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BUILDING AND CONSTRUCTION
**PRODUCTIVITY
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building value

Productivity Benefits of BIM

Building Information Modelling or BIM is emerging as a transformative technology that could greatly enhance New Zealand's built assets and infrastructure and provide a significant boost to the economy.

WHAT IS BIM?

BIM is a digital representation of the complete physical and functional characteristics of a built asset. A BIM model can contain information on design, construction, logistics, operation, maintenance, budgets, schedules and much more. This depth of information contained within BIM enables a richer analysis than traditional processes and it has the potential to integrate large quantities of data across several disciplines throughout the building's lifecycle.

BIM IS EMERGING AS A TRANSFORMATIVE TECHNOLOGY

PRODUCTIVITY GAINS

Productivity gain is one of the major benefits of using BIM and is the top metric organisations expect to improve when they adopt the technology. Primarily, BIM realises this gain through its ability to:

- minimise project management
- foster communication and co-ordination
- identify errors early
- reduce rework
- reduce costs
- improve quality.

Internationally, BIM's reputation for boosting productivity has made it widely accepted as a best practice approach for delivering major building projects. The United Kingdom government, for example, anticipates a 20–30% reduction in the lifecycle cost of its public-sector assets by requiring the use of BIM on all infrastructure projects built after 2016. In the United States, one of the most tightly controlled construction sectors in the world, the number of building sector professionals using BIM has surged from 28% in 2007 to 71% in 2012.

ADOPTION UP TO
71%

DESIGN

As a lifecycle model, BIM begins in the early stages of a project. Designers are likely to benefit from fundamental changes to the design process and the greater certainty between design intent and the final construction and operation of the building. Indeed, 69% of European organisations using BIM report that it improves the collective understanding of design intent, while 75% report that it improves multi-party communication and understanding, primarily from greater ability to visualise and share information in 3-D.

75% OF BIM USERS REPORTED BETTER MULTI-PARTY COMMUNICATION

As well as design and layout information, each project stakeholder has access to scheduling, financial, performance and materials data from the beginning of the project. This ability to share and collaborate promotes design decisions that optimise the building when it is cheap and easy to make changes, unlike latter phases, when alterations can have significant construction and lifecycle costs. In the United States, 57% of designers who use BIM say they find the technology directly reduces the number of errors and omissions during the design phase of the project.

57% OF DESIGNERS STATE BIM REDUCES ERRORS DURING DESIGN PHASE

PROJECT MANAGEMENT

Many project managers also report fewer errors, reduced rework, shorter project durations and lower overall construction costs when employing BIM in the early phases of a project. BIM's ability to visualise design options make it quick, easy and cheap to validate options against key performance criteria, keeping costs down and increasing the certainty of project outcomes.

BIM also has a strong influence on project duration. One overseas report, which documented construction practices over several years, found that in 2009 the average duration of BIM projects was 27% shorter than traditional projects. By 2012, BIM had widened the gap to 37%. This suggests that the

AVERAGE PROJECT DURATION REDUCED BY 37%

advantages of BIM become more pronounced as users gain experience and become more proficient with the technology. One survey even estimates that BIM's data sharing ability alone is enough to reduce the duration of a single project by up to 7%. This is one of the main reasons that development of collaborative BIM processes and communications infrastructure to improve model sharing is predicted to be the most important area of BIM investment in 2014.

CONSTRUCTION

Construction professionals see productivity gains as a result of more precise design and trade co-ordination, automated conflict avoidance, easier design interpretation, greater accuracy and fewer change orders.

In 2010, an Australian analysis found that BIM's ability to detect and avoid conflicts prior to construction reduces unbudgeted

65% OF CONTRACTORS REPORT BIM REDUCES REWORK AND COST OVERRUNS

construction changes by 40% and can save up to 10% of the entire value of a construction project when compared to a non-BIM project. Many construction businesses in the United States have seen similar results, with 65% of contractors reporting that BIM technology effectively reduces rework, cost overruns and missed schedules during construction.

BIM's sophisticated modelling capabilities also enable builders to make much greater use of prefabricated materials and pre-assembled components, which have well-documented productivity and quality advantages. In the United States, 81% of contractors say this is the single most important benefit of moving to a BIM-based construction model.

ASSET OPERATION

BIM's real-time performance monitoring and asset management processes also lead to high-quality post-construction outcomes. The greatest advantages for public-sector asset managers are likely to arise from a new ability to create and manage building and infrastructure assets faster, more economically and with less environmental impact.

Asset managers, owners and occupants can optimise the building's systems and performance for human comfort and safety, while minimizing environmental impacts and running

costs during operation. At the end of the building's life, BIM documents all the materials, recyclables and any hazardous substances for the decommissioning team.

In the United States, almost two-thirds (62%) of organisations using BIM to procure and manage assets report a greater return on their investment, a figure that rises to three-quarters (74%) of organisations in Europe. The economic return correlates strongly with the level of BIM engagement, rewarding asset managers with higher skill, greater experience and more extensive implementation of the technology.

62% OF BIM USERS REPORTED GREATER RETURN ON INVESTMENT

Worldwide, BIM's positive impact on sustainable design, construction and post-occupancy monitoring is given as a major driver in the decision to adopt the technology.

ECONOMIC BENEFITS

Ultimately, BIM's ability to integrate processes and ensure accurate, timely and intelligent transfer of information between key project stakeholders lies at the heart of its productivity gains. Many countries have already realised many of these gains, yet the overwhelming majority of organisations using BIM believe it has the potential to offer even greater value in the future. If that proves true, it makes the case for accelerating BIM's adoption in this country very difficult to ignore.

INCREASE PRODUCTIVITY IN THE BUILDING AND CONSTRUCTION SECTOR

As BIM changes the way public assets are procured, constructed and managed, it is increasingly important that New Zealand's government agencies understand BIM and are able to exploit the substantial lifecycle benefits that the technology has to offer.

SOURCES AND FURTHER READING

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FURTHER INFORMATION

- BRANZ
www.branz.co.nz
- Building and Construction Productivity Partnership
www.buildingvalue.co.nz

