BUILDING INFORMATION MODELLING (BIM)

EMBRACING AN ALIGNED AND COLLABORATIVE APPROACH IN THE CONSTRUCTION INDUSTRY

MEC

QUANTITY SURVEYING
PROJECT MANAGEMENT

BIM: BEYOND COORDINATION TOWARDS COLLABORATION

The construction industry is continually identifying and developing better, faster, safer, and cheaper construction processes. This is the reality behind Building Information Modelling (BIM). With the concept of BIM around since the 1970s, there is an immense amount of information about it available on the Internet, highlighting its history, opportunities, and underlying value.

With the early days of BIM being viewed as a simple coordination tool long passed, today it continues to add immense value while ensuring a seamless development experience. BIM provides benefits right across the entire construction process. For instance, using BIM within the design and construction phase of a built asset are now widely accepted as it brings significant efficiency to project delivery. This results in cost reductions to capital works (CAPEX) and to the building life cycle (OPEX).

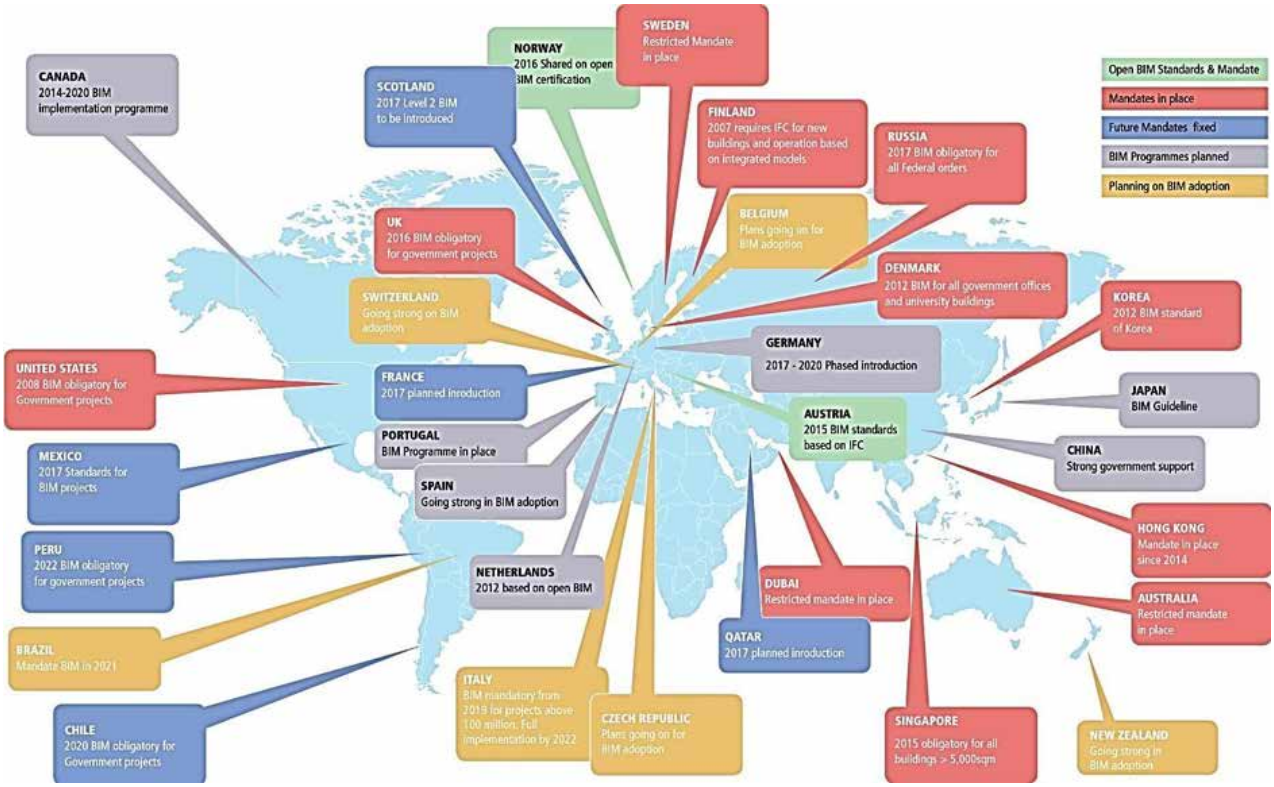
There are also many additional benefits yet to be realized. When it comes to widespread digital technology adoption, the construction industry is clinging to the bottom rung of the ladder as it remains a low profit, high risk sector. It is only a matter of time until Computer Aided Design (CAD) is replaced with BIM and late adopters will be at a disadvantage.

As it stands now, construction companies currently invest approximately one percent of turnover in new technologies compared to the manufacturing industry at three – four percent. This is probably much lower in Oman. Identified reasons construction companies may look to increase this investment as they consider new development or renovation of their built assets include:

- Improved efficiency and cost reductions across all phases of development;
- Clash detection to ensure fewer construction changes with early problem identification, reducing risk, and improving productivity;
- Collective buy-in with clients, the municipality, and the obtaining of permits;
- Interfacing with GIS (geographic information system) in building better cities;
- Providing a collaboration tool to improve communication and clarity of responsibilities and expectations;
- Preconstruction visualization to effectively plan the construction phase and logistics;
- Reduction of waste in the construction phase, thus providing potential for keener pricing;
- Simulations for alternatives and assisting in early Value Engineering;
- Increasing options for modular and prefabricated solutions as they can be built into the model;
- Improving transparency of project evolution over time;
- Reducing in safety risks on construction sites by identification of hazards early in project process; and
- An ability to easily undertake energy, structural, and environmental analysis.

BIM ACROSS THE GLOBE

The below image highlights a number of global initiatives dedicated to investing in BIM related activities. A new set of International Standards have recently been published to benefit the industry as a whole.



Overview of global BIM adoption practices to date. Source: https://www.geospatialworld.net/article/bim-adoption-around-the-world-how-good-are-we/

BIM IN THE MIDDLE EAST

Investment in new technologies remains low. However, as the rest of the globe moves towards standardization and implementation of BIM practices, Oman must look to how BIM investment and integration will benefit the greater health of the region. The following highlights key values BIM brings to invested stakeholders, including owners, contractors, and quality surveyors/project management.

BIM ADVANTAGES FOR...

BUILT ASSET OWNERS

Early development of the BIM Execution Plan, with the pre- and post-contract completed by the Lead Designer or designated BIM Coordinator, offers:

- Improved visualization of the project to enhance the design, with the added potential for early sales;
- A digital record of the building, which can interface with Facilities Management systems to help guide operating decisions; and
- A more nuanced approach in supporting clients understanding the full impact of BIM in relation to them, their safety, stakeholders, and overall asset bottom line.

CONTRACTORS

"Keeper of All Assembly and Commissioning Phases," BIM supports these Contractors through:

- Enhanced collaboration and communication for improved project understanding;
- Clear project visualization to assist in the design, construction, and health and safety planning;
- Better cost estimation using 5D BIM software;
- Improved coordination to identify clash detection early in project development;
- Superior Scheduling and Sequencing of the project works for improved timelines;
- Productivity enhancements and use of prefabrication for safety and cost controls;
- Safer construction sites through an early visual risk analysis; and
- Stronger facility management and building handover opportunities due to transparency in project design and construction.

QUALITY SURVEYORS (QS) / PROJECT MANAGERS (PM)

BIM allows the QS to potentially generate quantities in minutes via data harvesting from the BIM model. While this time saving certainly has huge benefits, particularly with regards to resources, there are a number of implementation considerations within the QS/PM responsibilities, such as:

- With BIM software, continuous cost modelling improves project development across the design and construction phase;
- Quantities extracted from the BIM model will still require reviewing for construction procedures and methods;
- Costs relating to software, hardware, and individual training are still an issue that require deeper government support; and
- Recognition that while 5D BIM will be used by QSs in the future, it is not standard due in part to current absence of electronic coding.

BIM AND THE WAY FORWARD

The impact of digitization on an industry that accounts for six percent of global GDP will undoubtedly be massive. According to the Boston Consulting Group, full-scale digitization may help the construction industry save between $1 to $1.7 trillion annually.

BIM is a fantastic development for the built environment that is fast-becoming a real game changer. A big push, in many jurisdictions from the government, would help in speeding up the pace of change to ensure standardization for BIM across global markets. A focus on developing a culture that embraces BIM will undoubtedly lead to the potential for more modular offsite construction, prefabrication, and other interlinked future constructive solutions.

Our hope at MEC is that government, academics and design and construction leaders in Oman will all rise to the challenge of developing a framework of education and implementation for the improvement of the Omani construction sector.

At MEC, we are ready to embrace BIM. Our QS and technical staff are upskilling, our systems are capable, and we are constantly looking for opportunities to be part of BIM based projects here in Oman. We fully appreciate the fact that BIM in design and construction will soon be mainstream and we will ensure our services, being a regulated RICS company, will proactively meet the challenges.

To discuss your next project, visit www.majaneng.com or contact Kevin Ellis at k.ellis@majaneng.com.

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BIM IN OMAN

Understanding where Oman currently is in relation to BIM adoption is crucial for all stakeholders. At MEC, we anticipate that:

- Quality projects and complex projects in Oman will increasingly be driven by BIM;
- Clients, both public and private, will start to mandate BIM, particularly with the cost estimation model benefits;
- A greater focus will be placed on data management and data manipulation; and
- Facility Management teams will be involved earlier in the project, often at the onset of design.

As these trends grow, there are challenges that remain in the adoption process of BIM. Three obstacles to overcome include:

- **Resistance:** There is still resistance to change from stakeholders. For BIM's benefits to add full value, this requires all members of the design and construction team to embrace new technology and all stakeholders to support this adoption.
- **Barriers:** current technological (hardware/software/network) and cost of implementation barriers need to be addressed to allow seamless integration of software while it remains an evolving process. Technology cannot become redundant alongside the software.
- **Training:** A lack of BIM trained staff exist in the current labour pool. To drive change towards a BIM adoption, companies will either hire an international specialist or invest in training staff. To cover training costs and ensure quality of training, support at the government, university, and SME level is required. For instance, university courses will need to include BIM training as standard industry software. In addition, work permits for BIM qualified staff will also be a requisite, adding yet another layer of complexity.