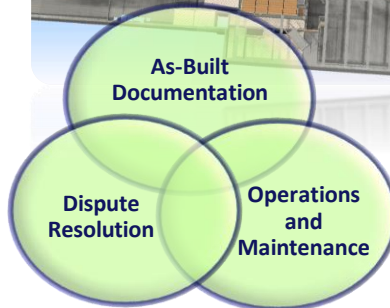
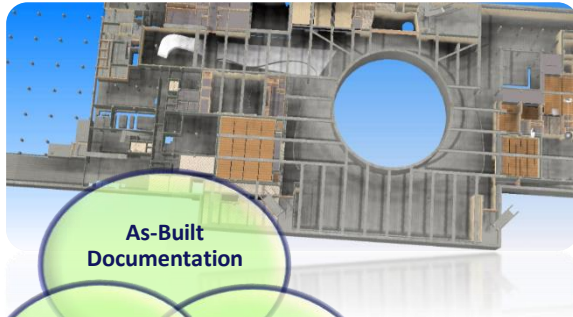
## 4. Construct Stage : Typical floor finishing works cycle



Bluewaters Project

# Virtual Design & Construction

## 5. Lessons Learned Stage



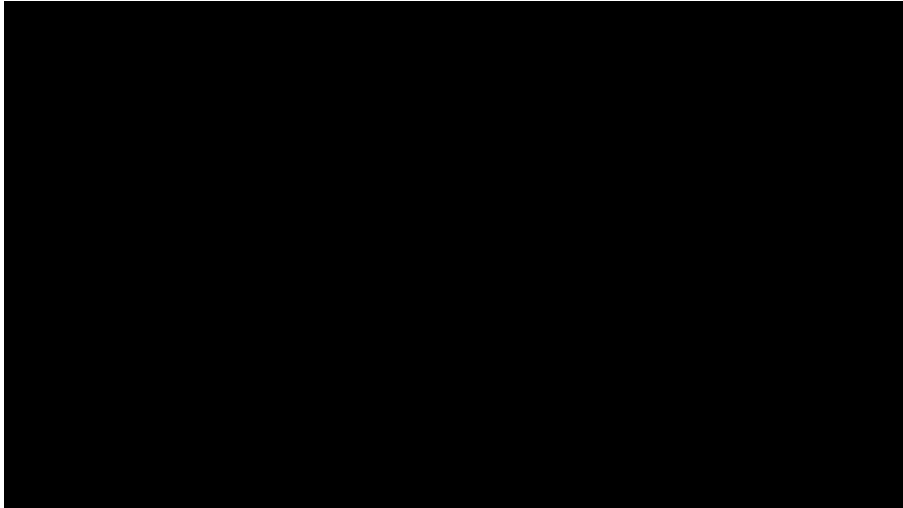


# Reality Capturing





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# Reality Capturing



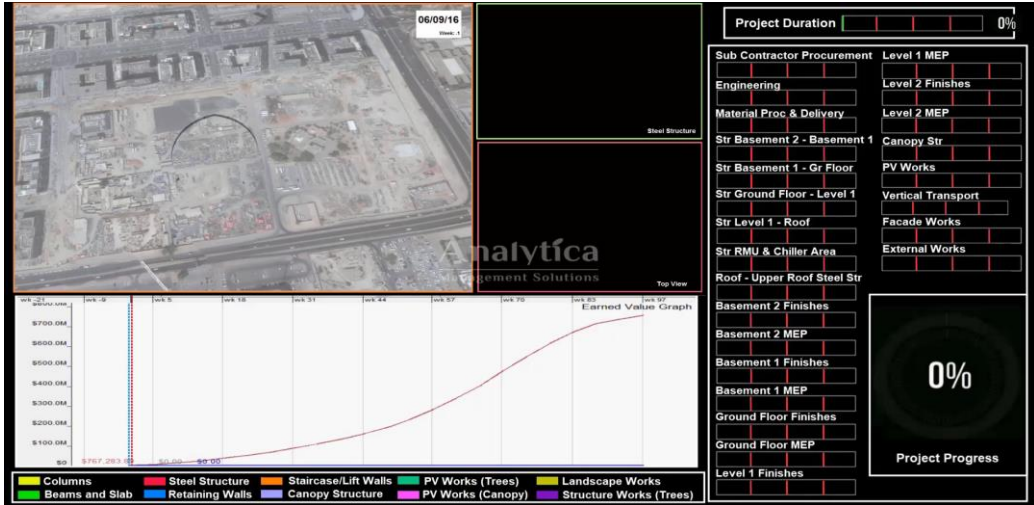
# Reality Capturing & VDC

## Integrations

- The integration between the BIM 4D modeling and gaming engines. 
- The integration between the 4D and Mixed reality.
- The integration between the 4D and Drones. 

# Reality Capturing & VDC

## Integrations



# Data & Analytics

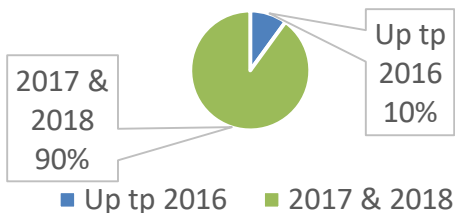


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# Data & Analytics in Megaprojects

## Data

### % of Data Generated



From the beginning of time and until **2003**, humankind generated **5 exabytes** of data. Now we produce **2.5 Exabytes of data daily** and the pace is accelerating.

**1 EB**  
=  
**1 Million TB**

# Data & Analytics in Megaprojects

ANY BUSINESS THAT DOESN'T SERIOUSLY  
CONSIDER THE VALUE OF DATA RUNS THE RISK  
OF BEING LEFT BEHIND.

# Data & Analytics in Megaprojects

## Construction?

A report by McKinsey Global Institute indicates that in the US (up to 2009):

- Total stored data for the **construction** industry was **51 petabytes**,
- Compared to **966 petabytes** for **manufacturing**
- And **846 petabytes** for **government**.



# Data & Analytics in Megaprojects

## Construction?

**This ratio simply reflects how the industry is:**

- Fragmented
- Working in Silos
- Labor intensive
- Heavily relies on paperwork
- Historically among the latest to adopt technology



**Which simply leads to:**

- Repetitive reporting
- Multiple data systems
- Unprioritized and unorganized data
- Lack of system connectivity
- Delayed decision-making

# Data & Analytics in Megaprojects

THE CHALLENGE LIES IN **COLLECTING DATA** AND  
OUR ABILITY TO **MAKE USE** OF THOSE MASSIVE  
VOLUMES OF DATA.

# Data & Analytics in Megaprojects

How do we get the data?



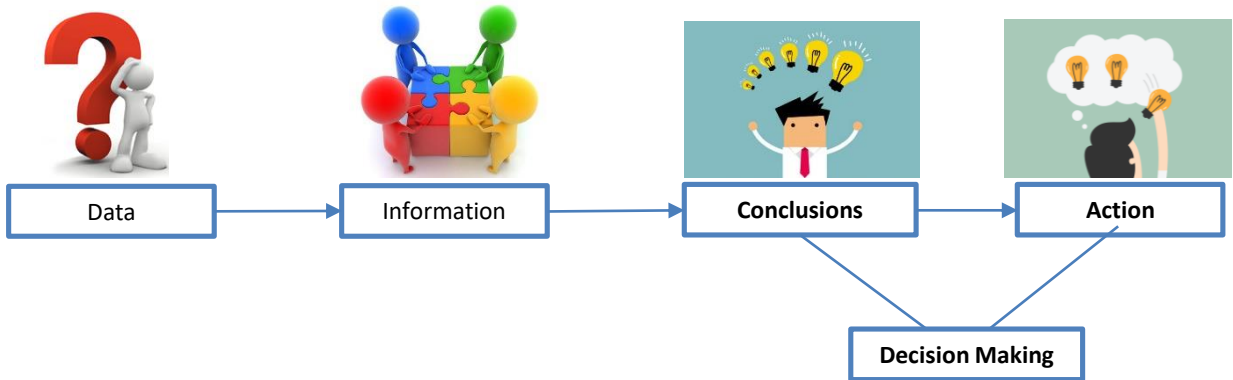
# Data & Analytics in Megaprojects

**Collecting data is a challenge** but technology has made it way easier:

- Photo and video image data
- Sensors' data
- IoT data : (Internet of Things) technology can monitor and collect data from equipment and tools, machinery and other assets on the jobsite.
- Planning Software
- ERP Systems
- Modeling Software
- Laser scanners and other reality capturing tools

# Data & Analytics in Megaprojects

## How do we turn data into value?



# Data & Analytics in a Megaproject

## How do we turn data into value?

- Sensors
- Photos & Videos
- Words
- Voice & Conversations
- Social Media



- Text Analytics
- Sentiment Analysis
- Face Recognition
- Voice Analytics
- Movement Analytics



- Performance evaluation & progress metrics
- construction equipment and assets utilization data
- Financial reporting
- HSE Statistics

# Data & Analytics in Megaprojects



# Data & Analytics in Megaprojects

## Benefits:

- ▶ Eliminated geographical barriers related to the reporting of different business units
- ▶ Help create insight not just observations; which contributes to timely decision making
- ▶ Reduced risks & Problem prevention
- ▶ Improved Business & Financial Planning
- ▶ Effective Portfolio & Project Management
- ▶ Improved HSE on construction sites



# Dashboards

## Data

Source 1  
For E.g.:  
Planning  
Software

Source 2  
For E.g.:  
ERP  
systems

Source 3

Source 4

Source 5

Source 6

Source 7

# What is next?



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# Blockchain?



“Effective decision-making can be seen as an optimal link between memory of the past, ground-realities of the present and insights of the future”

Amit Ray



# Questions?



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# Analytica Management Solutions / ASGC Awards

Analytica Management Solutions and ASGC are award-winning companies with wealth of experience that resulted from being involved in numerous mega-projects in the middle east region.

## Most Prestigious International Project Management Awards “Hamdan Bin Mohammed Innovation in Project Management Awards”

Innovation in project management – Runner-up 2017


  
 جائزة حمدان بن محمد  
 Hamdan bin Mohammed

تمنح هذه الشهادة لمؤسسة الشعار للحقائات العامة  
 This certificate is presented to ASGC Construction LLC

لترشيح لمجموعة التوكيلات في  
 جائزة المكرة المبتكرة في إدارة المشاريع  
 الدورة الأولى من  
 جائزة حمدان بن محمد للتفكير في إدارة المشاريع

For being shortlisted for  
 “The Innovative Idea in Project Management” Award  
 in the first cycle of Hamdan Bin Mohammed Award  
 for Innovation in Project Management

متمنين لكم بمرور التوفيق والتناجح  
 Wishing you Continued Success

  
 محمد بن راشد آل مكتوم  
 Chairman of Award Board of Trustees

2017 في 2017

Innovation in Portfolio management – Runner-up 2017


  
 جائزة حمدان بن محمد  
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2017 في 2017

Innovation in Portfolio management – Runner-up 2018


  
 جائزة حمدان بن محمد  
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لترشيح لمجموعة التوكيلات في  
 جائزة المكرة المبتكرة في إدارة محافظ المشاريع  
 في الدورة الثانية من  
 جائزة حمدان بن محمد للتفكير في إدارة المشاريع

For being shortlisted for  
 “The Innovative Idea in Portfolio Management Award”  
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 Award for Innovation in Project Management

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2018 في 2018



# Analytica Management Solutions / ASGC Awards

Analytica Management Solutions and ASGC are award-winning companies with wealth of experience that resulted from being involved in numerous mega-projects in the middle east region.

## Global Project Controls Innovation Award - Project Controls Expo UK



# Analytica Management Solutions / ASGC Awards

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## Most prestigious regional business awards

### Mohammed Bin Rashid Al Maktoum Business Excellence Award 2018

الدورة العاشرة لجائزة محمد بن راشد آل مكتوم للأعمال  
10<sup>th</sup> CYCLE OF THE MOHAMMED BIN RASHID AL MAKTOUM  
BUSINESS AWARD 2019

تفصيلاً للمزيد من  
فئة التشييد والبناء

In recognition of business excellence in the  
Construction Category  
awarded to

*ASGC Construction*

مدير مشروع تشييد مبنى  
مركز دبي للإعلام  
Mr. Saad Mohammed Al-Fozari (Chairman)  
Mr. President, Prime Minister of the UAE and Ruler of Dubai



غرفة دبي  
DUBAI CHAMBER



### Mohammed Bin Rashid Al Maktoum Business Innovation Award 2018

الدورة الثانية لجائزة محمد بن راشد آل مكتوم لابتكار الأعمال  
2<sup>nd</sup> CYCLE OF THE MOHAMMED BIN RASHID AL MAKTOUM  
BUSINESS INNOVATION AWARD 2019

تفصيلاً للمزيد من  
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مركز دبي للإعلام  
Mr. Saad Mohammed Al-Fozari (Chairman)  
Mr. President, Prime Minister of the UAE and Ruler of Dubai



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## UAE Innovation Award



# Thank you

Contact us:

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