BIM: better building process – building better performance

Purpose of this report

This report summarises the achievements of the BIM Acceleration Committee (BAC) for the past three months. It is provided to the two major funders, BRANZ and the Ministry of Business, Innovation and Employment (MBIE). It will also be published on the BIMinNZ website so that our wider stakeholders are informed of our progress.

Summary

Research this quarter has continued to focus on industry's awareness of BIM (industry and client focus group surveys/interviews) to identify who, and the next steps in, enabling the greater use of BIM across the value chain. This cuts across several of BAC's and other organisations strategic initiatives. For example, the survey results have been shared and are being used by other researchers outside of BAC.

During this quarter BAC also identified the need and commissioned the development of a communication strategy to determine how to inform all members along the value chain. The result of these two pieces of work form the foundations for shaping BAC's future research agenda in 2018/2019, both in terms of content and ensuring the content gets to the right people for implementation.

Industry training and education of BIM continues to be at the forefront of BAC's agenda with additional content being developed. BIM 101, BIM fundamentals for new users, is being re-released as free of charge video content to engage with a wider audience. Its subsequent course, Virtual Project Professional BIM Training (BIM 201), is currently under development.

BAC has also developed and is in the process of publishing two new case study reports on BIM use for facilities and asset management, and Project participant collaboration.

BAC and BIM in the Market Place:

BAC has also been strengthening its own, and the role BIM has in the wider construction industry. Traditionally BAC has focussed on large scale commercial buildings, typically office and educational use types. This reflects precedents set internationally, where these buildings typologies and activities have predominantly been the early adopters/implementors of BIM use. These are often the subject buildings used in case studies to drive BIM knowledge and growth.

However, recognising the success of BIM use in these buildings typologies (demonstrated through the user group/client surveys), the BAC as part of its strategic review is broadening its focus to promote BIM use and its benefits to other sectors of the wider construction industry. These include:

- Residential buildings e.g. standalone housing, medium density housing, and high-density apartments.

- Construction along the supply and value chain, including BIM and its role with prefabrication.
- Infrastructure e.g. transport, potable, storm, and waste water.

BIM Acceleration Committee's 2017 Strategic Focus

The goal of the BIM Acceleration Committee is to develop a better building process for improved building performance in the design, construction, maintenance, and operation of all constructed assets. To achieve this goal, the BAC expanded its strategic focus (for the 2017-2020 period) to six key areas:

1. Conquer the digital divide to better enable BIM uptake for those smaller and further down the value chain.
2. Develop and deliver BIM training to build BIM expertise in industry and tertiary educations.
3. Create more client-side demand for BIM through the education of government and other large clients in the benefits of BIM, specifically in facility and asset management.
4. Increase the support for collaboration that maximises the benefits of BIM use.
5. Develop data quality and process standards to facilitate interoperable (computer to computer) exchange of reliable data along the value chain.
6. Communication and general awareness raising. Telling the BIM story to existing and new audiences.

Within each strategic focus area, research projects (activities) with specific deliverables and research outcomes have been developed.

Strategic Focus Area	Research Project / Activities
1. Conquering the digital divide - enable BIM uptake for those smaller / further down the value chain	• BIM survey of industry and clients • Understanding cohorts • BIM user barriers
2. BIM training	• Development of training resources • Industry training modules and courses • Technical courses • Tertiary education – BIM education working groups • International frameworks
3. More demand pull by informed clients	• Government as a client – support for government clients • Audit / evaluation tool • BIM for asset and facilities management – experts research and outcomes for positive strategies

4. Increasing collaboration	• Procurement guidelines • Process guidelines • Technology / modelling guidance
5. Interoperable and reliable data	• Understanding data issues, including ownership and intellectual property • Focus on barriers
6. Communication – telling the BIM storey	• BAC's communication strategy • BIM case studies • BIM industry support networks • Industry professional institutes

Third Quarter Research

The following are a summary of BAC's research project key findings from the third quarter of the 2017/2018 fiscal year.

The survey, 'The annual survey BIM in New Zealand' and focus group 'To help drive awareness and use of BIM', both highlight similar issues and solutions surrounding BIM use in New Zealand. Their common themes include, amongst others:

- The benefits/value of BIM
- BIM processes, project communication and collaboration, and education.

These themes align well with BAC's expanded strategic focus and will be used to inform and direct the 2018-2020 specific research projects/activities to deliver on its strategy.

1. **Completion of the annual survey BIM in New Zealand – an industry-wide view 2017 (EBOSS survey).**

   This survey was the fourth instalment of five survey series that follows the progress being made in accelerating the introduction of BIM into New Zealand. This longitudinal study follows an industry control group of large and influential organisations in New Zealand's built environment. This year also marks the second year a specific client control group of asset owners and managers from organisations with large property/constructed asset portfolios has been surveyed. Their inclusion was to better understand attitudes, drivers, and barriers towards BIM use. Here is a summary of the key findings:

   Industry Control Group:

   In the past 12 months BIM has being used on 57% of all projects, and 98% of respondents have indicated they have used BIM. BIM use is primarily for design (88%) and construction (70%), with 3D co-ordination and design review the two highest uses. By comparison, BIM use during the operational life stage, where the majority of BIM benefits are realised, is limited to only 20%, with asset management and evidence based maintenance receiving low use response rates (35% and 10%). This is despite these two

uses being the largest predicted growth areas in 2016 and again in the 2017 survey results.

Compared to the 2016 results, the 2017 results indicate amongst the industry control group that BIM growth has slowed, although there appears to be some evidence of increasing complexity, and hence maturity, in BIM use. However, compared to the 2014 results, the first year of the survey, BIM use and the percentage of projects using BIM has increased by 23%. These findings, combined with open question responses suggest that industry has moved past the initial learning stage and now realises how complicated BIM and BIM models can get. This is evidence that BIM is being used for more complex tasks, indicating an increase in the 'maturity' of its use. With this 'maturity', there is a realisation that this complexity has consequences including the cost of changes, the issues of combining BIM models from different parties, and the large amount of work involved in making changes and providing what clients need for later operation of construction/constructed assets.

Client Control Group:

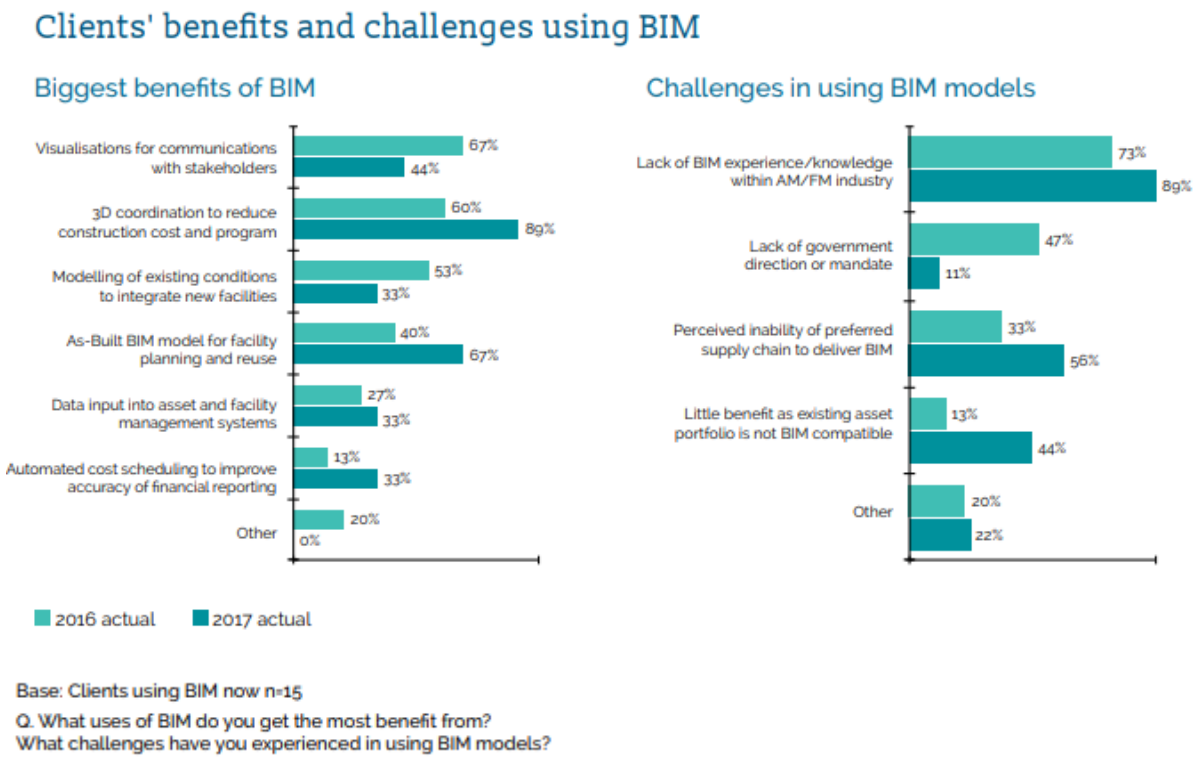
The high uptake of BIM by the Industry Control Group is contrasted with lower results from the Client Control Group. 92% of respondents are aware of BIM, but 54% of them have not used it in the past 12 months. Furthermore, of that 54% not using BIM, only 31% plan to start in the next 12 months. This indicates that clients are aware of BIM, but are not using it.

Client use of BIM, like the industry control group, is high in the design (100%) and construction life cycle stages (89%), but low in the operational stage (33%). Further questioning of why they are not using BIM for facility and asset management, as this is the use with the highest benefit to their core interests, indicated that the majority are not in a position to change their existing systems to integrate with BIM, or do not feel there is a need to change.

The survey results also indicated there is a perception that the costs of BIM outweigh the benefits. This coincides with a high number of responses being 'there is a lack of client BIM related knowledge'. This indicates that the perception of BIM benefits not outweighing costs may be a result of a lack of client BIM knowledge and experience. This conclusion is reinforced by some respondent's recognition that until legacy systems have been established for BIM integrated AM/FM, the costs may outweigh the operational benefits – as research evidence has shown, BIM's major economic efficiencies (cost savings and other benefits) come from data capture, especially in the construction of new large buildings typologies. Therefore it is expected that client's with a lot of new asset construction to be the most prolific BIM users for AM/FM. However, in the New Zealand context, this is not known and will be tested in next year's follow on client survey.

Benefits and Barriers/Challenges to BIM Use:

Client responses to the biggest benefits and barriers/challenges increased in most categorises. Despite a perceived negative result, this may indicate an improved understanding of BIM and its associated complexities.



Base: Clients using BIM now n=15

Q. What uses of BIM do you get the most benefit from?
What challenges have you experienced in using BIM models?

The 2017 industry control group responses indicate that many of their identified barriers to BIM uptake build on those identified in 2016. These barriers are centred around the communication between client and industry project participants, and industry practitioner collaboration. Client to industry miscommunication occurs when identifying and defining the client's BIM needs, and their understanding of what a BIM model can and cannot do. This suggests the need for more clarity on BIM, what it is able to do, what it needs to do, how to do it, and who is responsible. All from the stages of procurement through to asset and facilities management.

Overall conclusions:

The growth in BIM use amongst industry appears to have slowed compared to previous survey results. The respondent's comments suggest that this is due to a maturation of BIM knowledge and use in the industry, indicating a successful education of the fundamentals of BIM over the past four years. This suggests industry requires more detailed and targeted BIM research to further accelerate its use – particularly in the operational use stage of a building, and its associated asset and facilities management

uses, which continue to be the largest projected growth areas if future BIM use and benefit. It also indicates that BIM education of the industry control group, which consist primarily building design professionals, may have reached saturation point. The next step is to target the next tier of users along the value chain e.g. contractors, subcontractors, and small firm/project specialists.

Looking at the comments from both industry and clients, there is a sense of mismatched expectations. Industry members express that clients have unrealistic expectations about what BIM can do and what it involves (and costs). Similarly, clients mention the inability of preferred industry suppliers to deliver BIM to their expectations. There may be benefit in bringing industry and client expectations closer together, specifically by ensuring that BIM is considered at the procurement level and is costed up-front. This may reflect that many of BIM's benefits accrue to the construction and operation phases of a project, but many of its costs arise in the project's design phase.

2. Focus Group – To help drive awareness and use of BIM (GSL Promotus)

Complementing the Annual Survey of BIM in New Zealand, a focus group research project, 'To Help Drive Awareness and Use of BIM', was conducted to expand on the following areas:

- Knowledge and organisational use of BIM.
- Motivators, barriers, and solutions to promote BIM use.
- Effective methods of BIM communication channels.

Key findings:

The main barriers to BIM use (in their opinions) derived from the following:

1) Poor definition of expectations based on end use requirements, including, what are the end use requirements of a BIM model at each life cycle stage of the asset? What is required of BIM to meet such needs? What data, to what detail, and who is responsible for its delivery at each required life cycle stage? Many of these issues also highlight a lack of collaboration between project participants after the project team has been appointed.

2) Late contractor involvement, and a lack of collaboration. These issues relate to project procurement methods and their ability to enhance the delivery of BIM or inhibit it.

3) The value of BIM is not being realised, nor is it being well demonstrated (education issue). This is contributing to the opinion that there are additional high and hard to quantify costs associated with delivering a BIM integrated asset. Difficulties in quantifying upfront cost estimates derive from poorly defined BIM expectations, and result in a perception that BIM projects are loss leaders.

Identified Mitigation Strategies:

1) Continued education of both industry and clients on the costs, benefits, and processes of BIM.

2) Change the perception that BIM is simply an upfront cost, rather a long-term investment.

3) Promote innovative project procurement methods, and strategies that enable effective BIM delivery through full life cycle project collaboration, and equitable division of risk – even as the project evolves and changes.

Delivery of Mitigation Strategies:

A key recommendation of this research is the development of a communications strategy for BAC to target the different industry members in the most effective channels. It was strongly emphasised to BAC the importance of continuing to develop case studies showcasing the value and benefits of BIM. This recommendation is now being translated into an implementation plan that will include stakeholder engagement.

3. **Development and delivery of industry BIM training**

BIM 101

In 2016, BAC ran a very successful education series called BIM 101. BIM 101 was a seminar that covered the basic principles of BIM, starting with poor productivity and information flow, leading into BIM as a solution, and the fundamentals of BIM in the New Zealand construction industry.

During the 2017/18 fiscal year, BAC identified that greater industry penetration of this content would be possible if it were published on the BIMinNZ website, and available when and where people want to engage with this introductory content (rather than the costs and logistics of re-running half-day seminars in 7 centres).

An industry training group was formed to recast the content and make it suitable for video 'soundbite' delivery. This was recorded in December and is available on line at https://www.biminnz.co.nz/bim-industry-training-1

Virtual Project Professional BIM Training

Work has been undertaken to develop the next phase of BIM training courses in New Zealand called Virtual Project. Modelled off the successful Australian version, virtual project is a multidisciplinary course using best practice collaborative BIM processes and technologies. The course aimed for those who wish to gain a hands-on understanding of BIM processes and software technologies in the context of a sample project, in a low risk, collaborative environment. It is intended for senior and middle management of client, design, construction, FM and supplier organisations and will improve their understanding of how to plan the implementation of a BIM process for the benefit of a project.

To date, three universities, Auckland, Massy and Unitec have expressed interest in hosting.

Expanding the evidence of the benefits and value of BIM for Asset and Facilities Management

During this quarter, an article and case study on the value of BIM for Asset and Facilities Management (AM/FM) was developed. The content, aimed specifically for building clients and large

asset managers, showcases the new and innovative use of data/information management, and cloud based technology for on-site use of BIM AM/FM.

Committee Management Summary

During the third financial quarter, BAC been effected by the restructure of the Ministry of Business Innovation and Employment (MBIE), Building System Performance branch. This has had an effect on the resourcing and scope of the Governmental As A Client research project, which is currently being revised.

Third Quarter Deliverables

Over the past three months, BAC was worked to increase its momentum to deliver on its strategy. This work included:

- Engagement of external resources to assist in the delivery of the BIM In Use Case Study documents.
- Greater Use of BIM Across the Value Chain: Identification of the need for a BAC communications strategy to improve BIM research knowledge dissemination to industry.

Other BAC deliverables completed during the third quarter includes:

- Results published of the annual EBOSS survey of BIM use.
- Re-running and video recording of the BIM 101 training course. This content, a series of short 8-10 minute videos, will replace the physical BIM101 training courses.
- Results published from the focus group discussion with specialist trade and product suppliers.

Upcoming Deliverables

BIM201: This is BIM industry training. The course is the follow on from the BIM 101 introduction to BIM seminar.

Virtual Projects: This is being developed for delivery by Tertiary Institutes outside of their academic term.

More Demand Pull For Facilities and Asset Management: Case study document on the Mason Brothers Facilities Management AutoDesk 360 technology.

BAC Project Risk Management

The Government As A Client Project remains the committee's highest risk project. This is primarily because since August 2017 the project has been, largely, on hold due to the restructure at the MBIE's Building System Performance branch (BSP).

The Committee has previously (November and December 2017 meetings) discussed the project progress to date (see below) and re-affirmed the importance of continuing with the Government as a Client project.

- BIM maturity of Government Clients is still low. There is a lot more work that needs to be done to raise awareness of benefits of BIM.
- A new approach to better articulate the value proposition of BIM should be trialled with more emphasis on clients including the building owner, end-user and building operator with benefits to each of them clearly defined

During the third financial quarter of the 2017/2018 year, Seth Campbell (MBIE) takes over as the project leader. Work continues to rescope the delivery of this project.

Departing BAC Members

During this quarter, the BAC has seen a high turn over in its membership. The committee would like to thank all our departing members for their invaluable service and passion in promoting BIM use in New Zealand.

- Gleb Speranski.
- Heather Staley (formally MBIE) has notified BAC that she is leaving MBIE in the immediate future. Heather's role within BAC has been extensive, particularly in developing and driving the organisational processes of the committee. Heather's departure from the role of Programme Manager will require a significant re-shuffle of roles and responsibilities. In the coming week the BAC will be working through reallocating her projects and committee operational responsibilities. BAC however, has been fortunate in retaining Heather's Committee membership in her new roles for the New Zealand Defence Force.
- Paul Singleton has notified the committee that he will resigning from the BAC for family reasons.
- Tara McDonald (BRANZ), has stepped down from her role as secretariat. Samantha Johnston (AECOM) has filled this position.

New BAC Members

The BAC welcomes the following new members:

- Brian Berg, a Building Environmental Scientist from BRANZ, has joined the BAC as the BRANZ Ltd. representative.
- Seth Campbell has joined the BAC as MBIE's representative as part of his role as a MBIE Manager of the System Design and Implementation team.
- Steve Ritchie, Regional Operations Manager at Hawkins Construction Ltd.