Leveraging BIM as a Total Development Tool

BIM is typically viewed as a design tool to create efficiencies during the design and construction phases of a development project. But BIM has much more to offer real estate development companies during the entire life cycle of a project.

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Think of BIM as an Owner Tool

Building Information Modeling (BIM) has been a growing design tool in the architectural and engineering world for decades. Traditional BIM applications were first limited to designers and driving efficiencies in the design process. Preemptive clash detection, better coordinated engineering and architectural drawings resulted in tighter bids from contractors and less site delays from unexpected conflicts. BIM continues to grow in adoption in the design world and with contractors.

As completed projects were turned over to owners BIM files became the preferred "as built" documentation. But BIM files are far from consistent between different design consultants and contractors. Owners quickly realized that BIM files are only useable if there is a common format and consistently organized project data. This challenge is exasperated when an owner is managing a portfolio of completed projects in multiple locations (including multiple countries) and BIM files are inconsistent in format and organization. The unlocked potential of a well organized BIM file is in the rich data analytics that can be created.

When BIM files are created with a well thought out organization and format the building owner has a continuous stream of robust data for leveraging his internal stakeholders in multiple areas of value – cost comparison, design consistency, development of internal best practices, aggregated procurement opportunities, predictive estimating, facility management, proactive maintenance of equipment across a complete portfolio and client/tenant enhanced experience, to name a few.

This owner archive of BIM files and data creates a companywide platform of intelligent buildings that can open opportunities for enhanced revenues, design and construction efficiencies, facility maintenance efficiencies and unique customer experiences. BIM is a critical component of a companywide platform because of its inate ability to collect consistent data and provide a foundation for advanced analytics.

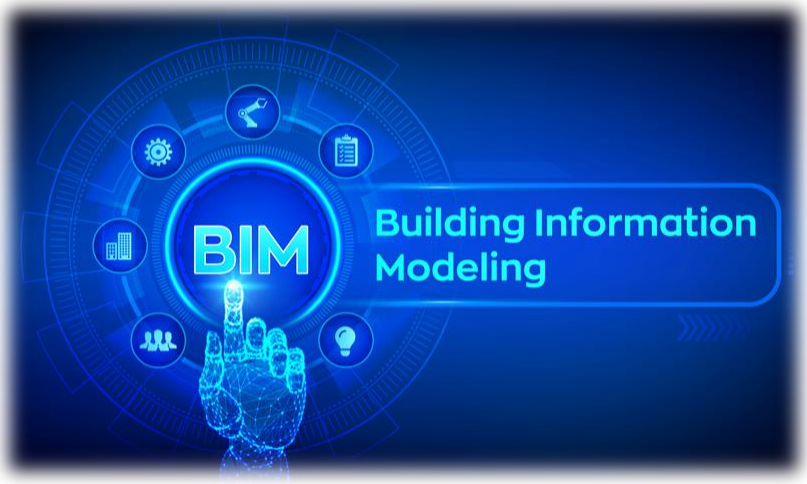
Where To Start - Create a Company BIM Design Standard for all Developments

As an owner of real estate you must start by creating a consistent, organized BIM platform for all your developments – new and existing. You need to establish the data and design criteria that is the most important to your organization and to the company's bottom line.

This objective is a critical foundation for a sustainable BIM program. All final BIM deliverables must be consistent in data architecture, design standards and the inclusion of clean, critical data for ongoing, credible analytics and companywide business use cases.

During this first, critical step your internal team should consider engaging a third party consultant to assess the BIM capabilities of your design partners and to prepare an appropriate BIM design standard that would provide a consistent, data rich digital model for all developments.

With the help of a knowledgeable BIM consultant your internal team needs to prioritize your company's critical information to accurately benchmark all stakeholders' technical capabilities. An important part of this internal prioritization will be the exploration of internal stakeholder use cases and coordination with your IT department for validation of necessary technology for the archiving and visualization of completed BIM models.



Pay particular attention to your operations and facility management team. Ensure that you include their "mission critical" building data for the potential creation of future operations and maintenance tools that would analyze BIM data and provide visualization dashboards. Conduct an appropriate number of interviews, face to face meetings, companywide surveys and collaboration with all design and construction partners to define a robust, consistent BIM standard for your company.

Once the information gathering is completed your BIM consultant and internal team can began testing a minimum viable BIM standard using the same group of internal managers, select architects and contractors. Critical feedback and recommendations need to be obtained during this testing period for course corrections.

When a viable BIM standard is successfully tested a companywide BIM standard can be released.

Identify Internal Stakeholders and Identify Business Use Cases

During the development of your companywide BIM design standard you will interview as many internal stakeholders as possible to ascertain the type of data that should be included to develop business use cases for BIM tools. All stakeholder input must be considered and incorporated into your BIM consultant's recommendations to appropriately define the companywide BIM design standards. The ultimate goal is to create a consistent, robust BIM platform that includes critical data and has value for as many internal stakeholders as possible.

Consider flexibility in your construction "as built" BIM deliverable. Perhaps you only need to embed critical design and construction information in the "as built" model. Other operations and maintenance data could be added as a separate layer. By adding additional data in a "user friendly" Excel format or COBIE format other participants (second generation contractors, operation teams or maintenance personnel) could easily update and provide their critical data to the BIM model.

Examples of BIM Business Use Cases to Consider

The following is a list of possible owner/stakeholder business use cases that can leverage BIM files and the data contained therein.

1. Digital Marketing

1.1. Virtual Walk Throughs – Virtual walk throughs are becoming an expected leasing and marketing tool for projects in design or under construction. There are a number of high definition, virtual rendering software tools that can quickly produce virtual walk throughs. 2D

1.2. Marketing Materials – Establishing a consistent quality and content for 2D deliverables can be easily achieved from BIM models. Floor plans, site plans and other marketing materials can be created quickly and with a companywide look and feel.

1.3. Producing Conceptual Renderings - Producing and updating marketing materials for projects in design or under construction can be done at no cost and in real time from BIM models. Critical milestones can be established for when a design is ready for publication and how often they should be updated. This could be a valuable sales tool that an owner's marketing and/or leasing team can use in providing more realistic and accurate marketing presentations.

1.4. Site Plans - An accurate site plan is critical for successful marketing. Consider adding the Civil drawings into your BIM deliverables so that the both building and the site design can be incorporated into marketing materials.

1.5. VR, AR, 3D Visualization –3D marketing presentations are often using BIM and Microsoft's HoloLens technology. This is an example of how projects can be effectively presented and marketed during the design and construction phase. When projects are designed with BIM technology the preparation of virtual reality, augmented reality and 3D experiential customer presentations are quick and cost effective.

2. Construction and Development

2.1. Generative Conceptual Design – There are a number of software options that can use generative design and artificial intelligence to establish the highest and best use for a new pursuit or a raw piece of land. There is an existing third-party software named KREO that has incredible potential for developer feasibility study use.

2.2. Real Time Estimating for Pursuits – Linking a generative design tool with historical company development costs will allow real time, project specific cost estimating. This tool will help your company achieve more accurate pre-design and pursuit cost estimates.

2.3. Real Time Estimating during Design – When a project is under design your company's historical development costs can be linked to the ongoing BIM design to get an accurate estimate for the project at key design milestones and to get real time costs for alternate designs.

2.4. BIM Standardization of Design Details and Templates –With a consistent BIM standard building details and components can be standardized as part of the BIM design process. The more details that are standardized as company "best practices" the quicker and more cost effective new designs will be.

2.5. Procurement Integration into Design - Procurement is an incredible opportunity to establish companywide equipment agreements that can be integrated early in the project life cycle. By becoming part of the BIM design process vs later in the construction bidding and procurement cycle costs and schedule can be compressed. Specific manufacturer's details can be integrated into new project designs before bidding. Pre-ordering negotiated pieces of equipment or components can be done during design by linking the project's BIM requirements with the manufacturers' factory. New project designs will be more complete for better contractor coordination during the bid and preorders can be sent to the manufacturer as the design is finalized thus insuring a timely delivery to the site.

2.6. 4D Schedule Optimization - 4D technology ties BIM model geometry to the construction schedule and the resulting simulation helps both development

manager and general contractor in "visualizing" the critical activities, analyzing construction sequencing, proof-testing and optimizing schedule logic. Using BIM 4D technology can uncover inefficiencies in construction staging, timing, logistics and potentially safety risks. Collecting 4D and schedule data over time and across multiple projects can provide an accurate, project specific database that can be shared across the company to provide efficiencies in the construction process.

3. Operations

3.1. Facility Management Tools - Visualization tools can be easily produced for buildings by importing company standard BIM models. Easier access to O&M manuals, warranties, service contacts, equipment cut sheets are possible when information is embedded into this visualization tool. IoT data from sensors, smart electrical meters, LED light fixtures can also be incorporated into this tool for more efficient and proactive service on critical equipment. Analytical decisions and preventive maintenance schedules are easily accessible using BIM and IoT technology.

3.2. Portfolio Visualization Tools – As individual projects collect data and analytic intelligence from a Facility Management Tool a companywide operations viewer for all development assets is possible. Connecting common maintenance issues across the entire company portfolio will allow better preventive maintenance, establishing best practices for specific building operations and specifications and better customer service.

4. Tenant Experience

4.1. Tenant Information Dashboard - IoT and BIM can unite to create a robust Tenant Information Dashboard. The BIM Model serves as the visual backbone for an informed customer and more companywide analytics. This provides an opportunity to link Tenant Information Dashboard data to internal business priorities (i.e. lease expiration dates, tenant complaints, work orders).

Examples of critical data layers for this type of BIM Dashboard would be:

- Circuit Level Analysis of Electrical Consumption (Smart Metering)
- Heat Mapping or Spatial Usage Efficiencies (Inside Warehouse)
- Traffic & Logistics Feedback (Outside Warehouse)
- Equipment or Physical Asset Health
- Water Usage

More use cases can be identified as company stakeholders begin to utilize BIM technology and cross functional applications are realized. The above list of possible use cases is a preliminary, minimum starting point for exploration of how BIM can add value to the development supply chain.

Conclusion

The future of a successful companywide incorporation of BIM technology depends on the vision and sponsorship of your company's upper management. Every company willing to work towards a more analytical business process should carefully craft a three year roadmap and company responsibility matrix in order to identify company priorities and opportunities for efficiencies and where BIM can be leveraged.

This roadmap must include recommended BIM exploration and test cases which incorporates a responsibility matrix to identify the horizontal stakeholder roles. This roadmap will identify a company BIM collaboration that acknowledges a complex, cross disciplinary initiative. Adopting new technology requires discipline and organizational communication at all levels. This is the most challenging, yet rewarding, part of BIM – driving the value of clean data from companywide, standard BIM models horizontally across the organization.

I feel certain that a company-wide collaboration is critical to leveraging the full potential and economic value that BIM can provide to a company and to each of its stakeholders.

For BIM to flourish at any company, there must be strong executive sponsorship and a dedicated managerial champion who is well respected within the organization. This champion must understand the long-term value of providing a technological source of pure data from which multiple stakeholders and departments can use to develop innovative analytical and visual tools.

BIM is the most complicated, frustrating initiative that an organization could embark upon – but it has the potential of being one of the most fruitful company initiatives. It will demand a level of cooperation, teamwork, communication and commitment to succeed.