BIM DNA group

BIM FOR QUANTITY SURVEYORS ENHANCING EFFICIENCY

Principal at BIM DnA Group

CEO (Past-President) buildingSMART Canada

Director of Design Technologies at Diamond Schmitt Architect

Director of Digital Practice at MJMA

BIM Manager / Architect at Moriyama + Teshima

Founder and Former Chair of torontoBIMcommunity

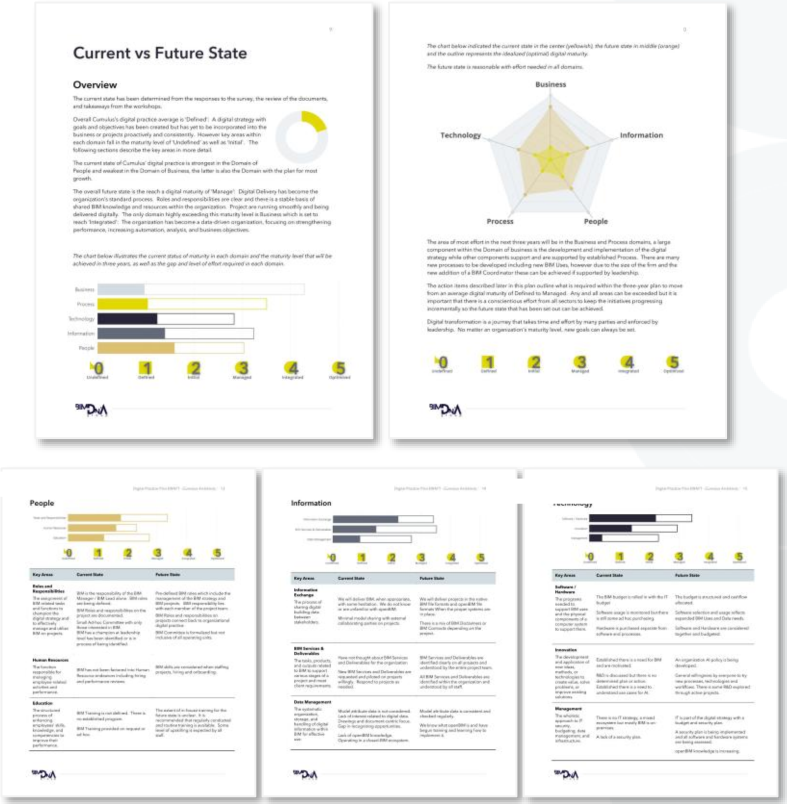
Licensed with the OAA and an OAA Mentor

University of British Columbia - Master's of Architecture

Ryerson University - Bachelors in Architectural Science

what we do

Our focus is on preparing you in your own digital transformation journey that supports your unique business.



Current vs Future State

Overview

The current state has been determined from the responses to the survey, the review of the documents, and takeaways from the workshops.

Overall Cumulus's digital practice average is 'Defined'. A digital strategy with goals and objectives has been created but has yet to be incorporated into the business or projects proactively and consistently. However key areas within each domain fall in the maturity level of 'Undefined' as well as 'Initial'. The following sections describe the key areas in more detail.

The current state of Cumulus' digital practice is strongest in the Domain of People and weakest in the Domain of Business, the latter is also the Domain with the plan for most growth.

The overall future state is the reach a digital maturity of 'Manage'. Digital Delivery has become the organization's standard process. Roles and responsibilities are clear and there is a stable basis of shared BIM knowledge and resources within the organization. Project are running smoothly and being delivered digitally. The only domain highly exceeding this maturity level is Business which is set to reach 'Integrated'. The organization has become a data-driven organization, focusing on strengthening performance, increasing automation, analysis, and business objectives.

The chart below illustrates the current status of maturity in each domain and the maturity level that will be achieved in three years, as well as the gap and level of effort required in each domain.

The chart below indicated the current state in the center (yellowish), the future state in middle (orange) and the outline represents the idealized (optimal) digital maturity.

The future state is reasonable with effort needed in all domains.

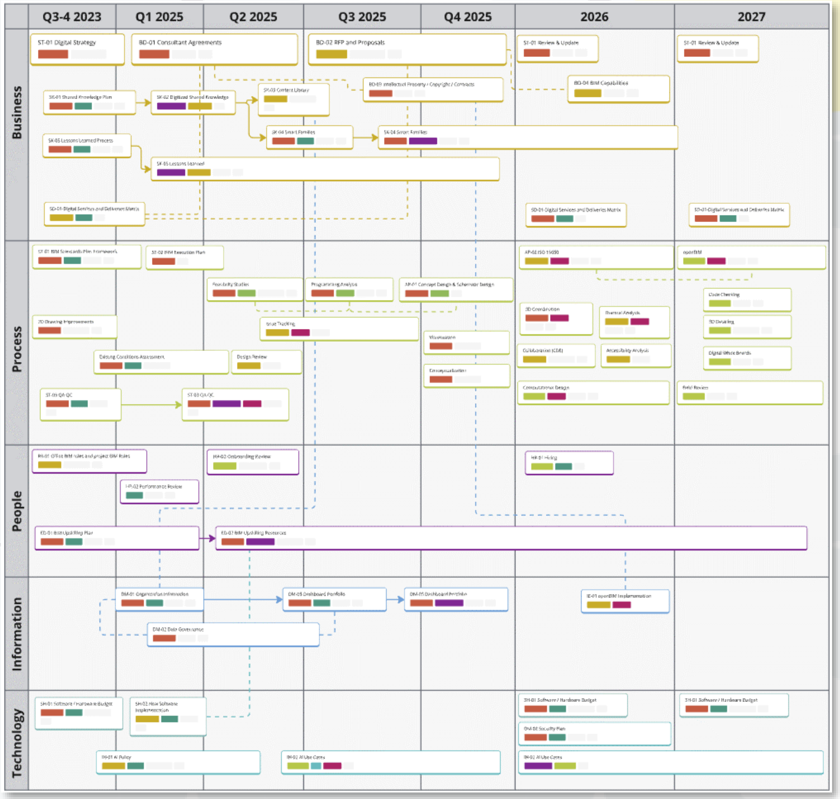
The area of most effort in the next three years will be in the Business and Process domains, a large component within the Domain of business is the development and implementation of the digital strategy while other components support and are supported by established Process. There are many new processes to be developed including new BIM Uses, however due to the size of the firm and the new addition of a BIM Coordinator these can be achieved if supported by leadership.

The action items described later in this plan outline what is required within the three-year plan to move from an average digital maturity of Defined to Managed. Any and all areas can be exceeded but it is important that there is a conscientious effort from all sectors to keep the initiatives progressing incrementally so the future state that has been set out can be achieved.

Digital transformation is a journey that takes time and effort by many parties and enforced by leadership. No matter an organization's maturity level, new goals can always be set.

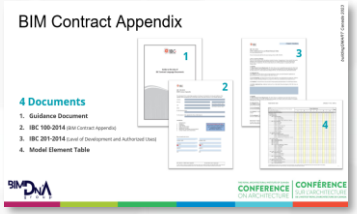
People

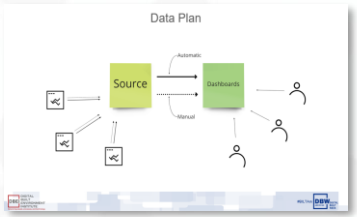
Information

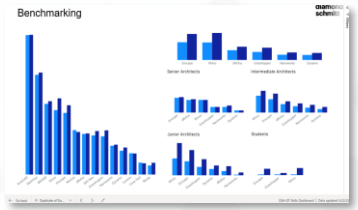


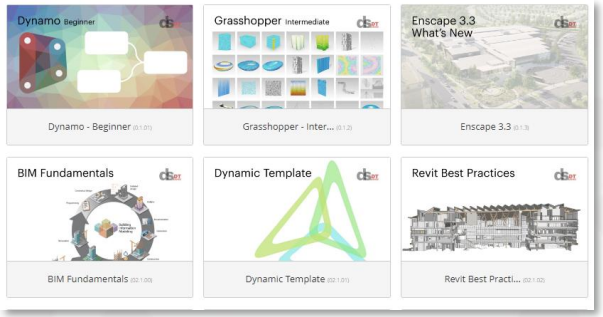
learning never ends

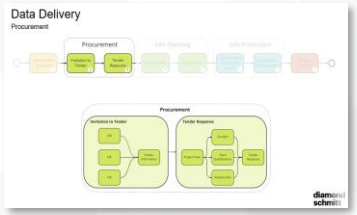
it enables adaptation and professional growth.

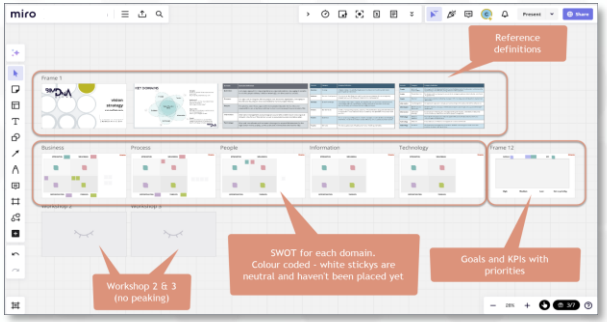


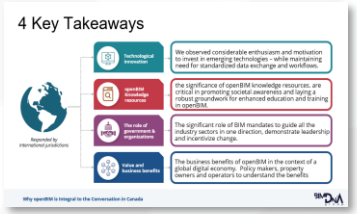


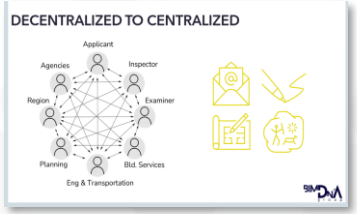


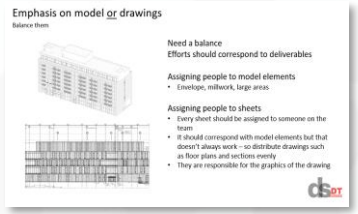








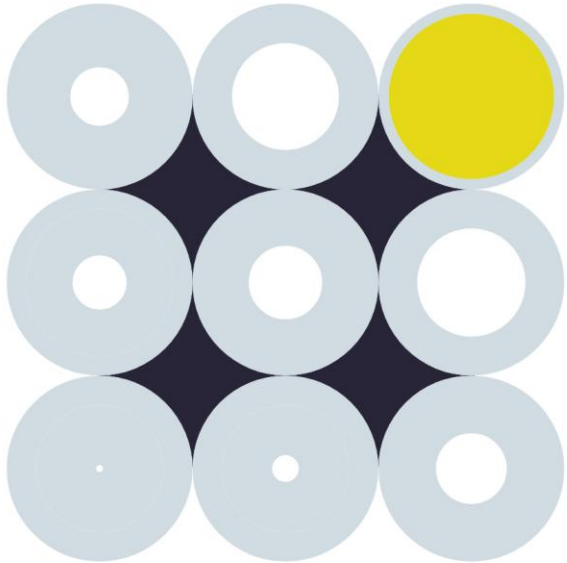




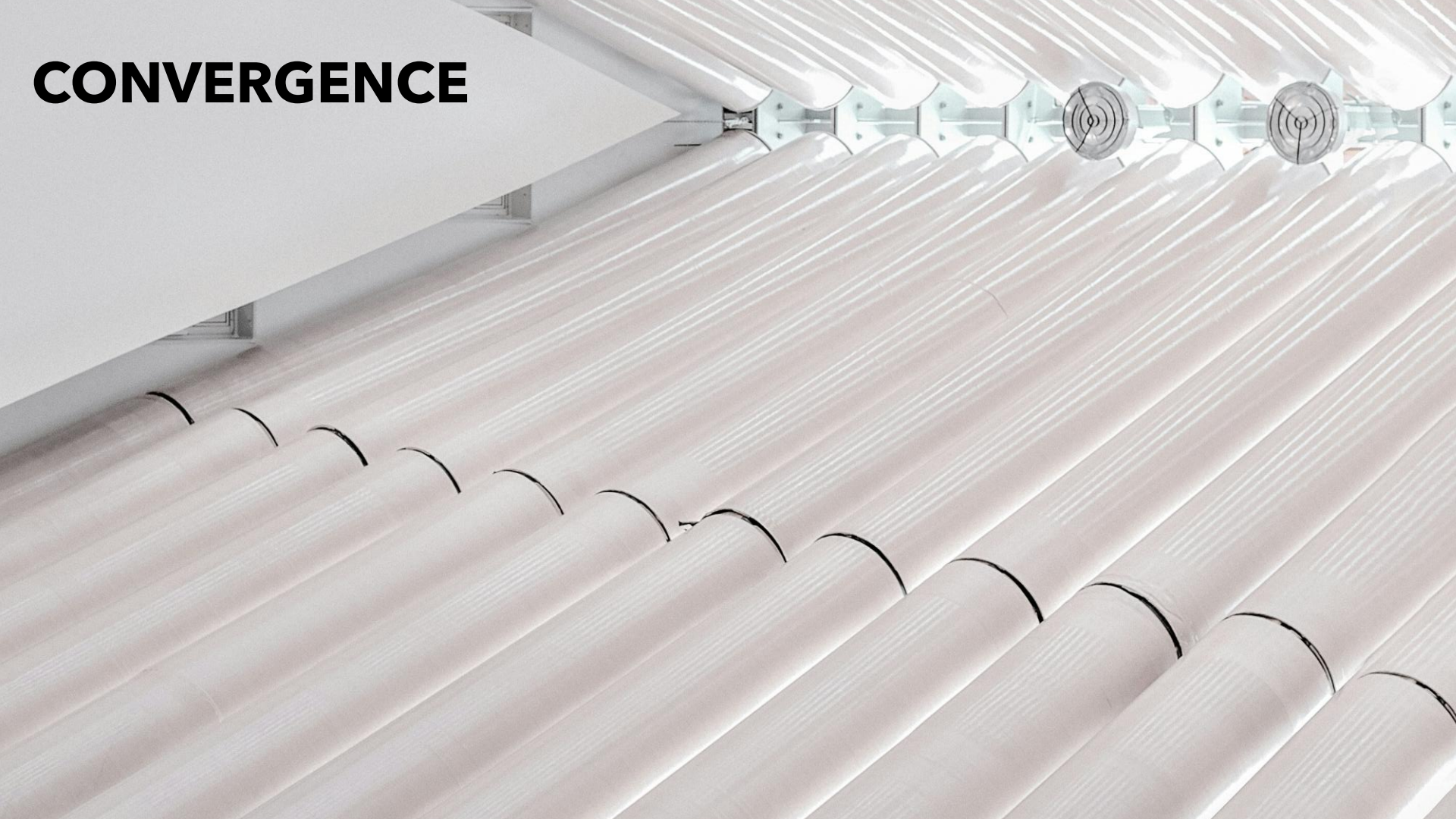
Keynotes Conferences Guest Lecturer Lunch n' Learns Con't Ed. Workshops Roundtables

FULL AGENDA

1. Overview
2. BIM Foundational Concepts
3. Business Benefits and Opportunities
4. How to get started
5. Q&A



CONVERGENCE



While a quantity surveyor may use a BIM to speed up some basic quantity take-off, the true value of the quantity surveyor is not in counting objects in a model

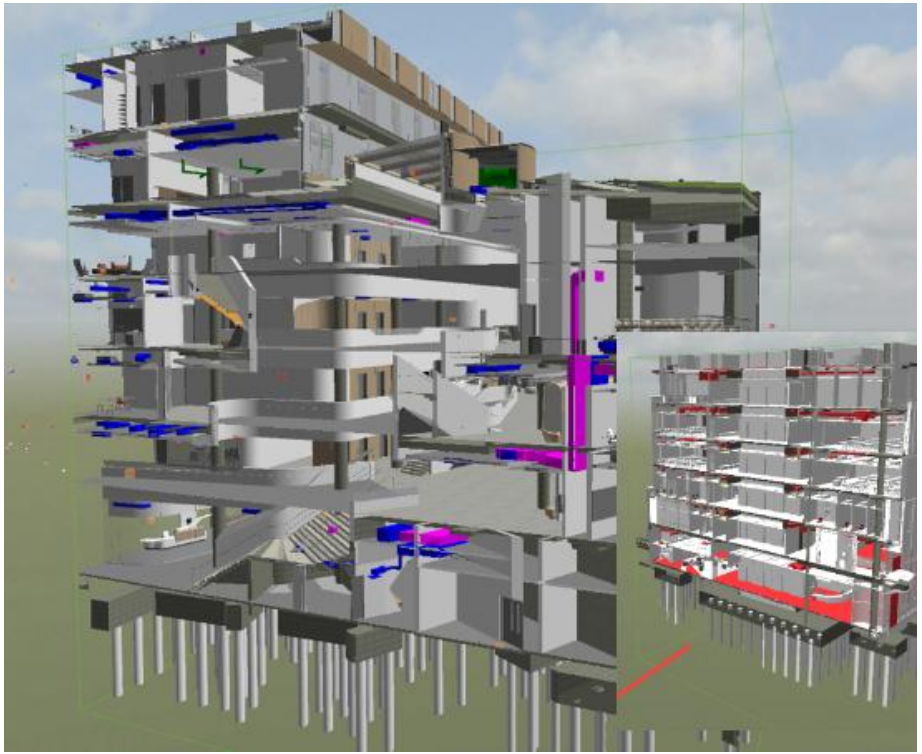
rather

The interrogation and analysis of the models. This enables the quantity surveyor to recommend alternatives and provide assurance to the client that the most cost-effective option has been put forward.

"The professional skill of a quantity surveyor is still needed for assessing the validity of the source data and source materials, ensuring the coverage of the take-off, proposing alternative solutions and analyzing the results."

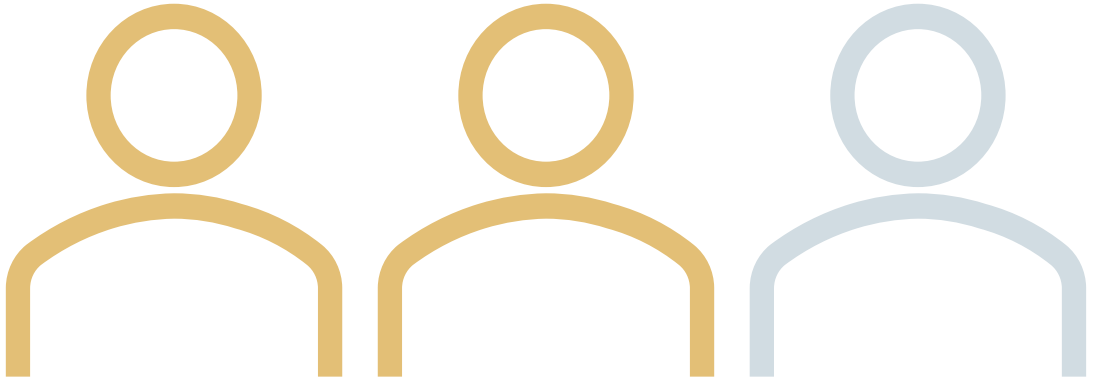
MISCONCEPTIONS

All quantities reside within the model and can be taken from a BIM



MISCONCEPTIONS

An architect or engineer can extract quantities from a model, so they can now do the role of the quantity surveyor



MISCONCEPTIONS

Bill of Quantities can be produced with the click of a button

WHY IS BIM IMPORTANT FOR QUANTITY SURVEYORS?

- Leveraging the 3D model and information being generated by design and construction team
- Fast and efficient quantity validation and verification
- Rapid processing of design revisions/updates, More efficient identification and costing of design changes
- Quickly cost design options to allow early informed decisions

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WHY IS BIM IMPORTANT FOR QUANTITY SURVEYORS?

- Increased visualization
- Efficient data extraction for estimating at various design stages, as well as leveraging off the model and producing schedules of quantities
- Opens new services opportunities and reframe the role of Quantity Surveyors in the supply chain

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BIM FOUNDATIONAL CONCEPTS

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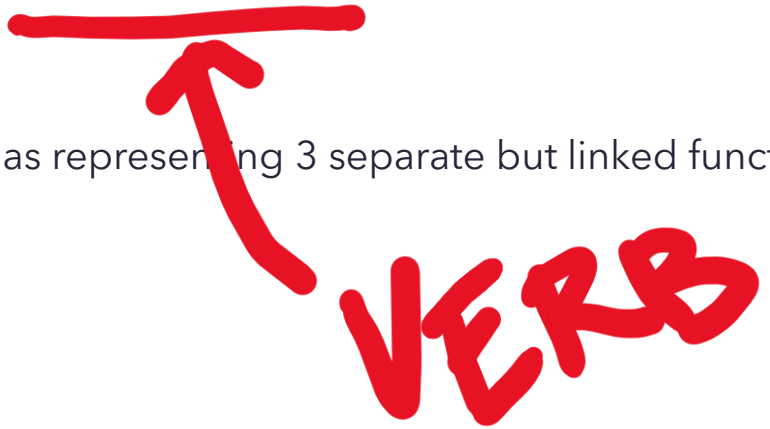
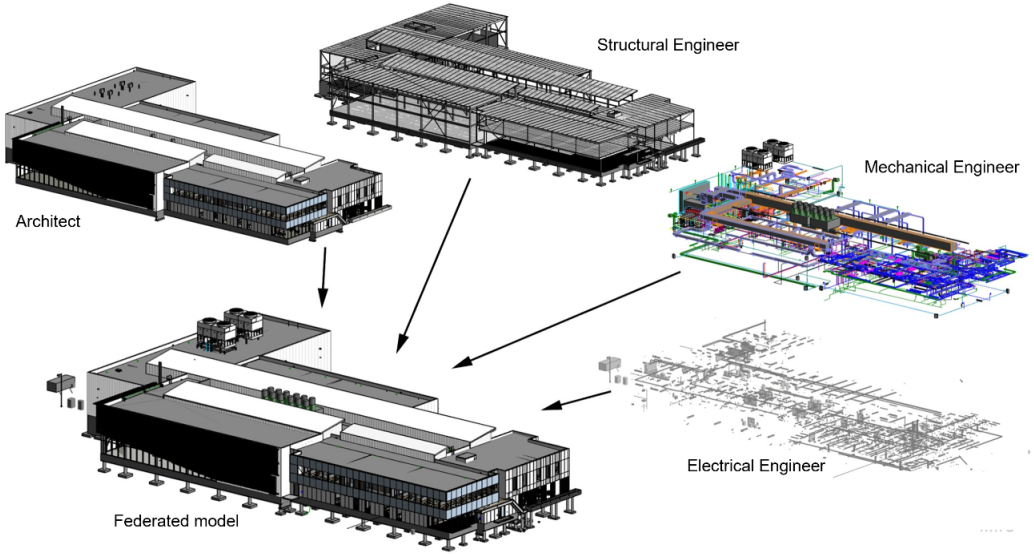
BIM: BUILDING INFORMATION …

Defined as representing 3 separate but linked functions



BIM: BUILDING INFORMATION MODEL



Is the DIGITAL REPRESENTATION of physical and functional characteristics of a facility, a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its entire life cycle.

BIM: BUILDING INFORMATION MODELING

Is a PROCESS for leveraging building data to design, construct and operate the building during its lifecycle. BIM allows all stakeholders to have access to the same information simultaneously through interoperability between different technology platforms.

Process

ISO 19650
International Organization for Standardization

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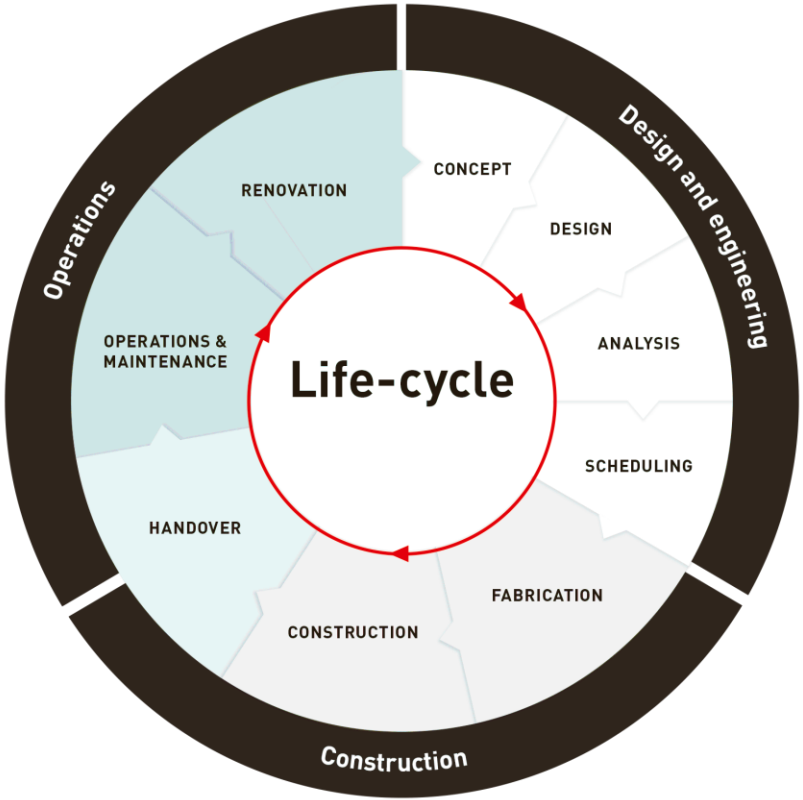
BIM: BUILDING INFORMATION MANAGEMENT



openBIM®

Information

Management: Is the ORGANIZATION & CONTROL of the process by utilizing the information in the digital prototype to affect the sharing of information over the entire lifecycle of an asset, effectively developing an asset lifecycle process and model from conception to retirement.

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BIM

BIM is the use of a **shared digital representation** of a **built asset** to facilitate design, construction and operation processes to form **a reliable basis for decisions**.

Definition according to ISO 19650-1 / ISO 29481-1:2016

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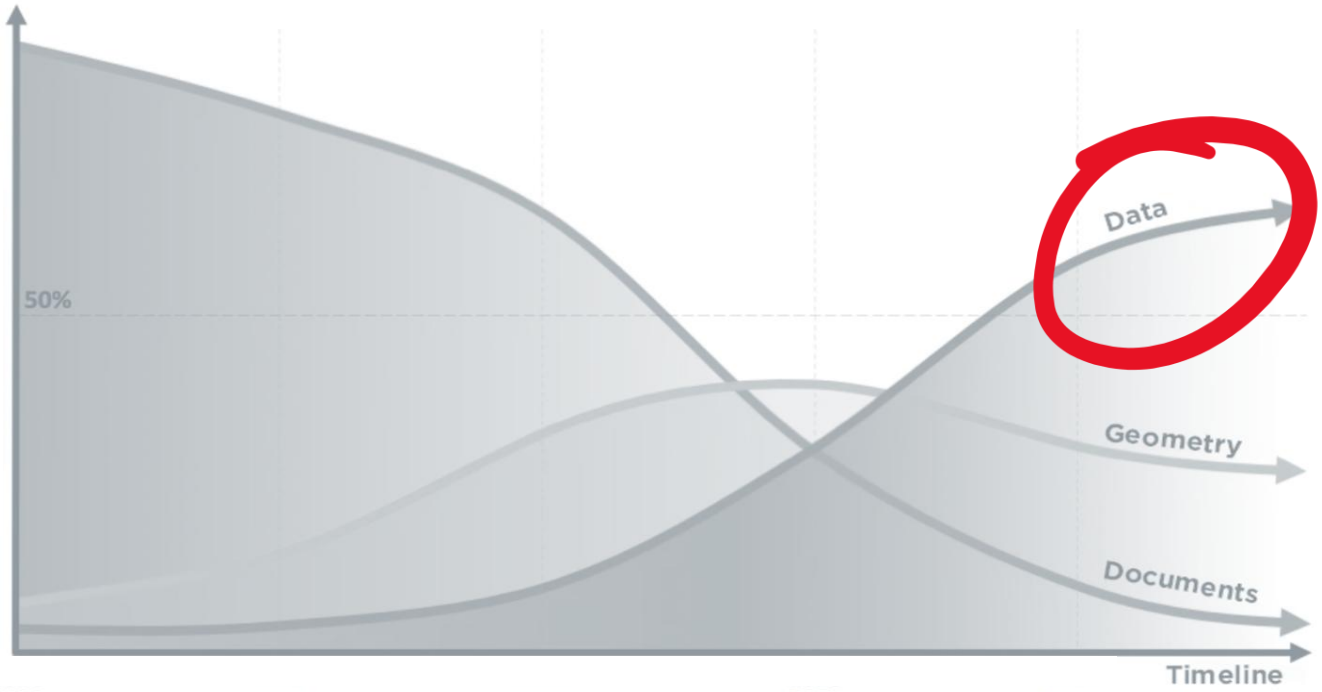
FUTURE DIRECTION



INFORMATION

Component Based

Information + Geometry

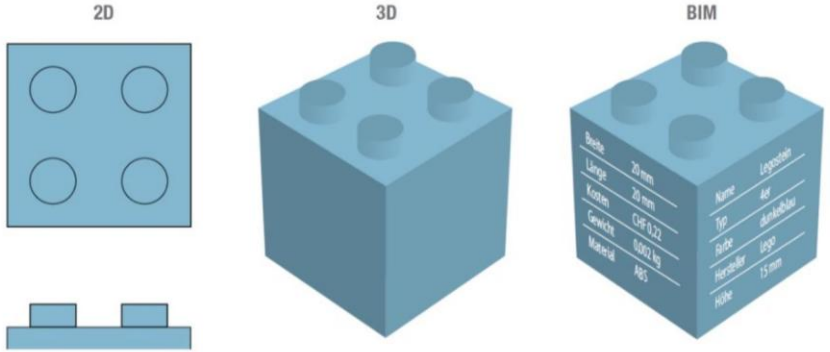
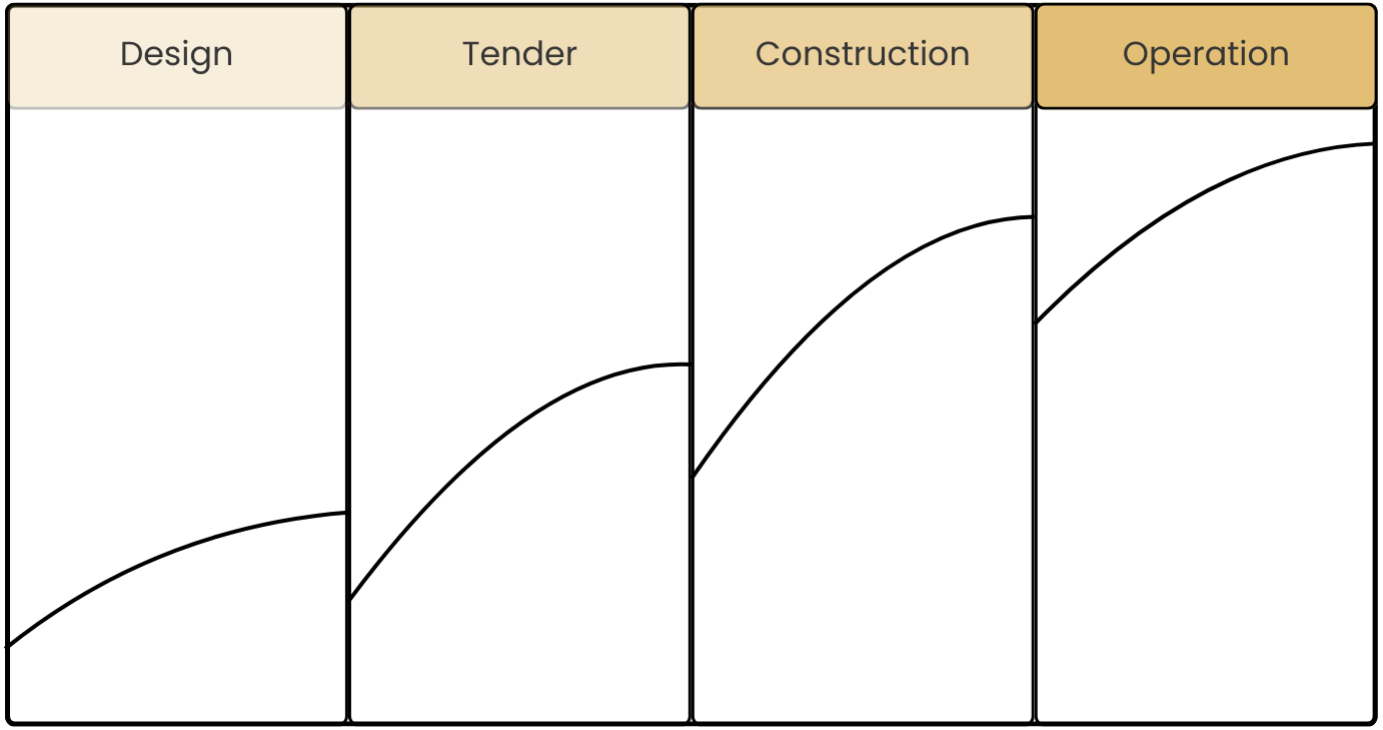
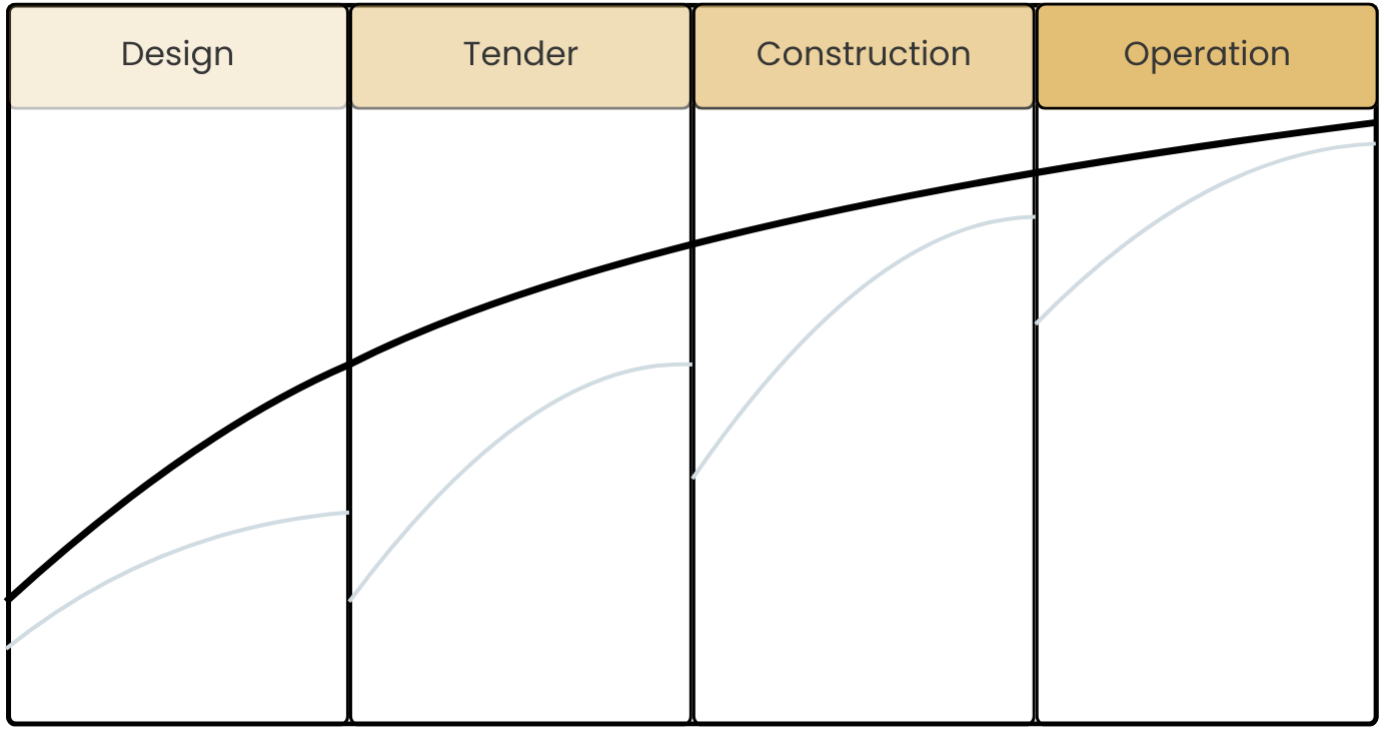


Image source: M. Baldwin, The BIM Manager (2018)

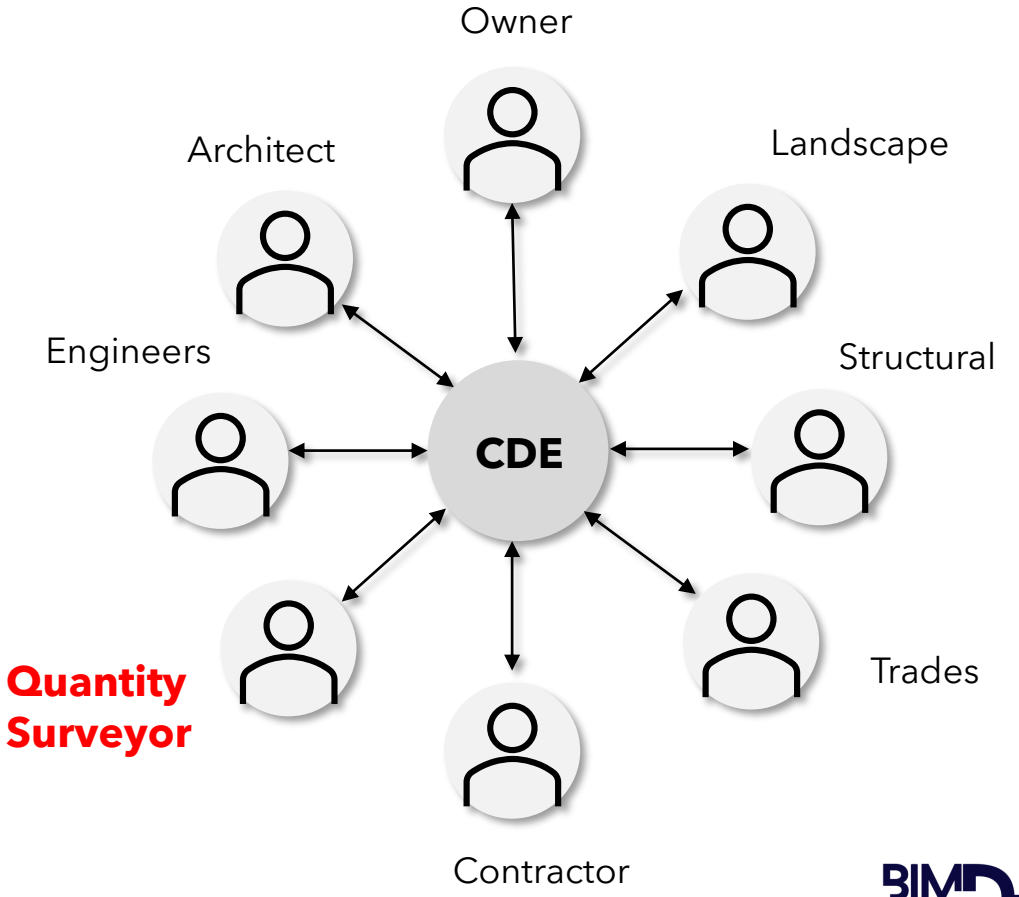
INFORMATION - TRADITIONAL WORKFLOW



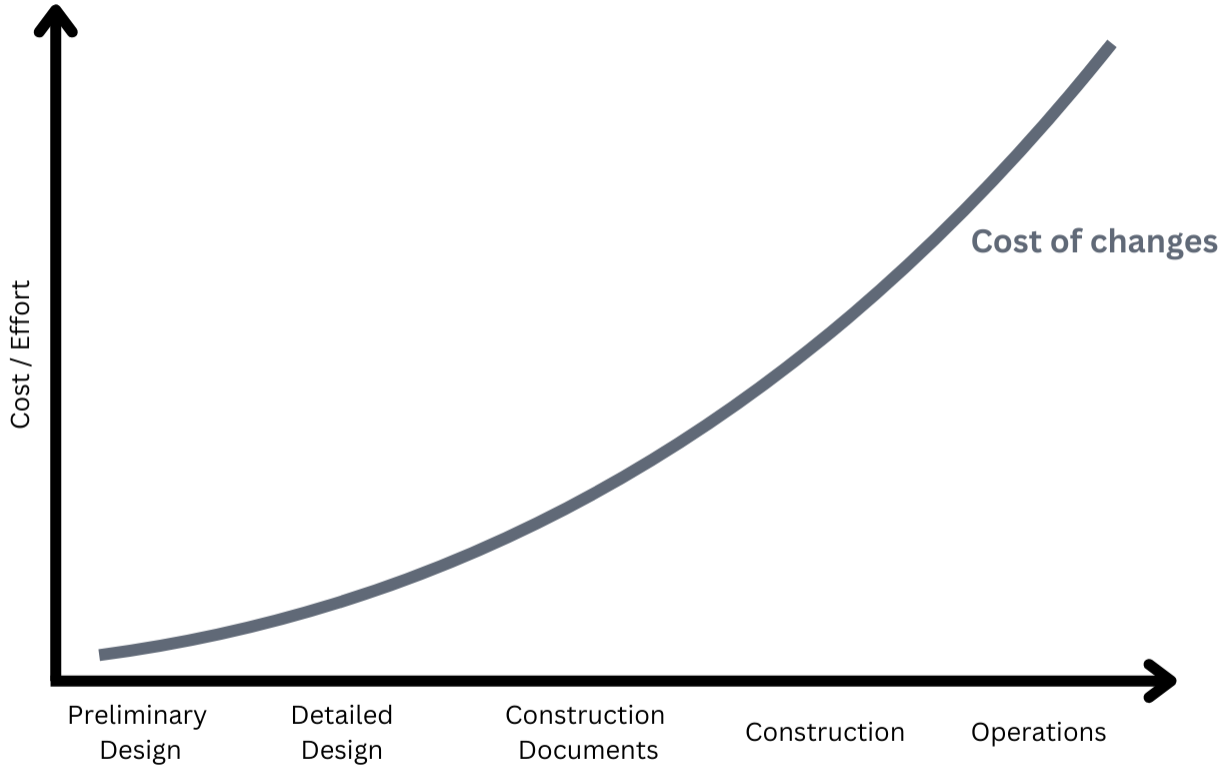
INFORMATION - BIM WORKFLOW



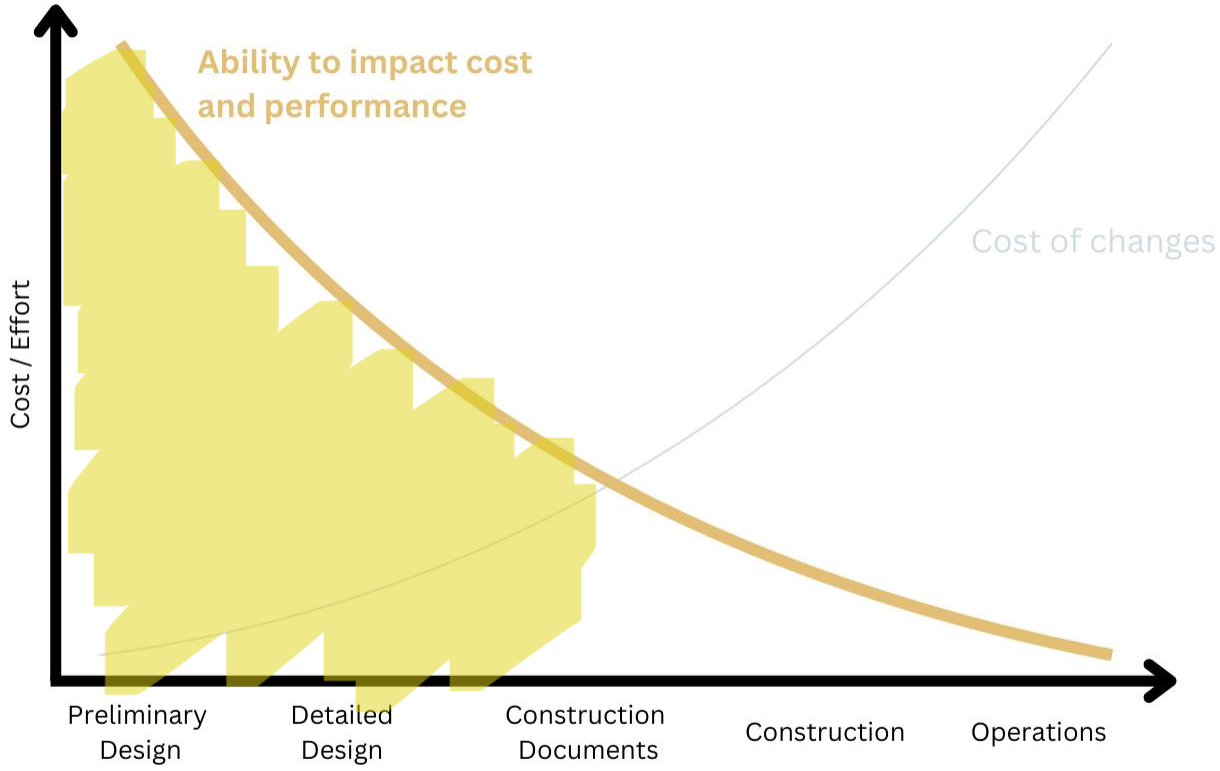
COLLABORATION

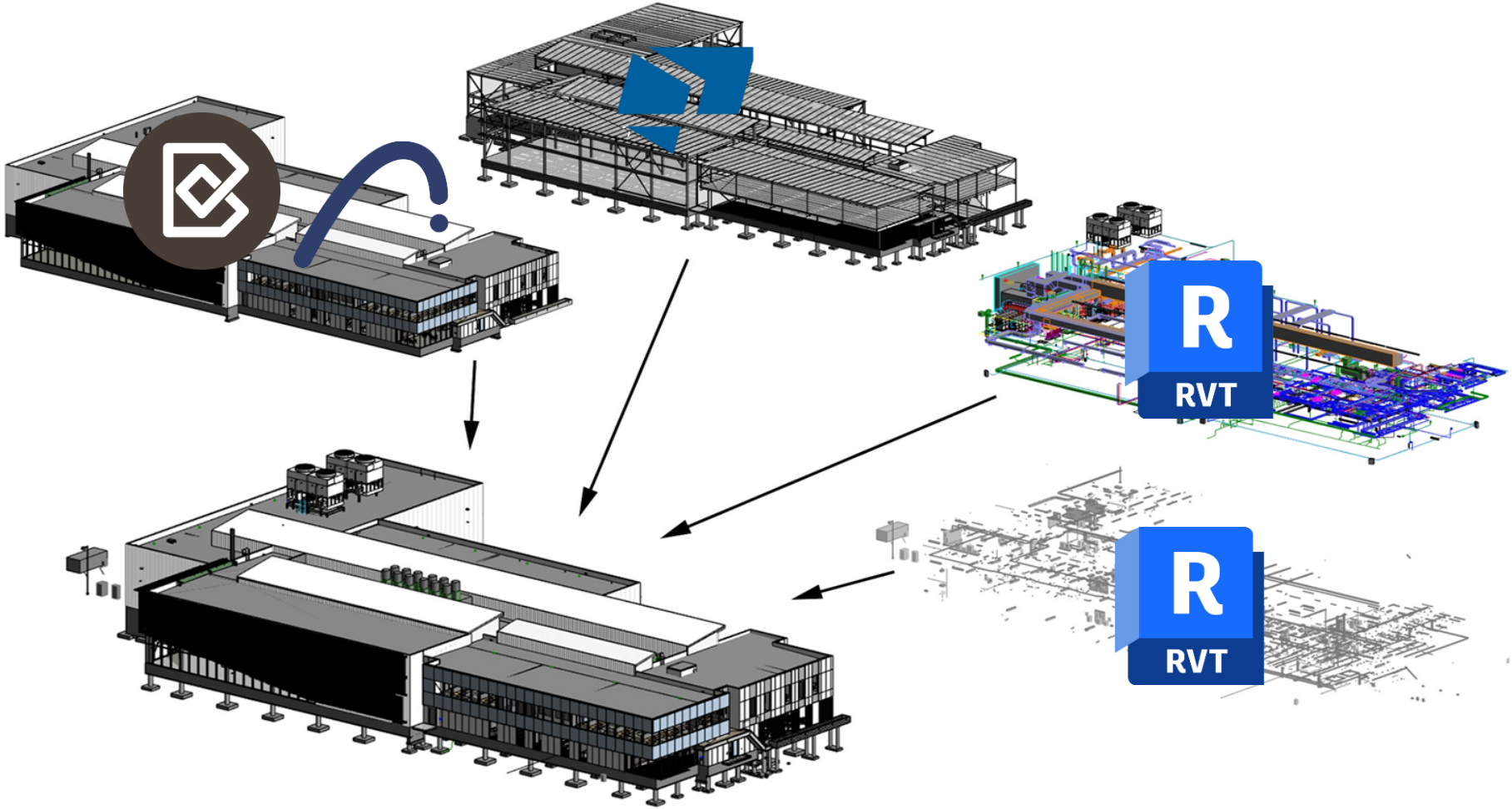


MACLEAMY CURVE



MACLEAMY CURVE

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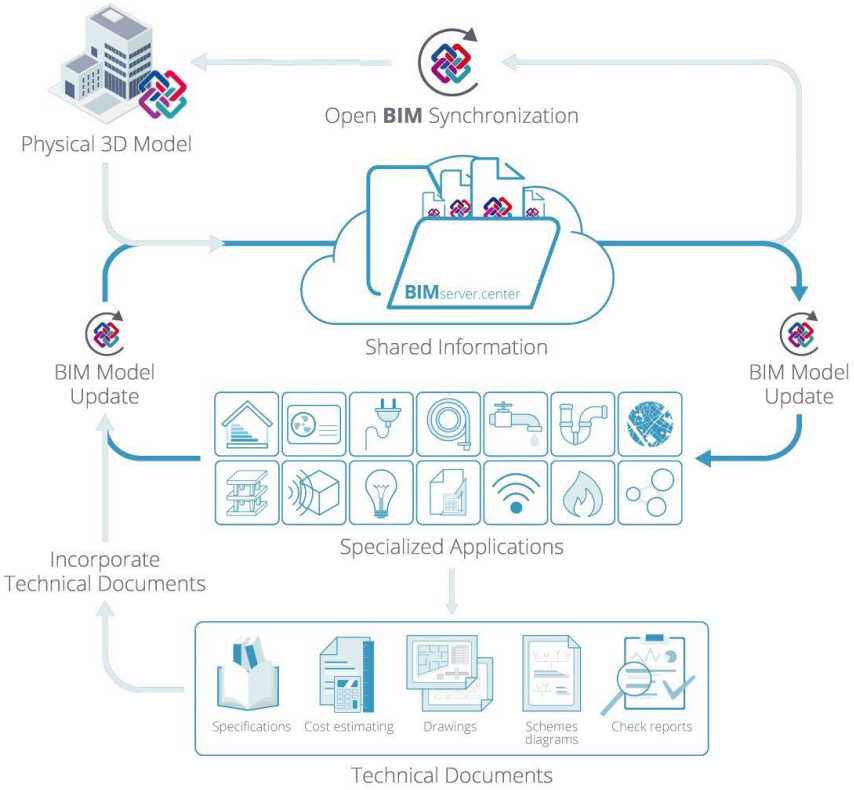
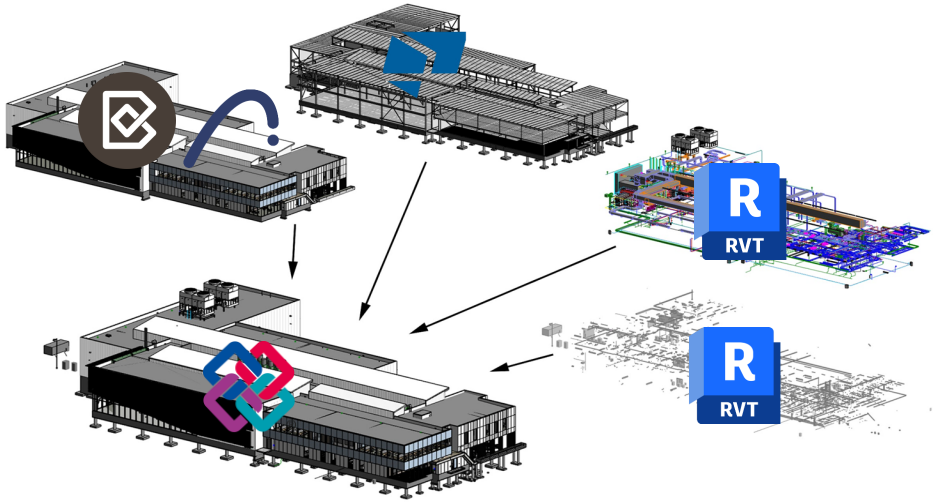
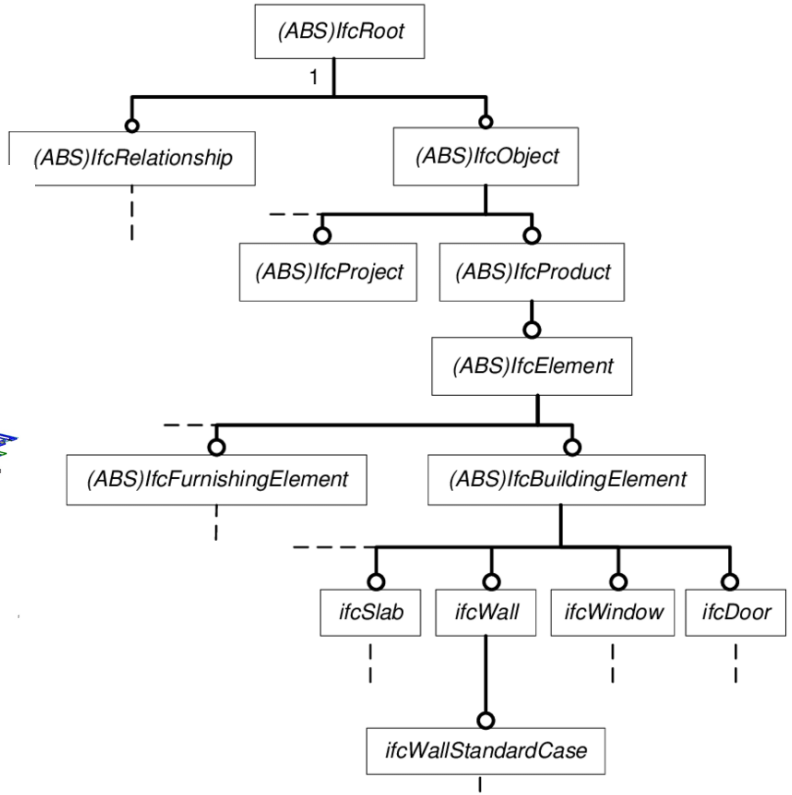
WHAT IS openBIM?

enables global universal data-sharing for BIM data regardless of proprietary BIM platform or BIM tool



INDUSTRY FOUNDATION CLASS





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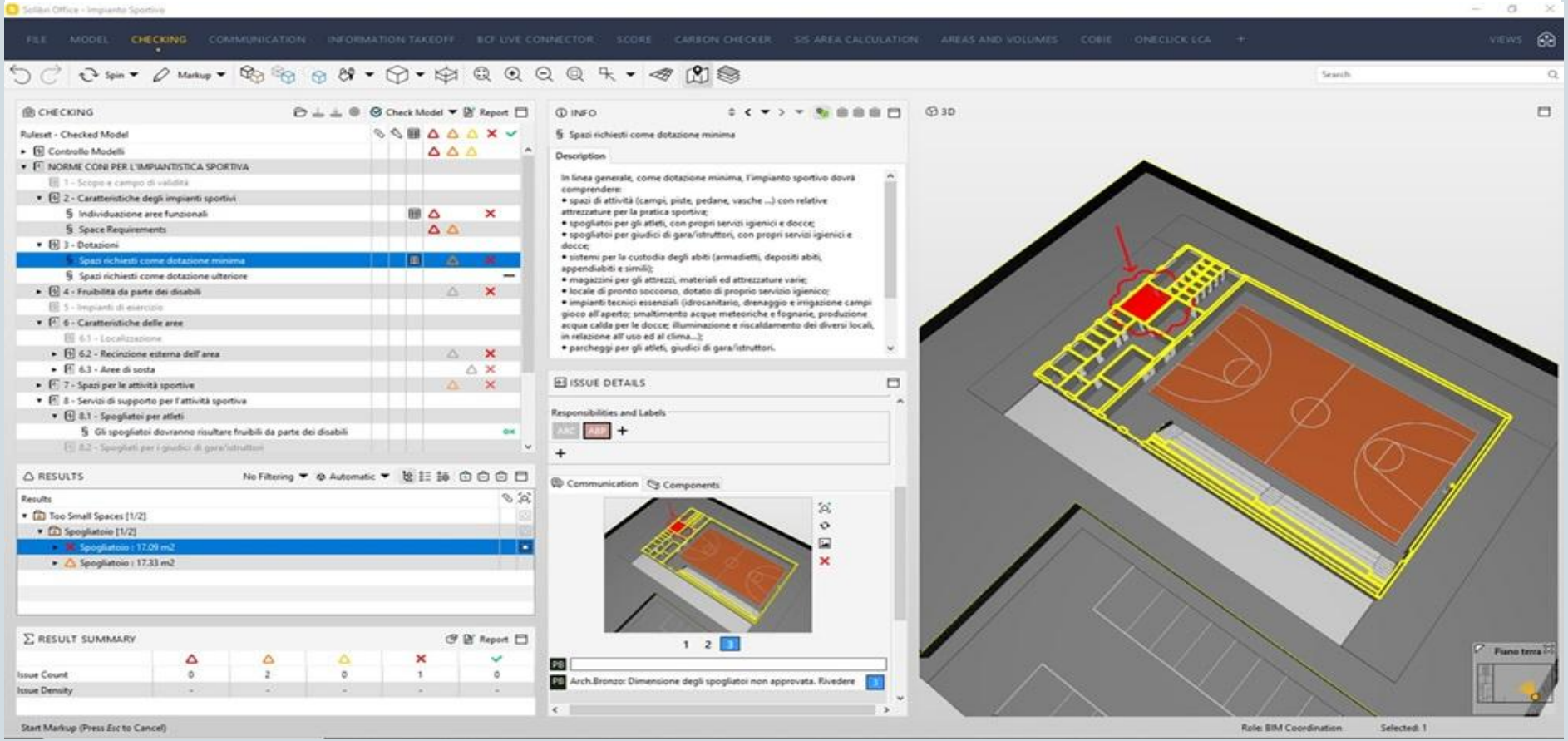
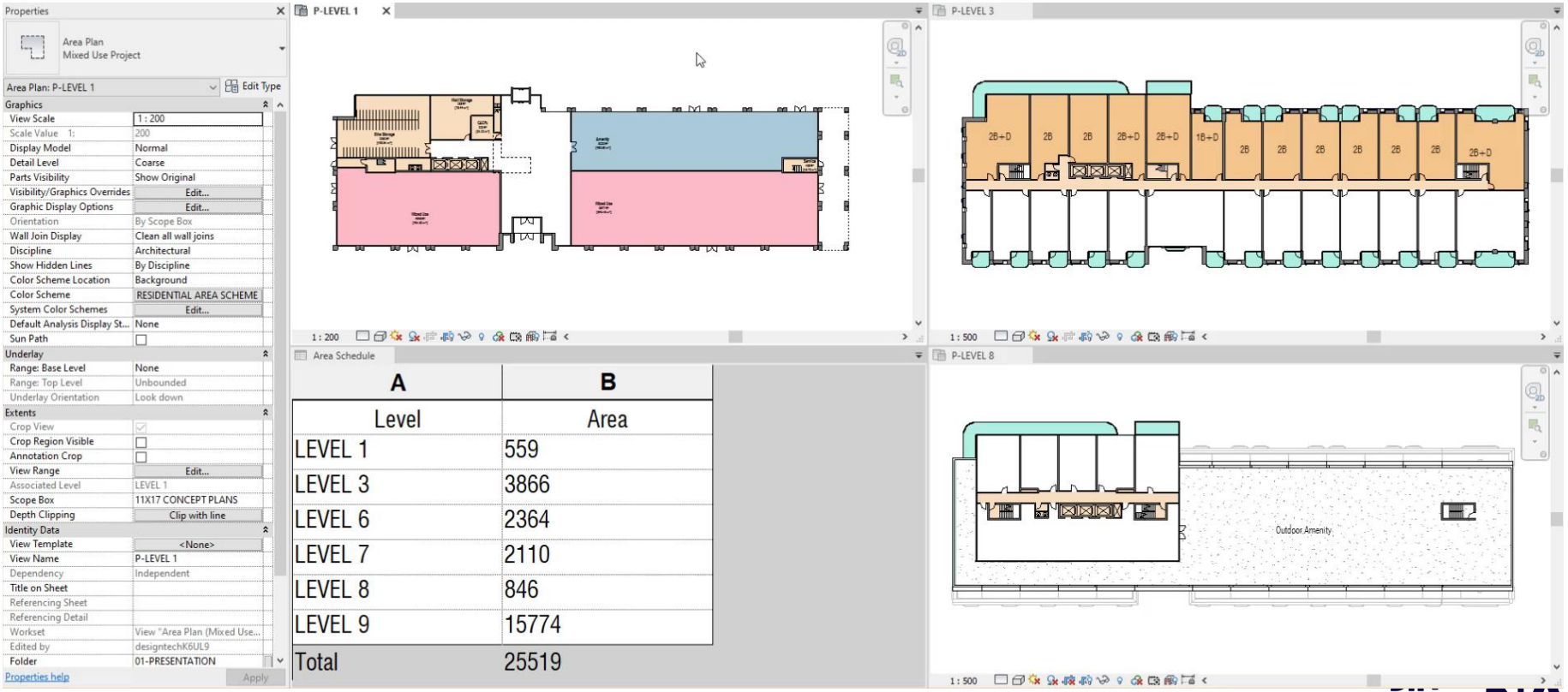
BUSINESS BENEFITS AND OPPORTUNITIES

INTEGRATED IN THE PROCESS



INSTANTANEOUS CHANGES

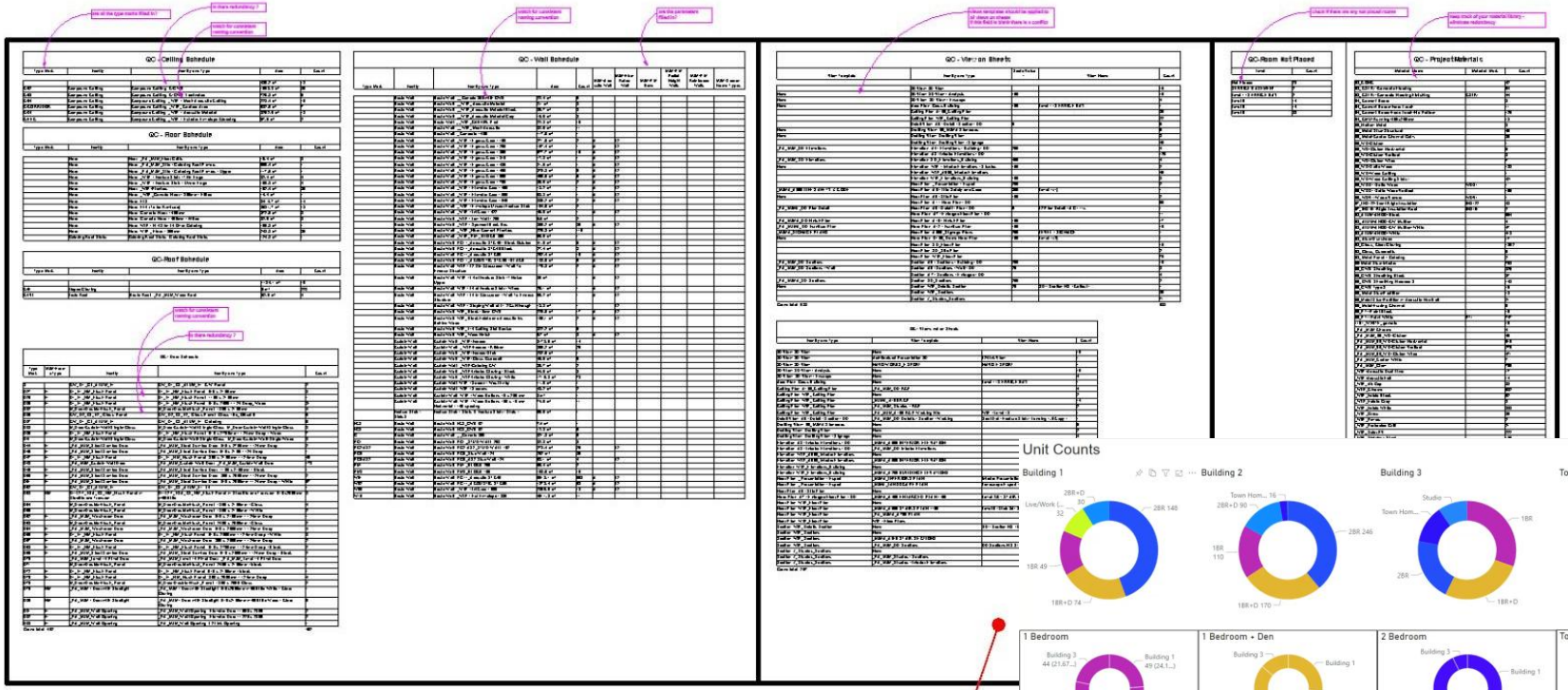


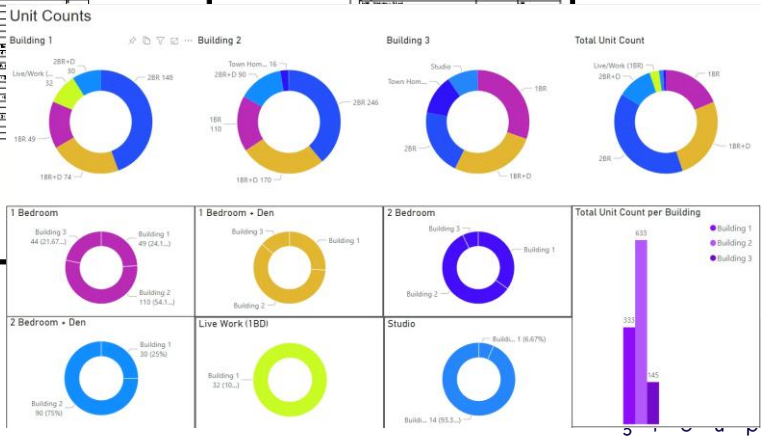
ANALYSIS

MASTER PLAN 3D VIEW COLOURED BY USE TYPE

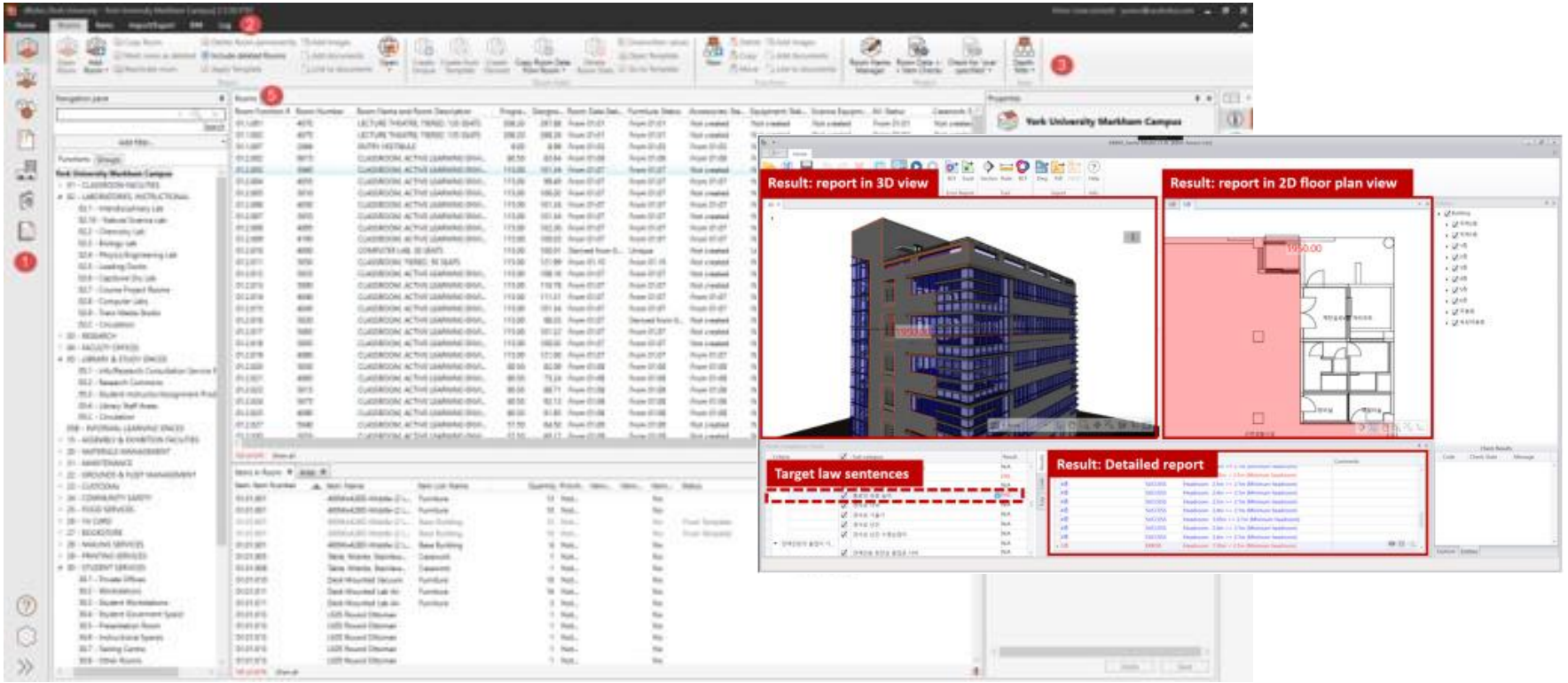
PARCEL 4

VALUE ENGINEERING

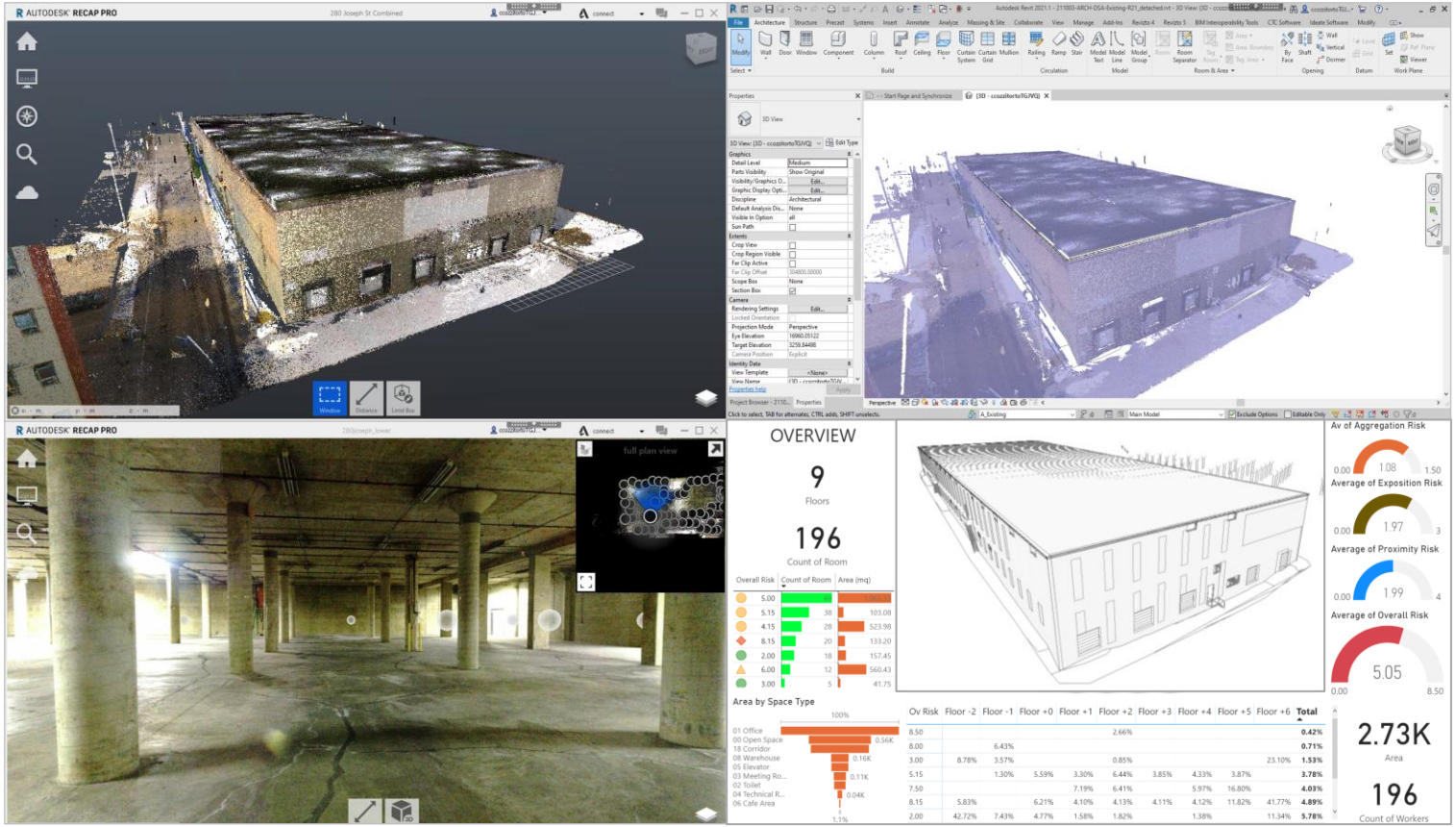




LIFE CYCLE COST ASSESSMENT



PROPERTY CONDITIONS ASSESSMENT



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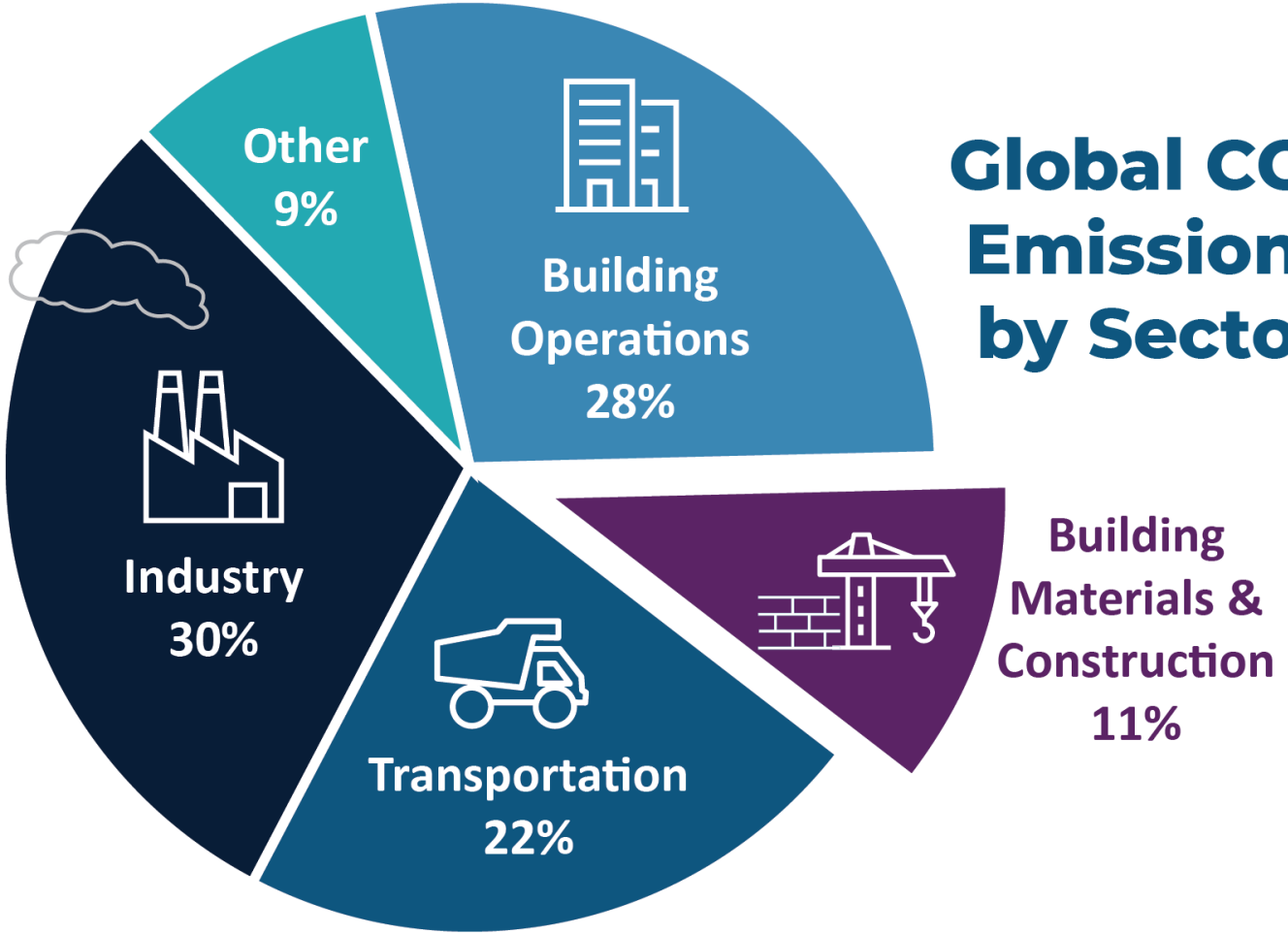
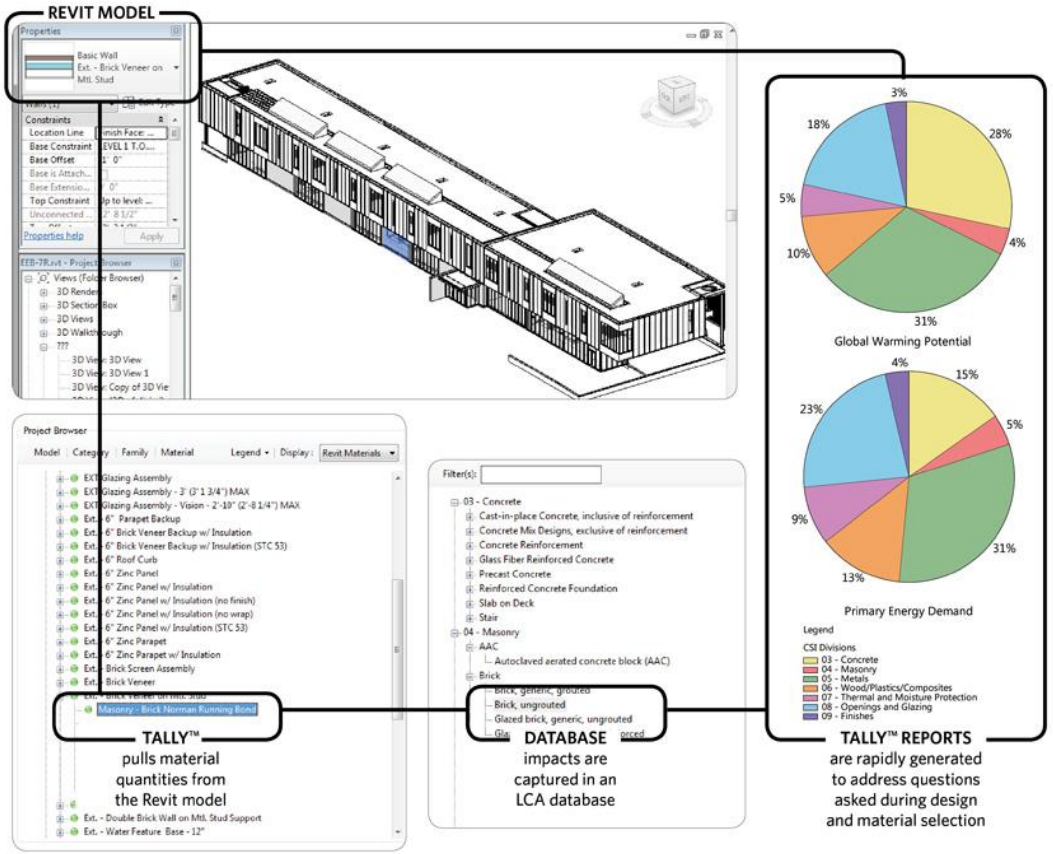
Global CO2 Emissions by Sector



Source: Adapted from the World Green Building Council, Global Status report, 2019.

CARBON



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CIRCULARITY

3

HOW BIM WORKS

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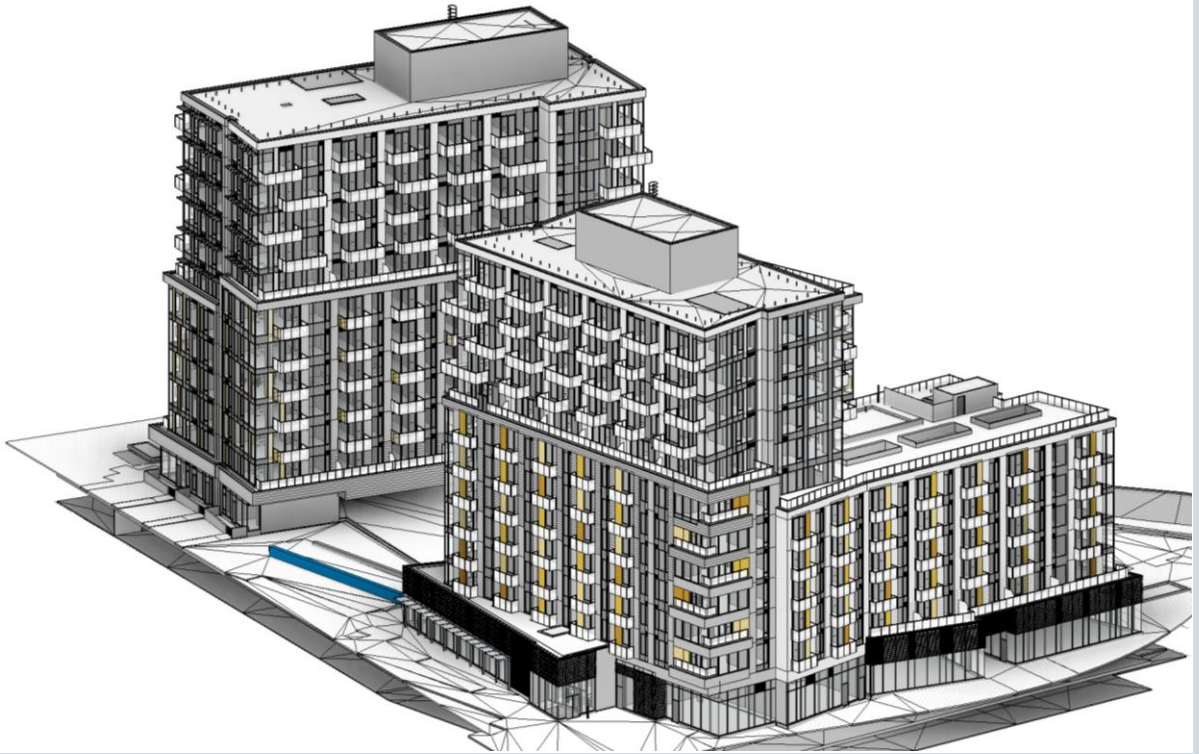
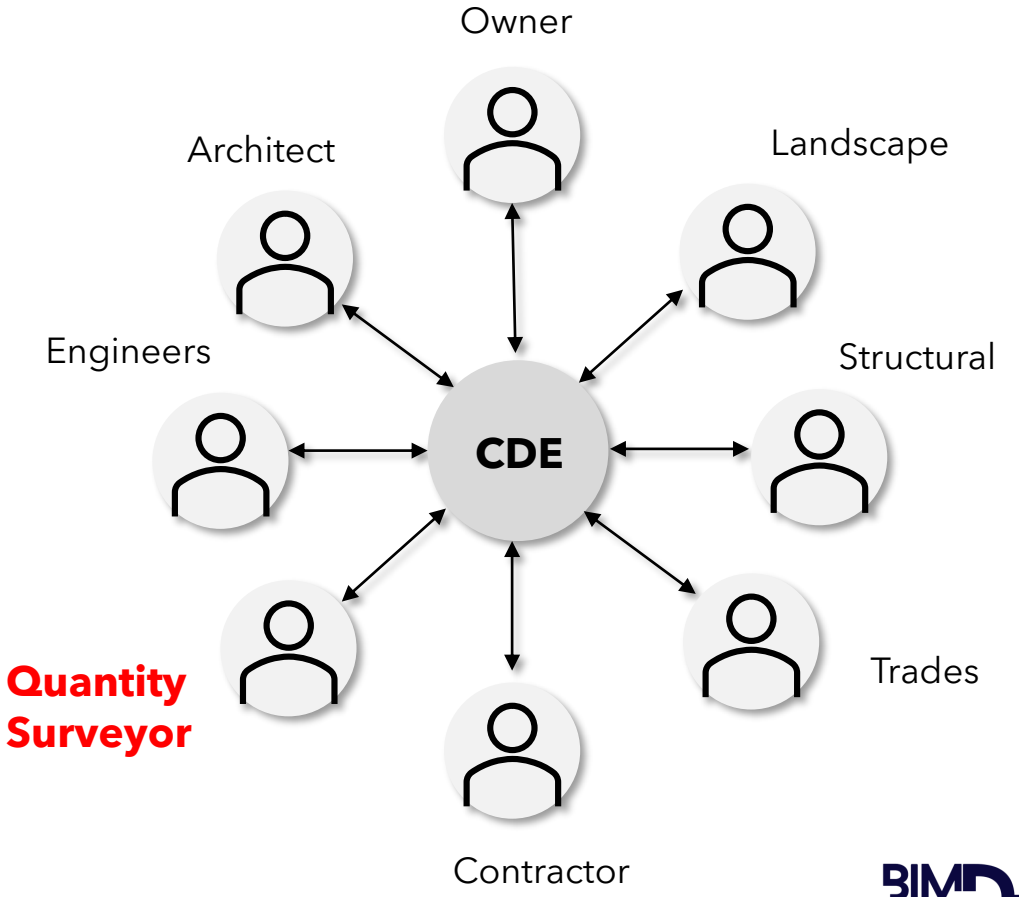
QUANTITY SURVEYOR'S INPUT



HOW


Owner
Architect
Landscape
Engineers
Structural
CDE
Quantity Surveyor
Trades
Contractor

BIM EXECUTION PLAN

describes **HOW** it should be done.

A BEP should include:
The **name(s) of the person(s)** who will perform the information management function within the project team.

The strategy for the **delivery of information** by the team (e.g. **MIDP - Master Information Delivery Plan**)

The team's responsibility matrix.
The team's proposed methods and procedures for information production.

A **list of the software, hardware** and IT infrastructure that the team will use.

Project description (incl timeline and milestones)

Project Organigram

Use-Cases Process decriptions

Information Delivery (u.a.Master Information Delivery Plan)

Model structure (modelling standards)

Coordination & Quality Control

Technical Requirements

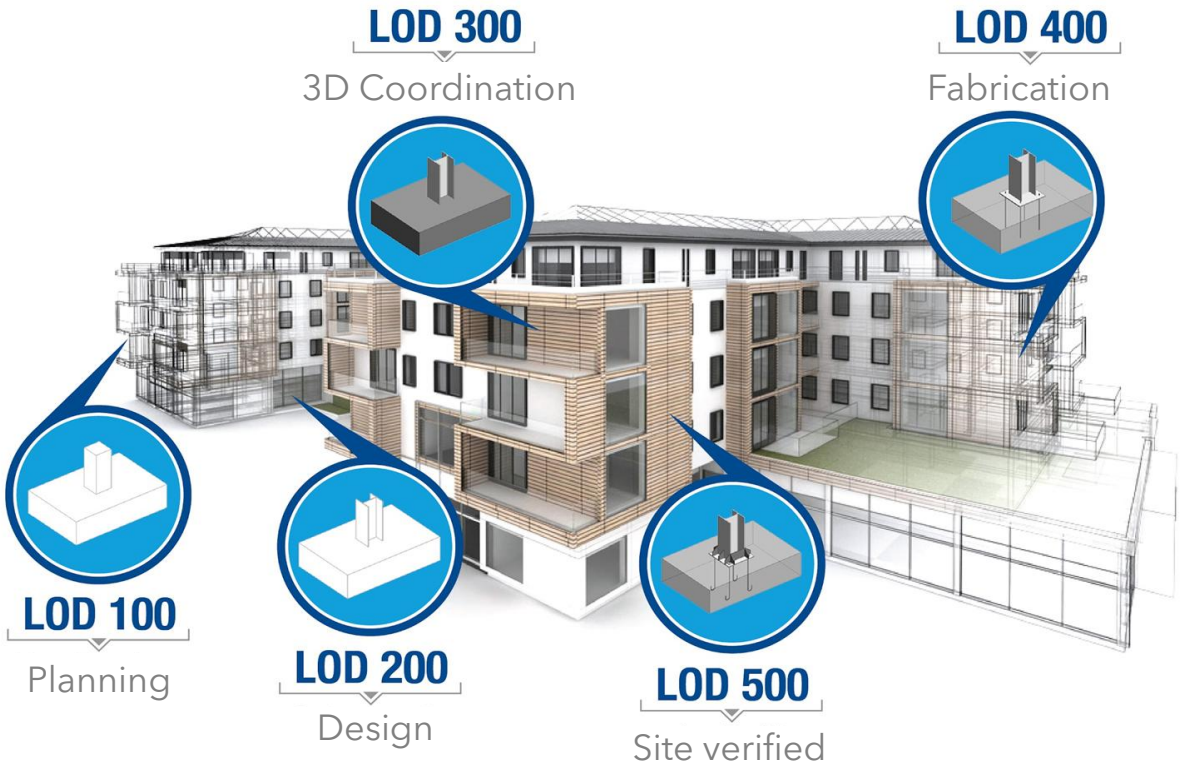
BIM USES

X	PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE
	PROGRAMMING		DESIGN AUTHORING		SITE UTILIZATION PLANNING		BUILDING MAINTENANCE SCHEDULING
	SITE ANALYSIS		DESIGN REVIEWS		CONSTRUCTION SYSTEM DESIGN		BUILDING SYSTEM ANALYSIS
			3D COORDINATION		3D COORDINATION		ASSET MANAGEMENT
			STRUCTURAL ANALYSIS		DIGITAL FABRICATION		SPACE MANAGEMENT / TRACKING
			LIGHTING ANALYSIS		3D CONTROL AND PLANNING		DISASTER PLANNING
			ENERGY ANALYSIS		RECORD MODELING		RECORD MODELING
			MECHANICAL ANALYSIS				
			OTHER ENG. ANALYSIS				
			SUSTAINABILITY (LEED) EVALUATION				
			CODE VALIDATION				
	PHASE PLANNING		PHASE PLANNING		PHASE PLANNING		PHASE PLANNING
	COST ESTIMATION		COST ESTIMATION		COST ESTIMATION		COST ESTIMATION
	EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING

P-primary use
S-secondary use
A-auxiliary use

	Potential BIM Uses	BIM Use Description	COMMON STAKEHOLDERS: OWNER	CONSTRUCTOR	ARCHITECT	STRUCTURAL	MECHANICAL	ELECTRICAL	CIVIL	FABRICATORS
Simulating, Quantification, Coordination	3D Coordination/ Clash Detection [P]	Using 3D models to coordinate different disciplines (e.g. structural and mechanical) and to identify/resolve possible clashes between virtual elements prior to actual construction or fabrication.		•	•	•	•	•	•	•
	Design Review [P]	A process in which stakeholders view a 3D federated model and provide their feedbacks to validate multiple design aspects. These aspects include evaluating meeting the program, previewing space aesthetics and layout in a virtual environment.	•		•	•	•			
	Quantity Take-Off/ Cost Estimation [P]	A BIM Use representing how models are used to generate feasibility studies and compare different budgetary options and the use of models to calculate the quantity of Furniture, Fixtures and Equipment or building materials for the purpose of generating Cost Estimates.		•	•					
	Code Checking & Validation [S]	The process of inspecting a file, document or model for compliance against predefined specifications or established design, performance or safety codes.			•	•	•	•		
	Egress and Ingress [S]	A BIM Use where models are used to simulate individual/crowd behaviour within a building, either during normal operations or during emergency situations. Egress and Ingress simulations assist in identifying and improving access, circulation and exit routes.	•		•				•	
	Site Analysis [P]	A BIM Use where BIM Software Tools and/or Geographic Information System tools are used to decide on optimal site for a building project and/ or to decide the optimal building location within a specified site.	•		•				•	
	Solar Analysis [P]	A BIM Use where models are used to conduct shadow studies, simulate solar radiance on building envelopes, and analyze the effect of building location/shape on solar heat loads...Also refer to Reflectivity Analysis.	•		•					
	Lighting Analysis [P]	Using models to simulate natural and artificial lighting levels. This BIM Use is a form of Building Performance analysis and is not intended for rendering or visualization.	•		•			•		
	Energy Use [P]	A BIM Use and a Building Performance metric measuring how and how-much a facility will consumes energy in a comparative way.	•		•		•	•		
	Thermal Analysis [S]	Using the model to analyze thermal loads, inform Mechanical Systems' Design and relevant Materials' Selection. Thermal Analysis is part of overall Building Performance analysis and measurement.	•		•		•			
	Wind Studies [S]	The use of models to simulate the effects of wind on structures. The simulation is intended to inform the design process by identifying optimal orientations and shapes. Models of existing structures may also be used for the purposes of performing Wind Studies.			•	•				
	Sustainability Analysis [A]	Using the model to calculate the environmental impact of a new construction project or an existing facility. These calculation may include Carbon Footprint, Life Cycle Assessment, Embodied Energy and other sustainability metrics (Often refers to the LEED point system).	•		•					
	Phase Planning [P]	A process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in a renovation, retrofit, addition, or to show the construction sequence and space requirements on a building site. 4D modelling is a powerful visualization and communication tool that can give a project team, including the owner, a better understanding of project milestones and construction plans.	•	•						

LEVEL OF DEVELOPMENT



MODEL ELEMENT TABLE

MODEL ELEMENT TABLE

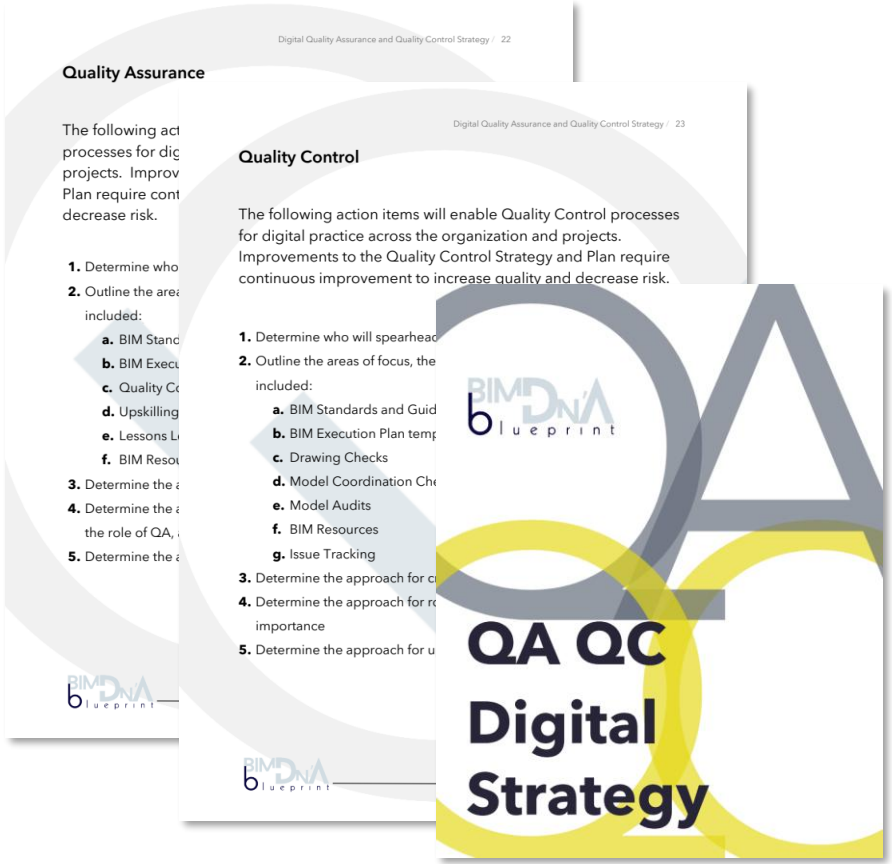
Project Number: {ENTER PROJECT NUMBER HERE}

File Name: 2-DSAI-MET-Template_v2

Project Name: **{ENTER PROJECT NAME HERE}**

Element			Element in Model		SCHEMATICS DESIGN		DESIGN DEVELOPMENT (50%)		DESIGN DEVELOPMENT (100%)		CONSTRUCTION DOCUMENTS		CONSTRUCTION DOCUMENTS		CONSTRUCTION DOCUMENTS		CONSTRUCTION DOCUMENTS		BID		CONSTRUCTION		CLOSE-OUT		Comments
Item #	Description	Minimum Size Required to be Modeled	As an object	As a detail	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	
10100	VISUAL DISPLAYS, CHALK AND TACK BOARDS		YES	YES	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	300	ARCH	300	ARCH					
10250	ACCESS PANELS - WALL & CEILINGS		NO	YES	N/A	N/A	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
10260	WALL/CORNER GUARDS		NO	YES	N/A	N/A	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
10270	ACCESS FLOORING		NO	YES	N/A	N/A	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
10400	ILLUMINATED SIGNAGE		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
10500	LOCKERS		YES	YES	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH	300	ARCH	300	ARCH	300	ARCH					
10510	FIRE CABINETS		YES	YES	100	ARCH	100	ARCH	200	MECH	200	MECH	200	MECH	300	MECH	300	MECH	300	MECH					
10520	FIRE EXTINGUISHERS		YES	YES	100	ARCH	100	ARCH	200	MECH	200	MECH	200	MECH	300	MECH	300	MECH	300	MECH					
10550	POSTAL SPECIALTIES		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
10610	TOILET PARTITIONS		YES	NO	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	297	ARCH	297	ARCH					
10650	OPERABLE PARTITIONS		YES	YES	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	298	ARCH	298	ARCH					
10670	STORAGE SHELVING		YES	YES	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH	300	ARCH	299	ARCH	299	ARCH					
10800	WASHROOM ACCESSORIES		YES	YES	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	300	ARCH	300	ARCH					
EQUIPMENT																									
11010	WINDOW WASHING EQUIPMENT (ANCHORS)		NO	YES	N/A	N/A	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
11020	SECURITY (CCTV CAMERAS, PANELS)		NO	YES	N/A	N/A	N/A	N/A	100	ELEC	100	ELEC	100	ELEC	200	ELEC	200	ELEC	200	ELEC					
11130	PROJECTORS, SCREENS, A/V EQUIPMENT		NO	YES	N/A	N/A	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
11150	PARKING CONTROL EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11160	LOADING DOCK EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11170	WASTE HANDLING		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11400	BUILT-IN FOOD SERVICE EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11410	LARGE PORTABLE FOOD SERVICE EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11420	WALK-IN COOLERS AND REFRIGERATION		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11480	ATHLETIC, THERAPEUTIC EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11500	INDUSTRIAL PROCESS EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11600	BUILT-IN LABORATORY EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11700	BUILT-IN MEDICAL EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
11800	BUILT-IN LAUNDRY EQUIPMENT		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
FIXTURES, FURNITURE, AND EQUIPMENT																									
12010	BUILT-IN FURNITURE		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
12020	LOOSE FURNITURE		YES	YES	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
12500	WINDOW TREATMENT		YES	YES	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
12690	PERMANENT FLOOR MATS AND FRAMES		YES	YES	N/A	N/A	100	ARCH	100	ARCH	100	ARCH	100	ARCH	200	ARCH	200	ARCH	200	ARCH					
12710	AUDITORIUM AND THEATRE FIXED SEATING		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
12800	BUILT-IN INTERIOR PLANTERS		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
12810	INTERIOR PLANS AND VEGETATION		NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					

QUALITY ASSURANCE & CHECKS



BIMDNA group

4

HOW TO GET STARTED

CHANGE CAN BE UNCOMFORTABLE

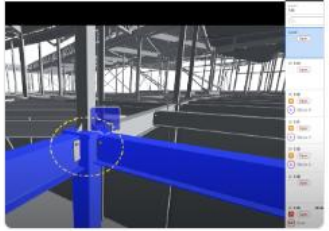
"I want you to find a bold and innovative way to do everything exactly the same way it's been done for 25 years."

BIM DNA group

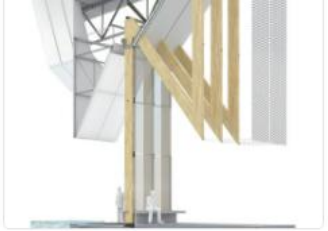
USE CASES

boration

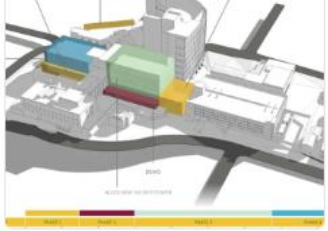
2D Drawing Development



3D Coordination



3D Detailing



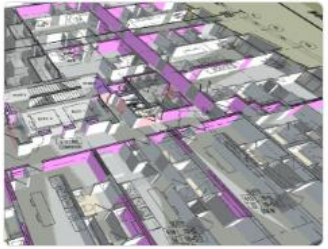
4D - Phasing

5D - Cashflow

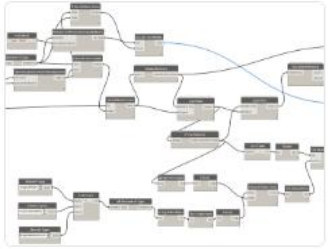
ilt

Asset Information Model

City Information Model

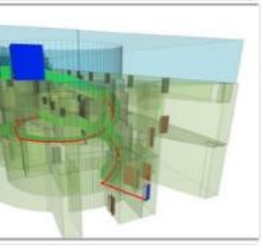


Code Checking



Computational Design

Conceptualizatio



l and Pedestrian Simulati...

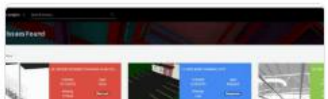
Design Authoring

Design Review

Digital White Boards

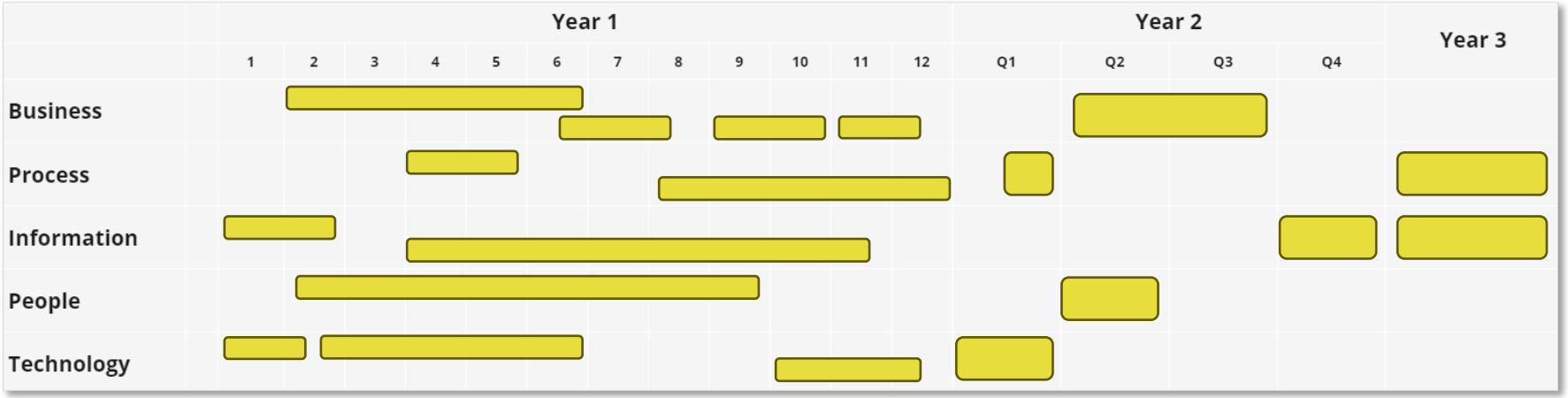
Energy Analysis

Existing Conditio



VISION

ROADMAP


Year 1
Year 2
Year 3
1
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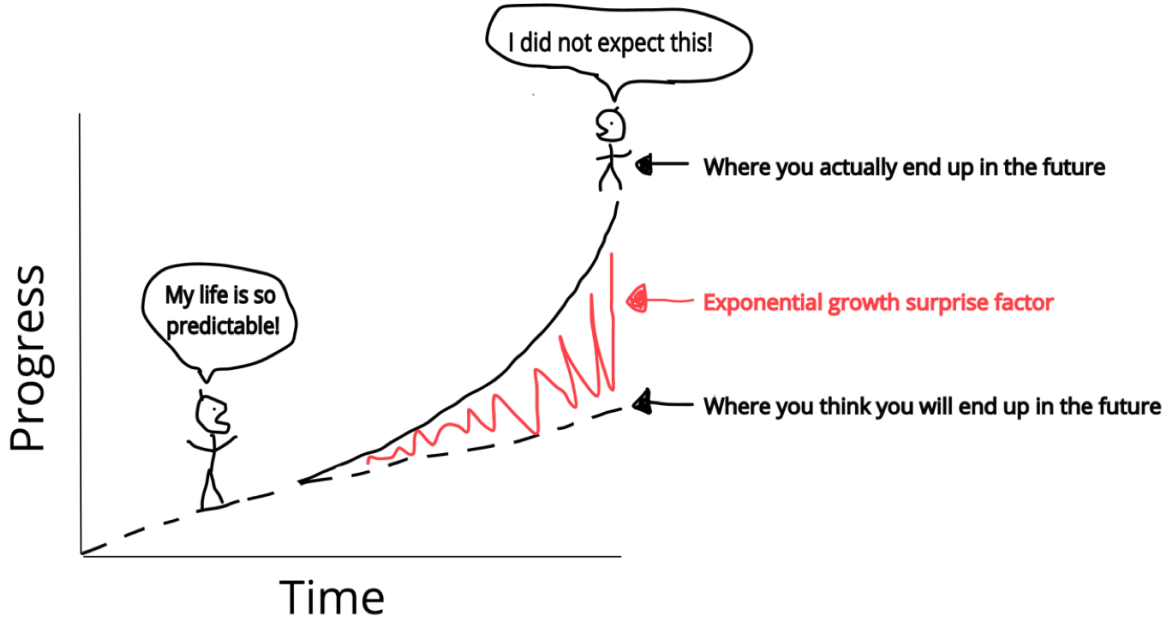
11
12
Q1
Q2
Q3
Q4
Business
Process
Information
People
Technology

DIGITALIZATION IS JOURNEY



Claudia Cozzitorto

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Principal

claudia@bimdnagroup.ca

THANK YOU

digitalization is a journey
those who adapt, lead

BIM DNA group