



دانشگاه علم و صنعت ایران

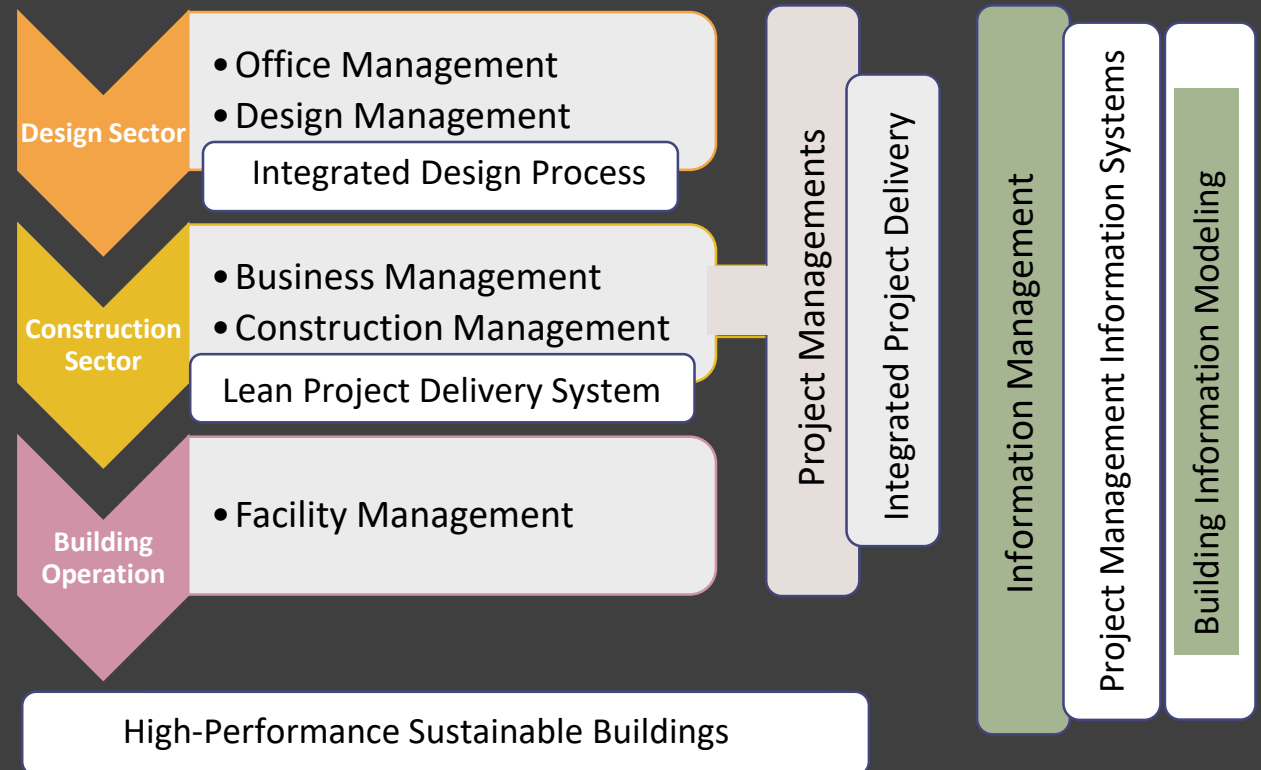
# Advanced Design & Construction Management Techniques- Building Information Modeling

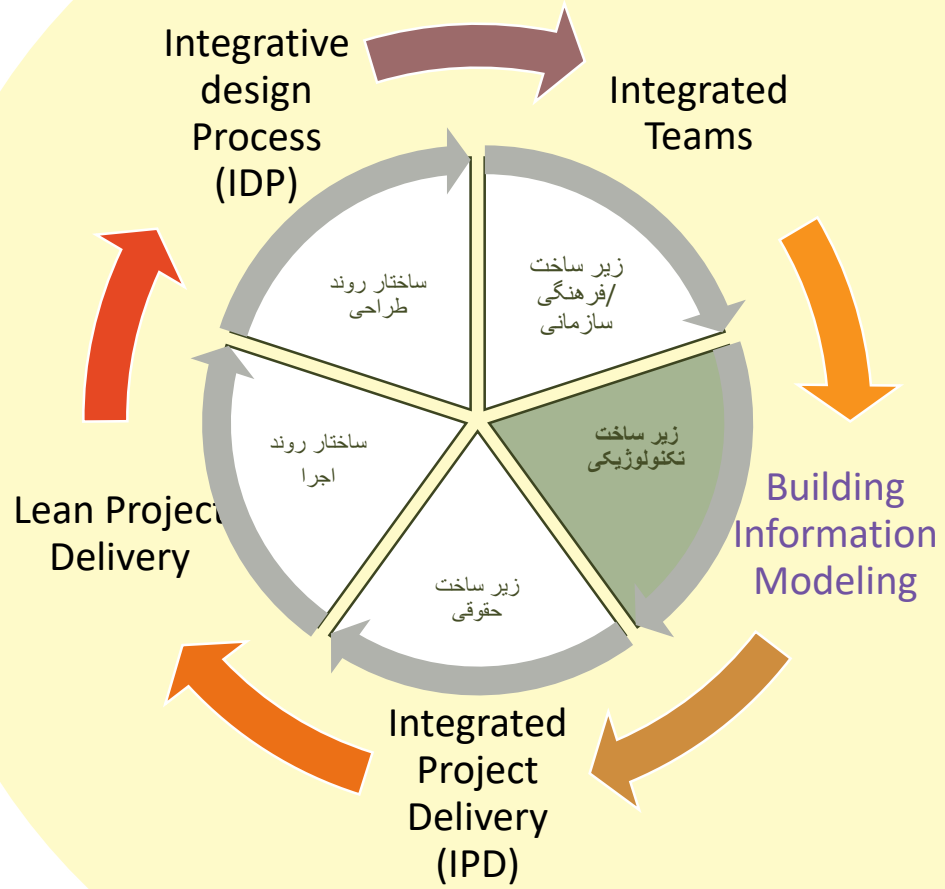
جلسه ششم- فروردین ماه 1398 - مدیریت پروژه

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# Introduction

- Inefficiencies of traditional documentation approaches
- BIM Introduction
- BIM Benefits





Inefficiencies of traditional documentation approaches

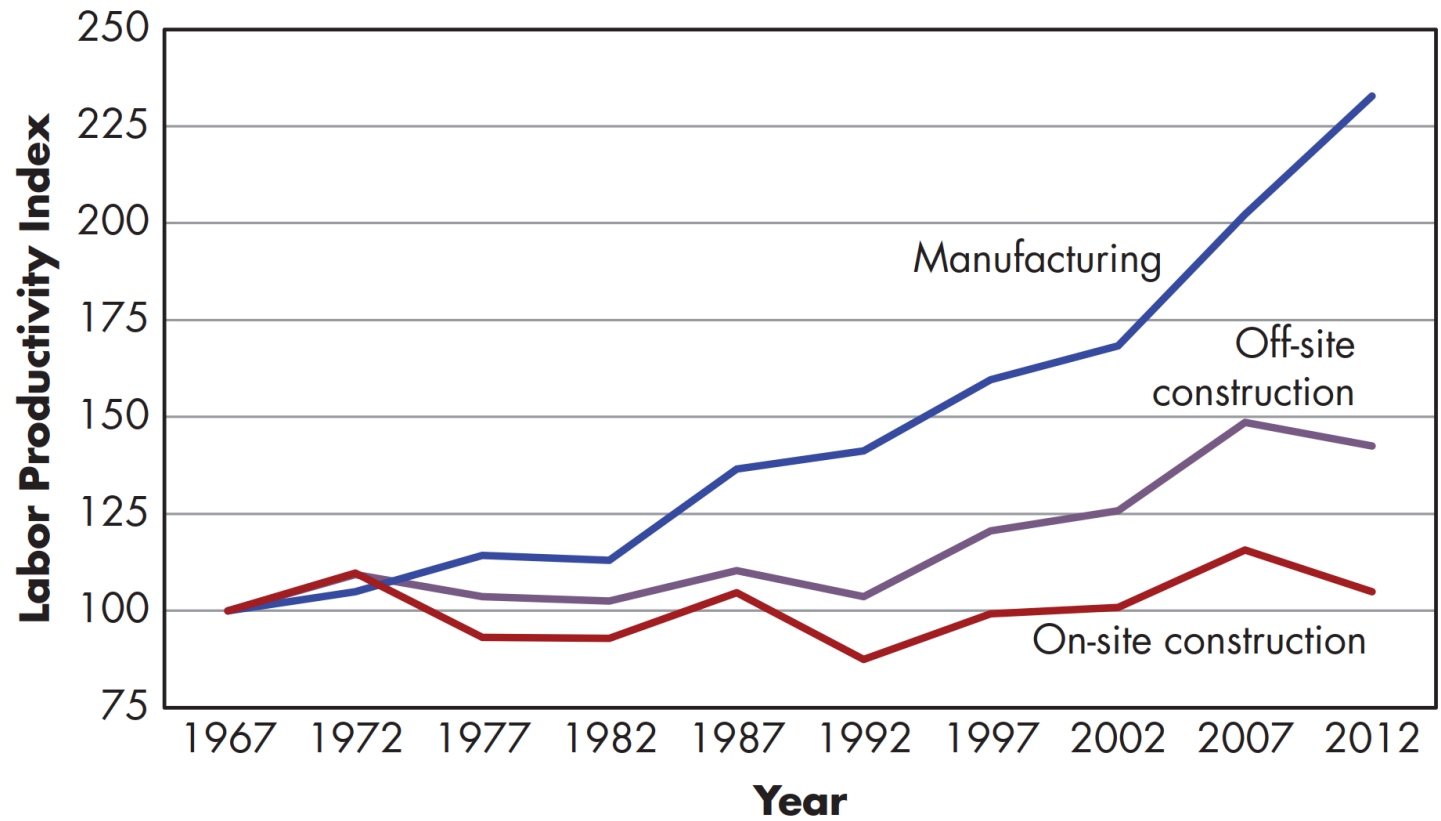


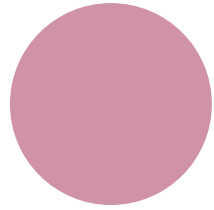
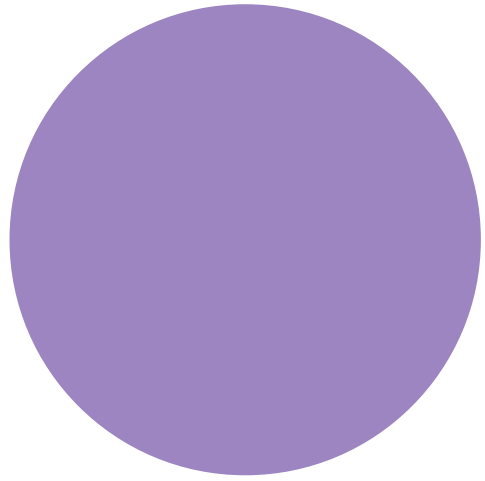
## Inefficiencies of traditional 2D documentation

- Errors & omissions=>
  - Unanticipated field cost,
  - delays,
  - friction,
  - eventual lawsuits
- Considerable cost & expense required to generate critical assessment information:
  - Cost estimate
  - Energy use analysis
  - Structural details....

=> Performed at the end=> Too late

CIFE study of  
construction  
industry  
labor  
productivity





Possible Reasons for stagnant  
labor productivity in construction  
industry



65% of construction firms consists of firms with fewer than 5 people  
=> Hard to invest in new technologies



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- the use of immigrant workers has increased
  - => discouraging the need for labor-saving innovations.





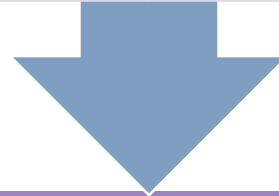
45% of construction work relates to:

Addition

Alteration

Reconstruction  
work

Repair



=> It is more difficult to use capital intensive methods for small scopes of work.

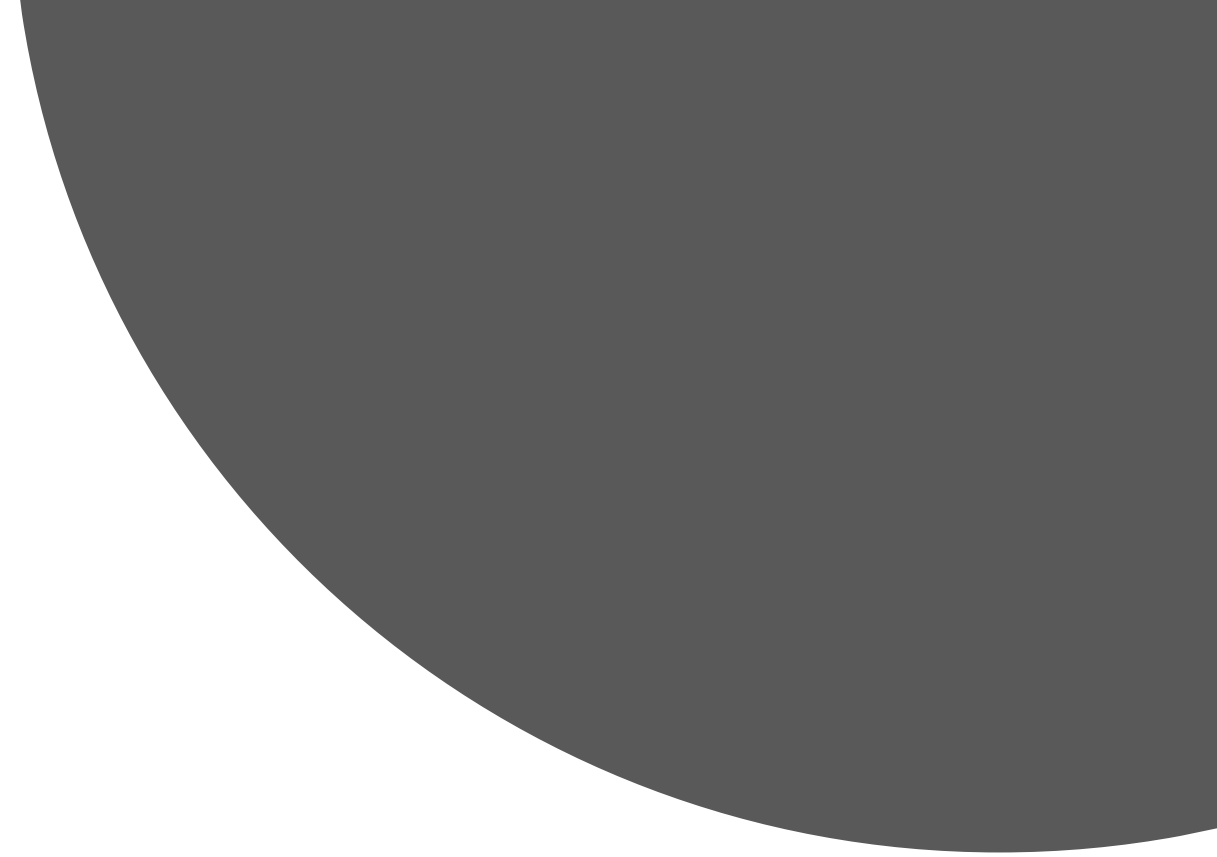
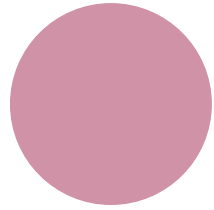
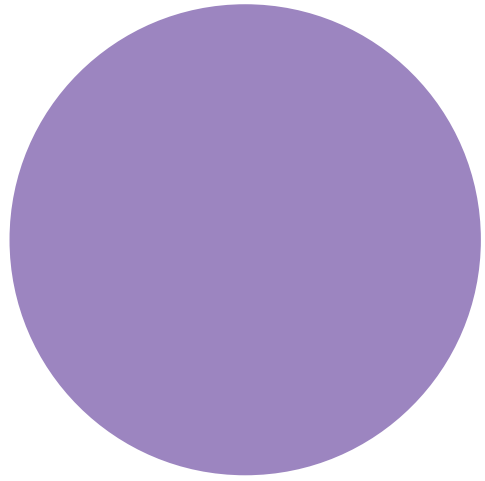
Reverting to paper/2D CAD drawings => All members can communicate => To keep the pool of potential contractors/subs bidding on a project large.

Local authorities still require paper submittals for construction paper reviews.

Construction projects typically involve different partners working together for periods of time and then dispersing.



few/ no opportunities to realize improvements over time through applied learning.

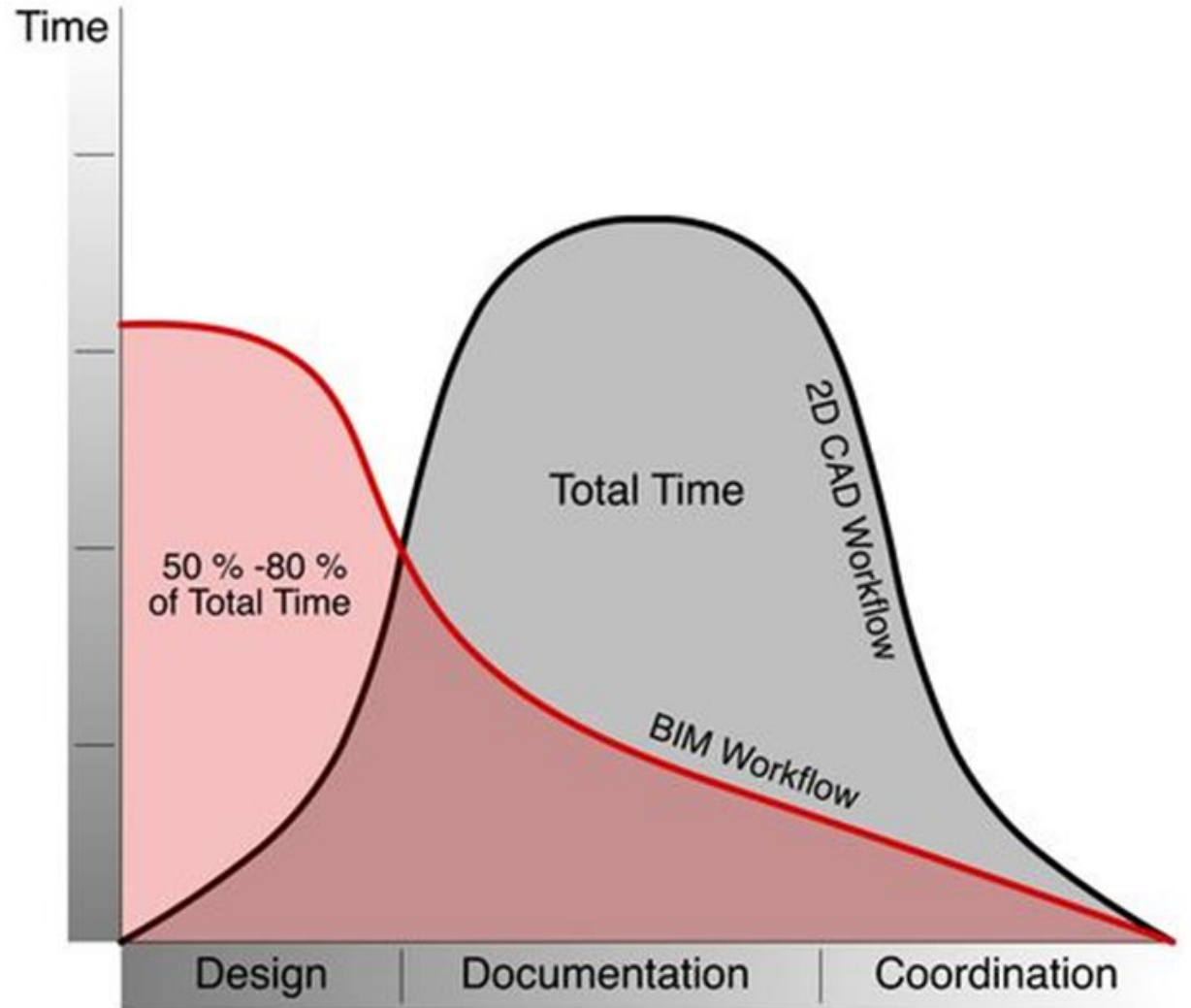


What's BIM & What's  
the premise?

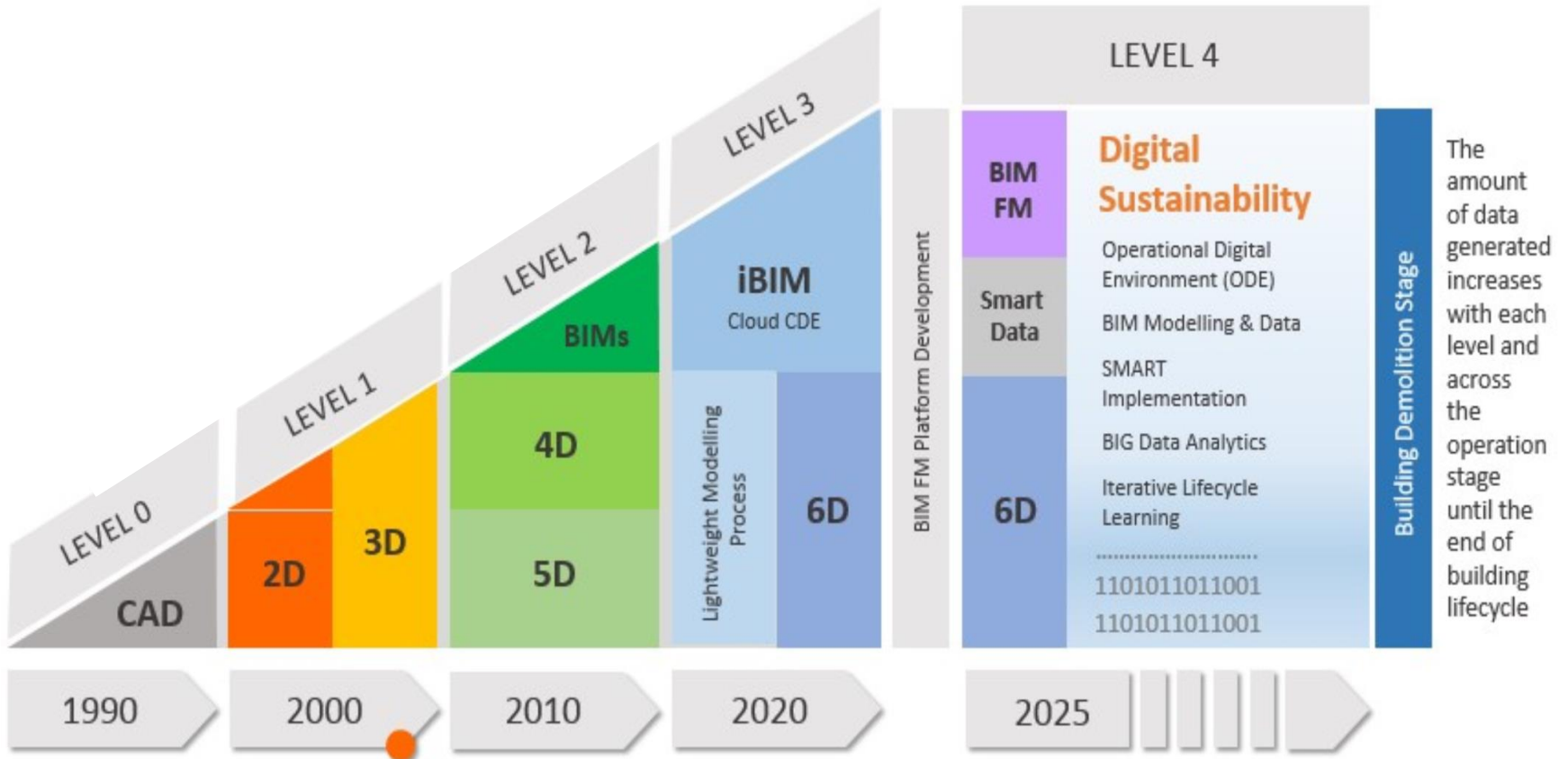


## BIM Facts

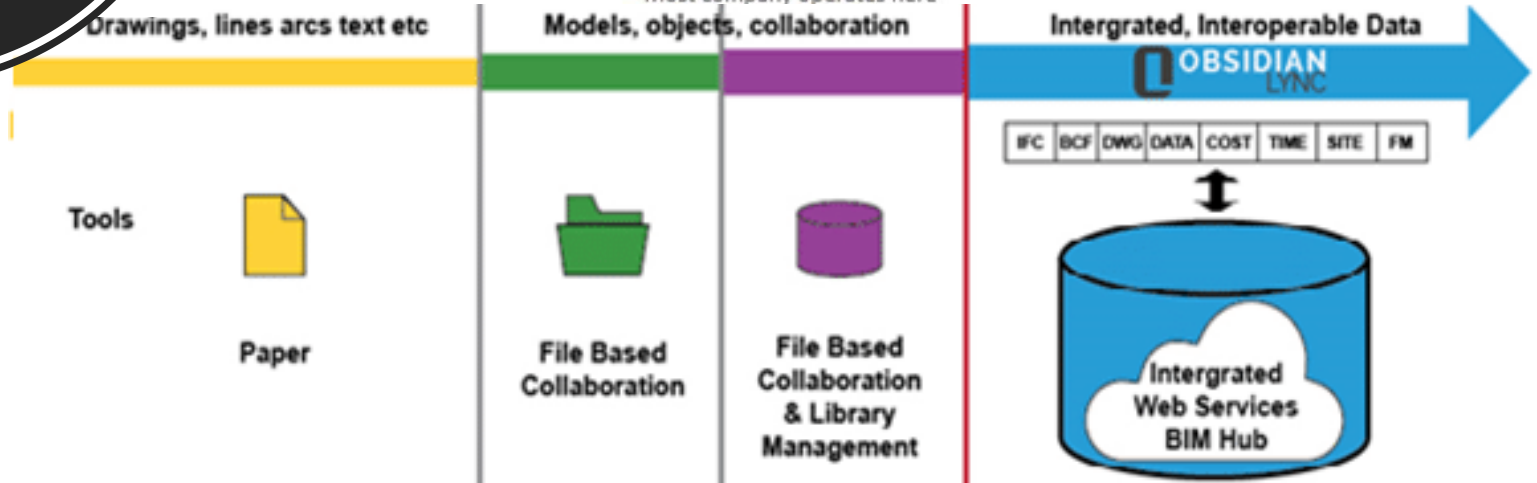
Object-based parametric modeling originally developed in 1970s for manufacturing.



# BIM Maturity Model



**Current Level**  
Most company operates here



The amount of data generated increases with each level and across the operation stage until the end of building lifecycle

# Parametric Objects

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Consist of geometric definitions and **associated data and rules**.

Geometry is integrated **non-redundantly**, and allows for no inconsistencies.

Parametric rules for objects **automatically modify associated geometries** when a new object is inserted into a building model or when changes are made to associated objects.

Objects can be defined at **different levels of aggregation**, so we can define a wall as well as its related components.

Objects' rules can identify when a particular change violates **object feasibility** regarding size, manufacturability, and so forth.

Objects have the ability to **link to or receive, broadcast, or export sets of attributes** to other applications and models.

# What is not BIM?



Models that contain 3D data only and no (or few) object attributes.



Models with no support of behavior.



Models that are composed of multiple 2D CAD reference files that must be combined to define the building.



Models that allow changes to dimensions in one view that are not automatically reflected in other views:



# What is BIM?

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Building components that are represented with **digital representations** (objects) that carry computable **graphic & data** attributes that identify them to **software applications**, as well as **parametric rules**.

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Components include data that describe **how they behave**, as needed for **analysis** and **work processes**.

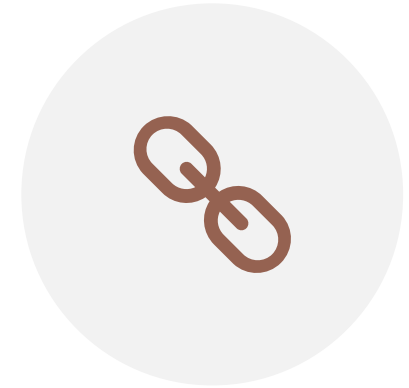
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**Consistent & non-redundant** data/ **changes** to component data are represented in **all views**.

# Questions to Consider in writing the reflections



WHAT CHANGES IN DESIGN AND CONSTRUCTION PROCESS ARE NEEDED TO ENABLE PRODUCTIVE USE OF BIM TECHNOLOGY?



CENTRAL MODEL VS FEDERATED MODEL. IS A SINGLE CENTRAL MODEL PRACTICAL? DO FEDERATED SYSTEMS OF MODELS WORK BETTER FOR THE VARIETY OF DESIGN AND CONSTRUCTION TASKS?

# Preparation Reading for Next Class:

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Subject:

Benefits & Challenges of Implementing  
BIM Technologies

