

CitA

BIM GATHERING 2019



4th CitA BIM Gathering 26th September 2019, Galway, Ireland.

Delivering **better outcomes**
for Irish Construction



Assessing the viability of applying Lean, Green & BIM principles in Office Fit-out Projects

Andy Taylor



- Why is this subject relevant
- BIM
- LEED
- WELL
- Lean
- Process
- Outcome
- Summary
- Further Research
- Questions



Image Courtesy of DPR



£3.7bn
69%



Image Courtesy of M Moser



Building Information Modeling (**BIM**) is an intelligent 3D model-based process that gives architecture, engineering, and construction (AEC) professionals **the insight and tools** to more efficiently plan, design, construct, and manage buildings and infrastructure.

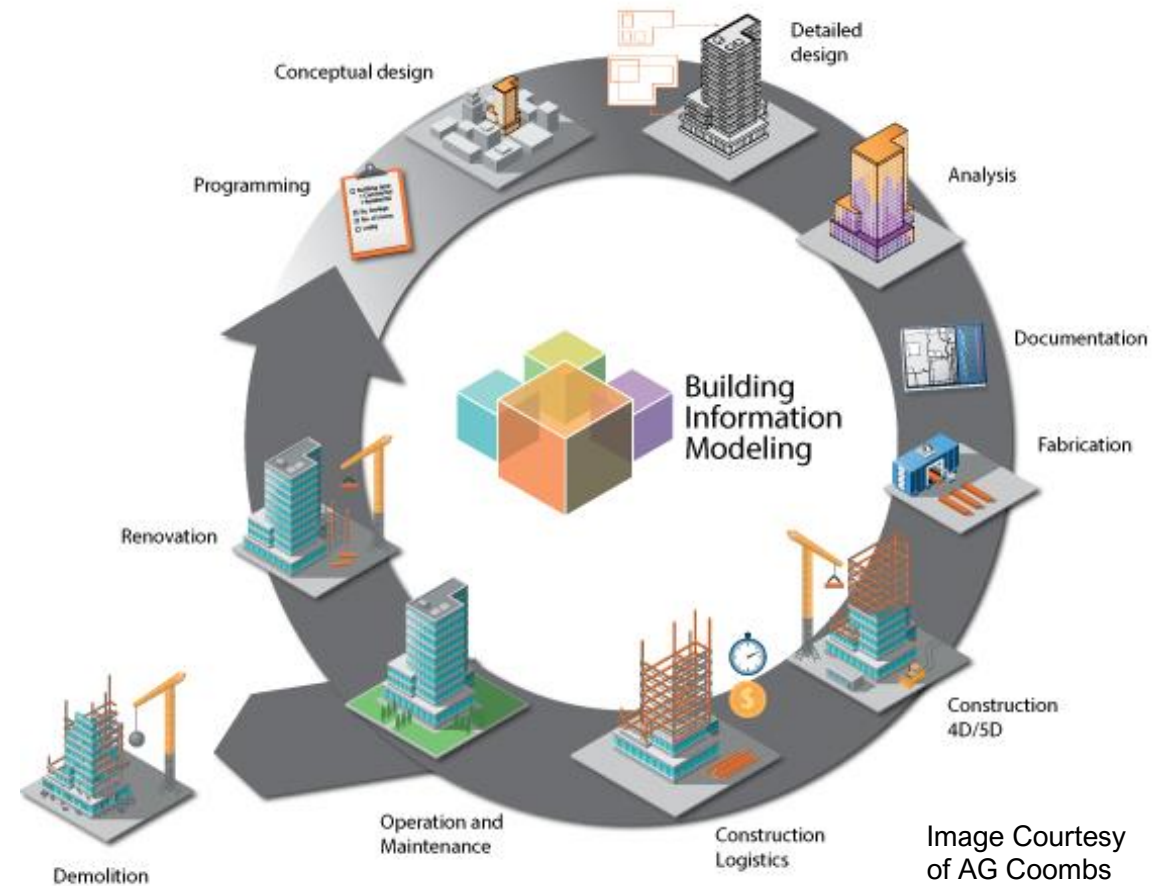


Image Courtesy
of AG Coombs



LEED (Leadership in Energy and Environmental Design) is a voluntary rating system to certify sustainable buildings and neighbourhoods.

90%

The percentage of time spent indoors by the average person.



Source : US Green Building Council



WELL is the leading tool for advancing health and well-being in buildings globally. Register your office, building or other space to leverage WELL's flexible framework for improving health and human experience through design.

Source : International WELL Building Institute

AIR	Quality standards including filtration, cleaning protocols, microbe control, material safety
WATER	Testing and monitoring to control public water additives and system contaminants
NOURISH- MENT	Promotion of healthy food options, nutrition labeling, safe food preparation and sourcing
LIGHT	Glare free and circadian lighting design, effects of surfaces & contrast, light quality, daylighting
FITNESS	Active design, enhanced ergonomics, activity incentives, and structured fitness programs
COMFORT	Physical and visual ergonomics; thermal, olfactory, and acoustic comfort
MIND	Organizational policies and transparency, bio-philic design, flexible and adaptable spaces



Lean construction is a **process** to maximise **efficiency**, avoid **waste**, minimise **costs**, maximise **value to customer**, enhance collaboration, and drive **continuous improvement**.



Defects

Efforts caused by rework, scrap, and incorrect information.



Overproduction

Production that is more than needed or before it is needed.



Waiting

Wasted time waiting for the next step in a process.



Non-Utilized Talent

Underutilizing people's talents, skills, & knowledge.



Transportation

Unnecessary movements of products & materials.



Inventory

Excess products and materials being processed.



Motion

Unnecessary movements by people (e.g. walking).



Extra-Processing

More work or higher quality than is required by the customer.



- Qualitative Analysis of previous research
- Interviews with Industry SME





- LEED supported by BIM
- WELL supported by BIM
- Lean supported by BIM

Addition of new parameters

Parameter Properties

Parameter Type

☐ Project parameter
(Can appear in schedules but not in tags)

☒ Shared parameter
(Can be shared by multiple projects and families, exported to CDEB, and appear in schedules and tags)

Select... Export...

Parameter Data

Name: <No parameter selected>

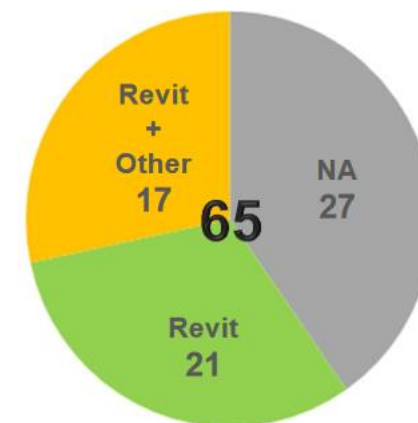
Discipline: <No parameter selected>

Type of Parameter: <No parameter selected>

Group parameter under: Dimensions

Tooltip Description: <No tooltip description. Edit this parameter to write a custom tooltip. Custom tooltips help...

☒ Add to all elements in the selected categories



Autodesk BIM 360 Plan

https://bim360plan.autodesk.com/gantt?project_id=dt7

D2-14040-00 Biomedical Partnership Building

Activity

Activity	Company	Person	Finish
Ejector Vault	Univer...	Brad Claus...	M 4/20
Wall Pour 6	Sundt...	Geoff Ballin...	M 4/20
Column Po...	Sundt...	Geoff Ballin...	T 4/21
UG conduit	Canno...	Aaron Knud...	W 4/22
Wall Pour 8	Sundt...	Geoff Ballin...	W 4/22
West Elevat...	Sundt...	Geoff Ballin...	W 4/22
Grade Bea...	Sundt...	Geoff Ballin...	F 4/24
Landscape	DPR-S...	Peter Berg	M 4/20

PPC 68% 47

Source : Chen, Gan, Chen, Cheng 2018



- Appoint a champion
- Take a people & process view and select technologies to support them, there is no 'one size fits all'
- Start with a pilot project
- Develop an integrated process flow
- Take a life cycle view



Source : Porr Group



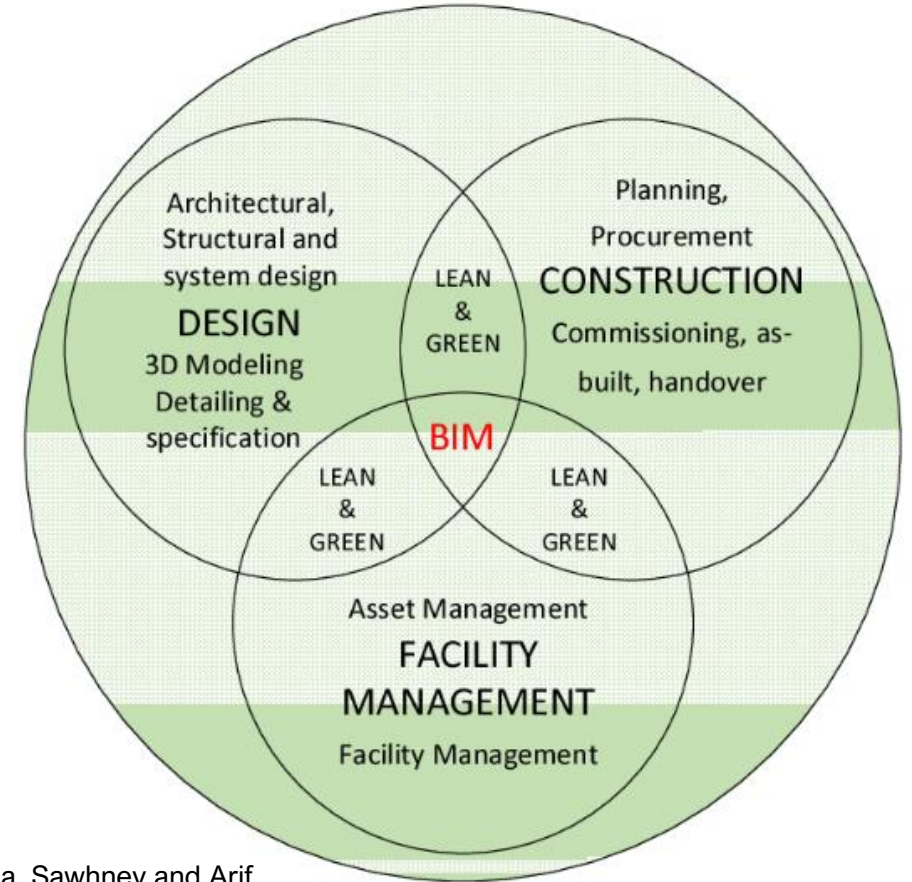
- Case Studies
- Process Application & Improvement
- Post Occupancy Evaluation
- Internet of Things



Source : jgateplus.com



- BIM supports Lean, LEED and WELL initiatives
- Most efficient when all are applied at the same time
- Further benefits can potentially be gained through integration of IoT.



Source : Ahuja, Sawhney and Arif



Questions?



Thank you

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