

# Digital Transformation of Nepalese Architecture, Engineering and Construction (AEC) industry



Nepal Engineers' Association

TALK SHOW INVITATION

“Digital Transformation of Nepalese Architecture,  
Engineering and Construction Industry”



**Ar. Sunil Suwal**  
*Chairperson*  
Nepal BIM Forum, International



**Er. Mahesh Karki**  
*Immediate Past-Chairperson*  
Nepal BIM Forum, Nepal

**Date:** Friday, 26-Jan-2024 (2080/10/12 BS)

**Time:** 4:00 PM

**Venue:** Engineer Bhawan, Pulchowk, Lalitpur

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM

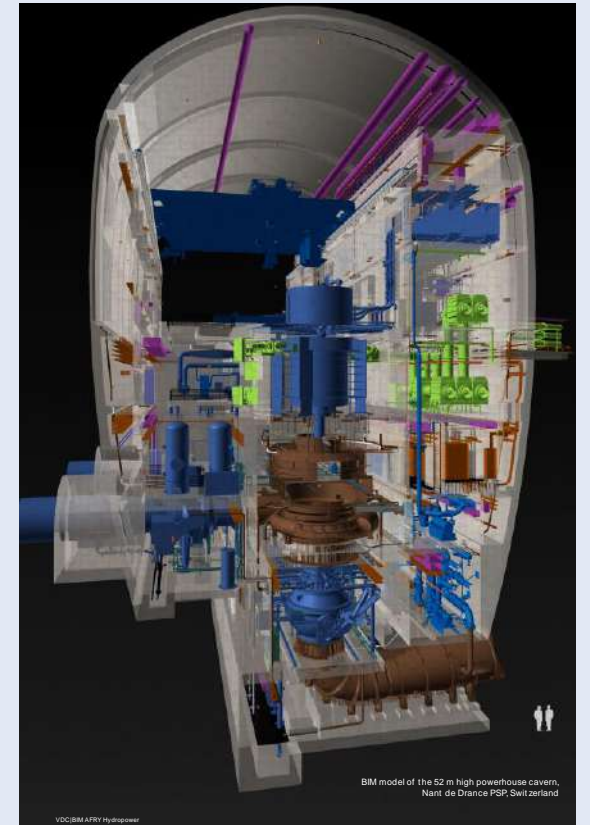
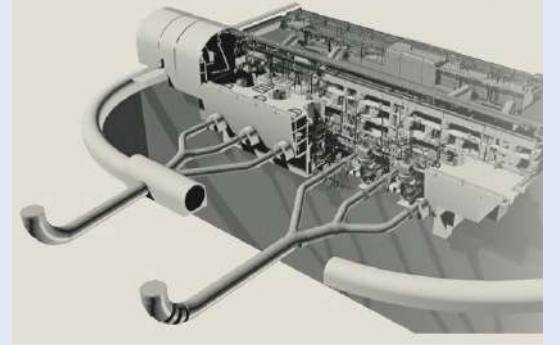
# TOC

Digital Transformation

BIM

BIM use cases (in Nepal)

VDC|BIM:  
the Collaborative Way



# Nepal BIM Forum (NBIMF)

Non-profit organization

- Estd. 2018 – Helsinki, Finland; 2019 – Kathmandu, Nepal

Activities:

- BIM Research
- BIM Implementation
- BIM Standardization
- BIM Education

<https://nbimf.com>

## Nepal BIM Forum is a BIM community in Nepal

We discuss and work together for the development of BIM tools and services.

Get Started →

Become A Member →



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COLLABRATE FOR

- > BIM RESEARCH
- > BIM IMPLEMENTATION
- > BIM STANDARDS
- > BIM EDUCATION

CONTACT US

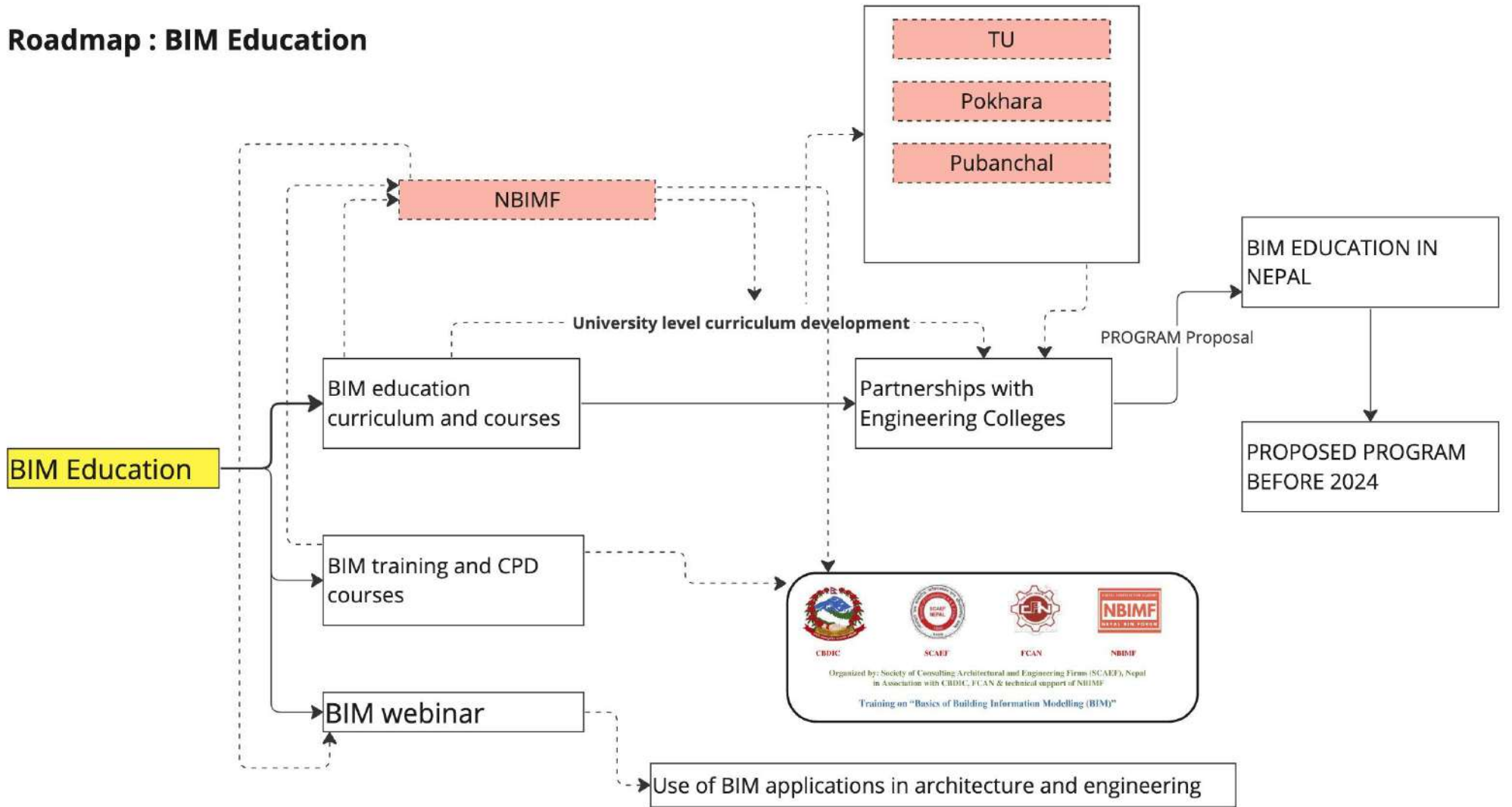
Phone (Nepal): +977  
9741803161  
Phone (Finland):  
+358403557900  
Email: [contact@nbimf.com](mailto:contact@nbimf.com)

VISIT US

Koteshwor  
Kathmandu, Nepal  
Otanientie  
Finland, 02150 Espoo



# Roadmap : BIM Education

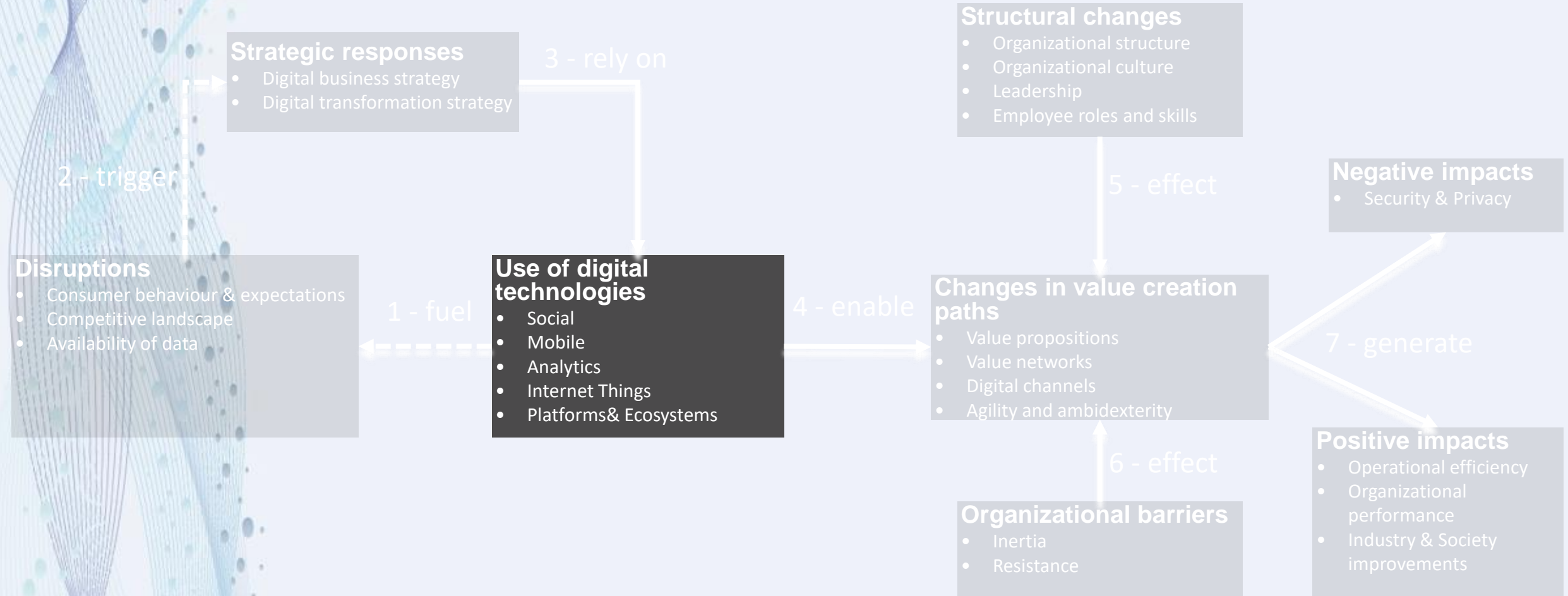


# Digital Transformation (DT)

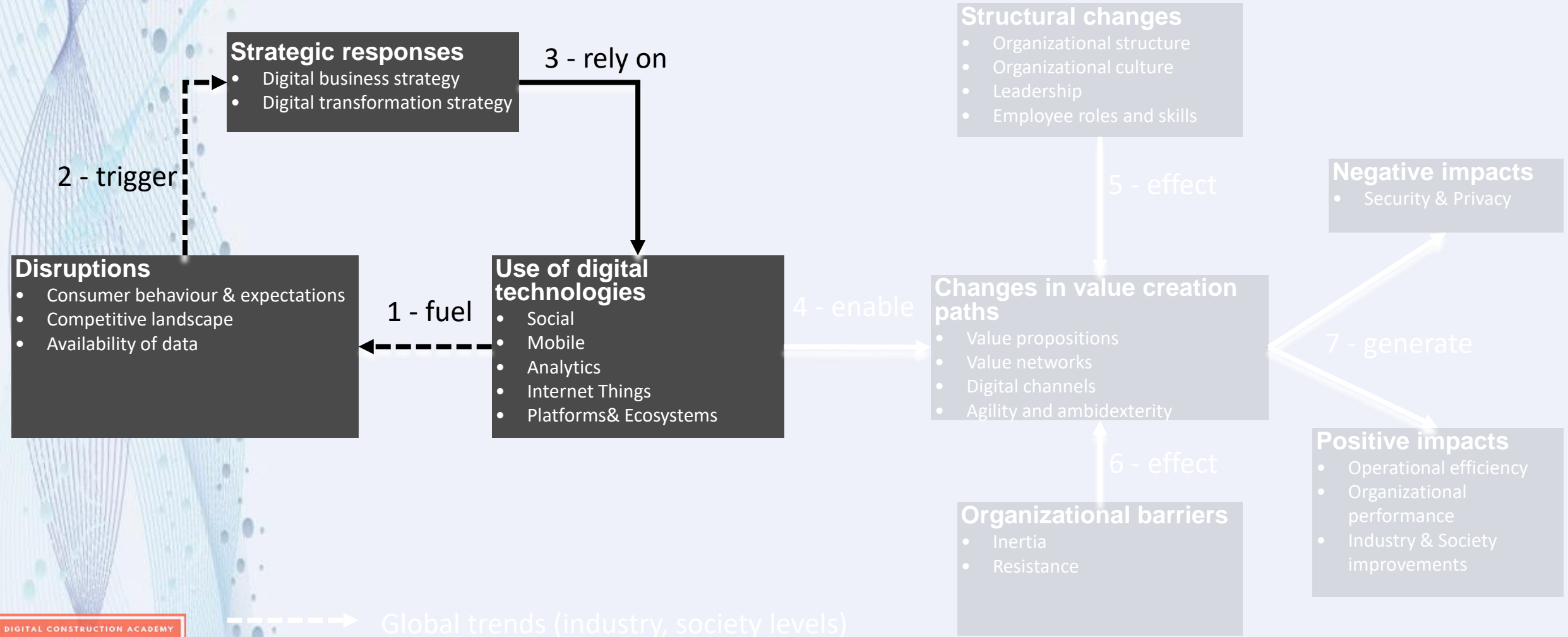
“a process that aims to improve an entity by triggering **significant changes** to its properties through combinations of information, computing, communication and connectivity technologies”

Vial, 2019

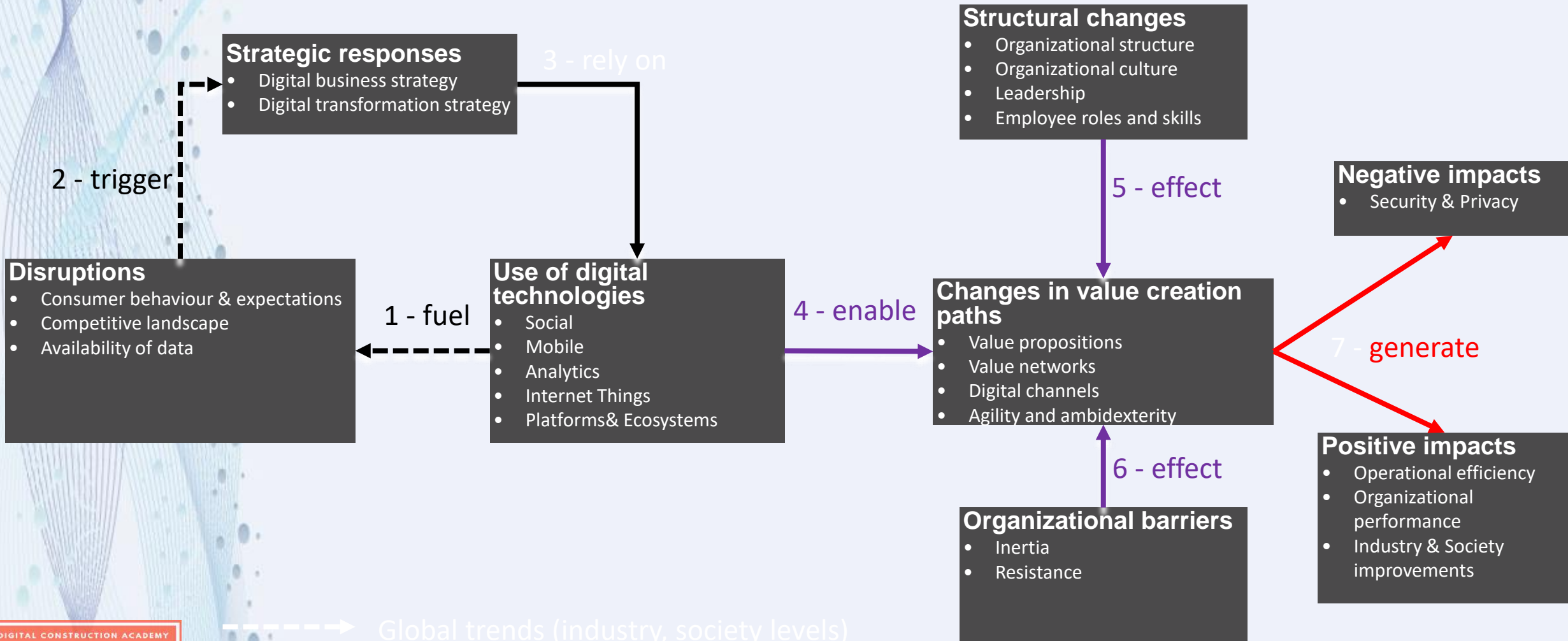
# Building Blocks of the DT Process



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<i>Building blocks</i>	<i>General description</i>	<i>Typical concepts</i>
<b>A. Use of digital technologies</b>	Use of different digital technologies at individual or organizational level. May include focus on one or more designated technologies in the industry. Does not include processes involved in achieving use, such as implementation or adoption.	<input type="checkbox"/> Use, Use cases. <input type="checkbox"/> Different technologies (e.g., BIM, IoT, digital twins, visualisation, AI, automation, platforms).

By far the most frequently considered technology in the articles is *BIM*, which is addressed in 14 of the articles.

However, BIM is not only a technology but also described in the literature as a method and way of working (Shadram *et al.*, 2016). It provides **a way for many actors of diverse professions and functions to store and transmit information throughout the whole construction process**

# Use of Digital technologies in construction

**VDC – Virtual Design and Construction**

**BIM – Building Information Modelling**

DIGITAL CONSTRUCTION ACADEMY

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# BIM

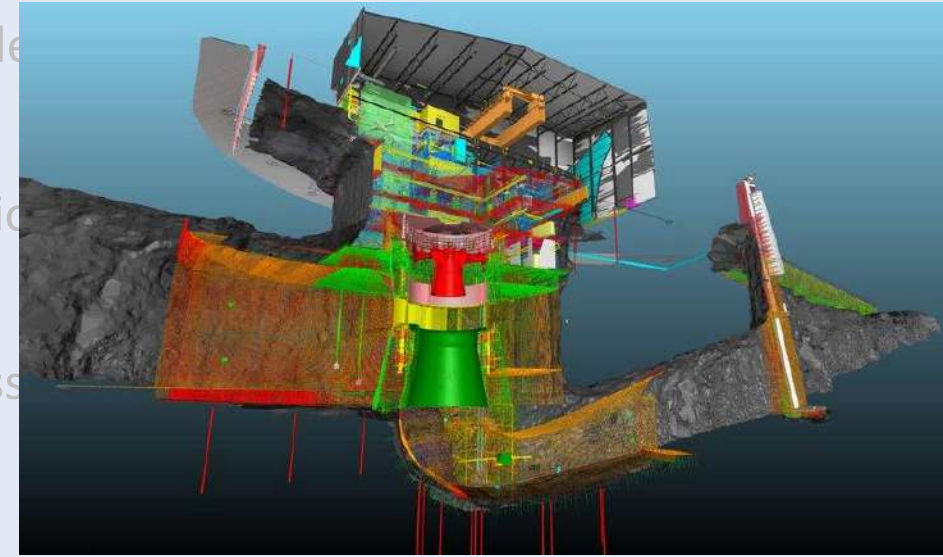
BIM – **B**uilding **I**nformation **M**odel/**M**odelling/**M**anagement

- Building – Building as a process
- Information – Very crucial for construction life cycle
- Model – Collection of three-dimensional information rich intelligent object(s)
- Modelling – Model creation process
- Management – Management of object and processes

# BIM

- BIM – Building Information Model/Modelling/Management
  - Building – Building as a process

Building Information Modelling is a set of technologies, processes and policies enabling multiple stakeholders to collaboratively design, construct and operate a facility

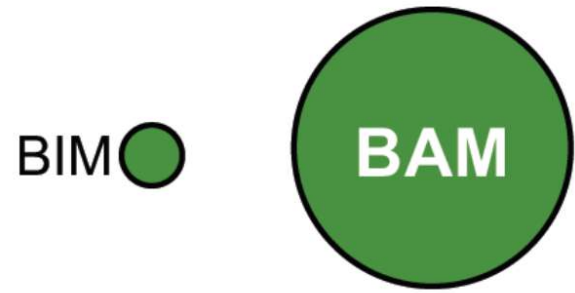


*norconsult*



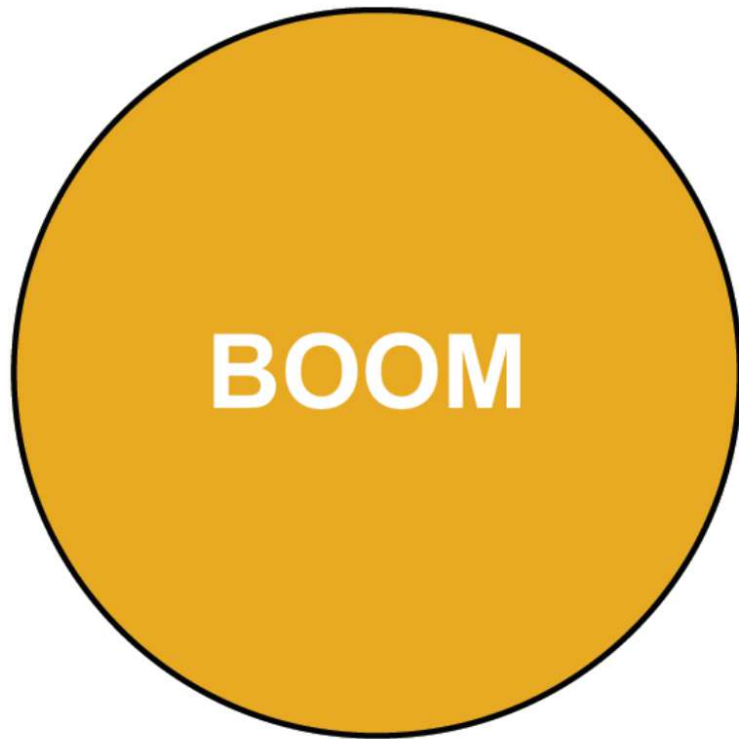
BIM ●

BIM = Building Information Model  
BAM = Building Assembly Model  
BOOM = Building Owner/Operator Model  
BIM-BAM-BOOM concept by Patrick MacLeamy, FAIA



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BIM

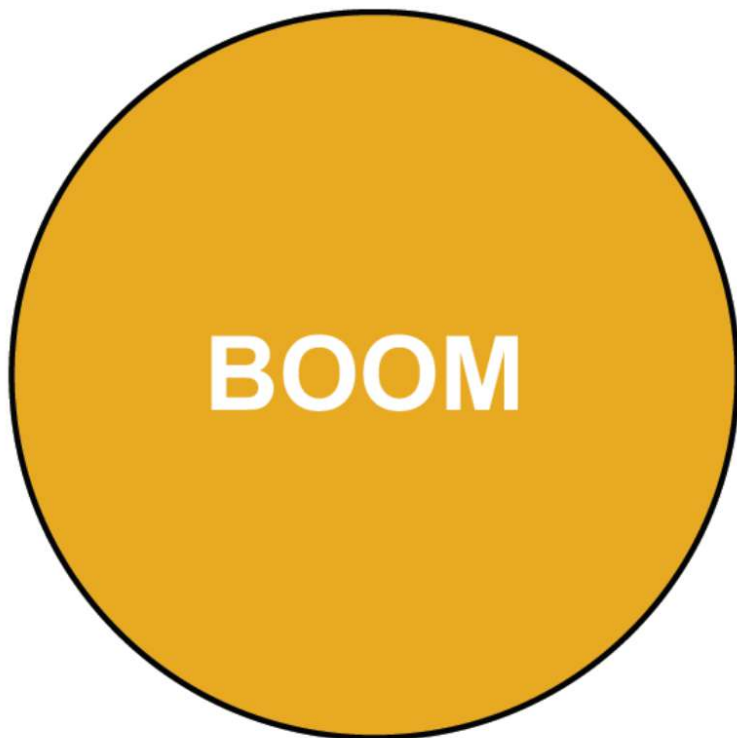


BIM = Building Information Model  
BAM = Building Assembly Model  
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BIM-BAM-BOOM concept by Patrick MacLeamy, FAIA

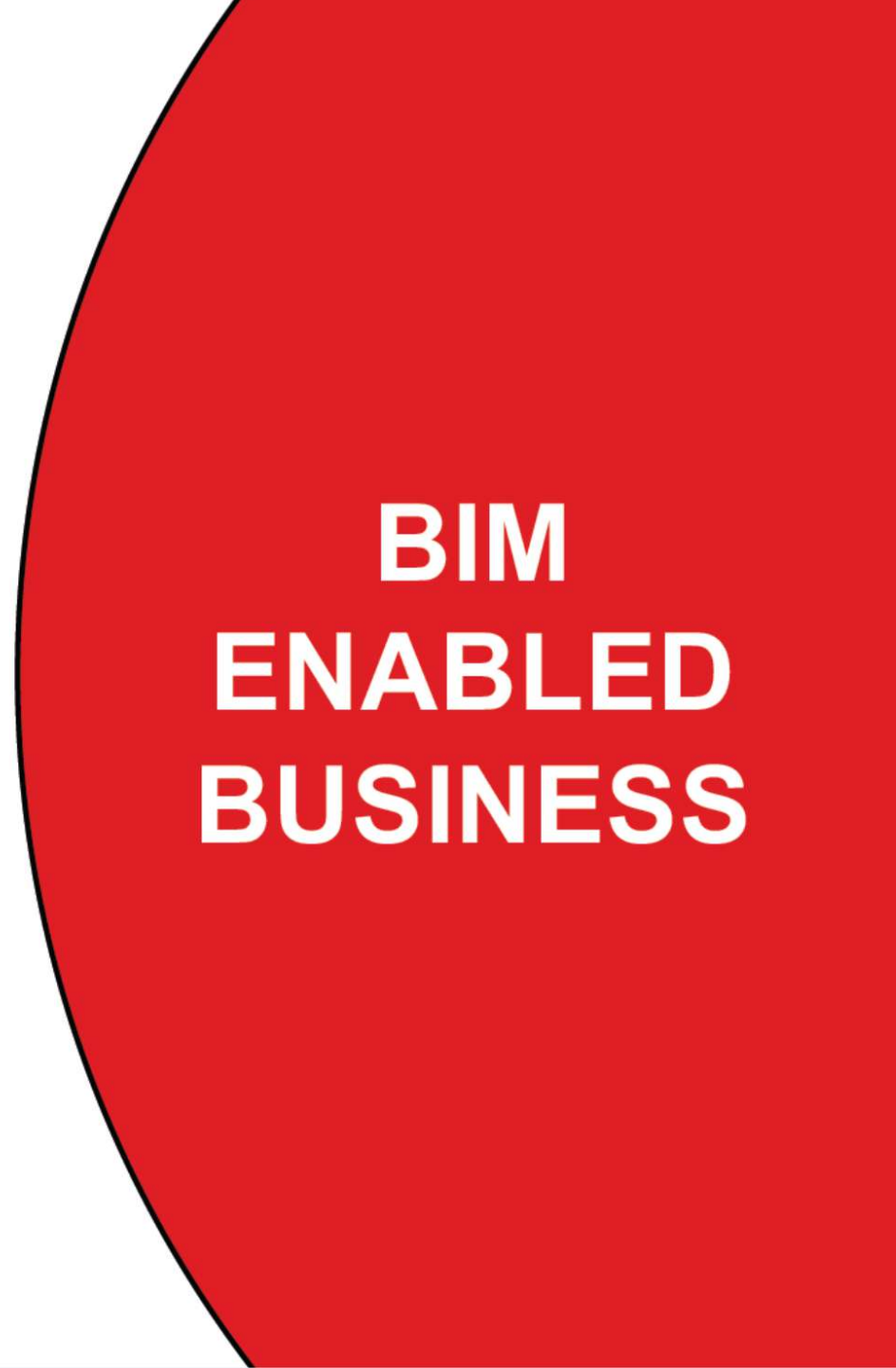
BIM



**BAM**



**BOOM**



**BIM  
ENABLED  
BUSINESS**

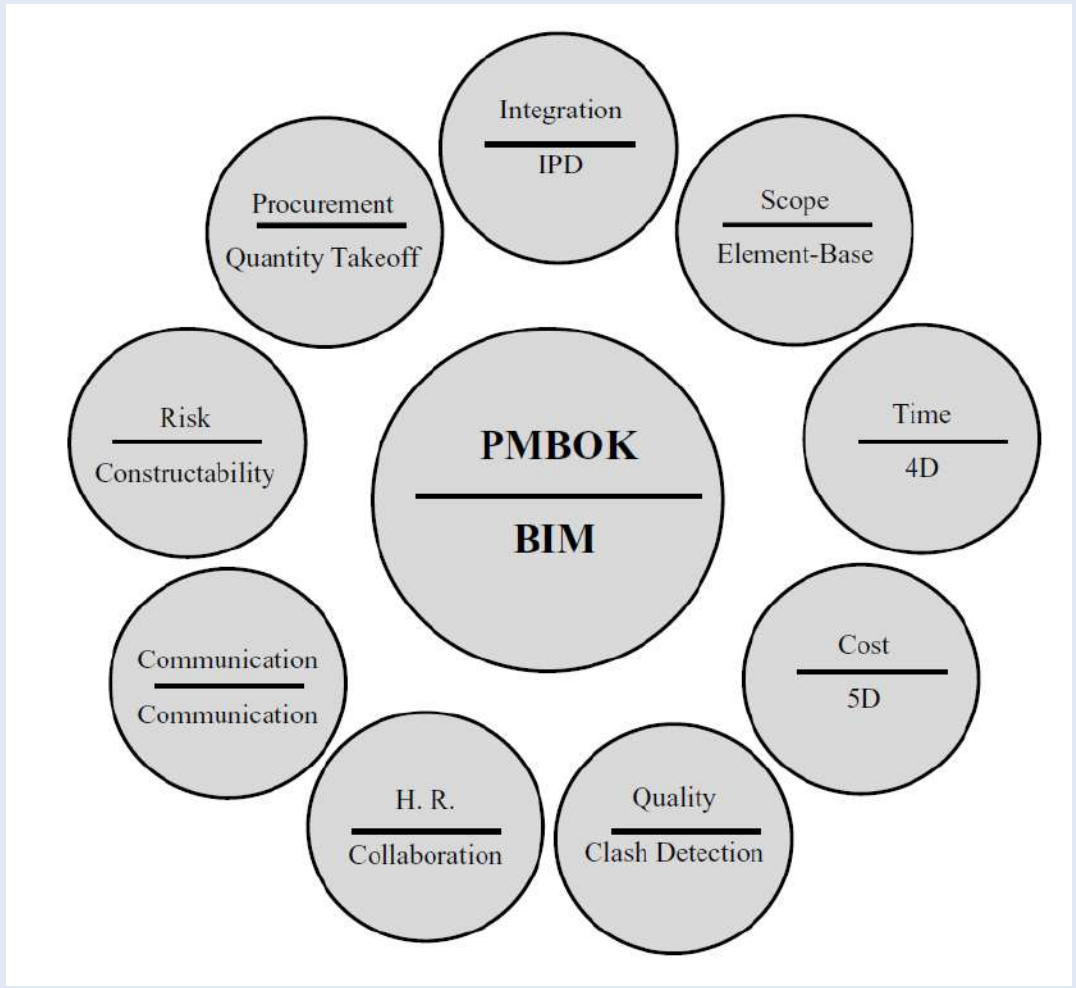
BIM = Building Information Model  
BAM = Building Assembly Model  
BOOM = Building Owner/Operator Model  
BIM-BAM-BOOM concept by Patrick MacLeamy, FAIA

# The BIM Concept

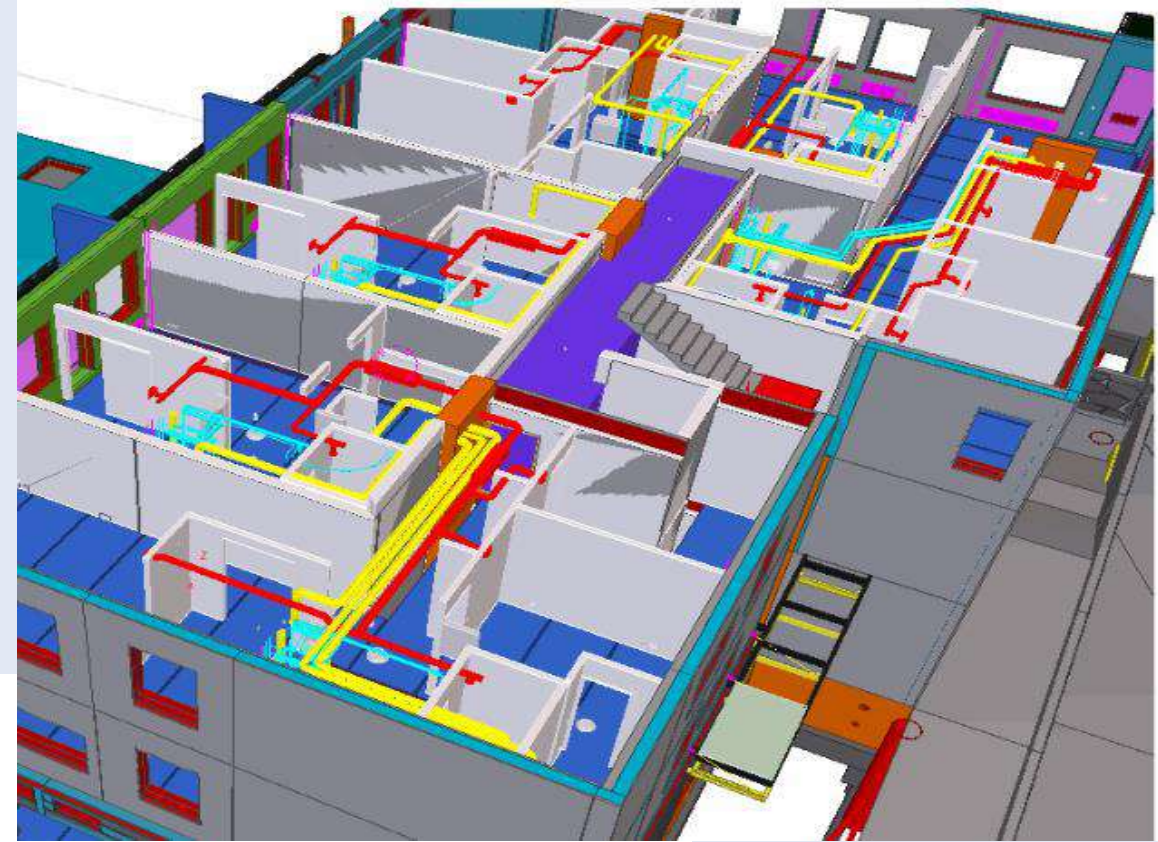
## The BIM Concept



Graphisoft BIM Curriculum

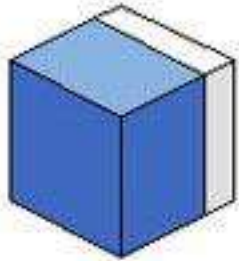


# BIM benefits –combination model

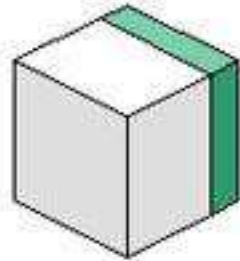


## discipline specific BIM-models

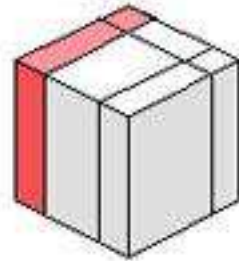
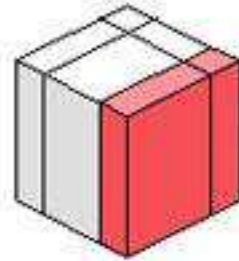
architect  
model



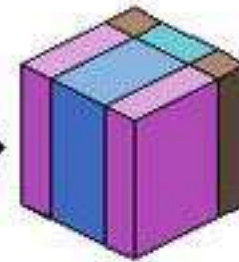
structural  
model



HVAC/MEP  
models



merged and joined  
BIM-models



# BIM Dimensions

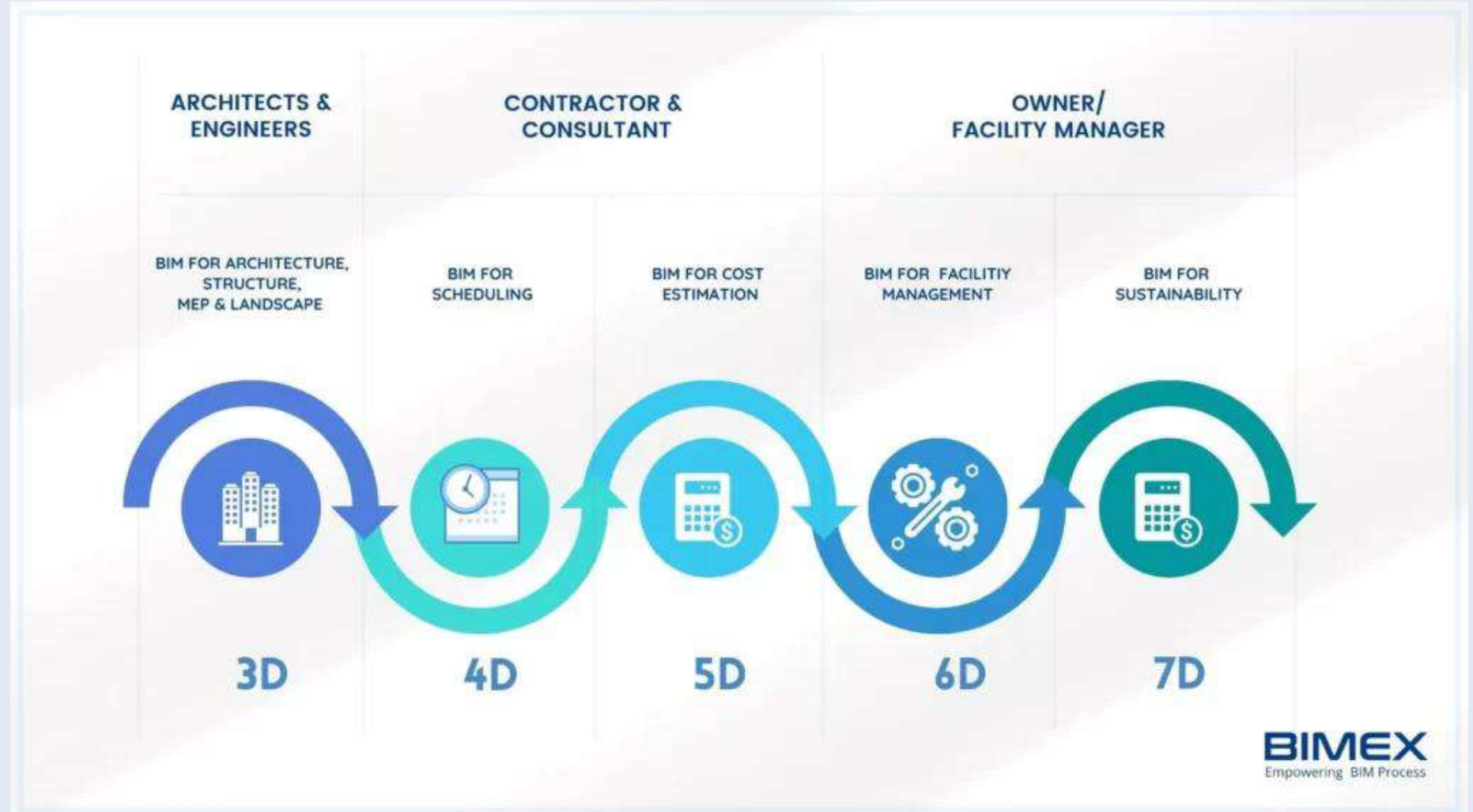


Image Source: [www.bimexeng.com/blog/bim/dimensions-of-bim](http://www.bimexeng.com/blog/bim/dimensions-of-bim)

# Virtual Construction

Construction industry is moving towards automated solutions. Adding time and cost information to the 3D model results the virtual construction model.



Time (4D)



Linked Schedules



BIM Model (3D)

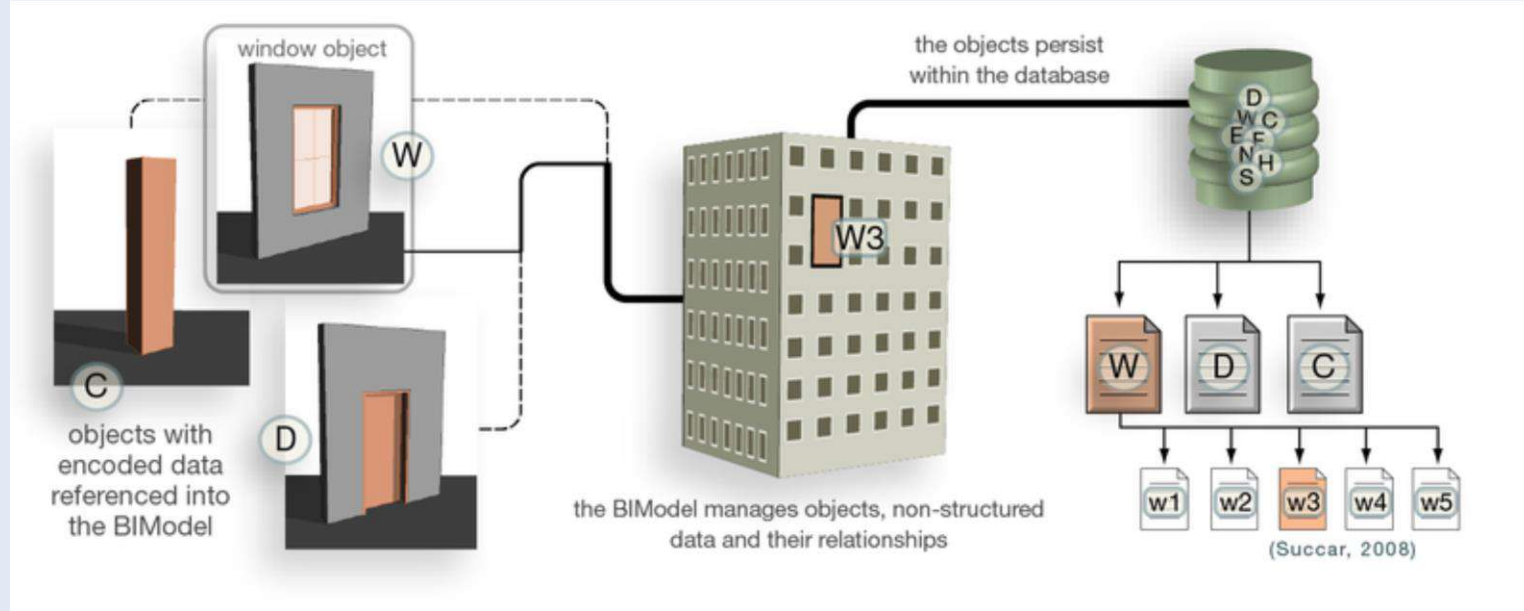
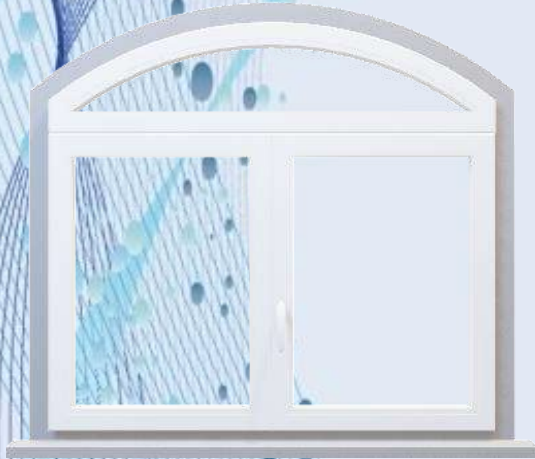


Linked Estimating Recipes

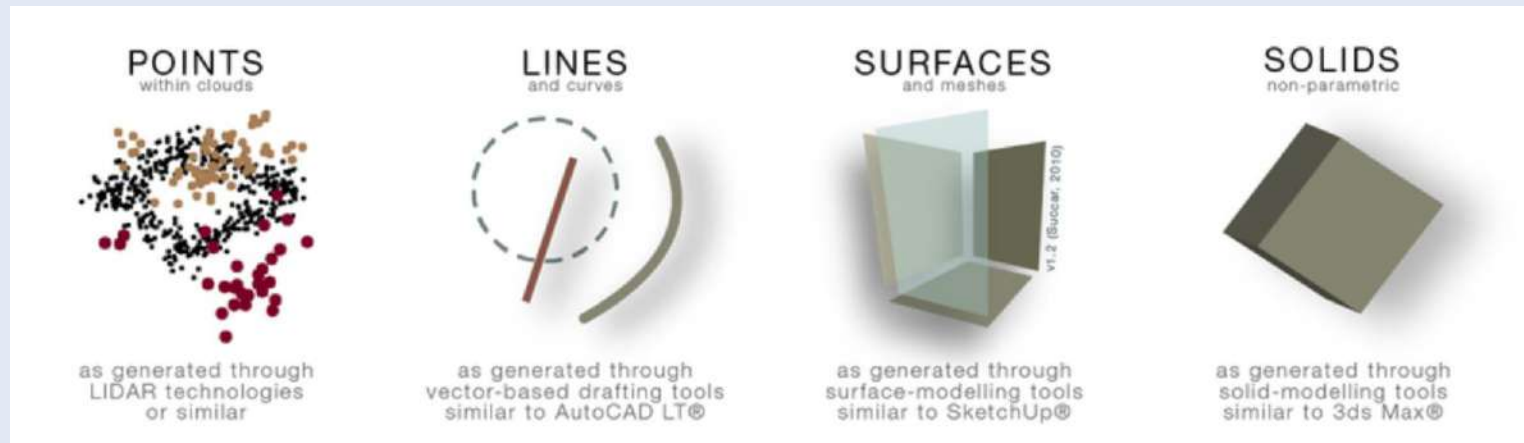
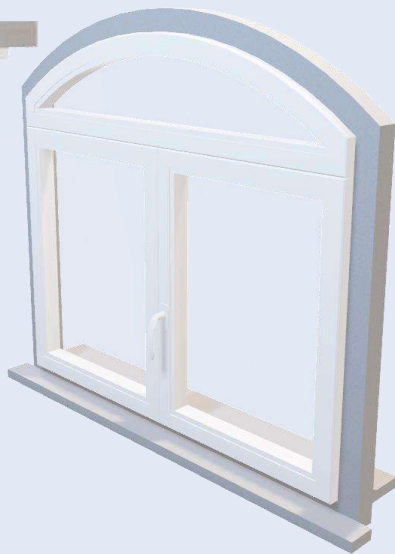


Cost (5D)

# BASIC OBJECTS AND BIM



Common Denominator for a BIM-Model (Succar)

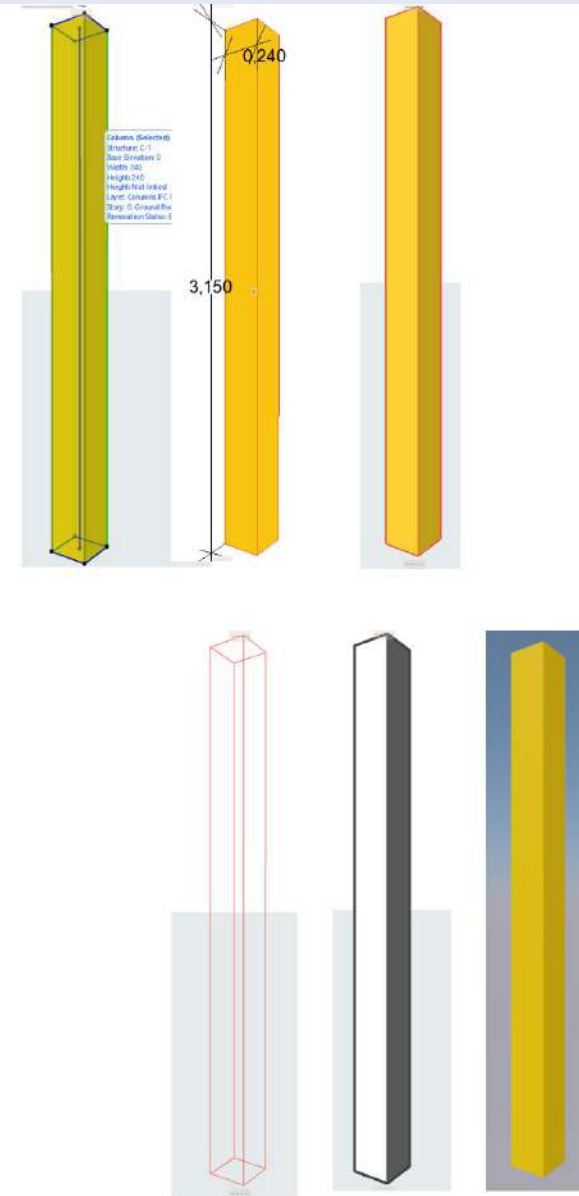
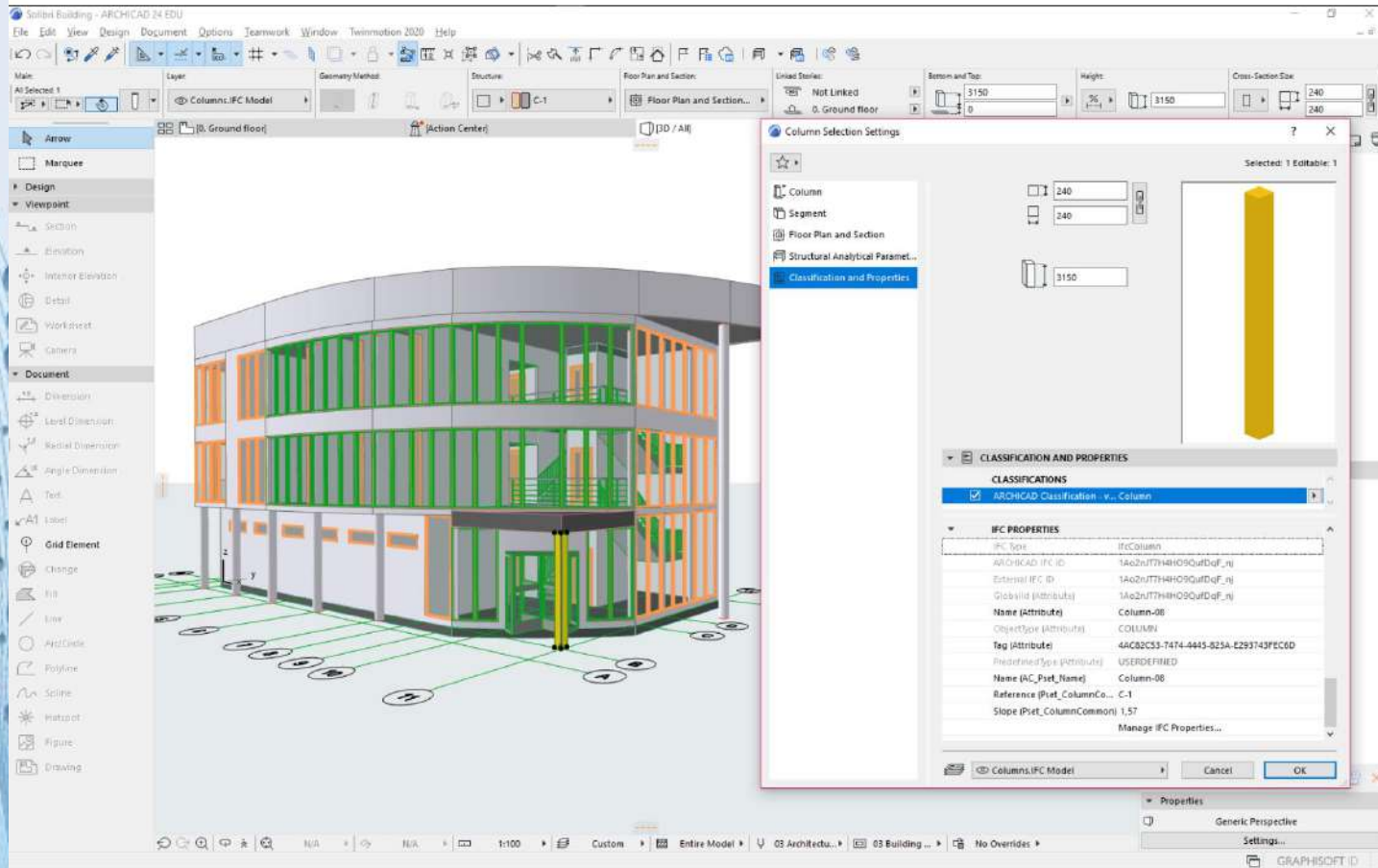


Non-BIM Modellers (Succar)

[https://www.bimthinkspace.com/2005/12/the\\_bim\\_episode.html](https://www.bimthinkspace.com/2005/12/the_bim_episode.html)

# 3D model representations examples

## View of the IFC file model in Archicad



# Purpose of the Model



Conceptual  
Design



Visualization



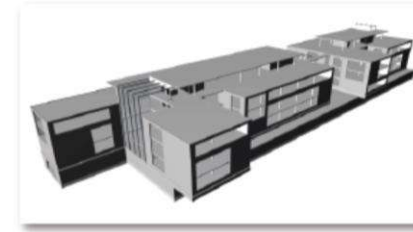
Site  
Planning



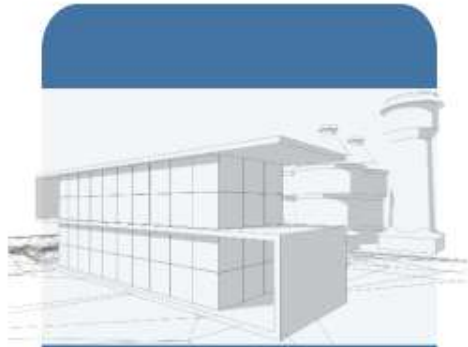
BIM  
Modeling



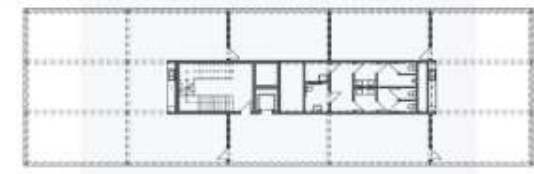
Construction  
Coordination



Structural  
Design



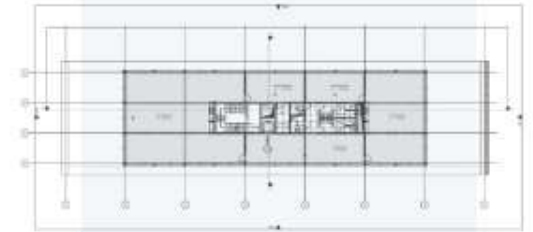
PRE DESIGN



SCHEMATIC DESIGN



DESIGN DEVELOPMENT



CONSTRUCTION DOCS

**BIM AS A PROCESS**



INFORMATION  
Client  
Surveyor



INFORMATION  
Consultants  
Codes

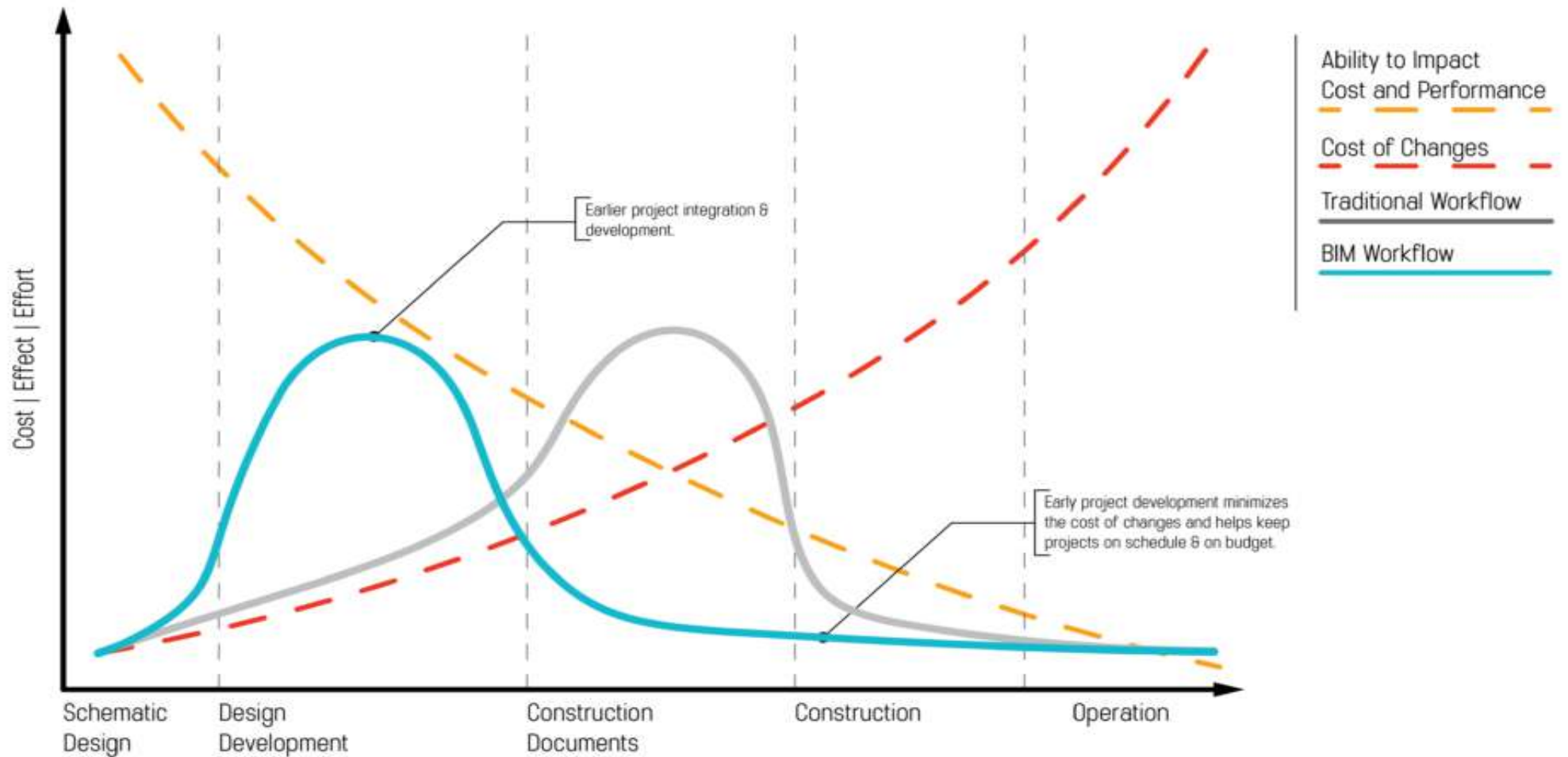


INFORMATION  
Manufacturing  
Other Disciplines

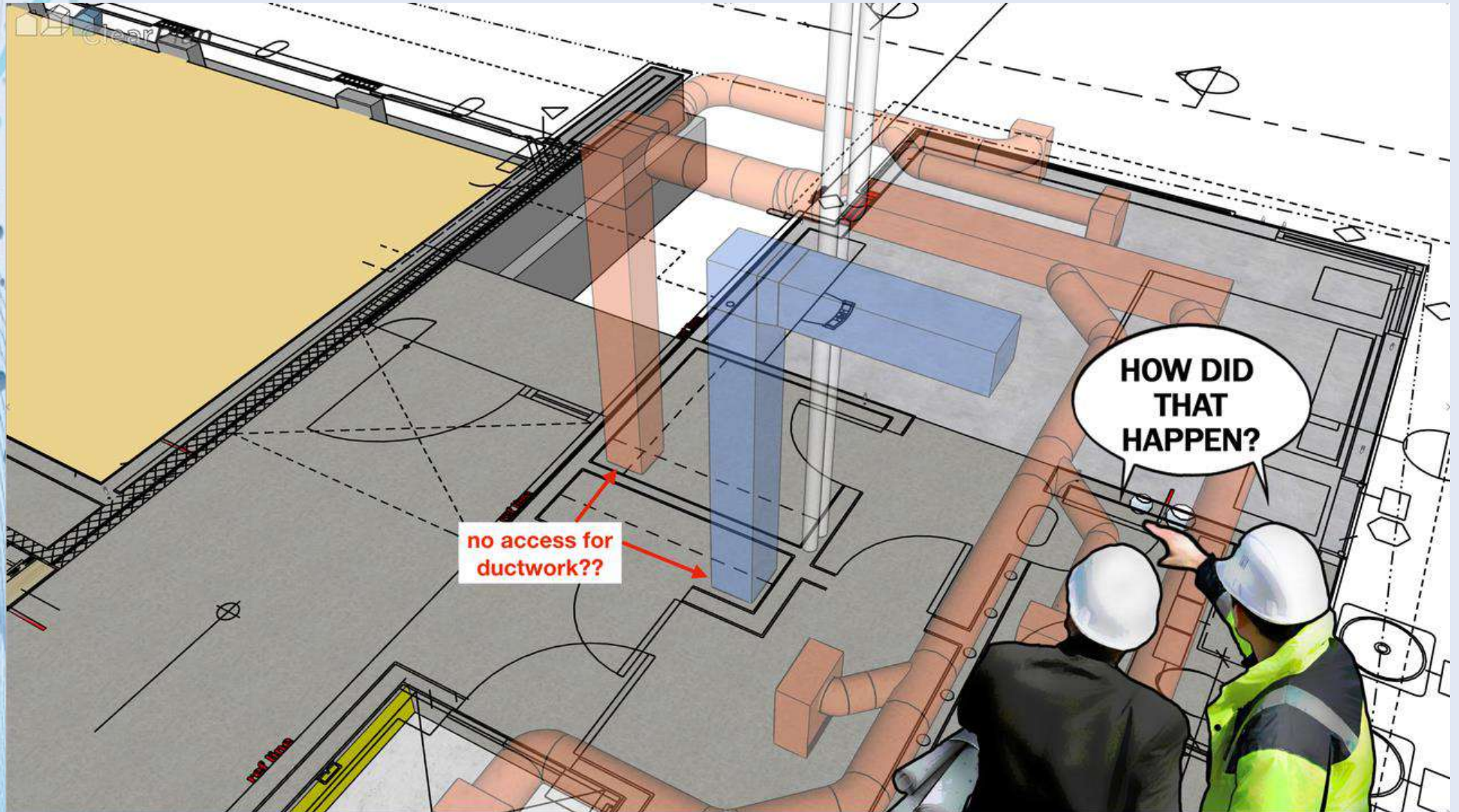


INFORMATION  
Construction Details  
Construction Site

# BIM VS traditional workflow

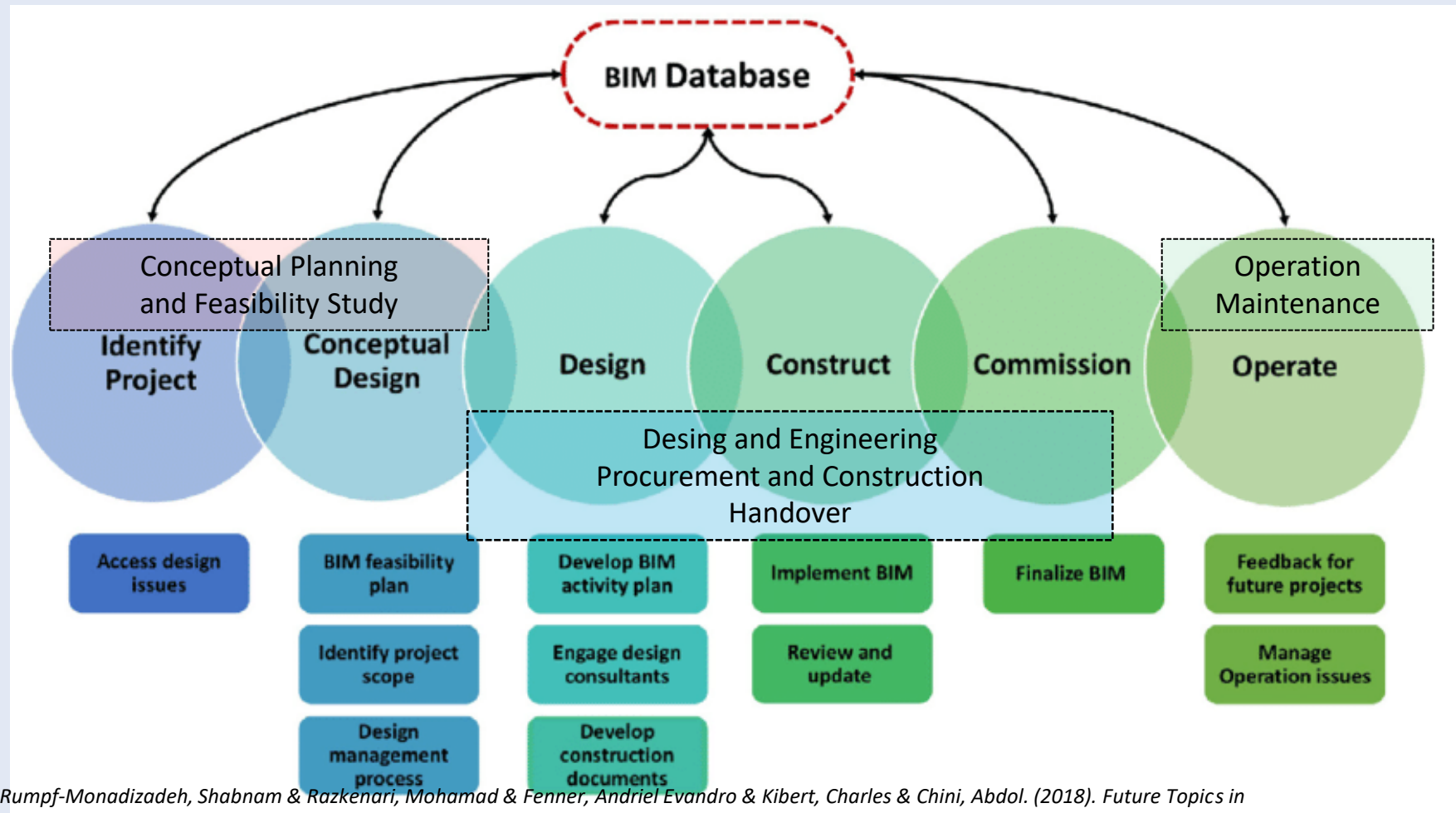


# Lack of coordination – issues - risk



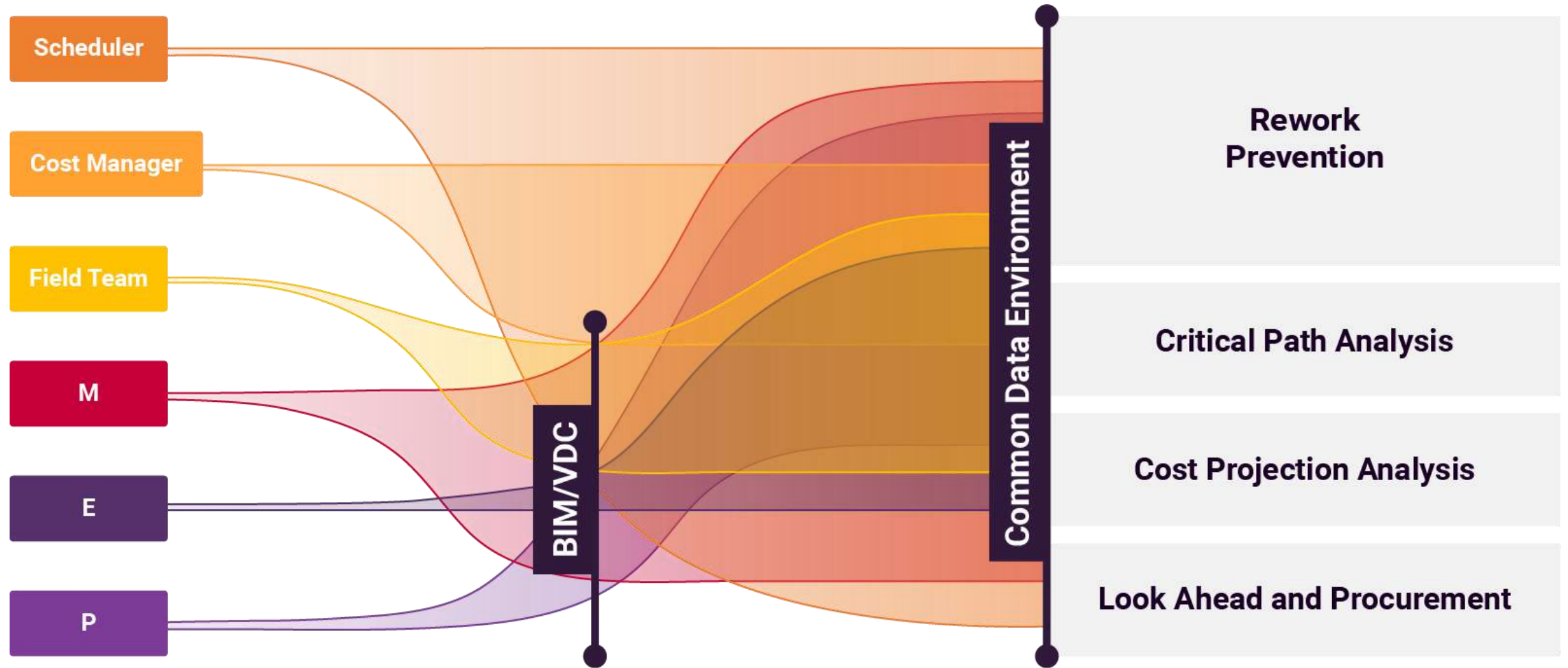
# Construction project lifecycle

Design – Construct – Operate



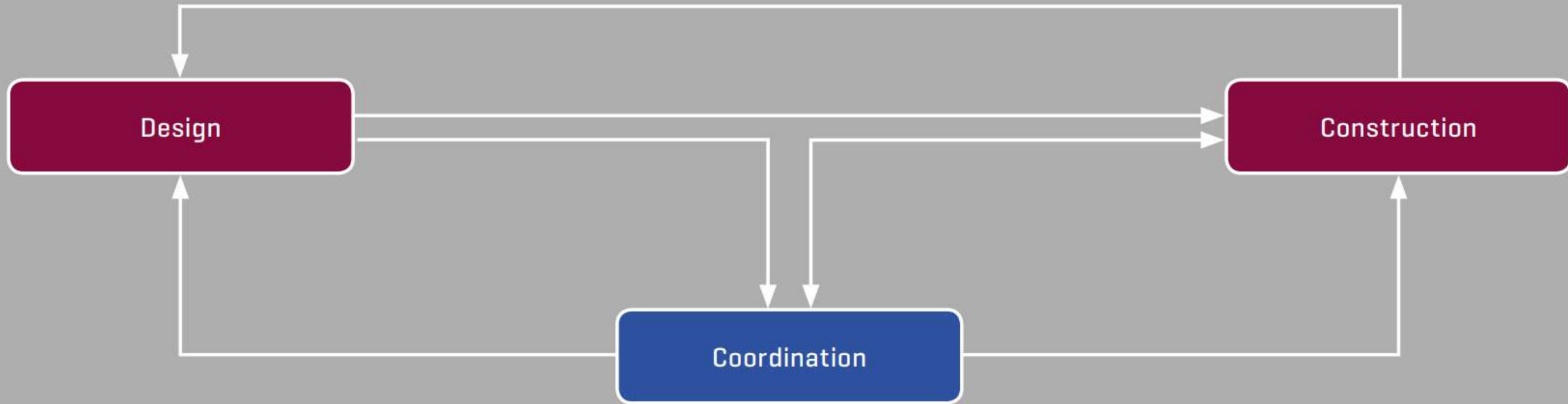
Rumpf-Monadzadeh, Shabnam & Razkenari, Mohamad & Fenner, Andriel Evandro & Kibert, Charles & Chini, Abdol. (2018). Future Topics in Manufactured Construction.

# BIM VDC - CDE



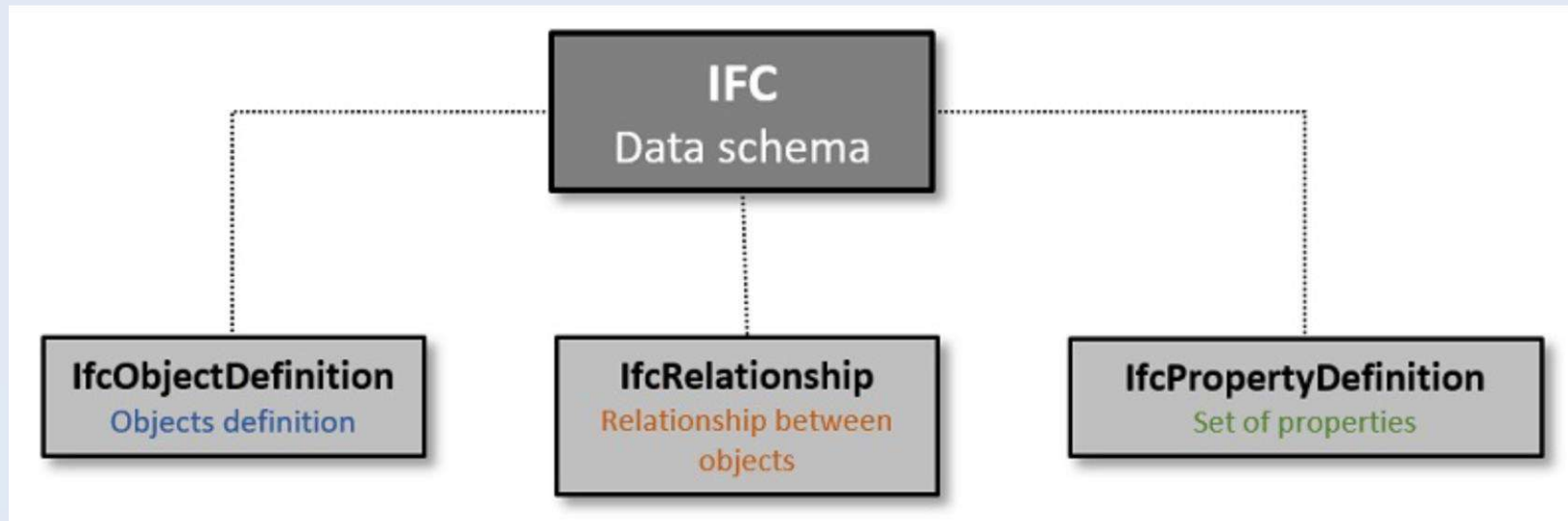
- Feeding project data from multiple stakeholders into a common data stream (Sankey diagram) allows any stakeholders to gather insights at any time.

# Communication, Coordination, and Collaboration



# IFC Data schema composition

The **Industry Foundation Classes IFC** represent an open specification for Building Information Modeling BIM data that is exchanged and shared among the various participants. IFC's are the international **openBIM** standard



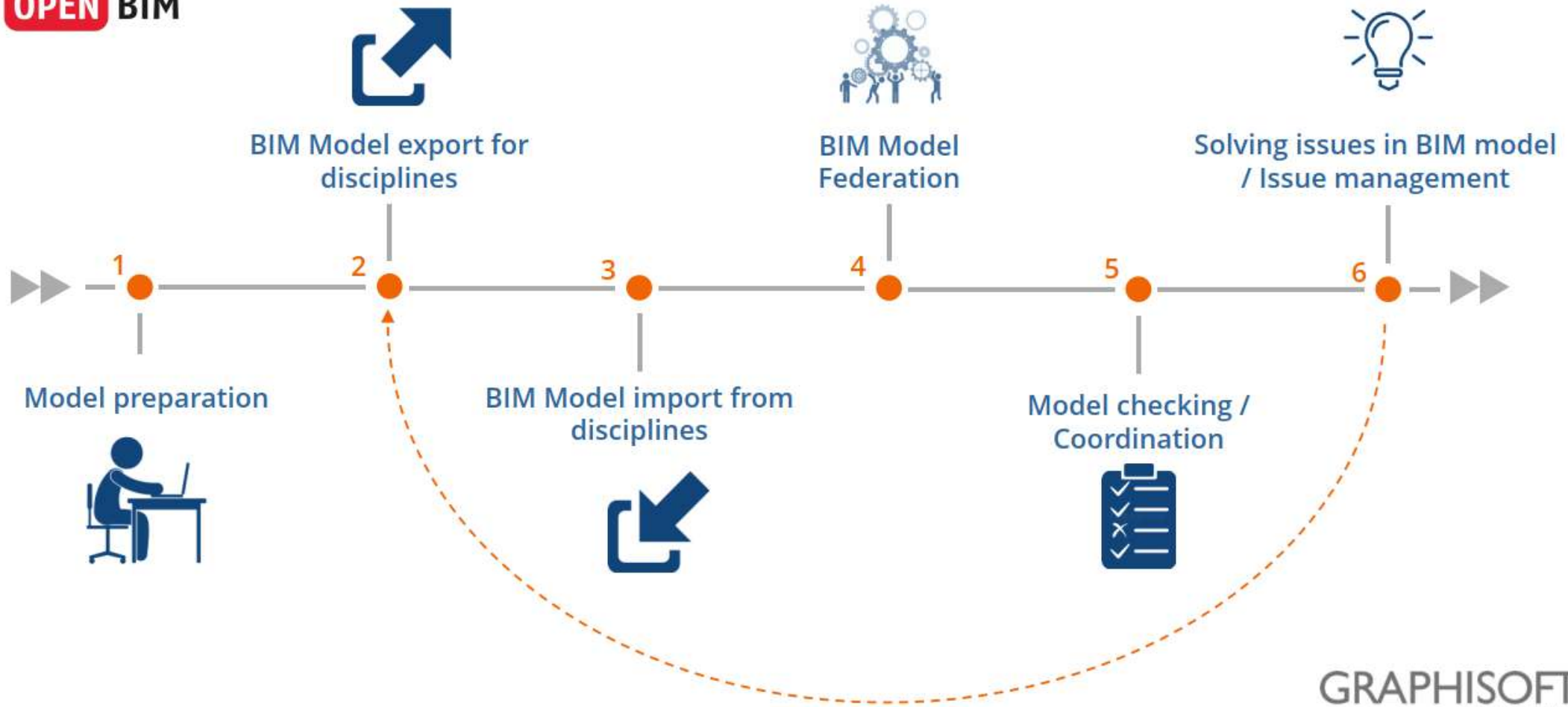
There are 3 fundamental concepts on which the IFC logic is based and that represent its structure:

- IfcObjectDefinition: stands for all entities (objects)
- IfcRelationship: summarizes relationships between entities
- IfcPropertyDefinition: describes properties associated with the entities.

<https://biblus.accasoftware.com/>

# Simplified OPEN BIM Workflow – Modeling Aspects

**OPEN** BIM™



**GRAPHISOFT**  
A NEMETSCHek COMPANY

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**  
NEPAL BIM FORUM

# Defining Metrics for Successful BIM Implementation

## 1. Design Authoring:

- a. All design drawings generated from BIM

## 2. BIM Coordination:

- a. Zero RFIs or Change Orders due to spatial conflicts between trades

## 3. Field Layout:

- a. All Shop Drawings or Field Layout drawings generated from BIM information
- b. Zero field errors in placement of building elements

## 4. BIM for Costing:

- a. % of Cost Estimate derived from Model

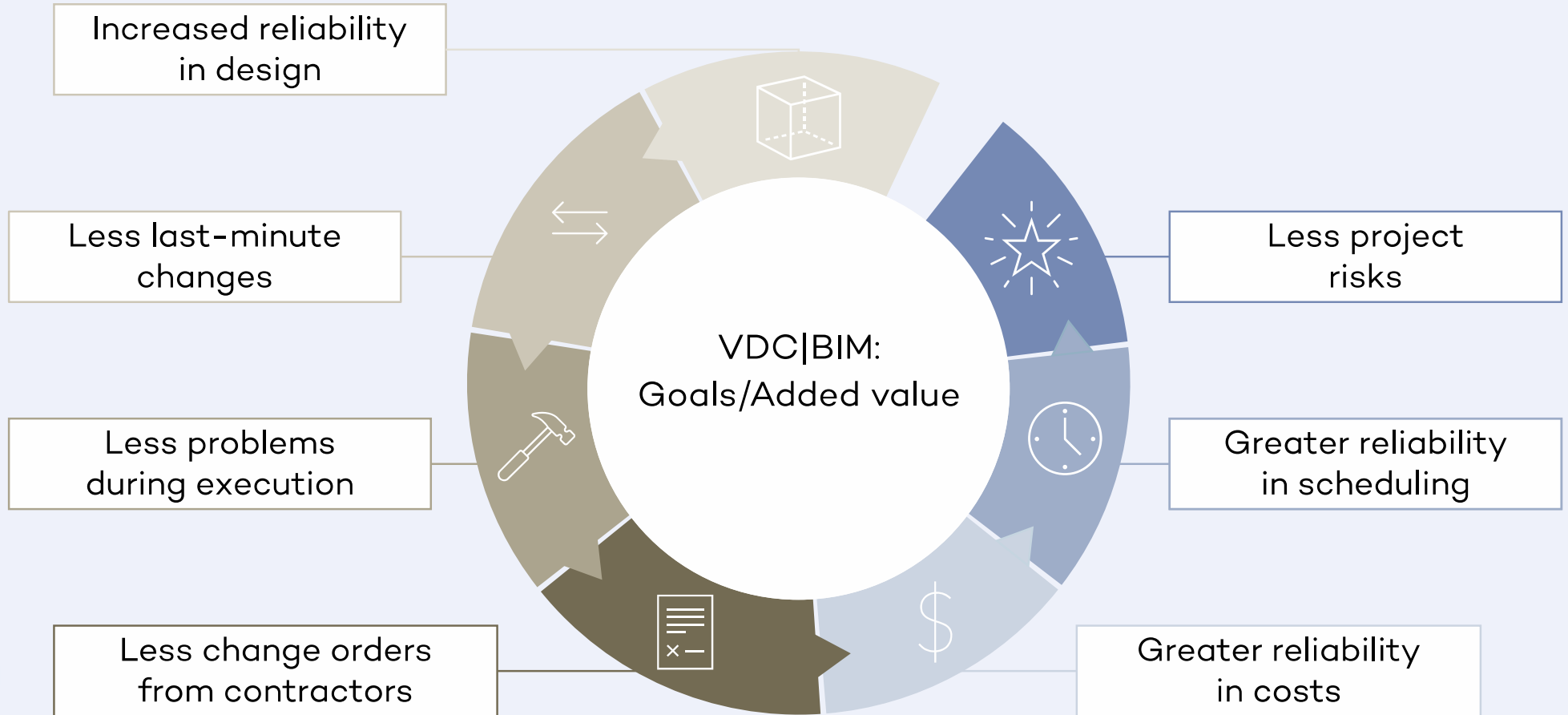
## 5. BIM for Facilities Management:

- a. % of Assets in Facilities Management System derived from BIM
- b. % of Asset Information derived from BIM

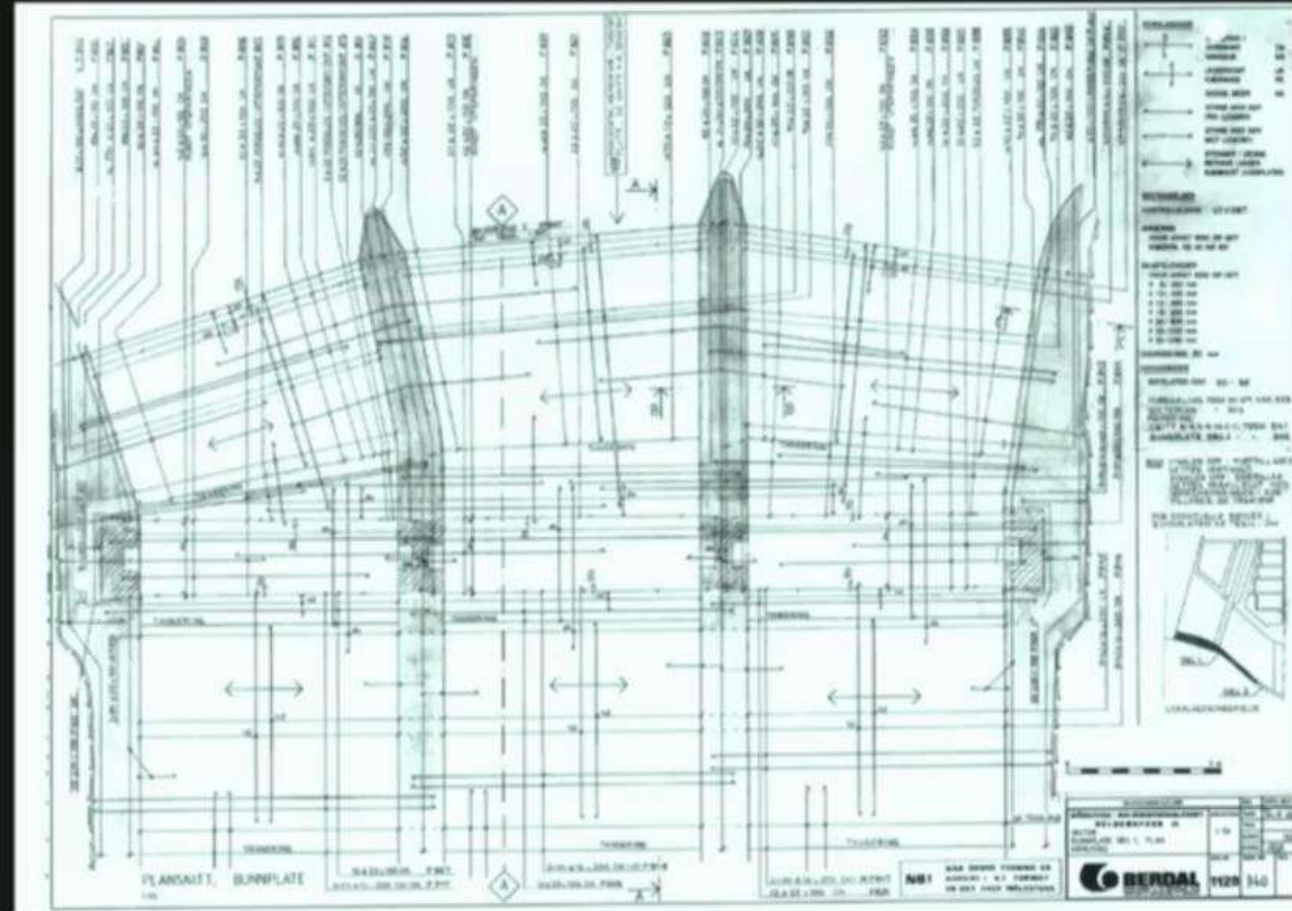
## 6. BIM for Planning:

- a. Zero schedule issues related to sequencing between trades

# BIM added value



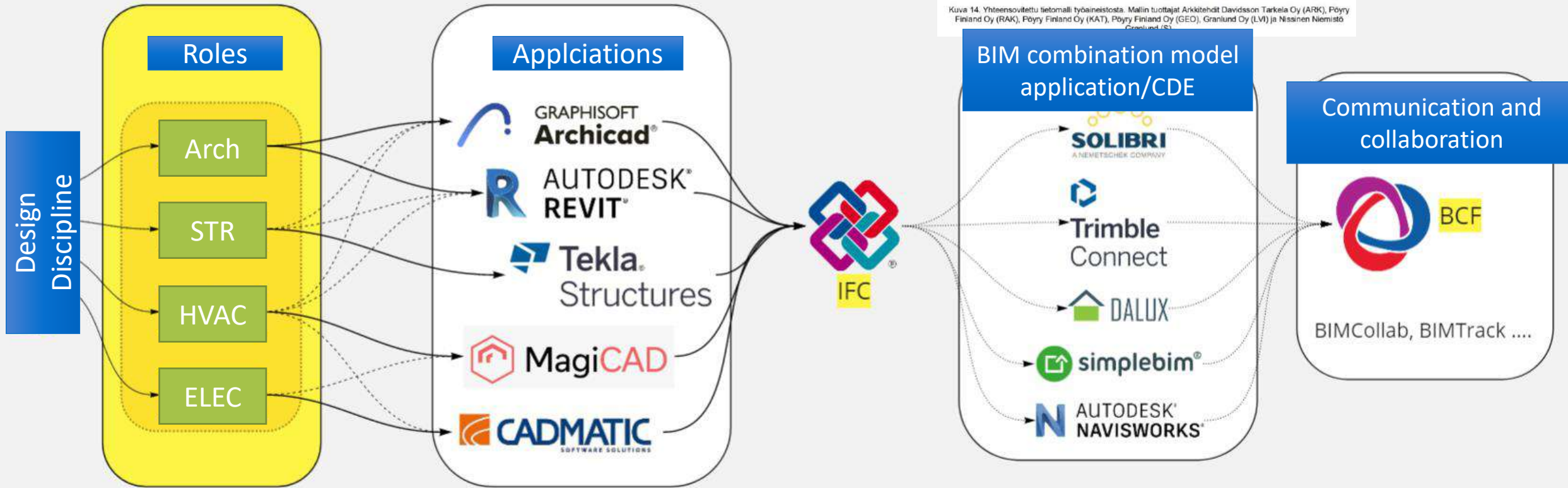
# To Draw, or Not to Draw?



# BIM tools in design/collaboration



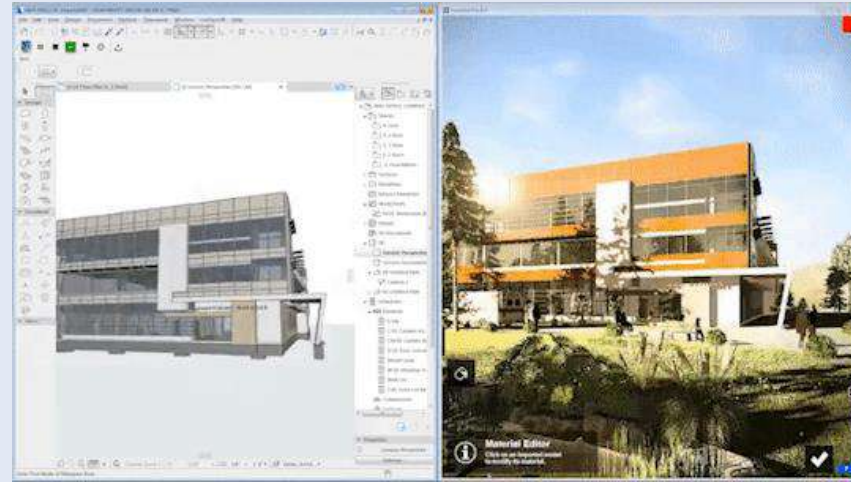
Kuva 14. Yhteensovitettu tietomalli työaineistosta. Mallin tuottajat Arkkitehdit Davidsson Tarkela Oy (ARK), Pöyry Finland Oy (RAK), Pöyry Finland Oy (KAT), Pöyry Finland Oy (GEO), Granlund Oy (LVI) ja Nissinen Niemistö (Creeclund, S).



# BIM tools -Visualization



BIMx – 2D + 3D integrinti



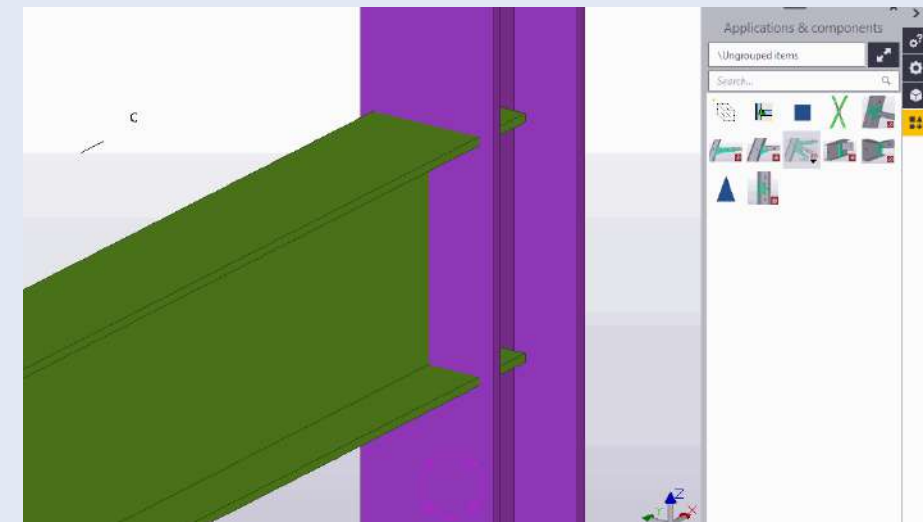
Archiad - Lumion (Ylös)  
Revit Lumion (Alas)



## Visualizaiton applications

- BIMx
- Tridify
- Enscape
- Lumion
- Twinmotion
- Unreal
- Artlantis
- ...

# Model driven desing and documentation



# Algorithmic desing ad simulation



Rhino  
NURBS modeling for Windows

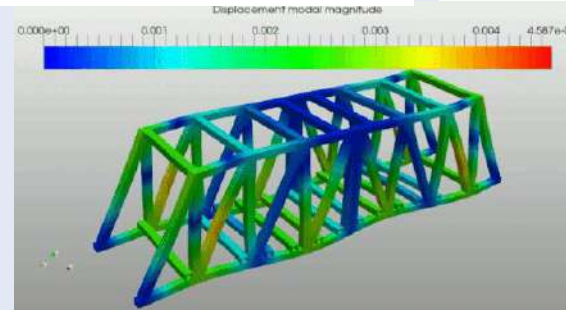
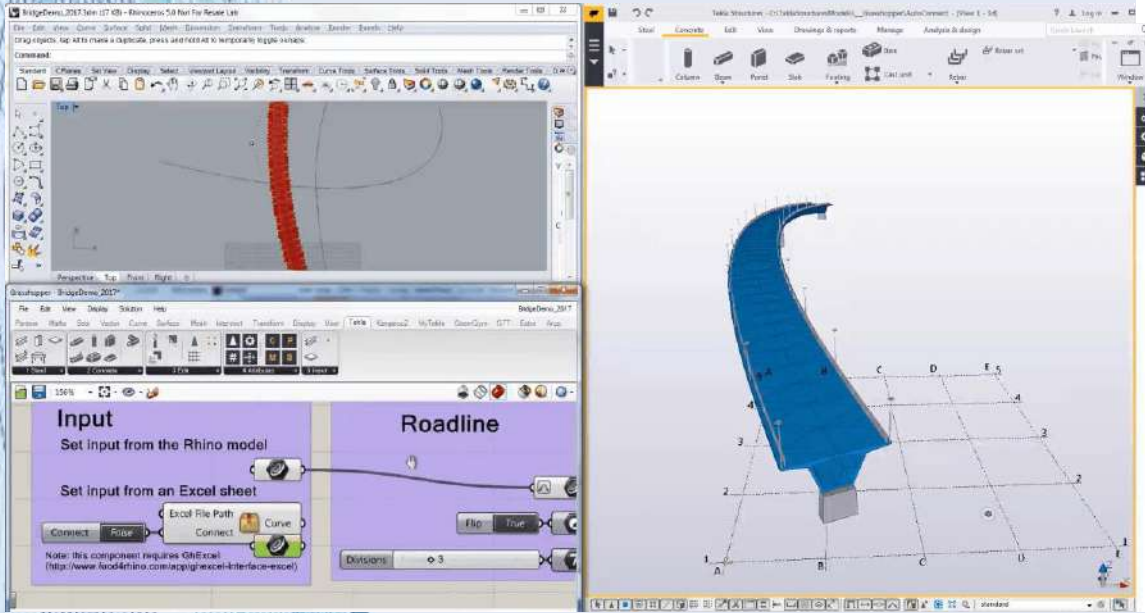
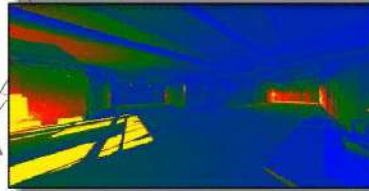
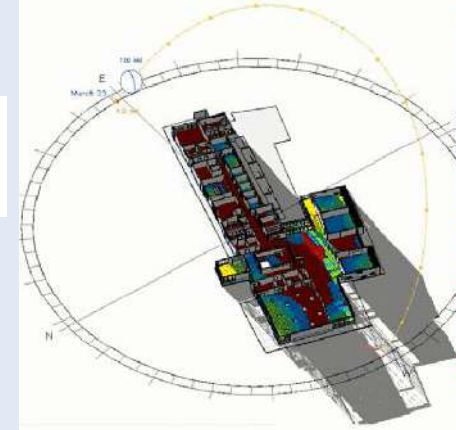


grasshopper

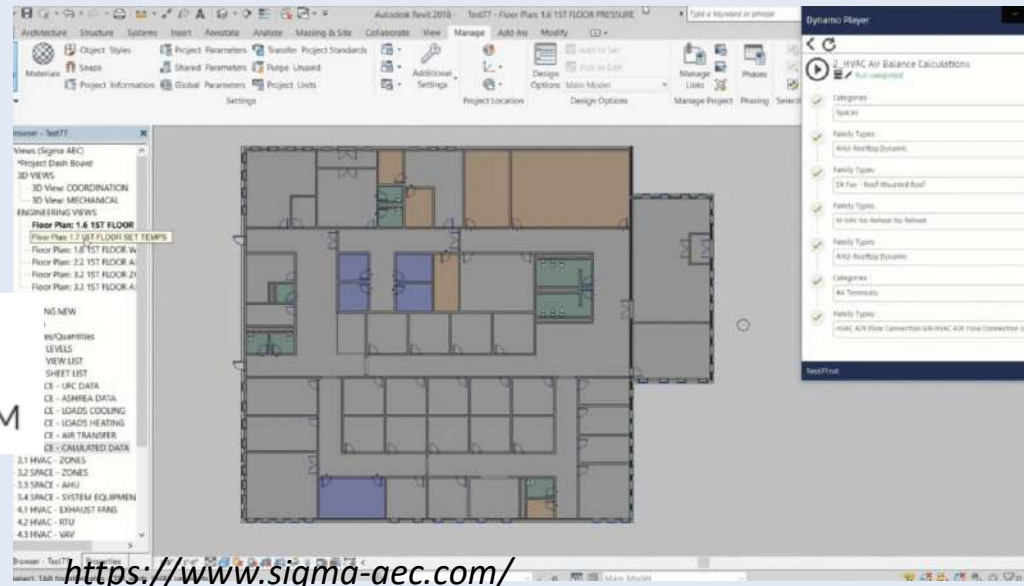


One Click LCA

Product of Bionova Ltd



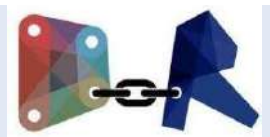
AUTODESK® ROBOT™  
STRUCTURAL ANALYSIS  
PROFESSIONAL



<https://www.tekla.com/>



Computational Design for BIM



<https://www.sigma-aec.com/>



# DATA DRIVEN DESIGN - COMPARING STRUCTURAL SOLUTIONS



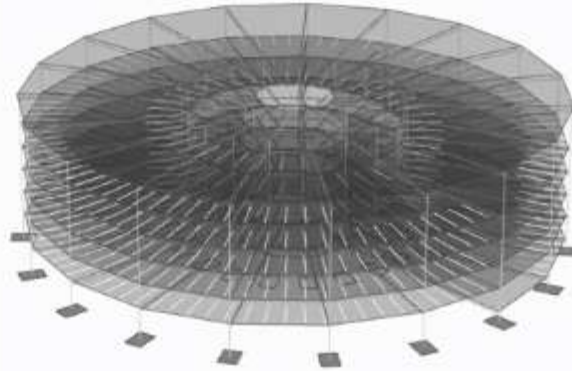
**BEAMS** 228 pcs

**COLUMNS** 114 pcs

**SLABS** 2278 pcs

**CAST IN PLACE** 3765 m<sup>3</sup>

**PRECAST** 5293 m<sup>3</sup>



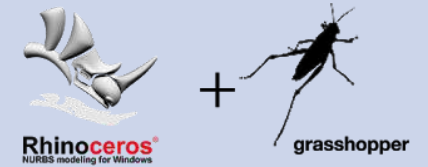
**PARKING SPACES**

**622** pcs

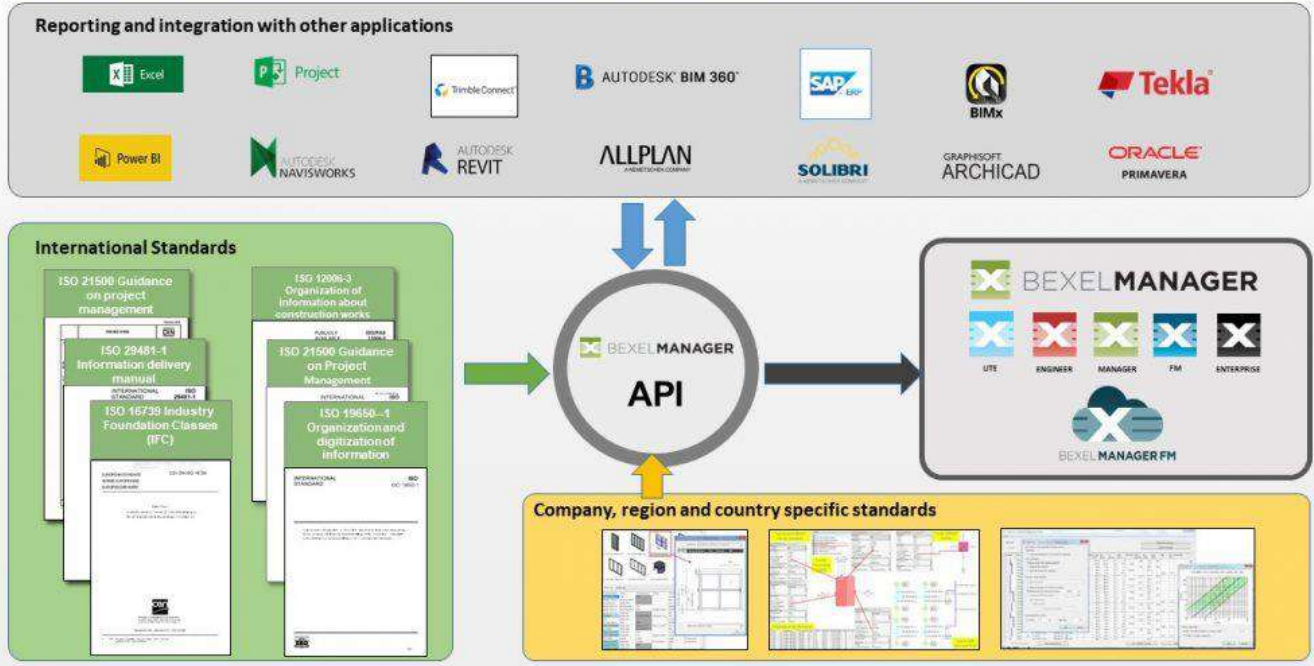
**A-INSINÖÖRIT**

## Algoritmisen suunnittelun työkalut

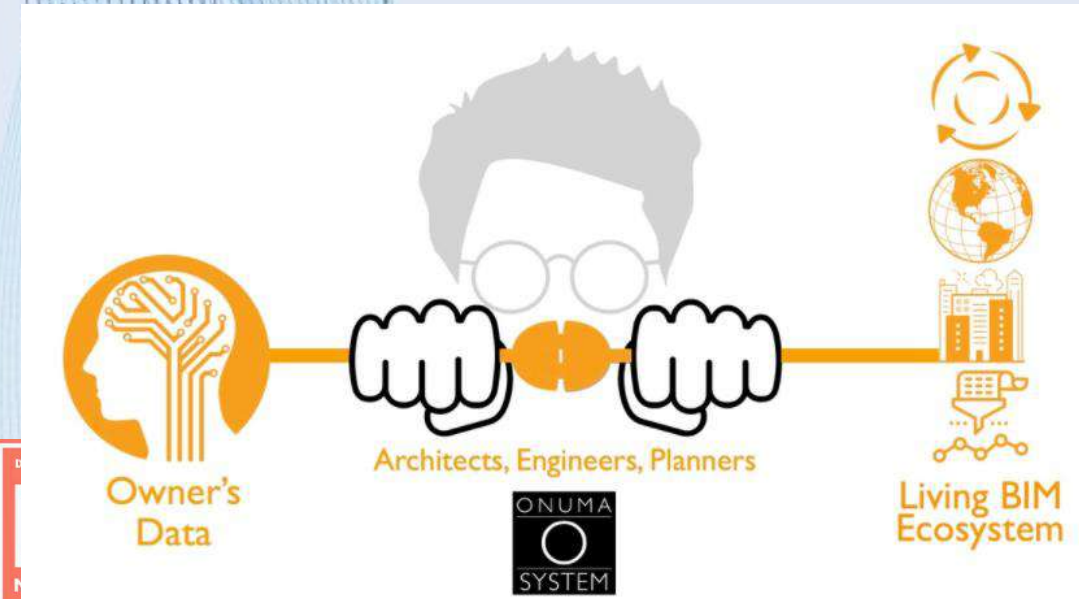
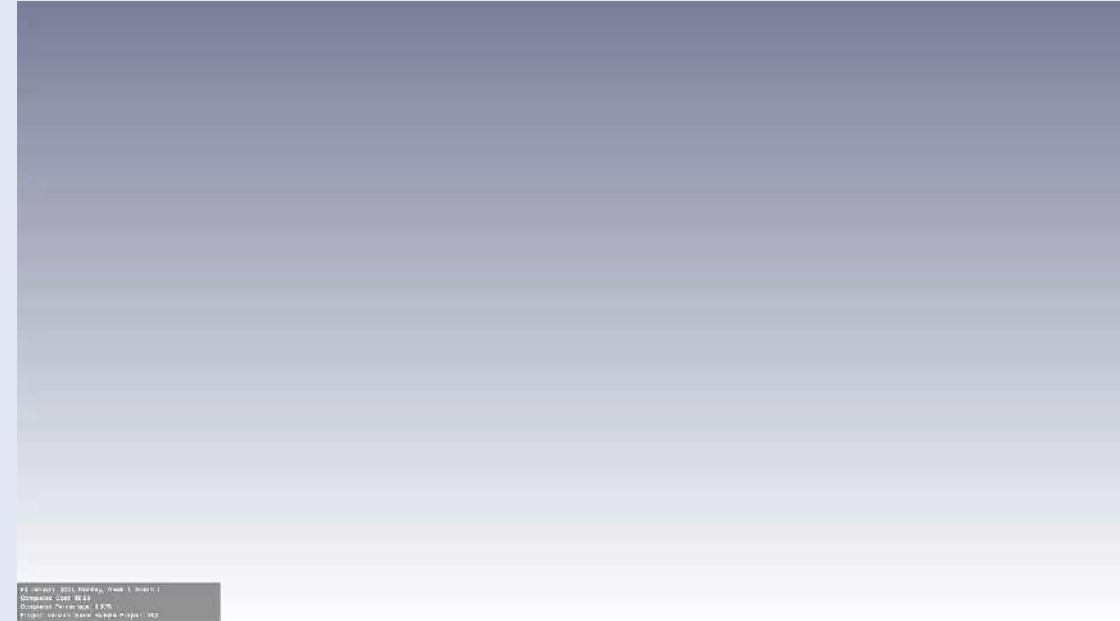
Rhino –  
Grasshopper  
Dynamo



Algorithmic design tools



# 4d Scheduling



# Global forecast for BIM market

## BUILDING INFORMATION MODELING MARKET GLOBAL FORECAST TO 2028 (USD BN)

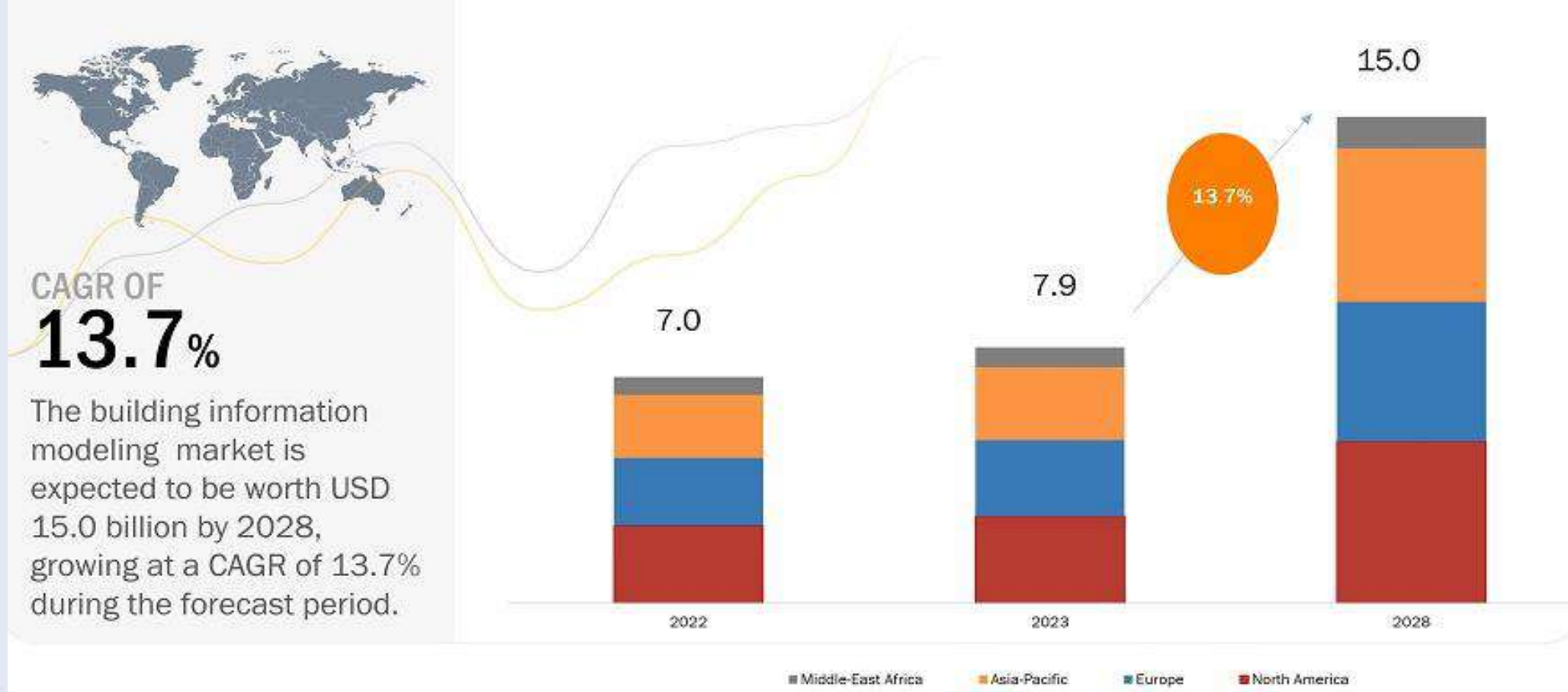


Image Source: [www.marketsandmarkets.com/Market-Reports/building-information-modeling-market](http://www.marketsandmarkets.com/Market-Reports/building-information-modeling-market).

# Future of BIM Trends in AEC industry

## 5 BIM Trends Driving the **AEC Industry** in 2023

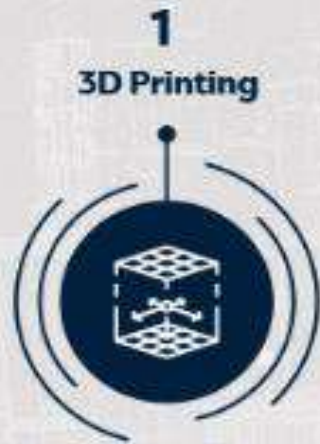
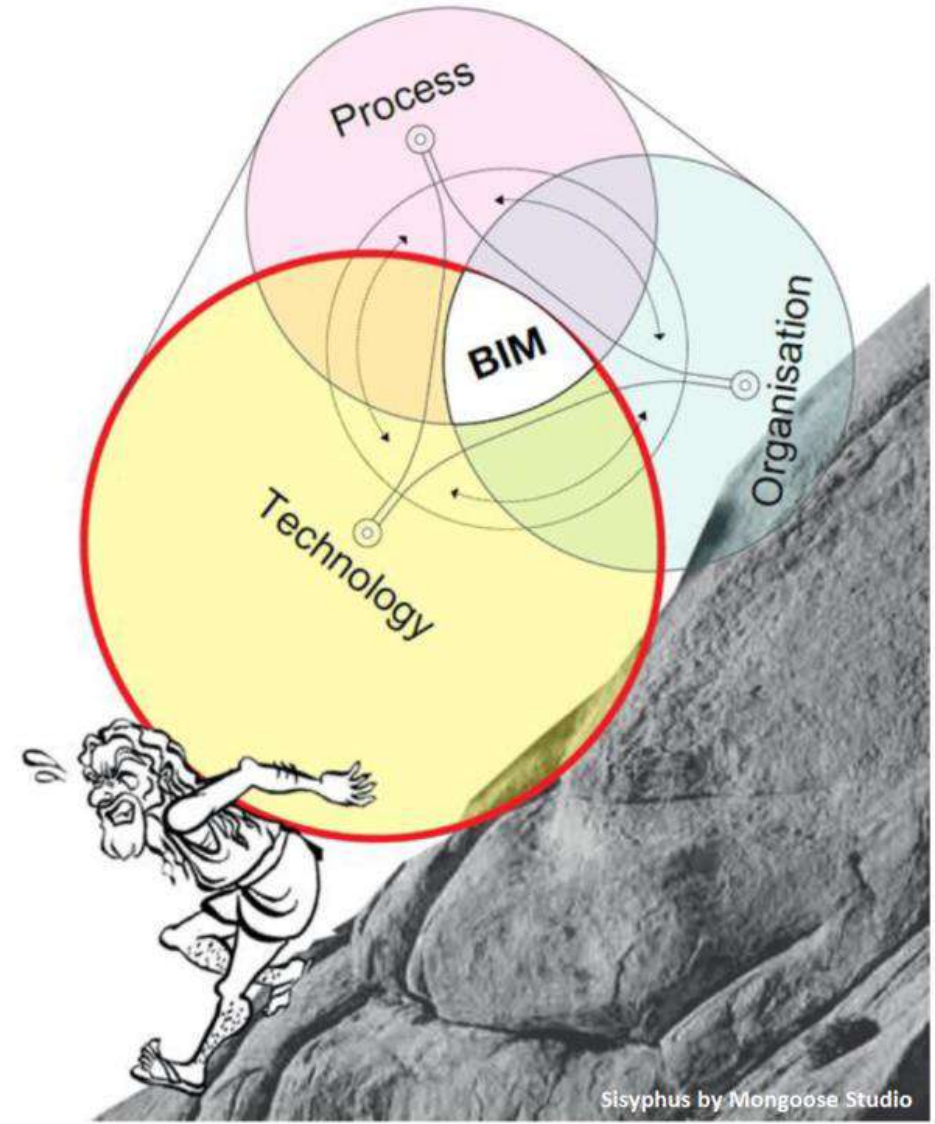
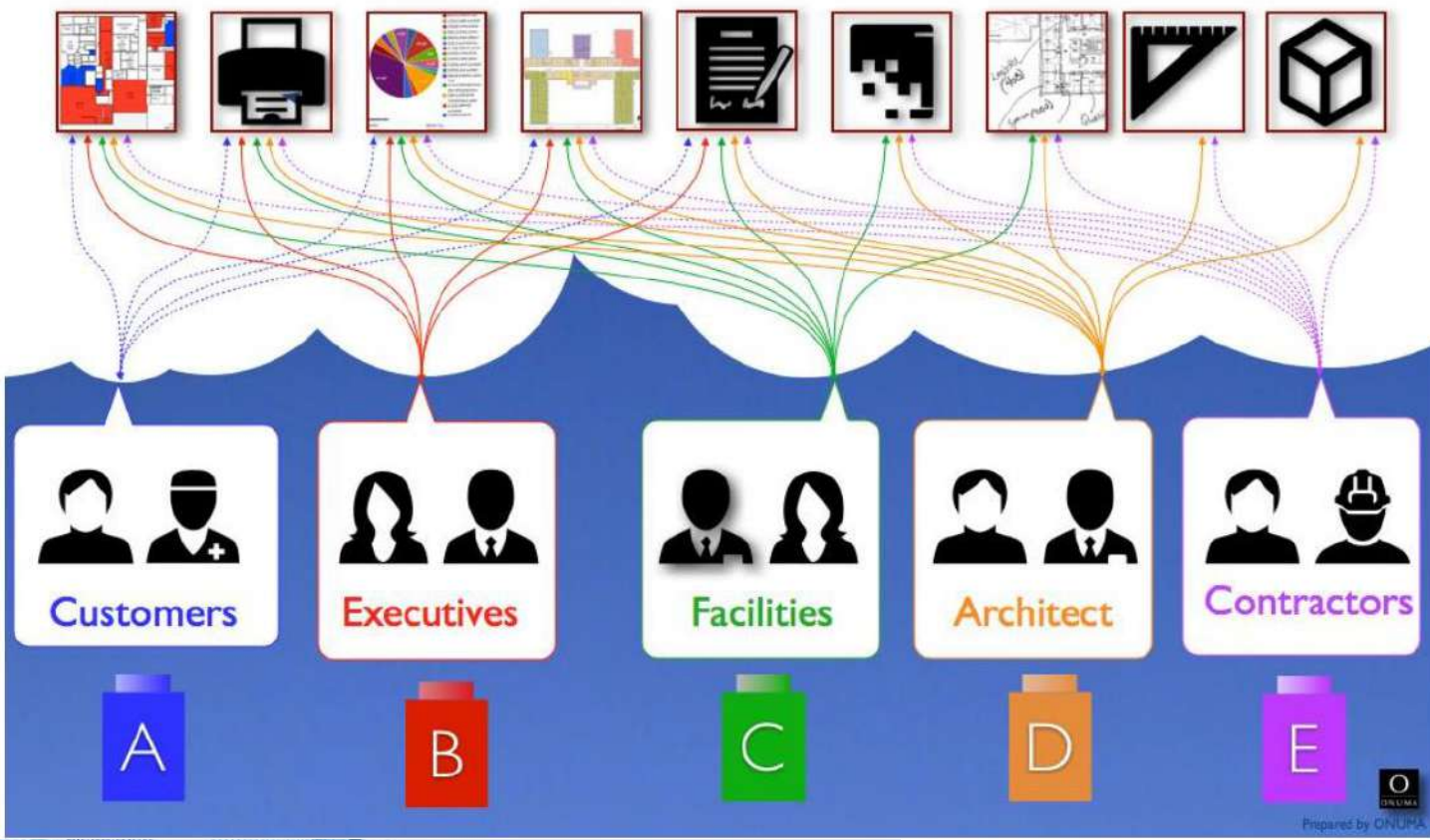


Image Source: [www.united-bim.com/5-innovative-trends-shaping-the-future-of-bim-technology](http://www.united-bim.com/5-innovative-trends-shaping-the-future-of-bim-technology)

**iFM** MANY USER - SIMPLE ACCESS TO COMPLEX DATA




Courtesy Kimon Onuma/Onuma Inc. Kiviniemi, Arto, as seen in [https://www.forum-holzbau.com/pdf/wbn19\\_Kiviniemi.pdf](https://www.forum-holzbau.com/pdf/wbn19_Kiviniemi.pdf)



# CASE – Vamma 12 – paperless project and use of BIM

Vamma 12 power-plant

Norconsult 



Fully digital engineering design of Norway's largest run-of-river hydropower station. Vamma 12 Power Plant was officially opened in September 2019. Norconsult's team has provided the engineering design for the power station. The power plant has a total throughput of 500 cubic metres per second.

**Project name:**  
Vamma 12 power-plant  
**Client:**  
Hafslund Productio / E-CO  
**Location:** Norway  
**Time span:** 2011 to 2020  
**Relevant services:** Hydropower





# BIM In Nepal, Current Status and Future Prospects

Learning from Case Studies and BIM-  
Implemented Projects

Mahesh Karki

2024.1.26

Nepal Engineering Association

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM

# About Me



## Education

- **Bachelor's degree in Civil Engineering**  
Metropolia University of Applied Sciences, Finland
- **Master's Degree, Civil Engineering**  
Aalto University, Finland

## Experience

- **Co-Founder**  
Nepal BIM Forum International and Nepal
- **Managing Director**  
Forefront Engineering Pvt Ltd - Present
- **Vice Chairman of the board**  
Engineers Without Borders Finland - Present
- **Structural Design Engineer**  
Ramboll Finland
- **Design Engineer**  
Sweco Finland
- **Lecturer**  
Metropolia University of Applied Sciences

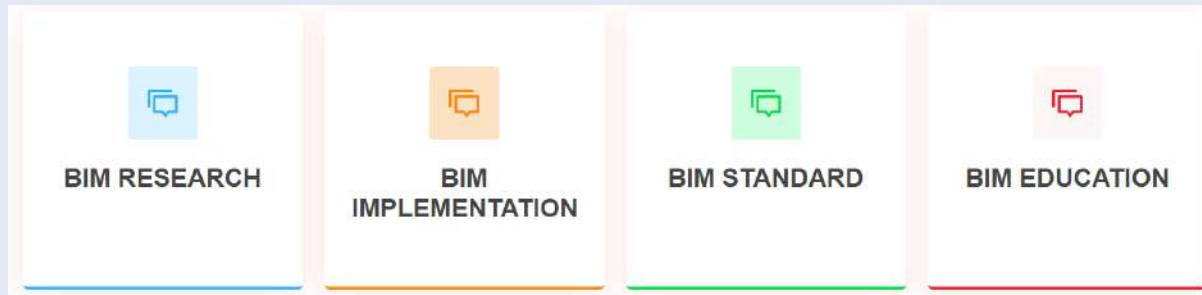
DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM

# About Nepal BIM Forum (NBIMF) - Nepal

Nepal BIM Forum is a Non-Profit Organization that works for the [DIGITIZATION](#) of the Nepalese AEC industry.



[www.nbimf.com](http://www.nbimf.com)



Nepal BIM Forum

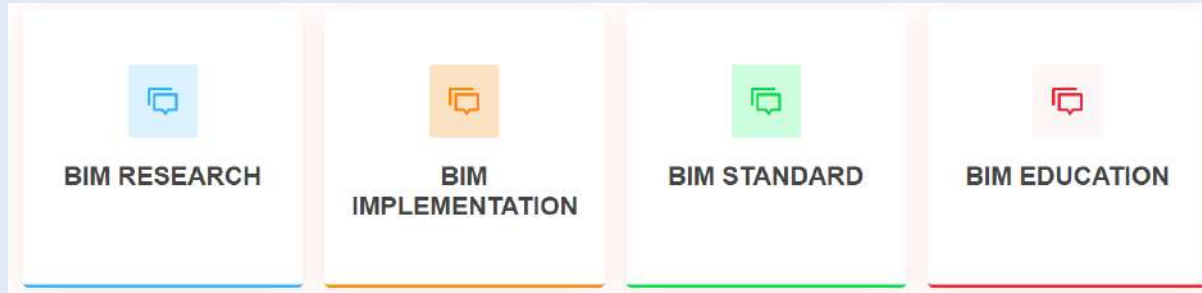


<https://www.youtube.com/@nepalbimforum/>

<u>1<sup>st</sup> Committee</u>	<u>2<sup>nd</sup> Committee</u>	<u>3<sup>rd</sup> Committee – Current</u>
Ram Prasad Suwal – Chairperson	Mahesh Karki - Chairperson	Sankalp Pokhrel - Chairperson
Baburam Bhattarai – Vice Chairperson	Baburam Bhattarai – Vice Chairperson	Nabin Ghising – Vice Chairperson
Moti Shrestha – Secretary	Moti Shrestha – Secretary	Sudhir Thapa – Secretary
Nirmal Koirala – Treasurer	Nirmal Koirala – Treasurer	Moti Shrestha – Treasurer
Mahesh Yakami - Executive Board Member	Mahesh Yakami - Executive Board Member	Ashit Adhikari - Executive Board Member
Sankalp Pokhrel - Executive Board Member	Sankalp Pokhrel - Executive Board Member	Kamal Karki - Executive Board Member
Mahesh Karki - Executive Board Member	Ram Prasad Suwal – Immediate Past Chairperson	Mahesh Karki – Immediate Past Chairperson
Sunil Suwal - Executive Board Member	Nabin Ghising - Executive Board Member	Aarju Mali- Executive Board Member
Nabin Ghising - Executive Board Member	Sudhir Thapa - Executive Board Member	

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Nepal BIM Forum



<https://www.youtube.com/@nepalbimforum/>



## **3<sup>rd</sup> Committee – Current**

Sankalp Pokhrel - Chairperson

Nabin Ghising – Vice Chairperson

Sudhir Thapa – Secretary

Moti Shrestha – Treasurer

Ashit Adhikari - Executive Board Member

Kamal Karki - Executive Board Member

Mahesh Karki – Immediate Past Chairperson

Aarju Mali- Executive Board Member

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**  
NEPAL BIM FORUM

# NBIMF BIM Activities

- The first **BIM Conference** in Nepal was organized in 2019.
- MOU signed with **Nepal Engineering College, Janakpur Engineering, National Innovation Centre, Indian BIM Association** and integration of BIM in Education.
- Various **training sessions** for students and professionals in collaboration with **SCAEF, FCAN, and CBDIC**.
- Published various **research papers** on the topic of BIM Implementation in Nepal.
- Online webinar sessions at various times.



# NBIMF BIM Activities



# NBIMF BIM Activities



# NBIMF BIM Activities

**BIM WEBINAR SERIES 01**

## BIM IN ARCHITECTURAL DESIGN

**BIM AS A TOOL FOR ARCHITECTS**

**Date:**  
Sunday, 5th April 2020, Nepal Time 13:00 - 14:30

**Presenter:**

 **SUNIL SUWAL**  
Chairperson: Nepal BIM Forum  
Lecturer: Metropolia University of Applied Science

**For more info:**  
Contact - Ar. Suraj Khanal, Honorary secretary SONA

**ORGANIZERS:**  
Nepal BIM Forum, NBIMF Finland  
Metropolia University of Applied Sciences, Finland  
Society of Nepalese Architects, Nepal  
Nepal Engineering College, Nepal






**BIM WEBINAR SERIES 02**

"NBIMF supporting digital transformation of the Nepalese AEC industry."

## BIM AND ITS BENEFITS TO NEPALESE AEC STAKEHOLDERS

**Presenters:**

 Sunil Suwal  
Chairperson: NBIMF, Intl.  
Lecturer, Metropolia University of Applied Science, Finland

 Bansri Pandey  
Member, NBIMF Nepal  
MD, Integrated Technical Solutions Pvt Ltd, Nepal

**Team and support from:** NBIMF Intl & Nepal Team  
DUDBC, Nepal  
F2DCS, Finland  
Metropolia University of Applied Sciences, Finland

**13 MAY 2020**

**Date:** 2:00 pm - 3:30 pm  
**Where:** Online (contact@nbimf.com)

**For more info:**  
Mahesh Karki ☎ +358451448433  
Dharmendra Panthee ☎ +9779801012708  
Bishundas Lama ☎ +9779851146680

[www.nbimf.com](http://www.nbimf.com) | [@nbimf](https://twitter.com/nbimf) | [/nepalbimforum](https://facebook.com/nepalbimforum)







**BIM WEBINAR SERIES 03**

## BIM IN STRUCTURAL DESIGN

**BIM AS A TOOL FOR STRUCTURAL DESIGN AND DOCUMENTATION**

**Date:** 11th July 2020  
**Time:** 14:00 - 15:30 (Nepal Time)

**Presenters:**

 **MAHESH KARKI**  
Secretary: Nepal BIM Forum  
Structural Engineer, Svevia Oy, Finland  
mahesh.karki@nbimf.com  
+358451448433

 **BHUPENDRA BASNET**  
Member: Nepal BIM Forum  
Building Designer - Vuokanen Oy, Finland  
bhupendra.basnet@nbimf.com  
+35845190779

**For more information:**  
Dr. Jagat Shrestha, Chairman of Structural Engineer's Association-Nepal (SEANep)  
(seaneporg@gmail.com)

**ORGANIZERS AND SUPPORTED BY**







**BIM WEBINAR SERIES 05**

## BIM IN AUSTRALIAN ARCHITECTURAL PRACTICE

**Date:** 28th November 2020  
**Time:** 03:00 - 04:00 (Nepal Time)

**Presenter:**

 **DHANJEET SAH**  
NBIMF Representative Australia  
National BIM Manager, Rothelowman  
dhanjeet.sah@nbimf.com

**For more info:** contact@nbimf.com

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**BIM WEBINAR SERIES 04**

## BIM FOR NEPALESE CONTRACTORS

**BIM AS A TOOL FOR PROJECT MANAGEMENT**

**Date:** 13th September 2020, Sunday  
**Time:** 03:00 pm - 04:15 pm (Nepal Time)

**Welcome note**

 **MR. RABI SINGH**  
President, Federation of Contractors' Associations of Nepal

**Remarks**

 **MR. MINMAN SHRESTHA**  
President, Nepal Land & Housing Development Association

**Vote of thanks**

 **MR. ANAND SUBEDI**  
President, Youth Community for Nepalese Contractors

**Moderator**

 **MR. SAUVAV SHARMA**  
Member, Youth Community for Nepalese Contractors

**Presenters:**

 **MAHESH KARKI**  
Secretary, Nepal BIM Forum  
Structural Engineer, Svevia Oy  
mahesh.karki@nbimf.com  
+358451448433

 **ANIL BHATTARAI**  
Board Member, Nepal BIM Forum  
Technical Specialist, Sallin Ltd  
anil@nepalbimforum.com  
+358442645746

**For more information:** Sahara Rai, Admin Officer YCNC, info@ycnc.com.np, 014421164

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**BIM webinar series 07**

**Virtual Design and Construction**

## Turner Construction's Perspective

**Date:** 29th April 2021  
**Time:** 06:30 PM - 07:30 PM (Nepal Time)

**Presenter:**

 **Suman Paneru**  
VOC Engineer, Turner Construction  
NBIMF Rep. - North America

**Welcome note**

 **Ar. Ajit KC**  
General Secretary  
SONA

**Thank you note**

 **Ar. Rajesh Thapa**  
President  
SONA

**For more info:** contact@nbimf.com; sona2047@gmail.com

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**BIM WEBINAR SERIES 06**

**Date:** 21st Feb 2021  
**Time:** 15:00 - 16:00 (NST)


## BIM IN PANAMA CANAL 4TH BRIDGE

Winner of buildingSMART International Awards 2020  
Category - Design using openBIM

**Presenter**







 **Mr. Xi Liu**  
BIM Consultant  
COCC Highway Consultants Co., Ltd  
liu@hpdci.com.cn

**Welcome note**

 **Mr. Birendra Raj Pandey**  
Past President, YCNC  
Vice President, CNI

**For more info:** contact@nbimf.com

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**NBIMF**  
NEPAL BIM FORUM

JOIN OUR NEXT WEBINAR SESSION

## COMPARATIVE ANALYSIS OF BIM BASED AND TRADITIONAL APPROACHES FOR QUANTITY TAKE-OFF (QTO) ACCURACY : A CASE OF STUDY OF BUILDING PROJECTS IN KATHMANDU

**Monday | 3:00-4:00 PM | 3<sup>rd</sup> Sept**

**UTCRIST RAJ ONTA**  
Architect & Master's Graduate  
Nepal BIM Forum Representative of Engineering Architecture Students

 **Presenter**

☎ 986-3404703 | ✉ contact@nbimf.com








# NBIMF Research Activities

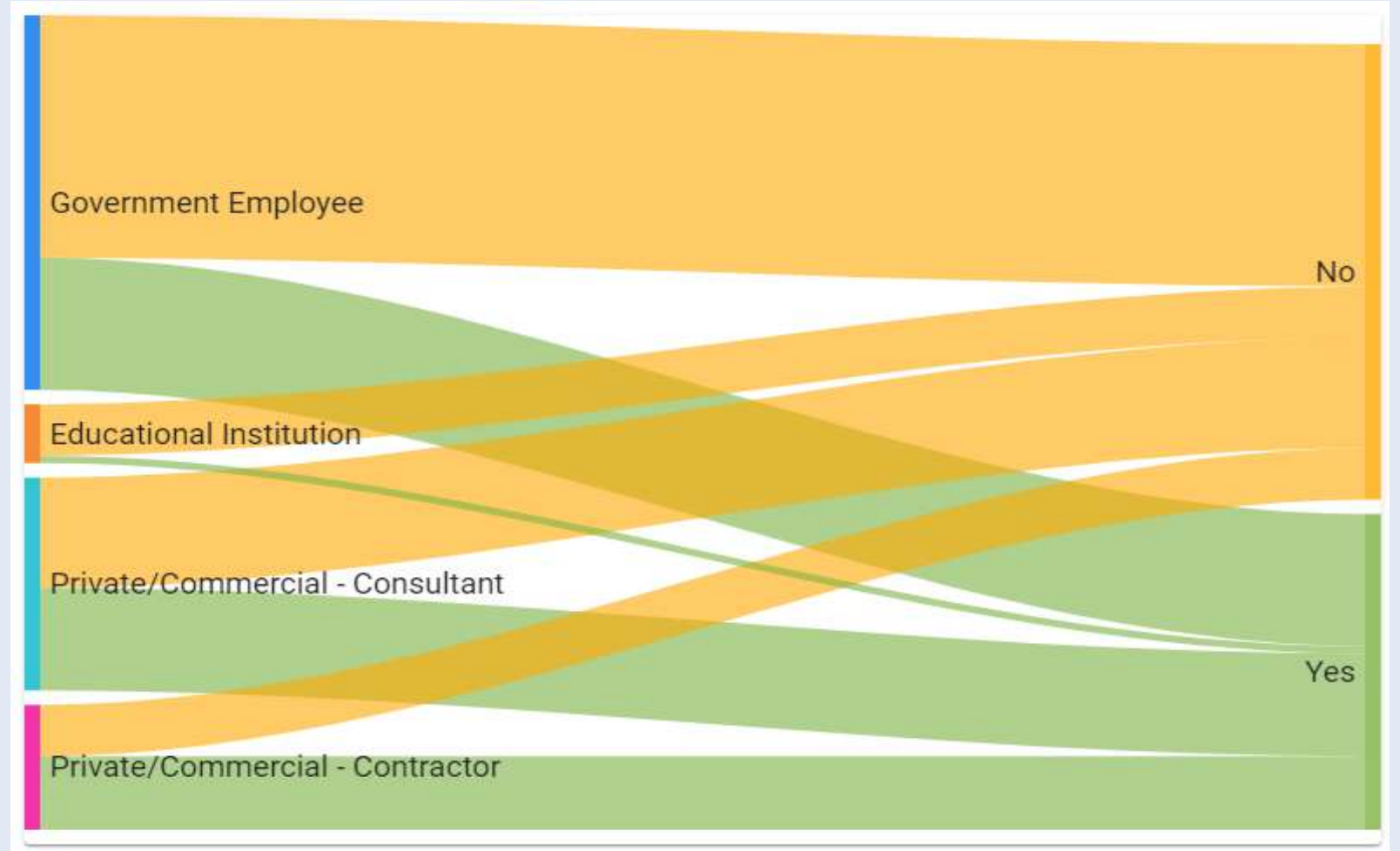
## Building Information Modeling Implementation Status in Nepal

August 2023

Conference: International Technical Conference (ITC) 2023 ,Chung-Ang University · At: Seoul, South Korea · Volume: Session 1-3: BIM and Smart System

Lab: [Nepal BIM Forum \(NBIMF\) Research Lab](#)

 Bishun Das Lama ·  Mahesh Karki





# NBIMF Research Activities

## Building Information Modeling Implementation Status in Nepal

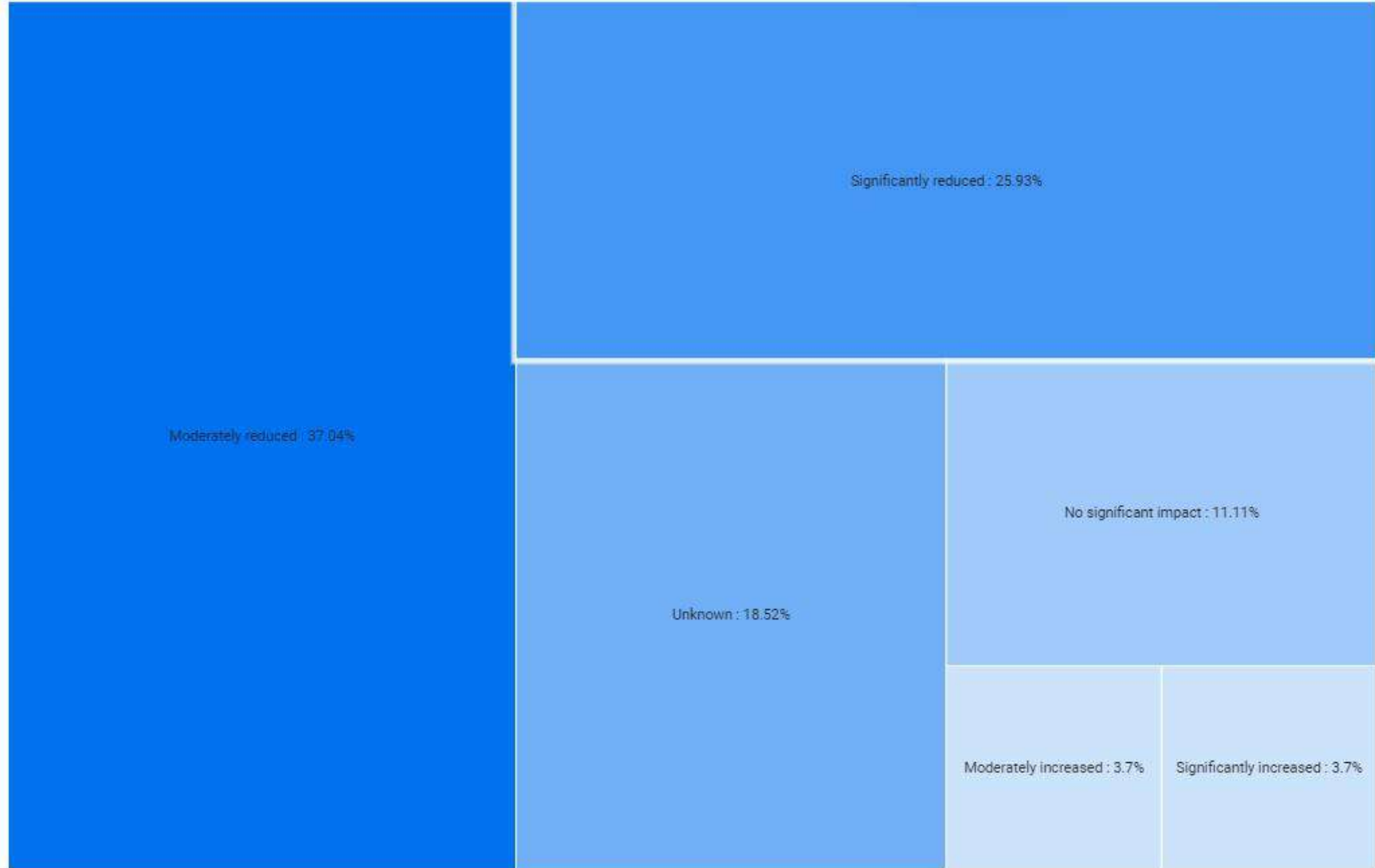
August 2023

Conference: International Technical Conference (ITC) 2023, Chung-Ang University - At: Seoul, South Korea - Volume: Session 1-3: BIM and Smart System

Lab: [Nepal BIM Forum \(NBIMF\) Research Lab](#)

 Bishun Das Lama ·  Mahesh Karki

Impact on the time of the project with the use of BIM workflow.



DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM



# NBIMF Research Activities

## Building Information Modeling Implementation Status in Nepal

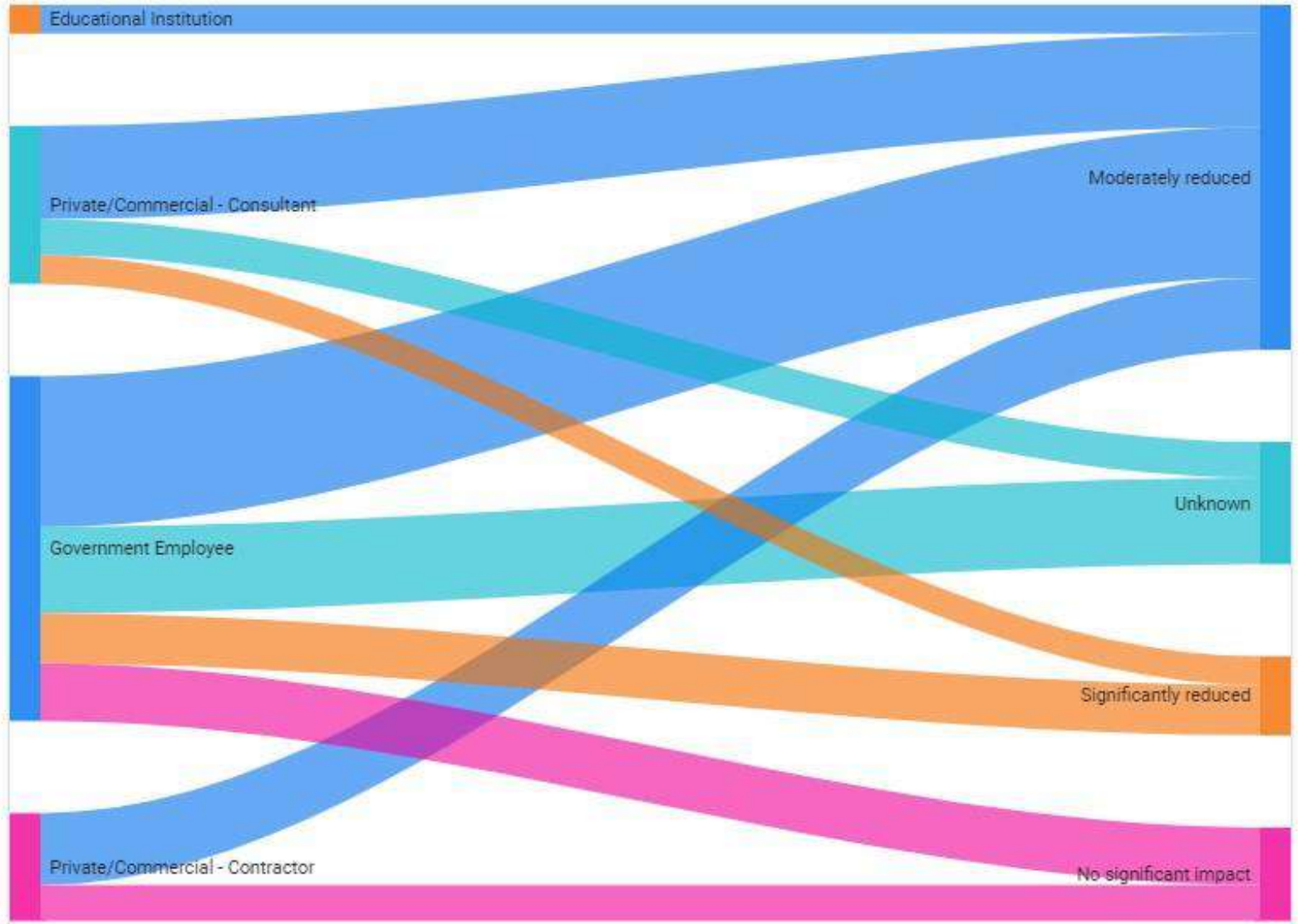
August 2023

Conference: International Technical Conference (ITC) 2023, Chung-Ang University - At: Seoul, South Korea - Volume: Session 1-3: BIM and Smart System

Lab: [Nepal BIM Forum \(NBIMF\) Research Lab](#)

 Bishun Das Lama ·  Mahesh Karki

Impact of BIM Implementation in respect to the cost of the project.



# Review of BIM Concept

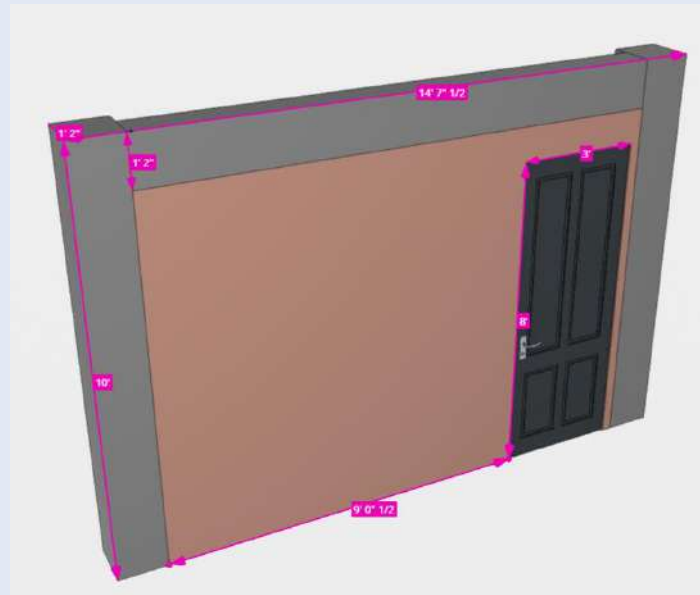
3D Geometry

+

Attributes

=

Building  
Information  
Modelling (BIM)



## Brick Wall

Thickness of wall, no of bricks  
First Class Chimney brick  
1:4 Cement Sand Mortar ratio

## Door

Material: Aluminum/Wood/UPVC  
Sliding door/Full Panel  
Frame Size: 60\*60 mm  
Sash: 104\*60 mm  
Color: White/Gray/Black

## Plaster

12.5 mm plaster in 1:4 (Cement: Sand ratio)

## RC Column and Beam

Size : 14"\*14"

Volume, Area, .....

Strength : M25 (1:1:2)

Rebar main [Material] : 4D25,  $F_c$ : 500N/mm<sup>2</sup>

Rebar stirrups [Material] : D12 c/c 150 mm  $F_c$ : 500N/mm<sup>2</sup>

## Other Attributes

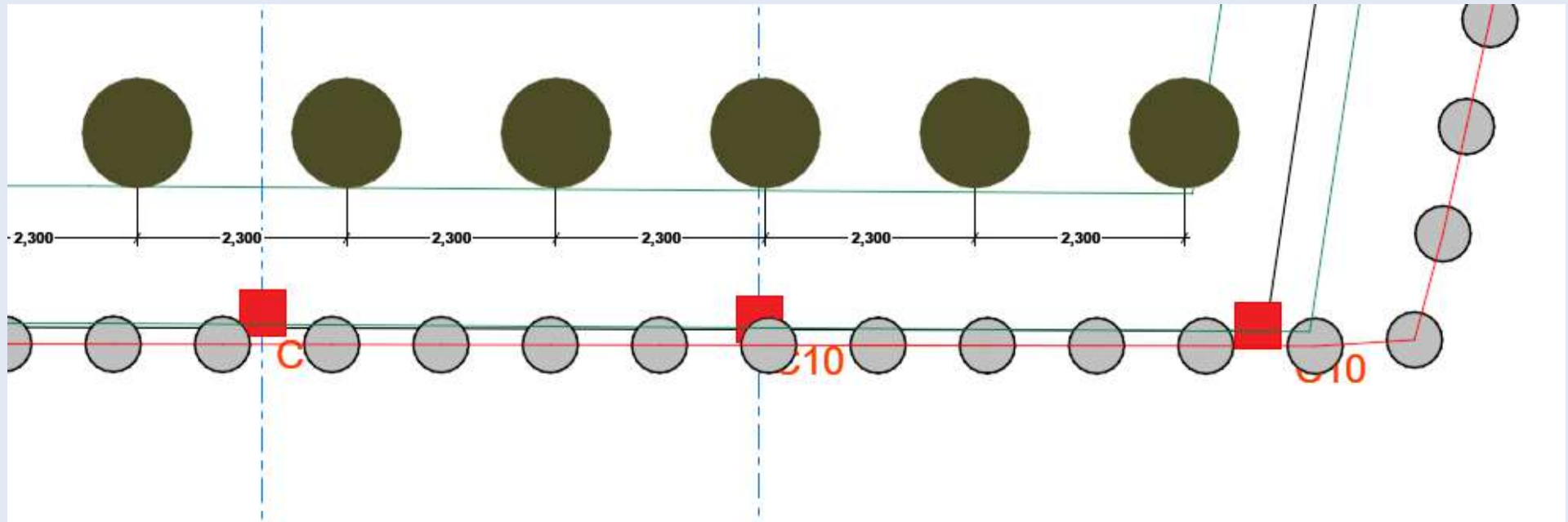
- Cost Information
- Construction Information
- Performance Information
- Operation and Maintenance Information and many more

	Representation	Geometry	Attributes
2D CAD	2 axial (X,Y)	Yes	No
3D CAD	3 axial (X,Y,Z)	Yes	No
BIM	3 axial (X,Y,Z)	Yes	Yes



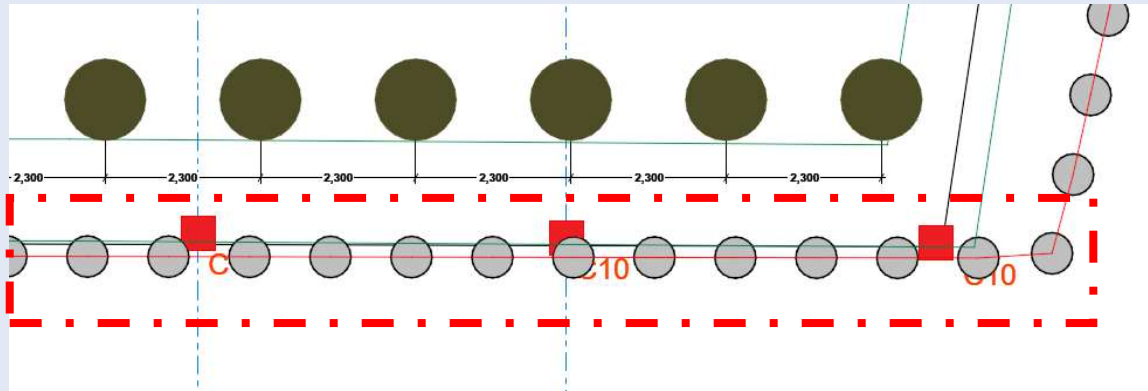
# Case Study: BIM Implementation in Nepalese Projects

## Lack of Structural Design and Site Coordination



# Case Study: BIM Implementation in Nepalese Projects

Lack of Structural Design and Site Coordination

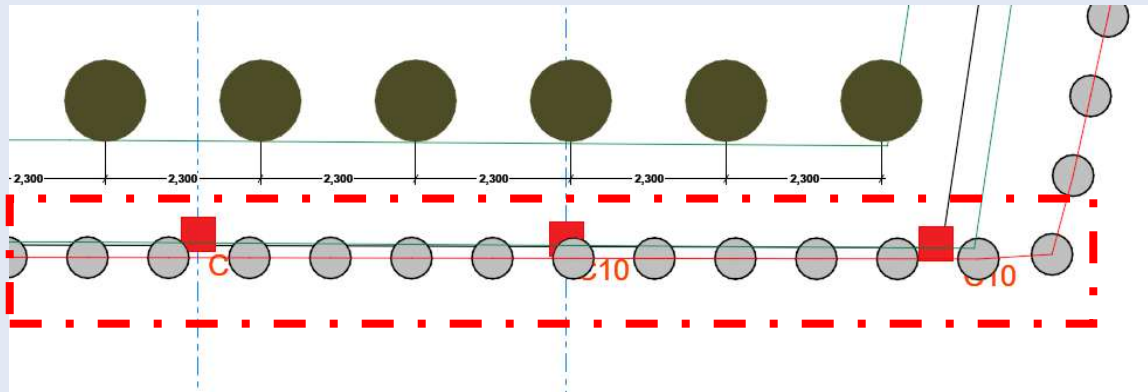


## Case 1

The clash between the Structural Column plan and the Protection piles around the building.

# Case Study: BIM Implementation in Nepalese Projects

Lack of Structural Design and Site Coordination



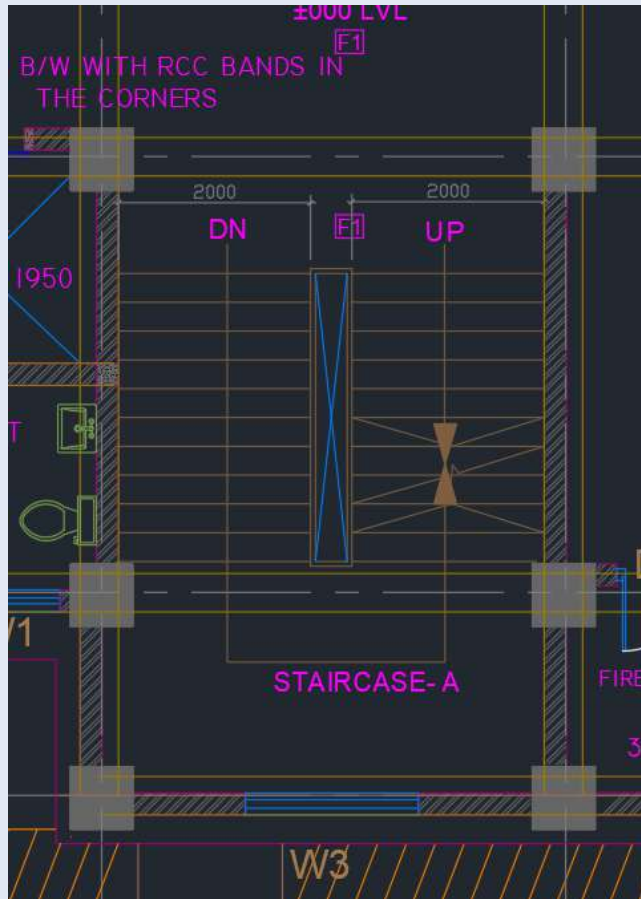
## Case 1

The clash between the Structural Column plan and the Protection piles around the building.

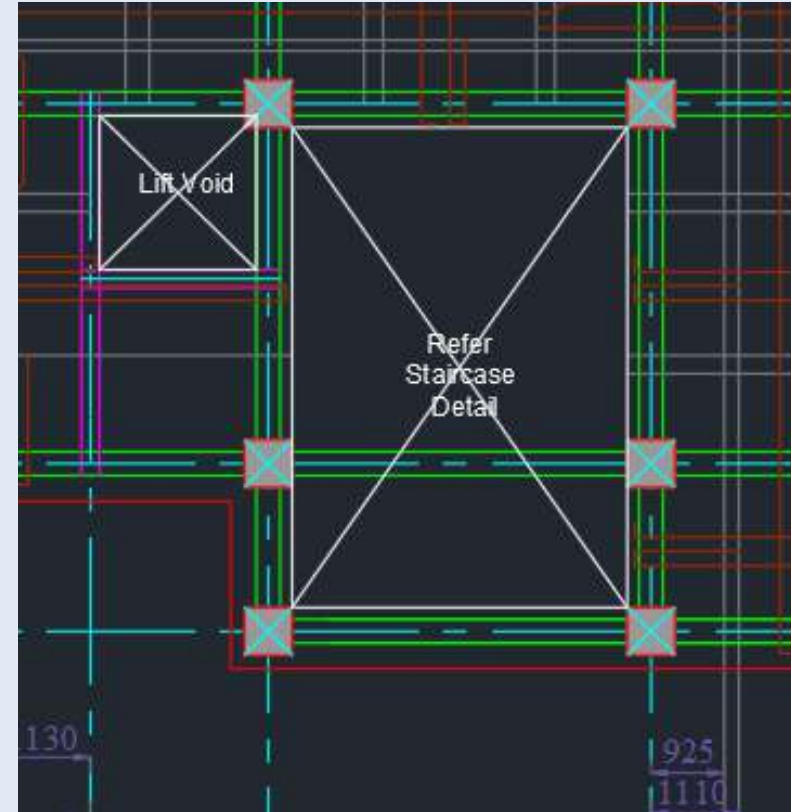
What might be the implications of these design issues on site?

# Case Study: BIM Implementation in Nepalese Projects

Architectural and Structural



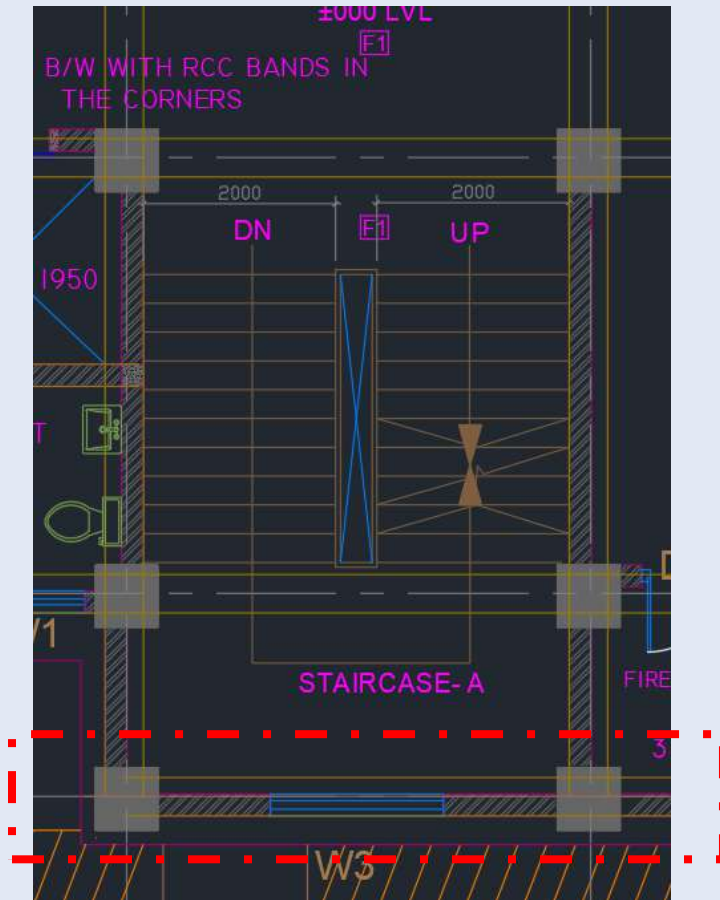
Architectural Drawing



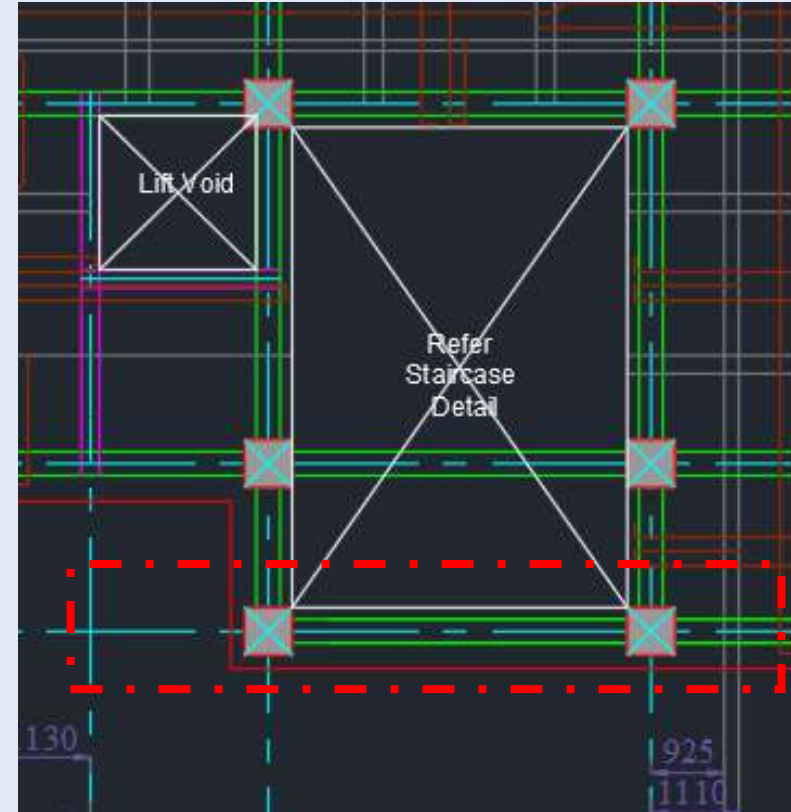
Structural Drawing

# Case Study: BIM Implementation in Nepalese Projects

Architectural and Structural



Architectural Drawing



Structural Drawing

# BIM Implementation in Nepalese Projects



Problem On-Site

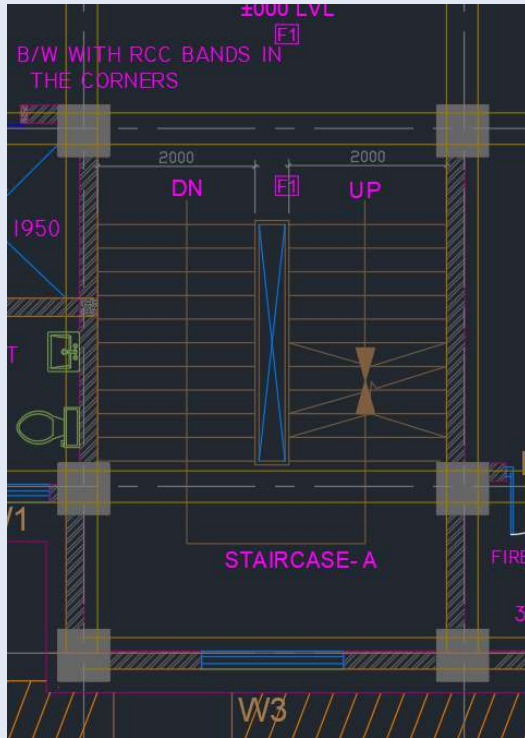
DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

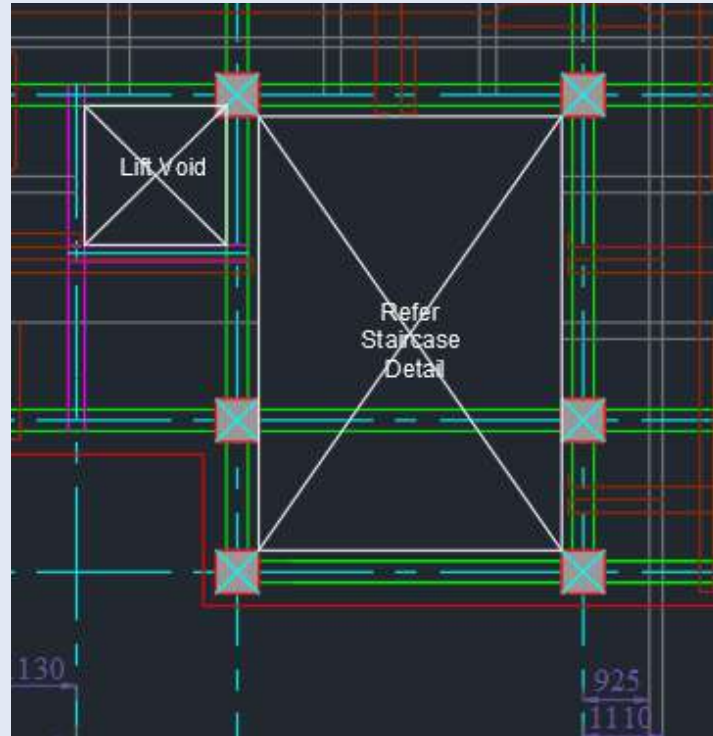
NEPAL BIM FORUM

# Case Study: BIM Implementation in Nepalese Projects

Architectural and Structural



Architectural Drawing

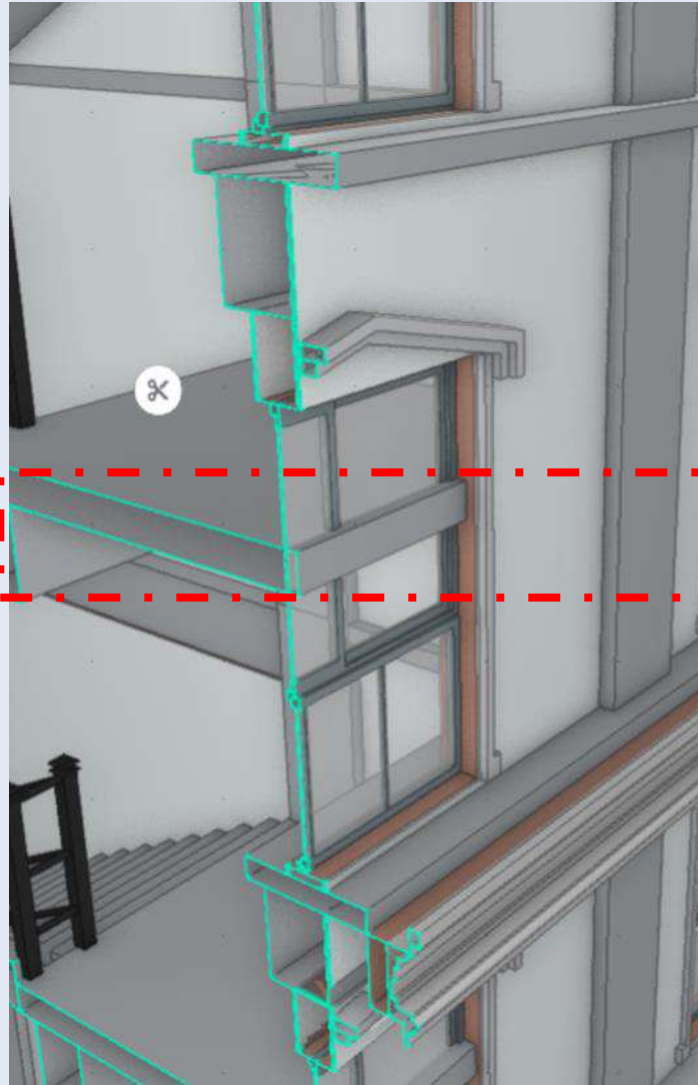


Structural Drawing

## Case 2

- Clash between the Architectural element and the structural element.

# BIM Implementation in Nepalese Projects



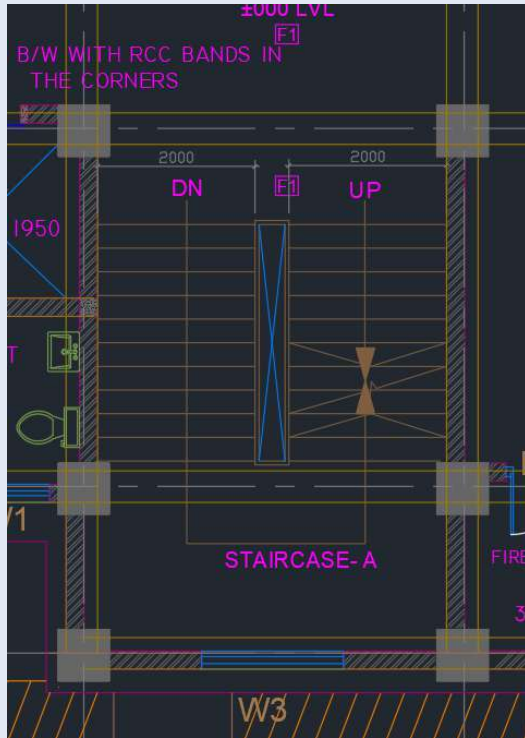
**Problem observed beforehand**



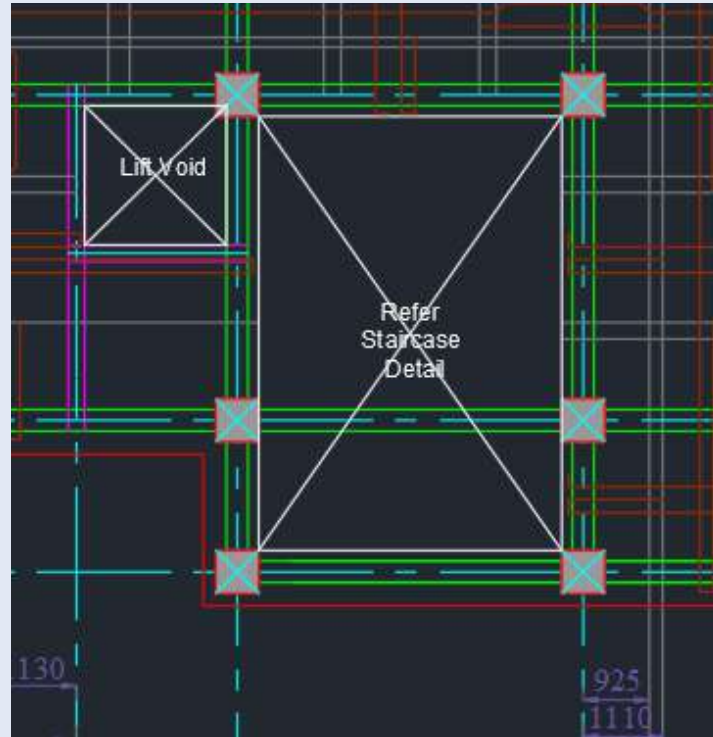
**Coordinated Architectural and Structural Design Processes**

# Case Study: BIM Implementation in Nepalese Projects

Architectural and Structural



Architectural Drawing

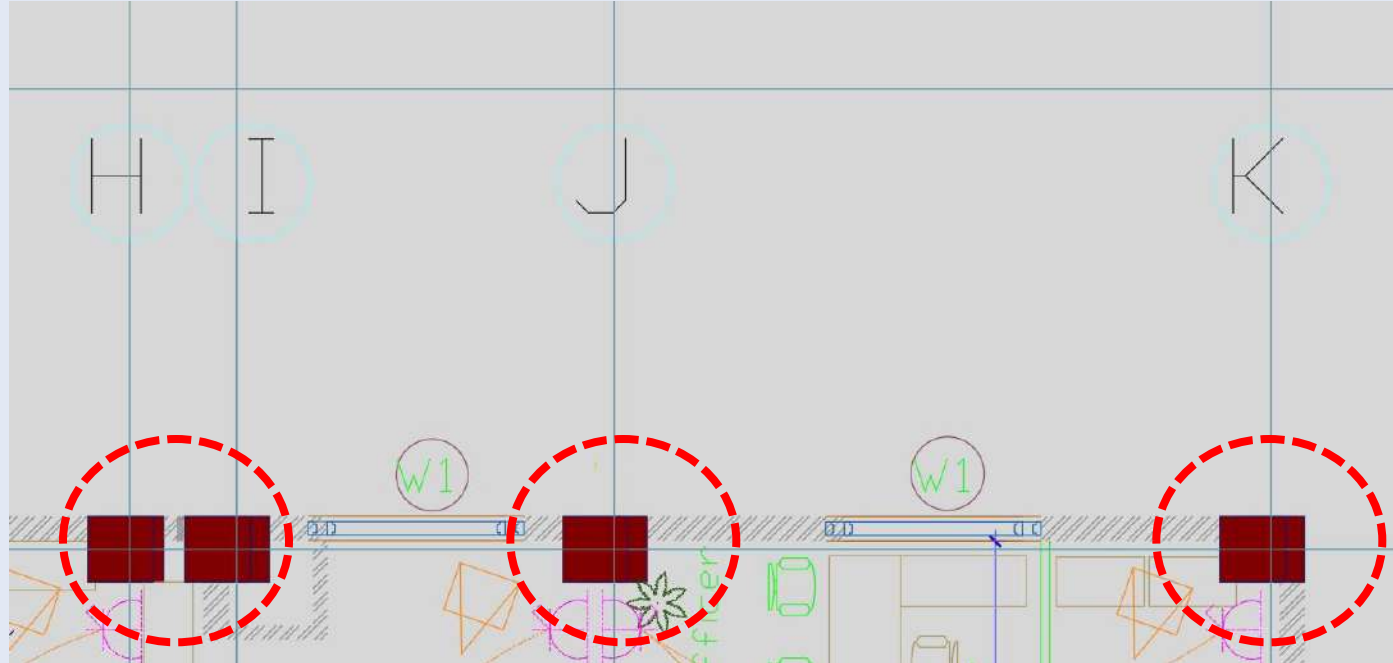


Structural Drawing


What might be the implications of these design issues on site?

# Case Study: BIM Implementation in Nepalese Projects

## Case 3: Uncoordinated Structural Column Plan



What might be the implications of these design issues on site?



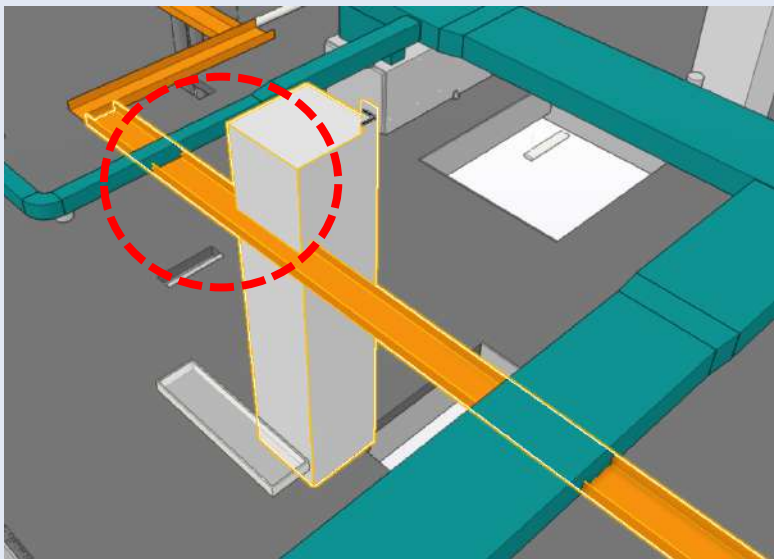
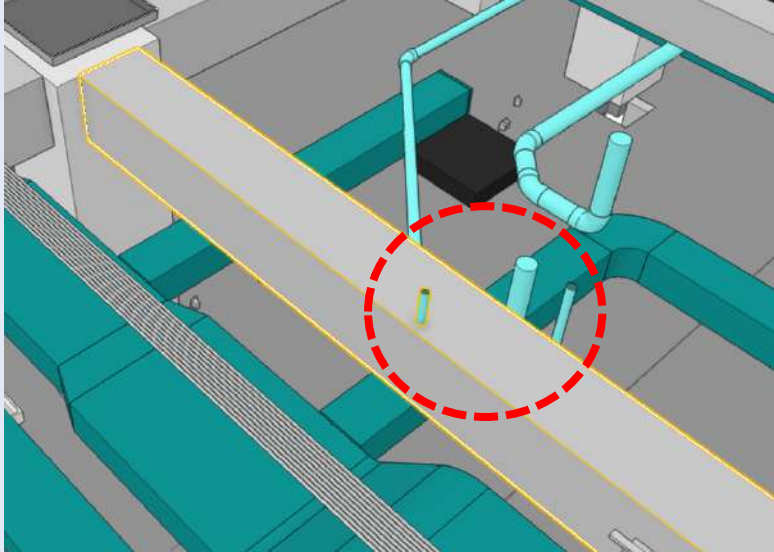
“It’s not Modelling, It’s a Building Process. Hence it is also called **Virtual Design and Construction.**”

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM

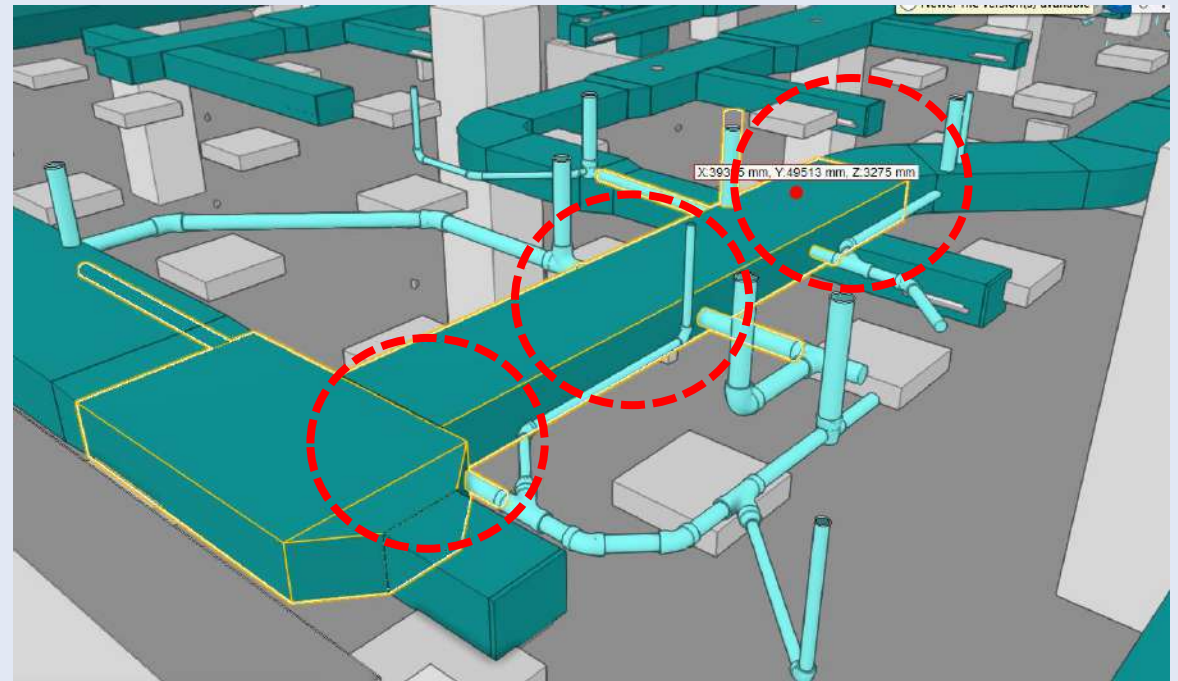
# Case Study: BIM Implementation in Nepalese Projects



## BIM Services

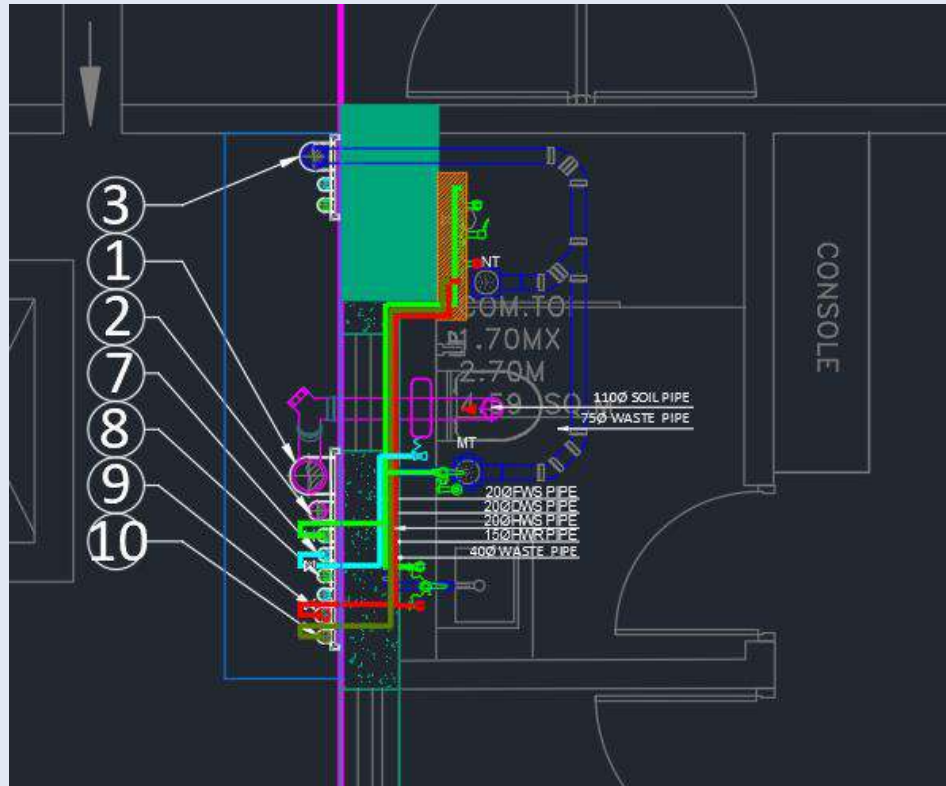
- All Project Discipline BIM Modeling,
- Clash detection
- Quantity take off

Found [more than 1000 clashes](#) in a project.



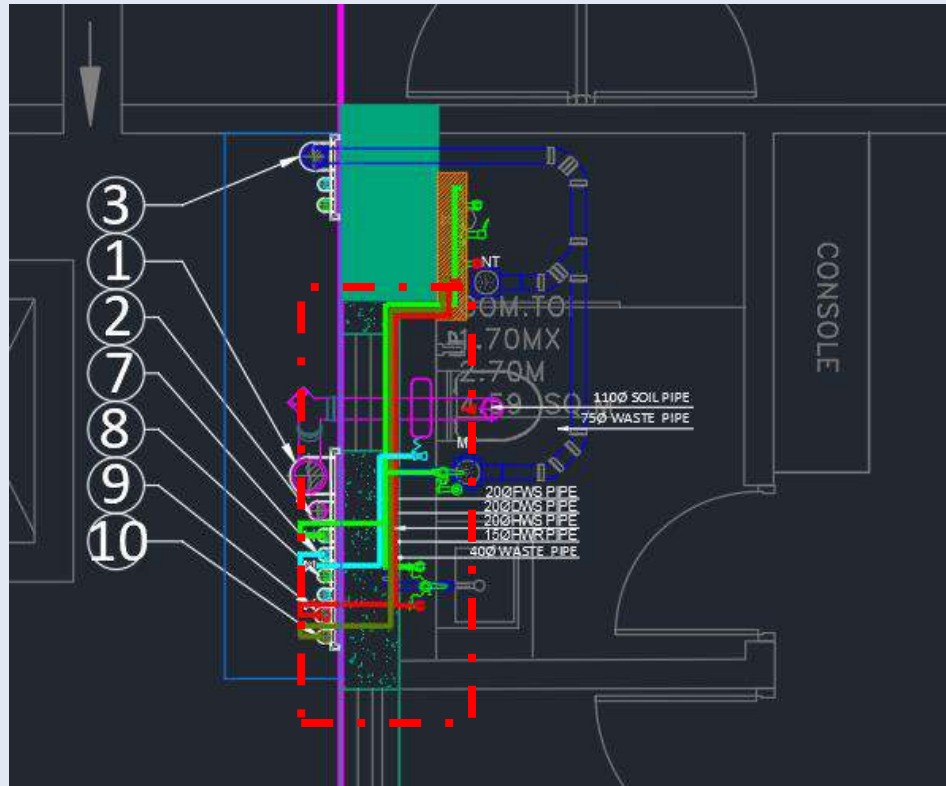
# Case Study: BIM Implementation in Nepalese Projects

## Structural Design and Water Supply Design



# Case Study: BIM Implementation in Nepalese Projects

## Structural Design and Plumbing Design

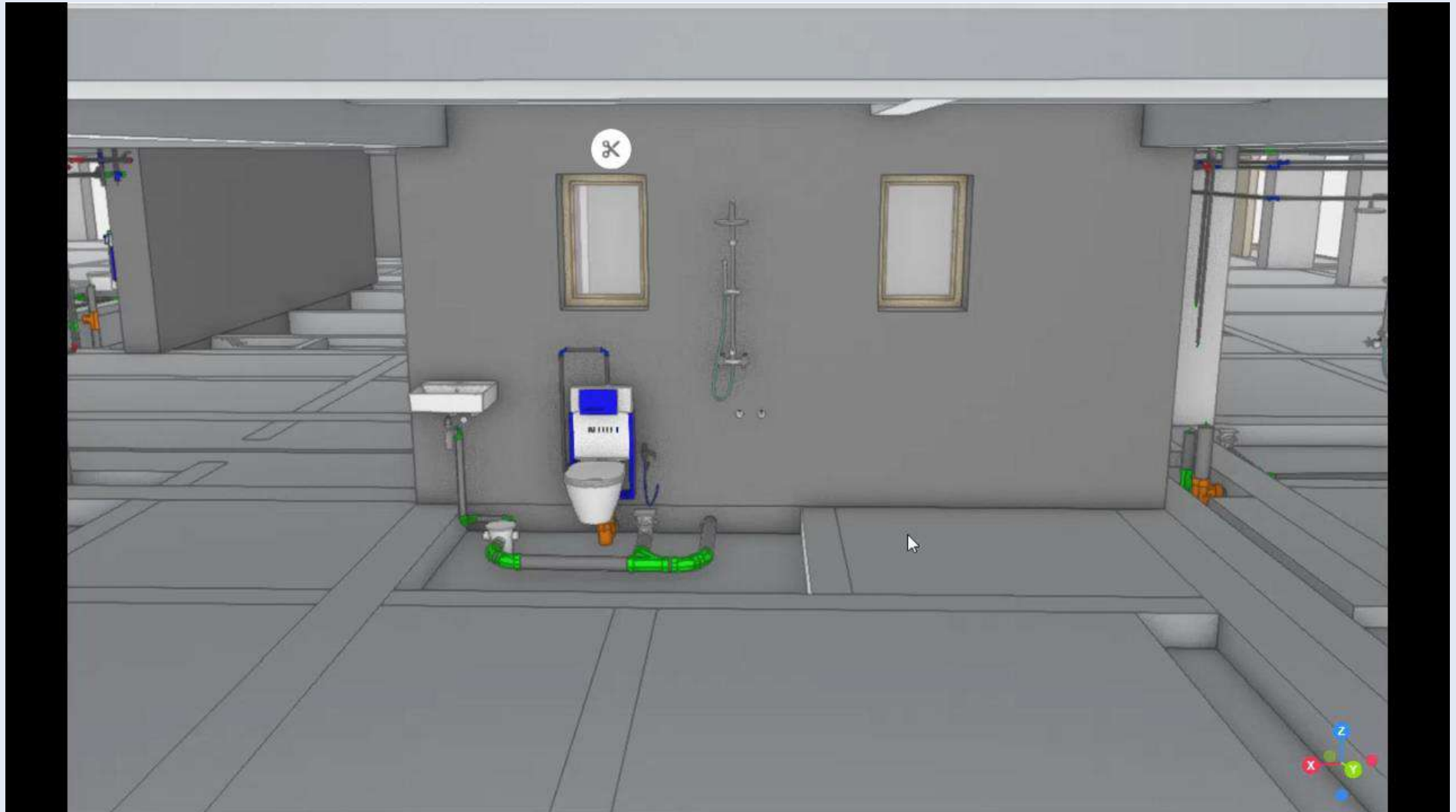


- The clash between the Structural Shear Wall and the Water Supply Pipelines

What might be the implications of these design issues on site?

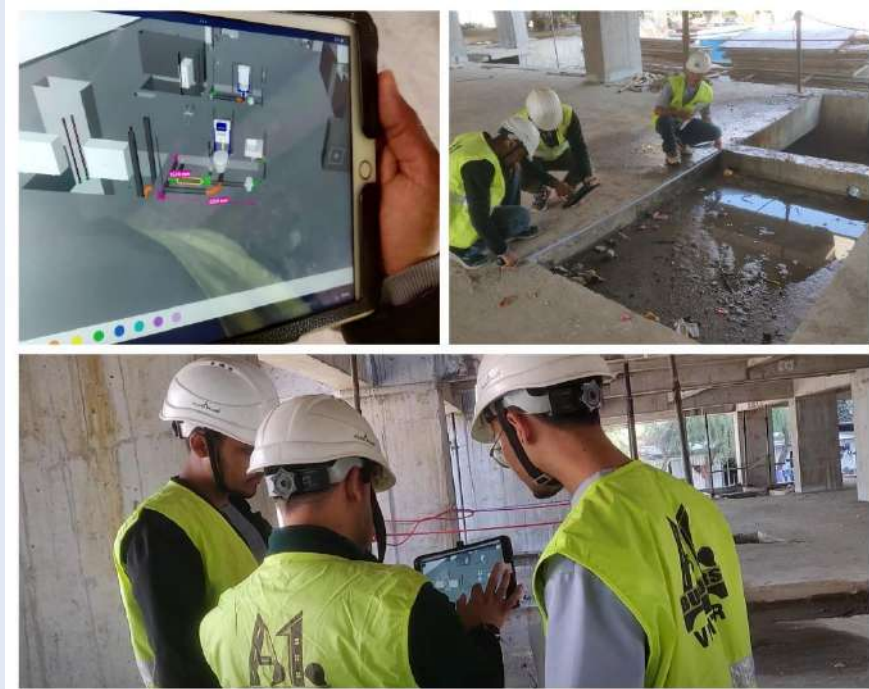
# Case Study: BIM Implementation in Nepalese Projects

## Structural Design and Plumbing Design



# BIM Implementation in Nepalese Projects

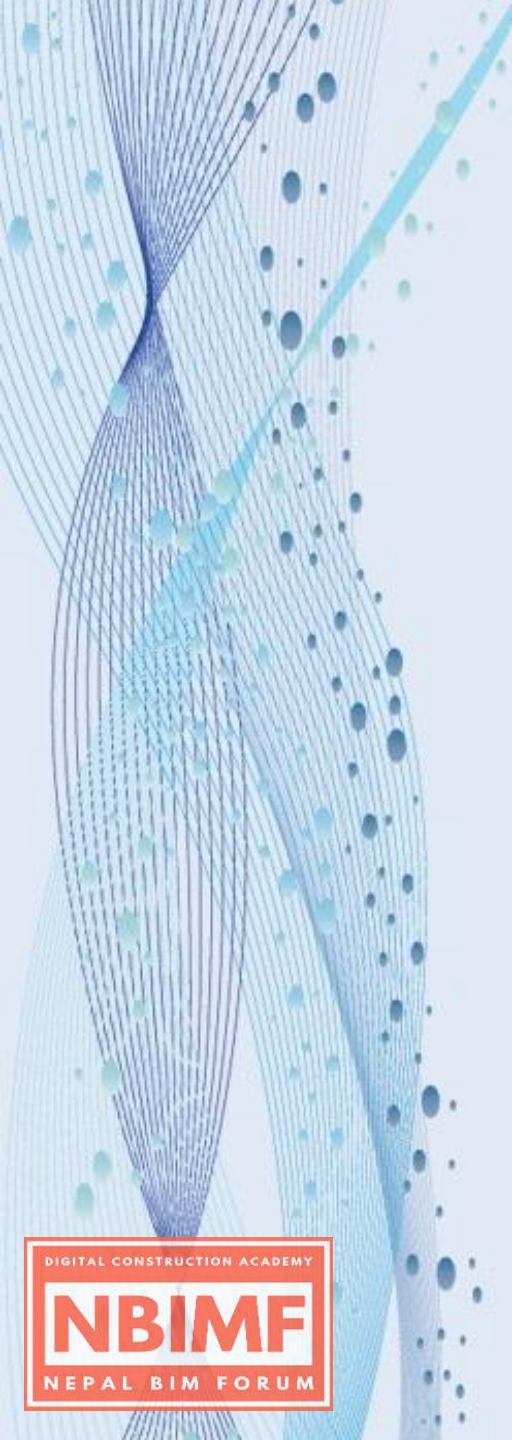
## BIM for QA/QC



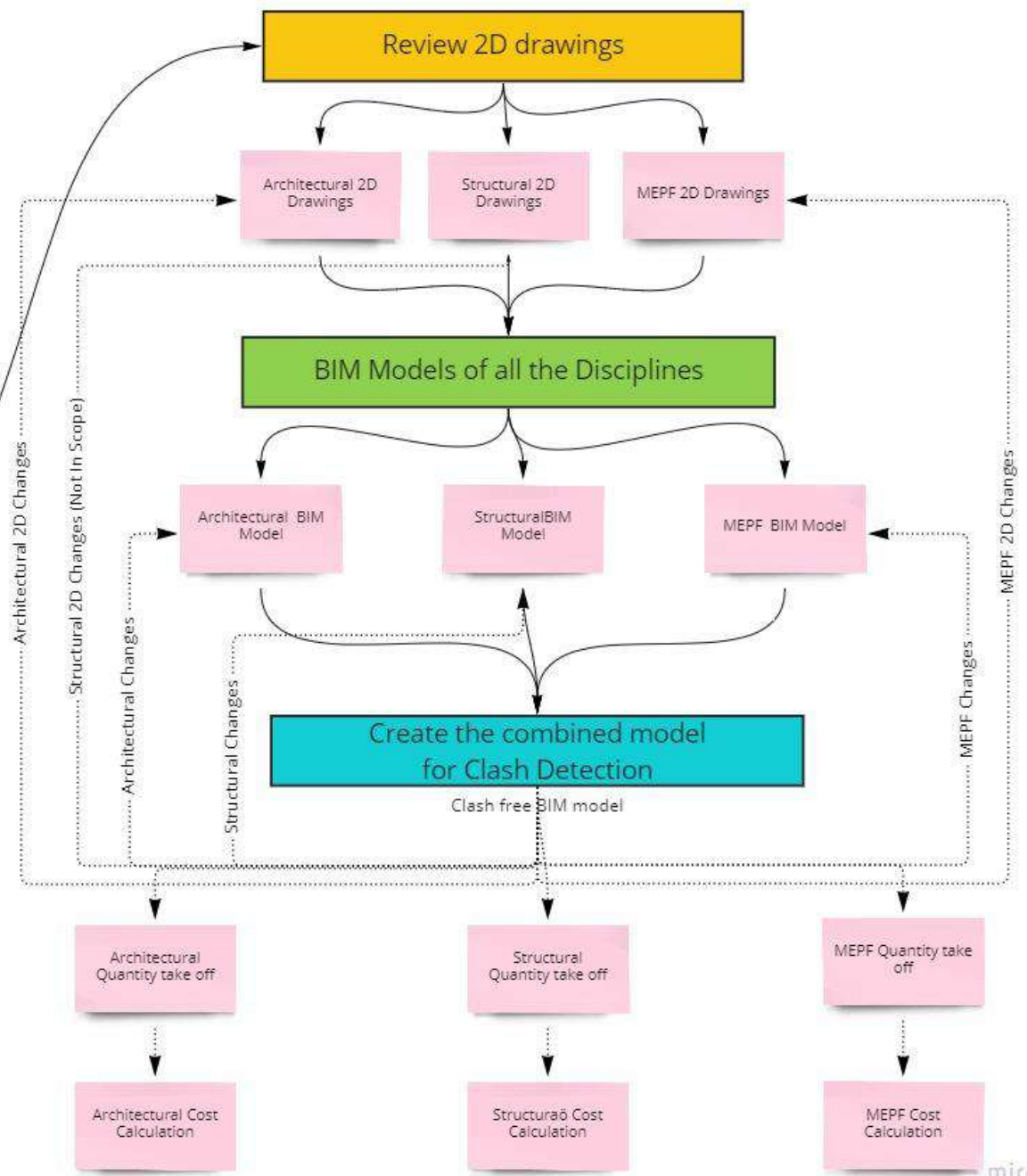
# BIM Implementation in Nepalese Projects

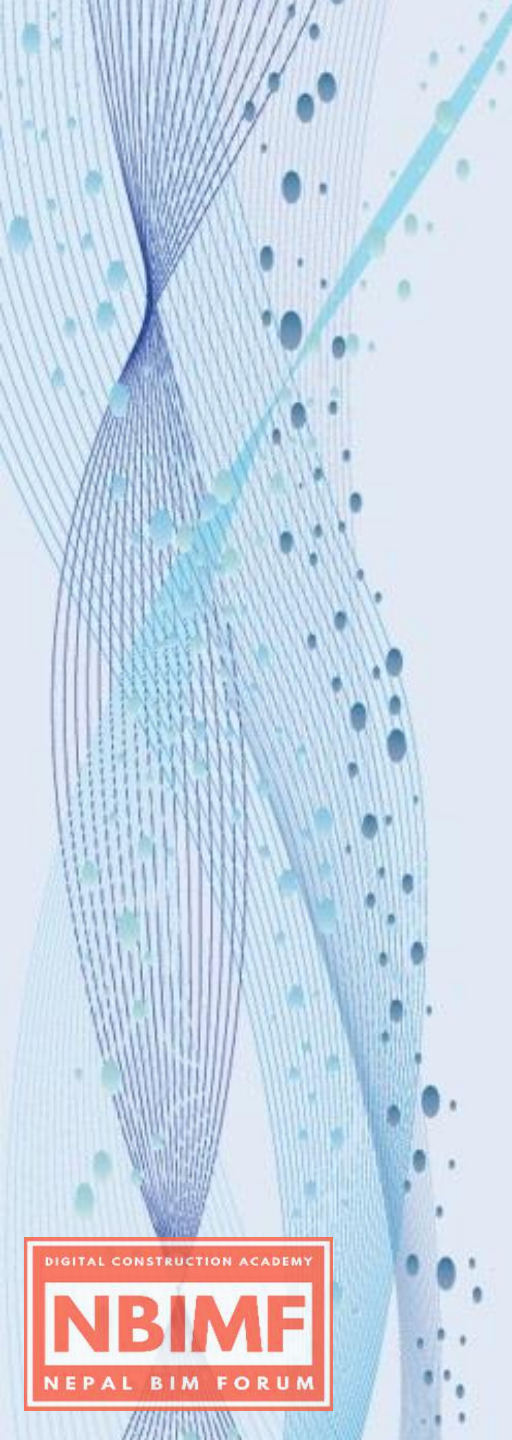
Augmented Reality Uses at Nepalese Projects



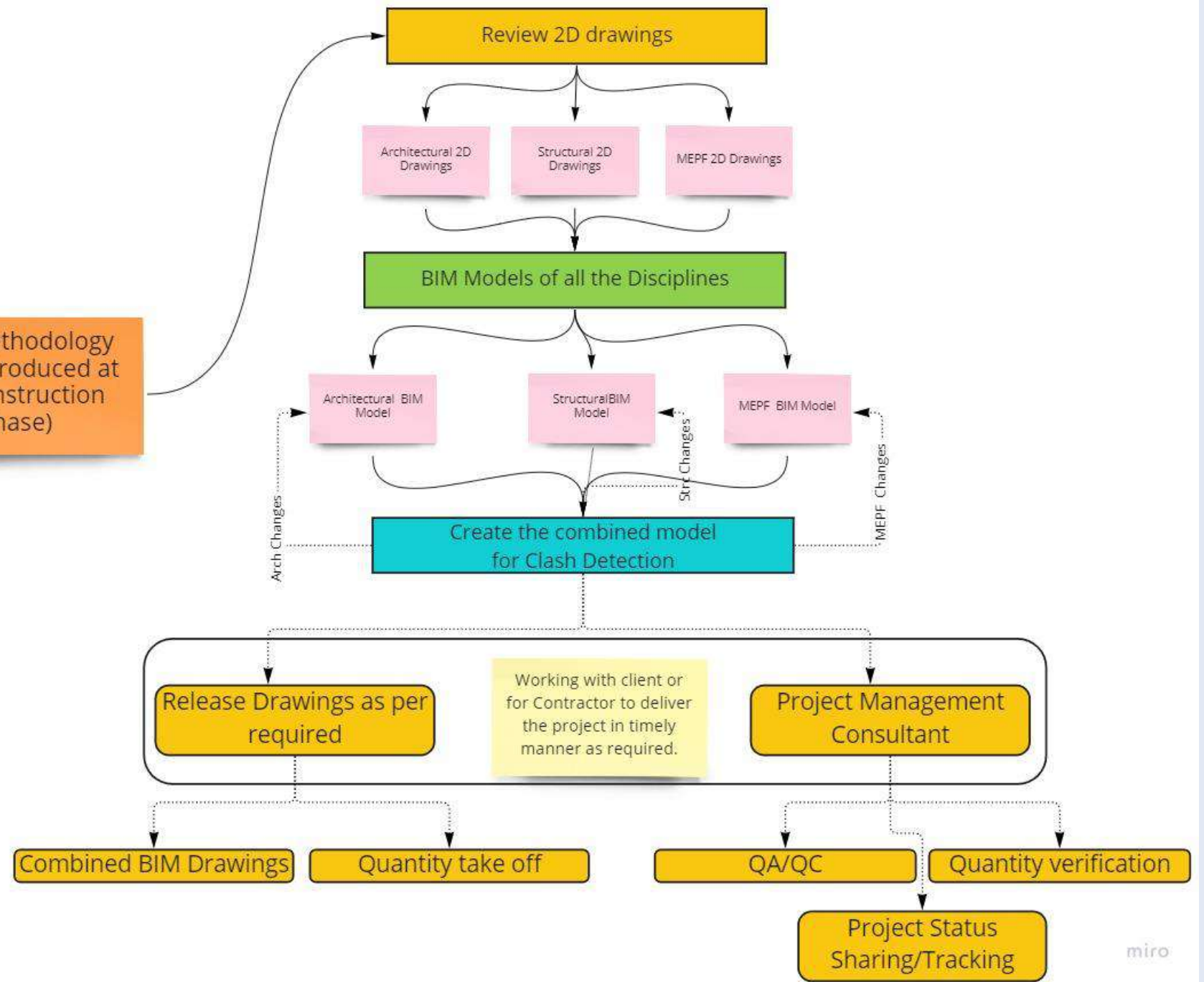


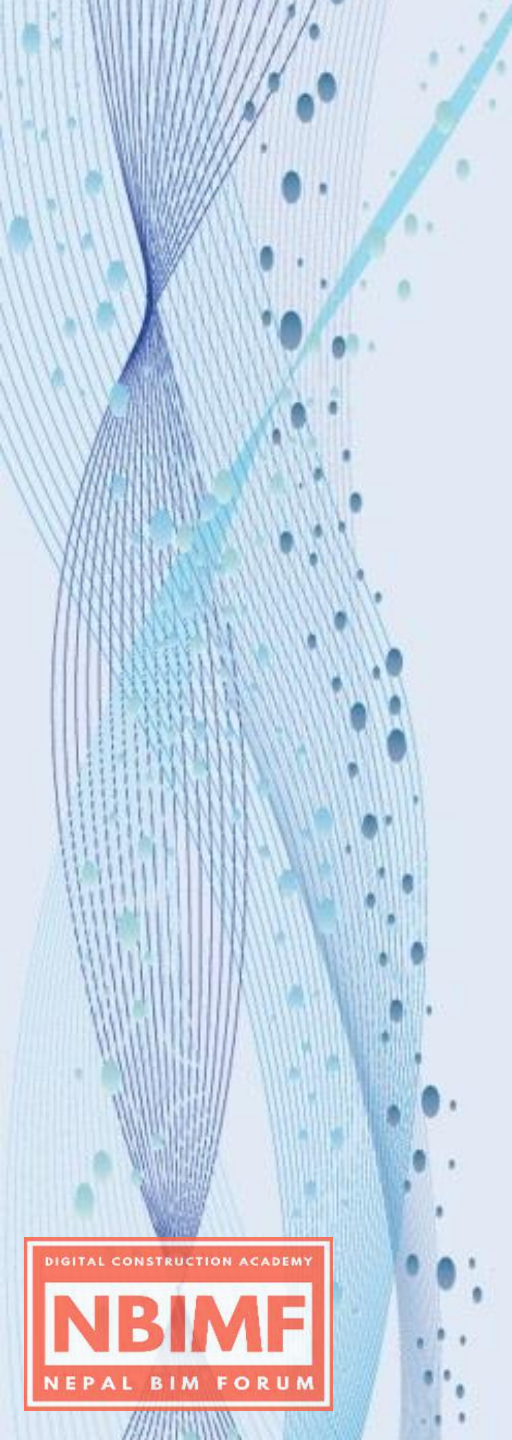
**BIM Methodology  
(After Design Phase)**



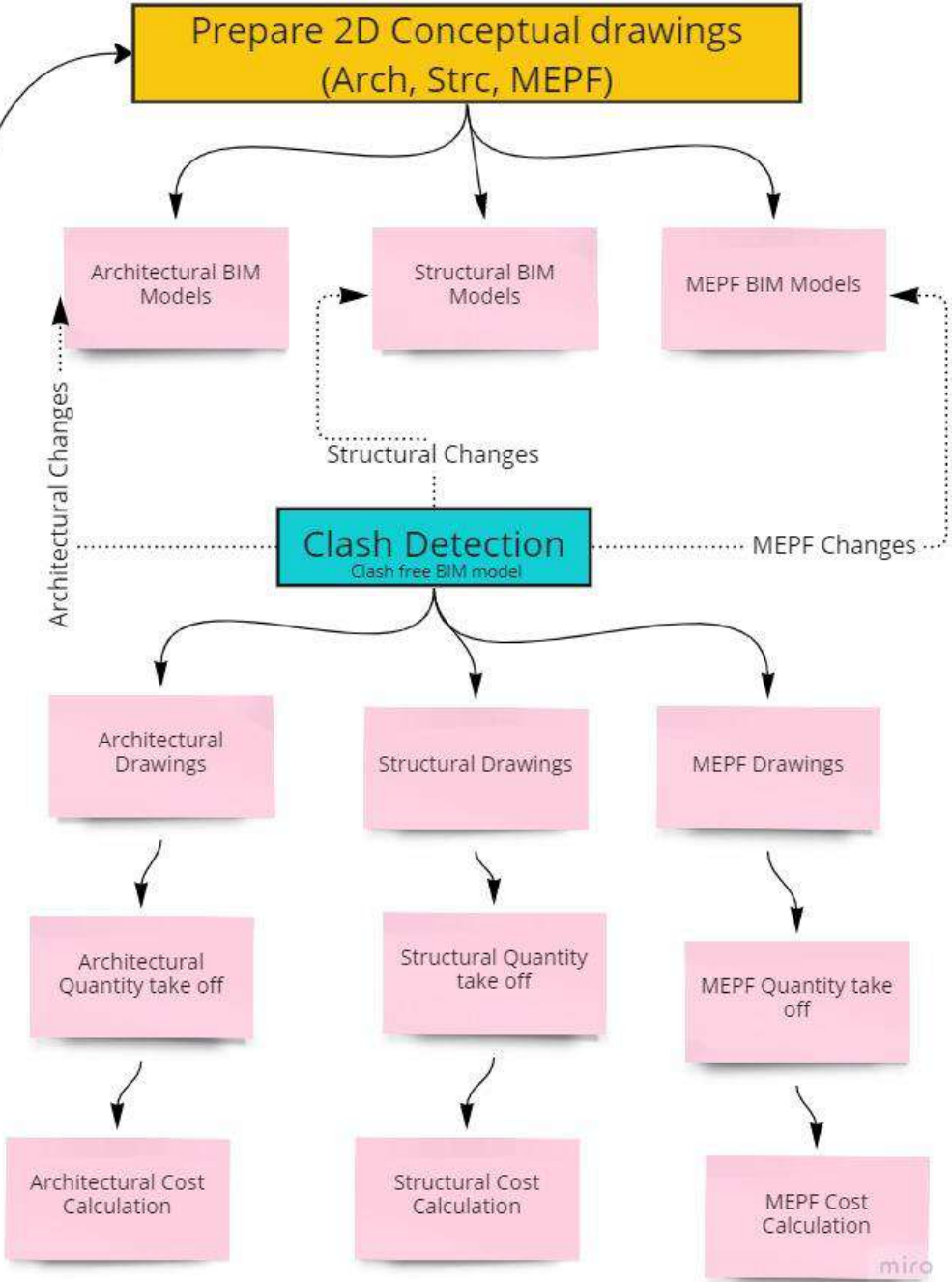


BIM Methodology  
(BIM Introduced at  
the Construction  
phase)





# BIM Methodology (Design with BIM Process)



# BIM aspects in Nepal that can benefit right away

PROJECT VISUALIZATION  
AT ANY TIME AND POINT

BETTER  
COLLABORATION AND  
COMMUNICATION

MODEL BASED  
QUANTITY TAKEOFF

DESIGN MANAGEMENT

CONSTRUCTABILITY ANALYSIS

DIGITAL CONSTRUCTION ACADEMY

**NBIMF**

NEPAL BIM FORUM

## Possible implementation in Nepal

- **BIM coordination/Design Review/Clash Detection** of multidisciplinary structures
- **Validation and 3D model compliance**, design review, and reporting (BIM on site)
- **Consulting and training of BIM** implementation at both project and organizational levels
- **Model Authoring/** 3D modelling of hydropower schemes, powerhouses, appurtenant hydraulic structures, concrete and embankment dams, excavations, and tunnel systems
- Production of **general arrangement and construction drawings, material schedules**
- **3D visualisations**
- **4D** (time/ schedule/construction simulations)
- **5D** (cost control) simulations
- **Data models** for hydraulic and structural analysis

# Thank You!

*Sunil Suwal*

MSc. Construction and Real Estate Management, HTW Berlin  
PhDc BIM Education, Aalto Doctoral Program in Engineering, Aalto University

Senior BIM Lecturer, Metropolia University of Applied Sciences, Finland | [www.metropolia.fi/en](http://www.metropolia.fi/en)  
Head Architect, ForeFront Engineering, Nepal | [www.forefronteng.com](http://www.forefronteng.com)  
BIM Awards Jury Leader (2019-2023), buildingsmartInternational | <https://www.buildingsmart.org/>  
Committee member - National representative Finland for CEN 442/WG8, the European Committee for Standardization (CEN)  
Committee member - Education, EC3 - European Council on Computing in Construction  
Core member - buildingSMART Finland, Knowledge and Change Management Group  
Chairperson, Nepal BIM Forum Ry, Helsinki

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M: +977-974987481

@: [sunil.suwal@metropolia.fi](mailto:sunil.suwal@metropolia.fi); [sunil.suwal@aalto.fi](mailto:sunil.suwal@aalto.fi); [sunil.suwal@forefronteng.com](mailto:sunil.suwal@forefronteng.com); [sunil.suwal@nbimf.com](mailto:sunil.suwal@nbimf.com)



  
**Nepal Engineers' Association**  
TALK SHOW INVITATION

**“Digital Transformation of Nepalese Architecture,  
Engineering and Construction Industry”**

  
**Ar. Sunil Suwal**  
Chairperson  
Nepal BIM Forum, International

  
**Er. Mahesh Karki**  
Immediate Past-Chairperson  
Nepal BIM Forum, Nepal

**Date: Friday, 26-Jan-2024 (2080/10/12 BS)**  
**Time: 4:00 PM**  
**Venue: Engineer Bhawan, Pulchowk, Lalitpur**