

# BIM in New Zealand — an industry-wide view 2018

Baseline information on the use  
of BIM across the New Zealand  
construction industry



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# BIM benchmark survey foreword

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This is the fifth survey in a series originally planned to total five, but which we now have a commitment to at least one more year. Its objective is to follow progress being made in accelerating the introduction of BIM into New Zealand.

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This five-year series follows an industry group of large and influential organisations in New Zealand's built environment, allowing developments in BIM's introduction to be monitored.

For the third year we have also carried out a client survey which focuses on asset owners and managers in order to better understand what progress BIM is having in facilities and asset management.

Once again the BIM Acceleration Committee (BAC) considers itself fortunate to have the continuing support of BRANZ, a number of large private sector organisations and several Government Ministries, as it enters its second three-year term in its effort to accelerate BIM introduction into New Zealand. Our sincerest thanks go to our partner, EBOSS, for its investment in managing and sponsoring these surveys; and to those organisations forming the industry and client survey groups. These surveys are critical in a very complete view of progress in BIM introduction and identification of barriers to its implementation.

Finally, should any reader of this report have any suggestions for improvement, please don't hesitate to e-mail BIMinNZ at [info@biminnz.co.nz](mailto:info@biminnz.co.nz), or raise the issue at one of the regular BIM network meetings now taking place in Auckland, Wellington and Christchurch (see [www.biminnz.co.nz](http://www.biminnz.co.nz) for more details).

Kind Regards



**ANDREW REDING**

Chair, BIM Acceleration Committee

Established in 2006, EBOSS hosts a comprehensive architectural product library, with an active audience of 35,000 architects, designers, main contractors and engineers. At EBOSS we are interested in improving the communication of BIM information through the construction value chain and appreciate the opportunity to partner with the BIM Acceleration Committee and sponsor this research initiative.



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# Executive summary

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From an industry perspective, the number of projects using BIM has seen a similar increase (of two percentage points) over the last three years. Among the client survey group there is full awareness of integrating digital spatial information with asset management systems, and of BIM processes as one of the ways to achieve that.

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Almost half of clients surveyed are integrating digital asset or spatial information with asset management systems. Across all clients surveyed, only 11% say they're unlikely to start to integrate this information or that it's not something they're considering. This means that almost nine in ten clients are either integrating information now or open to doing so in the future.

Within the industry group, design has always been the main area where BIM is used across the project lifecycle. However, in 2018 we see an increase in use in the construct, and the operate phases. In particular, the industry group believes ie 'asset management and building (preventative) maintenance scheduling' are likely to see some of the strongest growth of all BIM uses in 2019.

The industry group is largely consultants, and thus less likely to engage in the operate phase. This may explain the existing low uptake (30%) at the operate phase. However, among the client group 50% of those integrating digital asset or spatial information say they do so at the operate phase. While there is no direct comparison to 2017 (due to question change), the data does indicate an increase in use at the operate phase among clients. Barriers to uptake among clients who haven't already started integrating digital asset and spatial information include:

- Multi-layered systems customised to their needs and therefore a perception that existing tools don't (or can't) meet their needs;
- Different systems that don't integrate easily;
- A lack of experience in integrating digital spatial and asset information.

This builds to a belief that it is a difficult process, and suggests that an important workstream is helping clients work through the detail of how to integrate multiple disparate systems.

By contrast, the key issues to increased BIM use by the industry group include:

- A lack of coordination and interaction between parties;
- The need to rework models created by other parties, alongside the perception of costs of using BIM;
- As a result there is a theme of having to switch between 2D and 3D outputs – meaning that the benefits of BIM are not fully realised.

Collaboration and seamless transition between parties is critical in helping realise the value of BIM and reduce client perceptions of cost. More training and industry acceptance (once these collaboration issues are dealt with) are seen as the key factors to increasing BIM use within the industry.

**Almost half of clients surveyed are integrating digital asset or spatial information with asset management systems.**

## Who are the industry group?

The industry group is a sample of 46 businesses who have been identified as key users of BIM within the building and construction industry. These businesses completed the same survey on BIM use each year from 2014 to 2018, and make up a wide group of Industry professionals. 37 of the original 46 organisations completed the survey in 2018: a response rate of 80%.

The 2018 survey allows us to compare data from 2014 through to 2018 to see how BIM use and acceptance has changed across the group in the last five years.

The industry survey was sponsored and managed by EBOSS on behalf of the BIM Acceleration Committee. It was analysed by an external researcher.<sup>1</sup>

The maximum margin of error for the industry survey is +/-16% at the 95% confidence interval.

\*Location changed to multiple response in 2018

### A little about the industry group:

	2014	2015	2016	2017	2018*
<b>Where their businesses are based</b>					
Auckland	23	28	31	27	31
Bay of Plenty	1	1	1	1	3
Wellington	5	2	4	2	11
Canterbury	6	5	7	5	10
Otago/Southland	1	-	-	1	6
Other	3	1	-	-	5
Unspecified	7	3	-	4	-
<b>The size of these businesses</b>					
Conglomerate (30+ employees)	26	24	29	26	24
Large (10-30 employees)	8	10	10	8	9
Medium (5-9 employees)	4	-	1	-	0
Small (2-4 employees)	1	2	1	2	1
Unspecified	7	4	2	4	0
<b>Profession of respondents</b>					
Design/engineer	13	12	14	14	16
BIM Professional	9	13	11	8	7
Project Manager	4	2	2	2	2
Quantity Surveyor	3	4	3	4	3
Construction	5	3	5	3	5
Other (incl. Government, model creation, etc.)	4	6	4	3	-
Unspecified	8	-	4	6	4
<b>Total</b>	<b>46</b>	<b>40</b>	<b>43</b>	<b>40</b>	<b>37</b>

<sup>1</sup>The researcher is a member of the NZ Research Association, ESOMAR, and Australian Market Research Society, bound by strict codes of research ethics and requirements

## Who are the client group?

In 2016 we initiated the first survey of property/asset managers of organisations with medium to large portfolios of property or other constructed assets, focusing on their use and understanding of BIM. A total of 44 organisations agreed to participate in the survey. In 2018, 17 client organisations responded to the survey: a response rate of 39%. This survey will be repeated again in 2019 alongside the industry survey.

The client survey was funded by BRANZ and managed by EBOSS on behalf of the BIM Acceleration Committee. It was analysed by an external researcher.<sup>2</sup>

**NOTE TO READING CLIENT DATA:** Due to the reduced sample size and differences in role of respondents from 2016 through to 2018, some difference in 2018 data may be driven by sample changes.

The maximum margin of error for the client survey is +/- 24% at the 95% confidence interval.

Transparency of information has led to improved decision making across our development program. Projects have also finished ahead of schedule.

### A little about the client group:

Number of sites in their portfolio				
	Actual 2016	Actual 2017	Actual 2018	Projected 2019
1-20 sites	7	8	4	3
21-50 sites	6	2	-	1
51-100 sites	6	3	2	1
More than 100	6	7	1	1
Unspecified	8	6	10	11

Industry	2016	2017	2018
Local Government	7	3	1
Central Government	5	3	4
Property management	4	3	1
Property development	3	1	-
Infrastructure management	2	1	-
Maintenance	2	1	1
Utilities provider	2	1	-
Healthcare	1	3	2
Tertiary education	-	-	2
Procurement	-	-	1
Other	5	6	4
Not specified	2	4	1
<b>Total</b>	<b>33</b>	<b>26</b>	<b>17</b>

Role of respondents	2016	2017	2018
Asset management	12	8	3
Portfolio management	3	-	-
Project management	3	3	2
Data management	2	-	2
Facilities management	2	4	3
Property management	2	1	-
Other	7	5	6
Not specified	2	5	1
<b>Total</b>	<b>33</b>	<b>26</b>	<b>17</b>

<sup>2</sup>The researcher is a member of the NZ Research Association, ESOMAR, and Australian Market Research Society, bound by strict codes of research ethics and requirements

# Is BIM currently being used?

## Use of BIM – industry and client groups

Both the industry and client groups were asked about their current use of BIM. Almost all (95%) of the industry group have used BIM in the last 12 months, and 97% plan to use BIM in the next 12 months. Within the industry group over half of all projects (59%) use BIM in some way.

Of the clients, 47% say they are integrating digital – spatial information with their asset, operations, or facilities management systems. This integration may include BIM processes. This question was changed from 2017 and direct comparisons are not available. We expect that digital spatial information will include information systems in addition to BIM. In 2017 clients were asked whether they used BIM – 38% said they used BIM for at least some sites.

## BIM use in the workflow – Industry

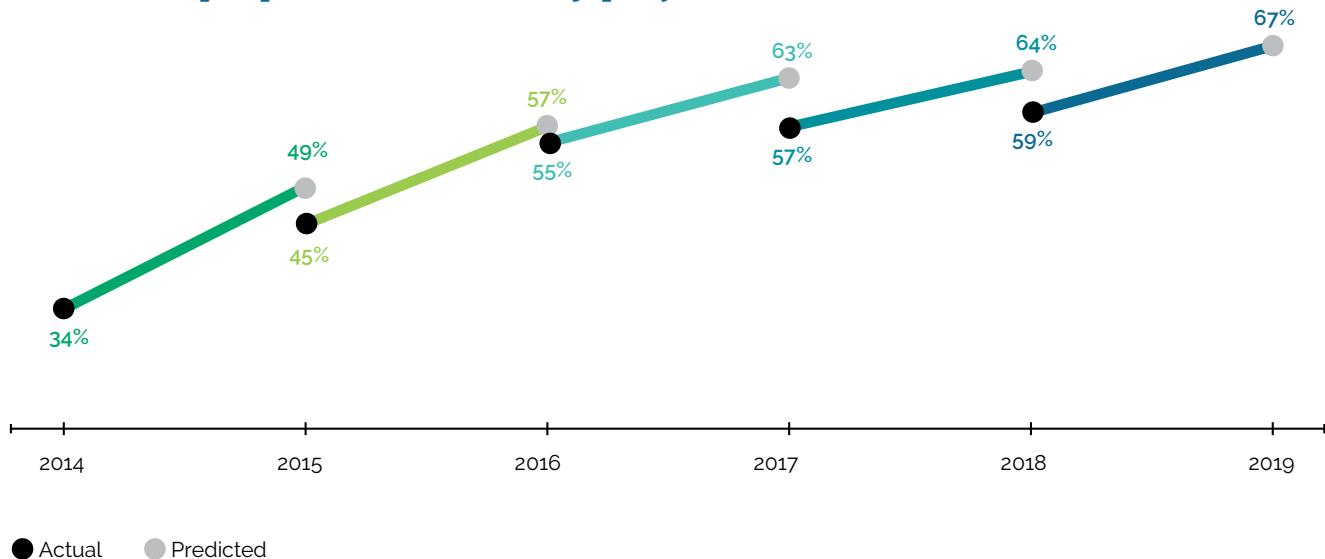
Increasing BIM use is about two things – firstly increasing the number of businesses that use BIM in their projects, and secondly increasing the proportion of projects that use BIM in each business.

We asked industry to estimate the proportion of their projects that:

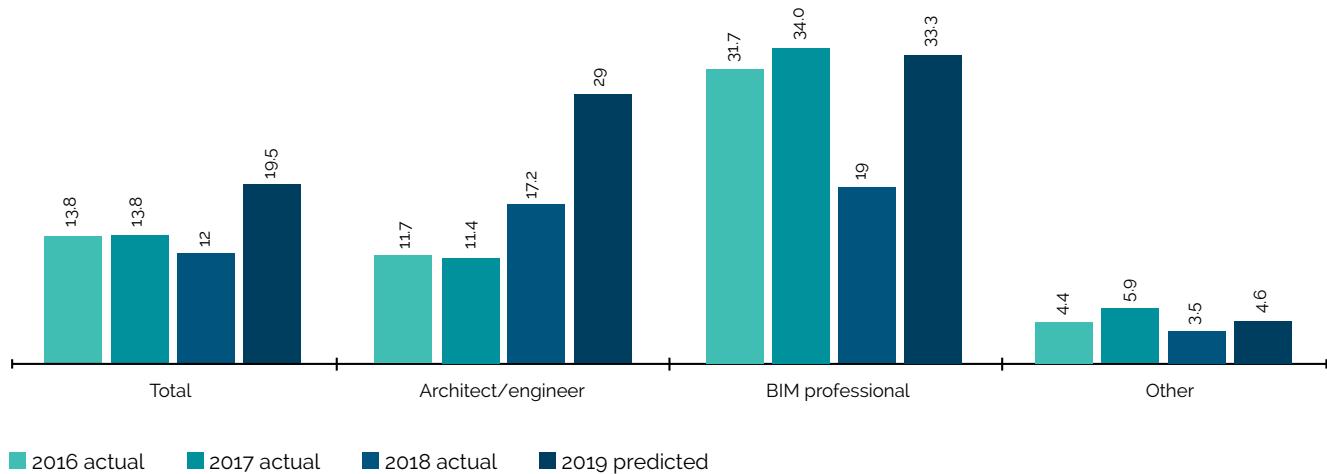
- a) have used BIM in the last 12 months; and
- b) will use BIM in the next 12 months.

This gives us the proportion of projects using BIM (actual) in 2014 to 2018, and predicted in 2019. The overall proportion of projects which use some form of BIM has increased gradually (not significant) from 2016 to 2018. Industry anticipates an increase in the proportion of projects using BIM in 2019 – rising to 67% of projects on average.

## Estimated proportion of industry projects that use BIM



## Average number of projects using a BIM execution plan (industry group)

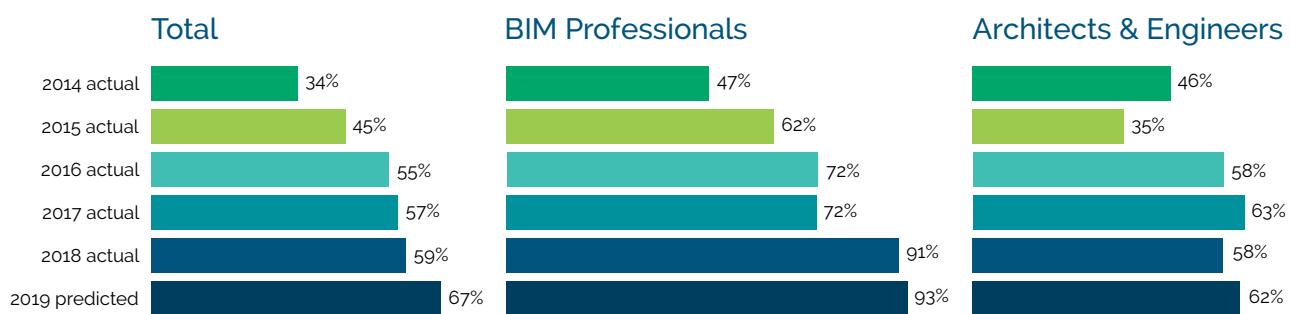


Base: Total 2016 n=43, 2017 n=40, 2018 n=37. BIM professionals 2016 n=11, 2017 n=8, 2018 n=7. Architects and engineers 2016 n=14, 2017 n=14, 2018 n=16. Other 2016 n=18, 2017 n=18, 2018 n=14.

The number of projects using a BIM execution plan for BIM professionals has dropped from 34 in 2017 to 19 in 2018. However, for this same group the proportion of projects using BIM has increased to 91% (from 72% in 2017) – shown in the next chart. This indicates that BIM professionals are increasing BIM use within current projects, but have had fewer projects in the last year.

The chart below shows the proportion of projects within each company that use BIM. This has gradually increased over the last five years (after initial leaps). Industry participants anticipate a further increase in the proportion of projects using BIM in 2019.

## Proportion of industry projects that use BIM



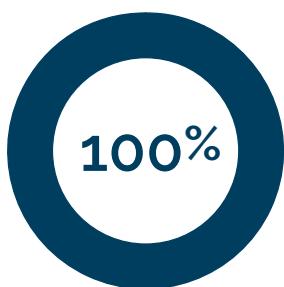
Base: Total 2014 n=46, total 2015 n=40, 2016 n=43, 2017 n=40, 2018 n=37. BIM professionals 2014 n=9, 2015 n=13, 2016 n=11, 2017 n=8, 2018 n=7. Architects and engineers 2014 n=13, 2015 n=12, 2016 n=14, 2017 n=14, 2018 n=16.

## BIM use by clients

The questions asked of clients were changed in 2018. Instead of asking about BIM use, clients were asked about integrating digital spatial asset information (which may include BIM processes) with asset, operations, or facilities management systems.

All clients surveyed have heard of integrating digital spatial information with asset management systems. At present, 47% integrate either digital or spatial information (or both).

### Integrating digital spatial and asset information with management systems

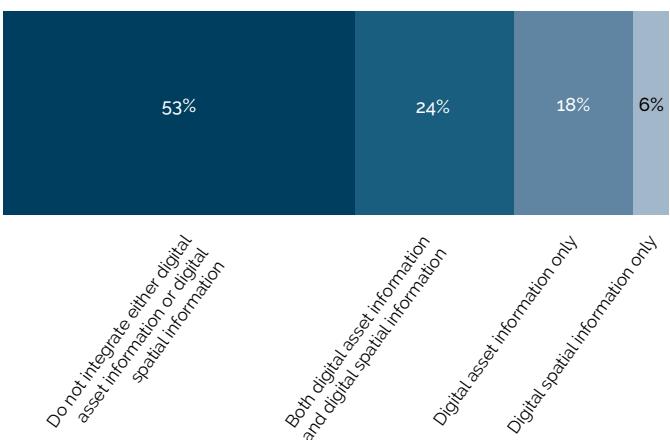


Have heard of integrating digital spatial information with asset management systems



Have heard of BIM processes as one of the options for integrating digital spatial information with asset management systems

Almost half are integrating digital asset and/or spatial information with asset management systems:



Base: All clients surveyed 2018 n=17

Q. Have you heard of integrating digital spatial information with asset management systems?

Q. Have you heard of BIM processes as one of the options for integrating digital spatial information with asset management systems?

Base: All clients surveyed 2018 n=17

Q. Do you integrate digital asset information with your asset / operations / facilities management systems?

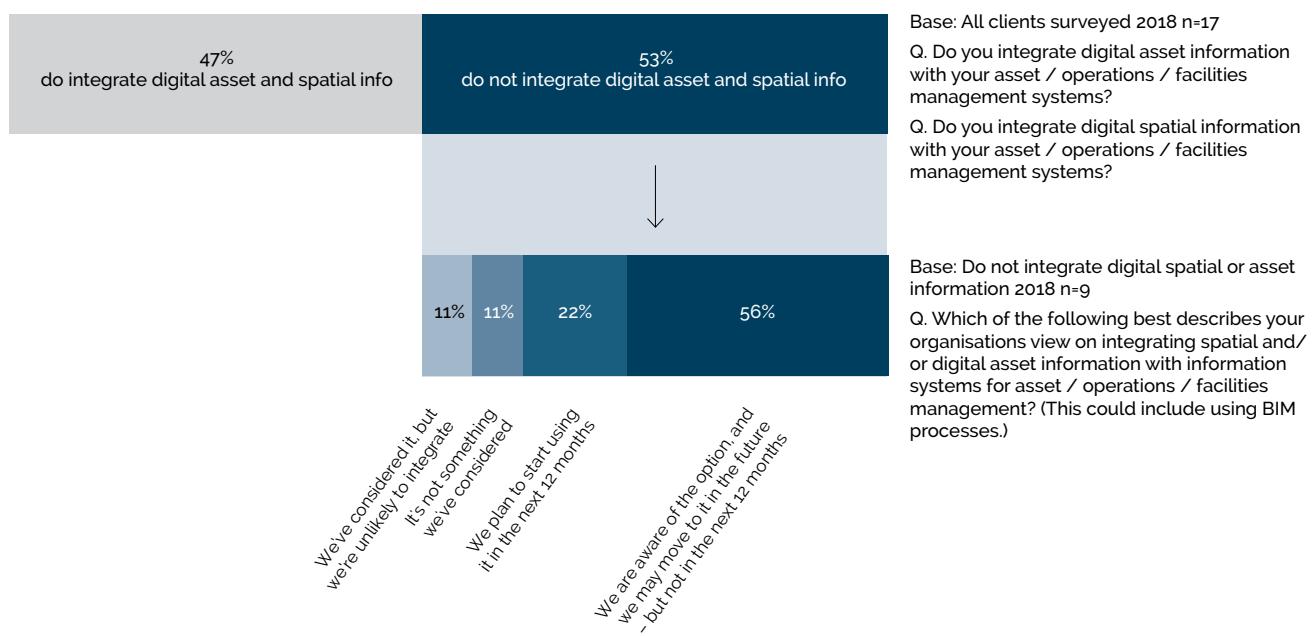
Q. Do you integrate digital spatial information with your asset / operations / facilities management systems?

Of those who are not currently integrating digital spatial information with their asset management systems, 22% plan to start doing so in the next 12 months. A further 56% are aware of the concept, and may look at it in the future (but not the next 12 months).

## Awareness and acceptance of BIM by clients

Clients who are aware of, but not currently integrating digital spatial and asset information with their systems were asked to summarise their organisation's view on doing so. Just over one in five (22%) are planning to start integrating digital spatial and asset information in the next 12 months. The same proportion (22%) either have not considered doing so, or have considered it but are unlikely to do so.

## Client use and consideration of integrating digital asset and spatial information



The main reason for not using, or considering a shift to integration of digital spatial and asset information is that the costs are seen as outweighing the benefits, or there is a lack of knowledge. Some clients commented further:

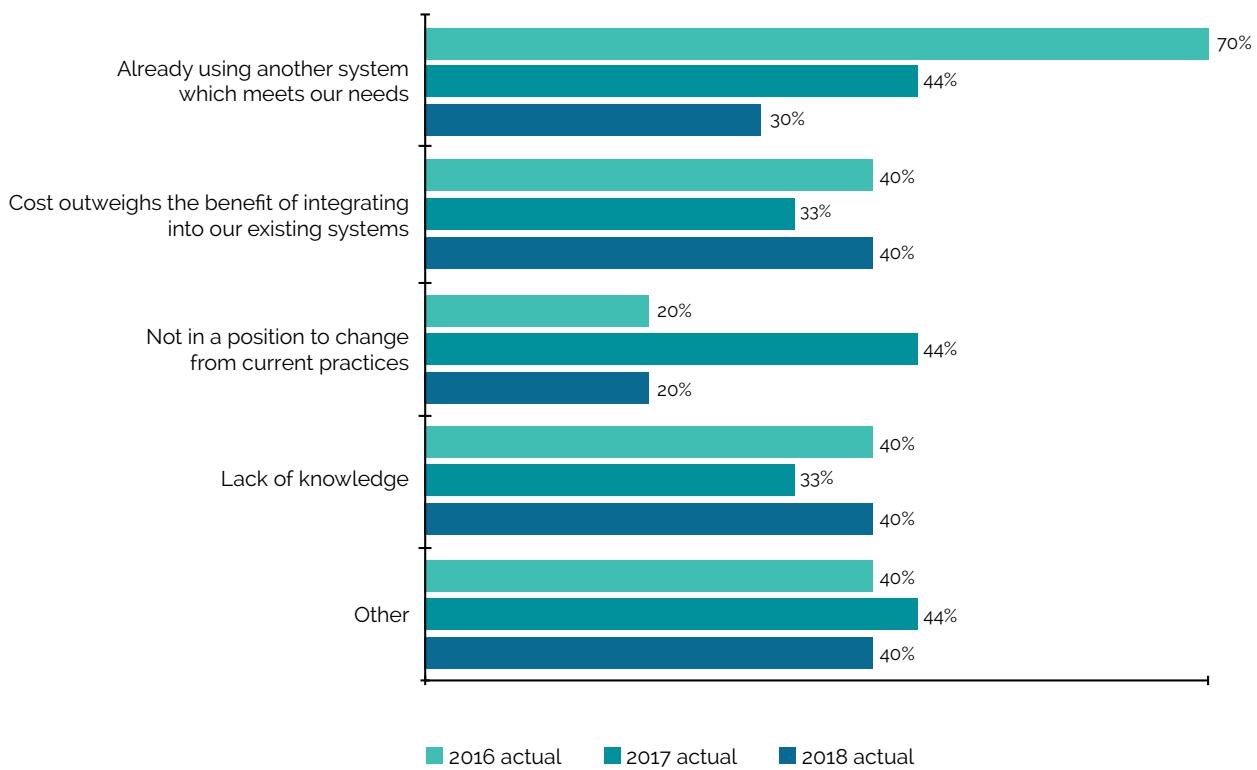
**"Due to cost we do not have a full BIM model."**

**"We are waiting for some industry maturity in this area."**

**"Contractors and sub trade are not set up to use this information. Consultants are charging a premium to design with these services."**

**"We are in the process of defining an integration key as part of our overall Master Data Management project."**

## Understanding clients who don't integrate digital spatial and asset information with systems



■ 2016 actual ■ 2017 actual ■ 2018 actual

Base: Client not using BIM now, not planning to use in next 12 months 2016 n=10, 2017 n=9  
Q. What are the main reasons you have not considered or moved to a BIM based system?

Base: Client not integrating information now, not planning to do so in next 12 months 2018 n=9  
Q. What are the main reasons you have not considered or moved to integrate spatial and/or digital asset information into your asset / operations / facilities management system?

NOTE: this question was changed in 2018.

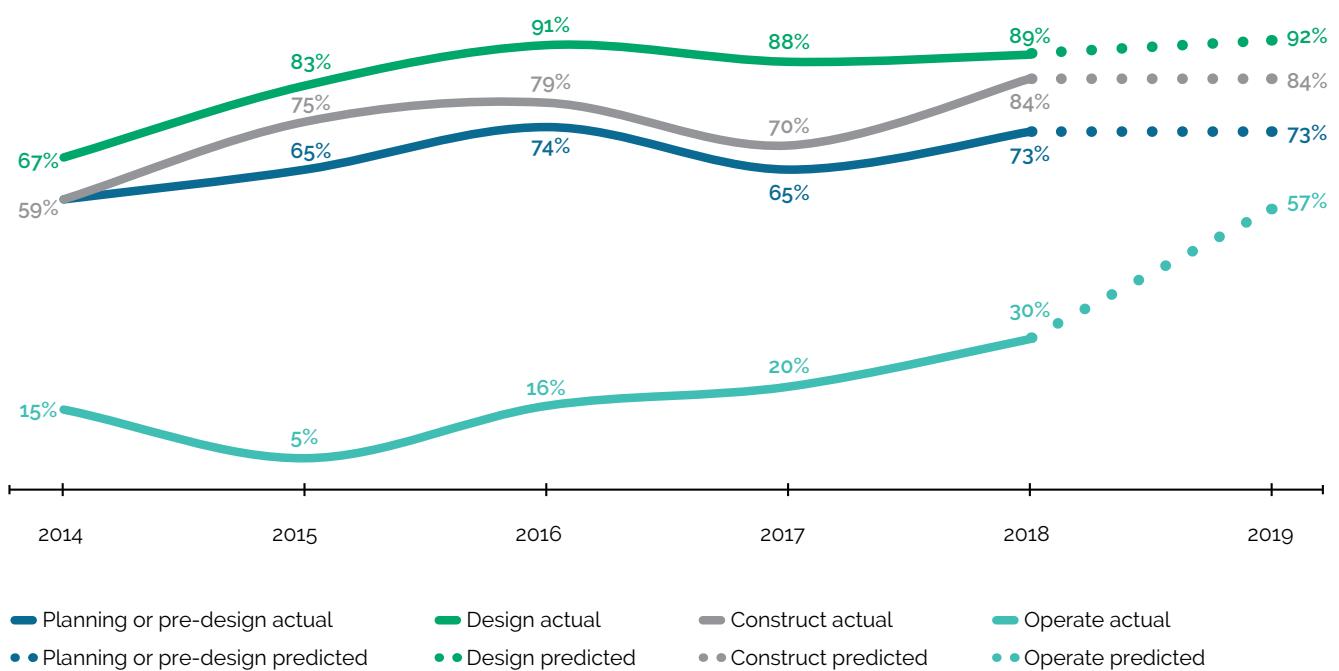
2016/2017: Reasons for not using/considering BIM

2018: Reasons for not integrating digital information

# What is industry using BIM for?

The industry group were asked where in the project lifecycle they had used BIM in the last 12 months, or planned to use BIM in the next 12 months. Almost nine of ten industry respondents use BIM at the design phase, while over 84% use BIM at the planning and 73% at the construct phase. In 2018 actual use of BIM for asset and facilities management (the operate phase) has increased from 20% in 2017 to 30% in 2018.

## Industry BIM use across project lifecycle



Base: All respondents 2014 n=46; 2015 n=40, 2016 n=43, 2017 N=40, 2018 n=37  
Q. For which project life cycle stages has/will BIM be used? Please select all that apply.

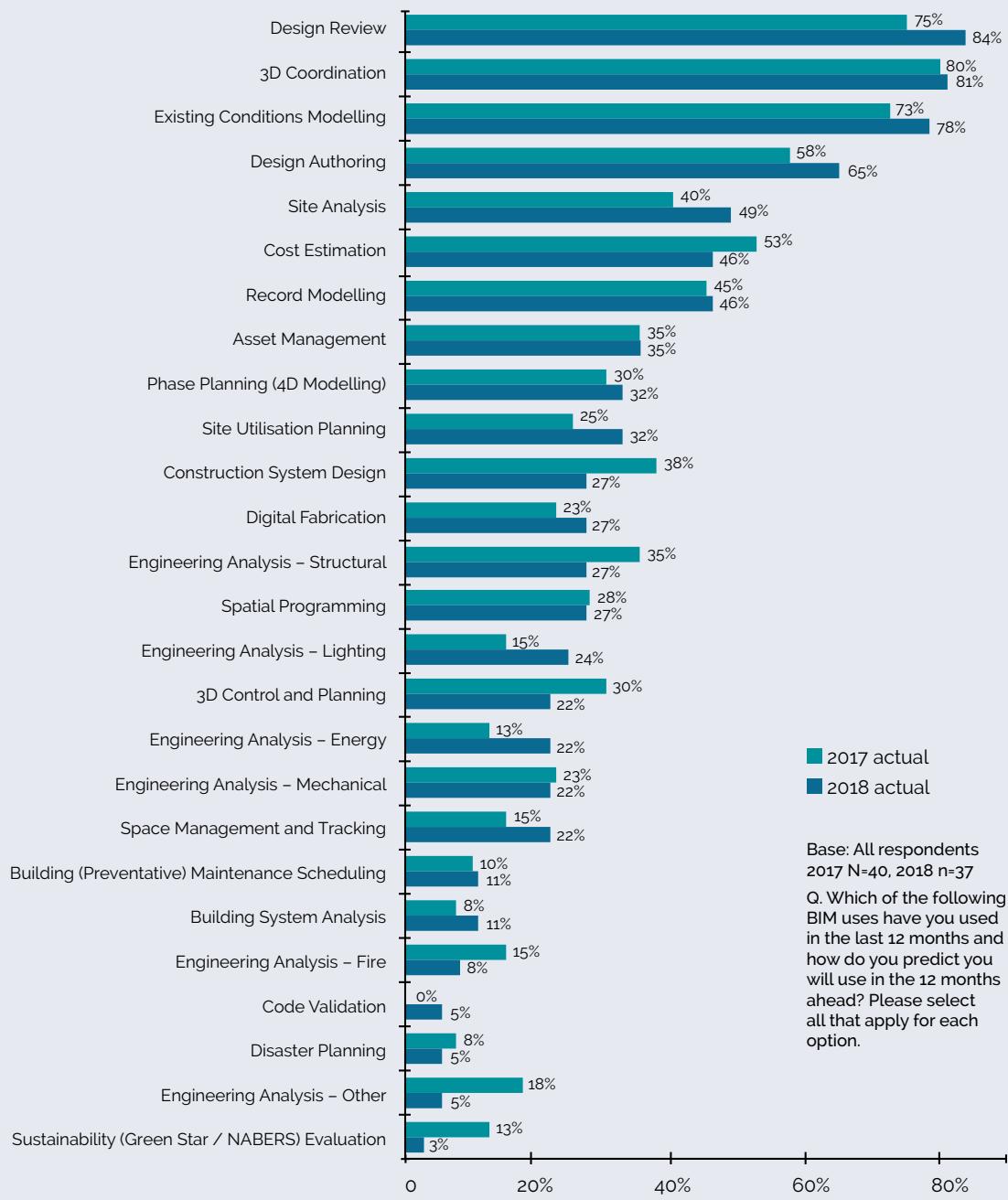
The low level of use in asset and facilities management may be partially driven by the sample structure of the control group: i.e. largely consultants. However, this has increased consistently over the last four years.

## Industry BIM uses in detail

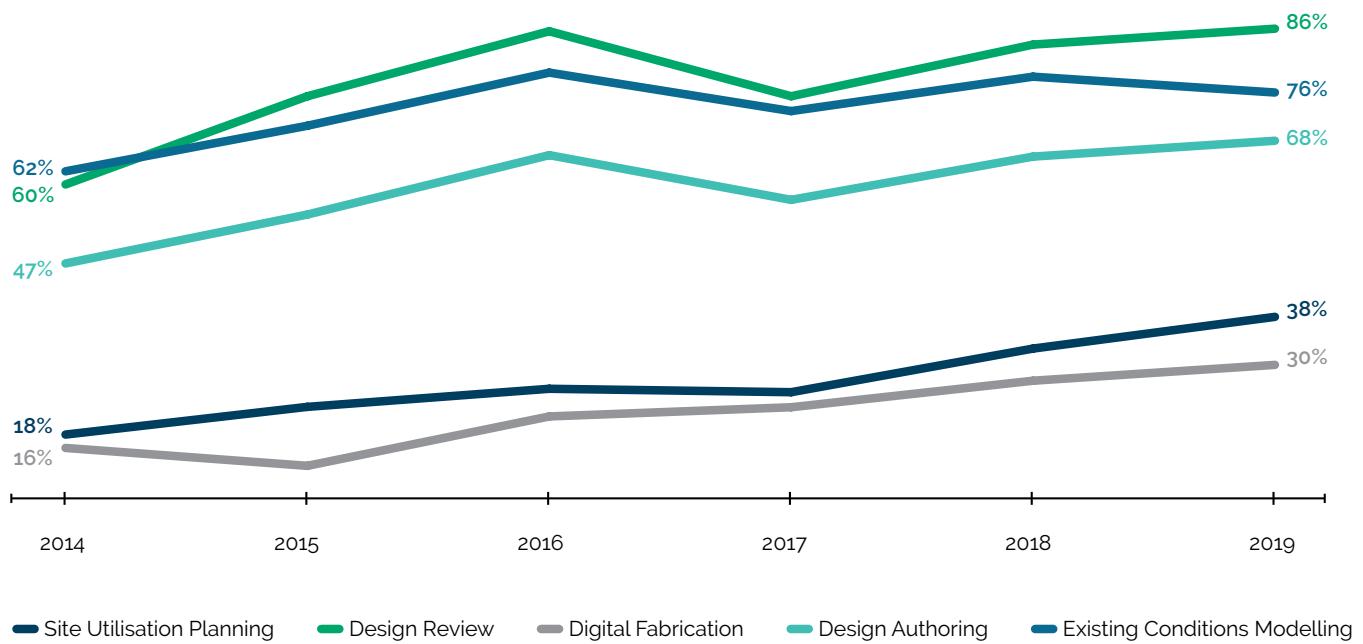
Over the last five years we have seen the most common BIM use change across each year of the survey. This year (2018) is no different – with further changes in the most common BIM uses (as shown the chart below).

The chart below shows that five uses have had consistent growth in the last five years. These activities are: site utilisation planning; design review; digital fabrication; design authoring; and existing conditions modelling. All of these (aside from digital fabrication) now sit in the top ten uses for BIM among the industry group.

### Industry's BIM uses (actual only) 2017-2018



## Upward trend in BIM use activities



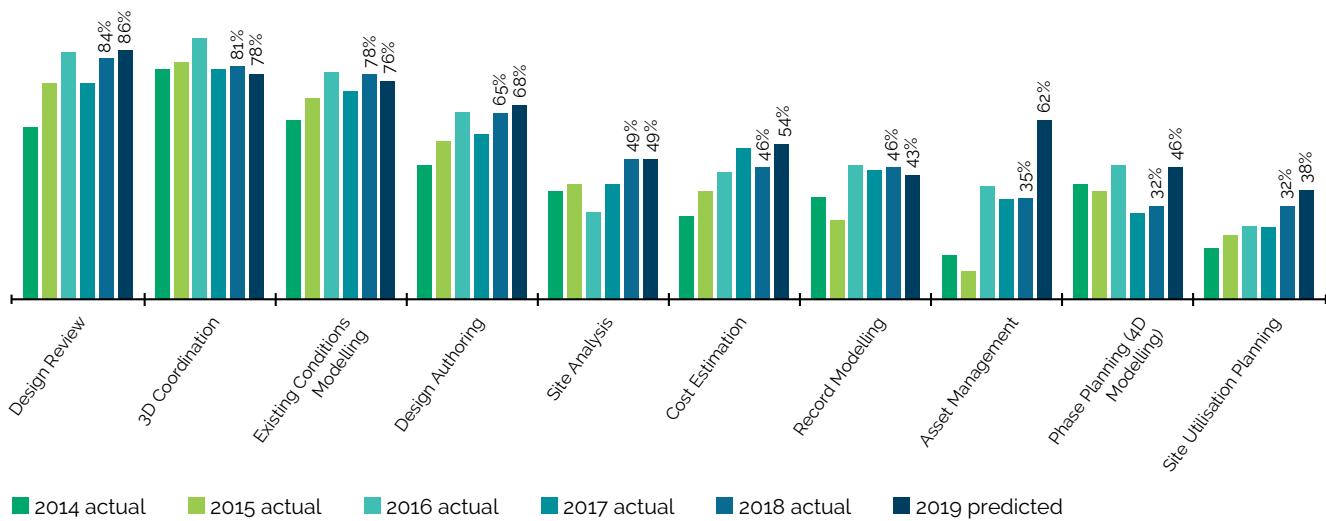
Base: All respondents 2014 n=46; 2015 n=40, 2016 n=43, 2017 N=40, 2018 n=37

Q. Which of the following BIM uses have you used in the last 12 months and how do you predict you will use in the 12 months ahead?  
Please select all that apply for each option.

## Industry's most popular BIM uses

The top ten industry group BIM uses remain largely similar to those in 2017. 'Construction system design' and 'engineering analysis – structural' have both dropped out of the top 10, to be replaced by 'site utilisation' and 'phase planning (4D modelling)'.

### Industry's top ten BIM uses



Base: All respondents 2014 n=46; 2015 n=40; 2016 n=43; 2017 n=40, 2018 n=37

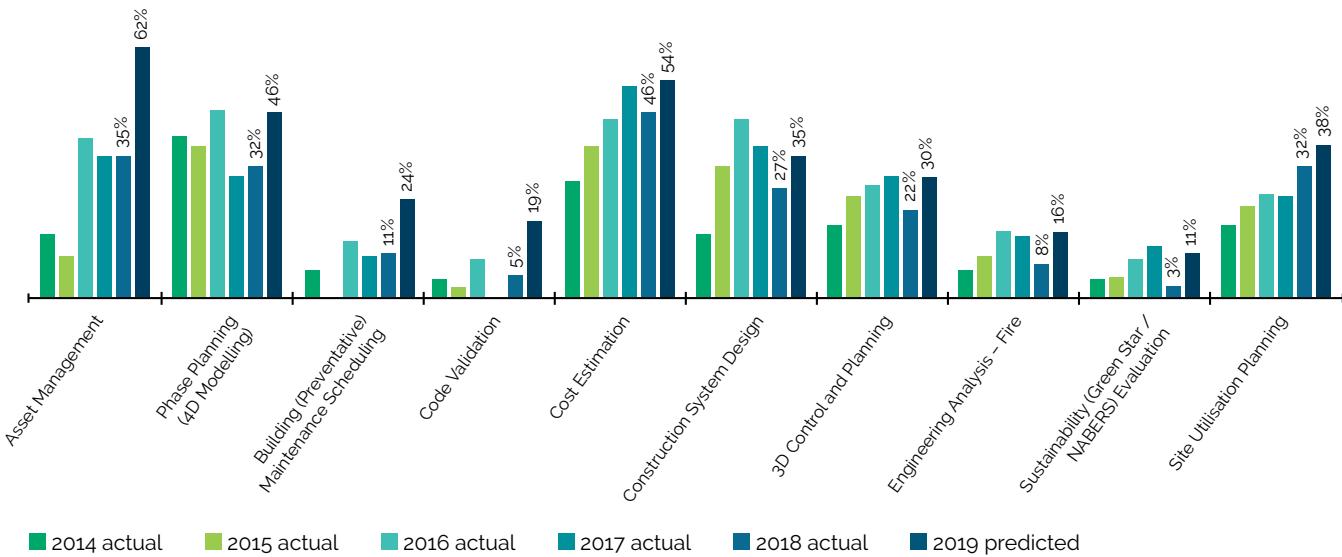
Which of the following BIM uses have you used in the last 12 months and how do you predict you will use in the 12 months ahead? Please select all that apply for each option.

## BIM uses most likely to grow in industry

As in 2017, asset management is predicted to grow substantially to more than 60% of all projects. The same prediction was made in 2017, though actual use remained stable (against this prediction) in 2018. However, when industry group participants were asked what stages they use BIM for (see previous section), operate has increased to 30% in 2018 – up from 20% in 2017. We may yet see some of the predicted increase come to fruition in 2019.

There continues to be a high degree of optimism that various use of BIM will increase in 2019 predicted across the majority of activities. Four out of the 26 uses are predicted to decline (three of which are in the top ten uses). These are: existing conditions modelling; record modelling; building system analysis; and 3D coordination.

### Industry BIM uses most likely to grow



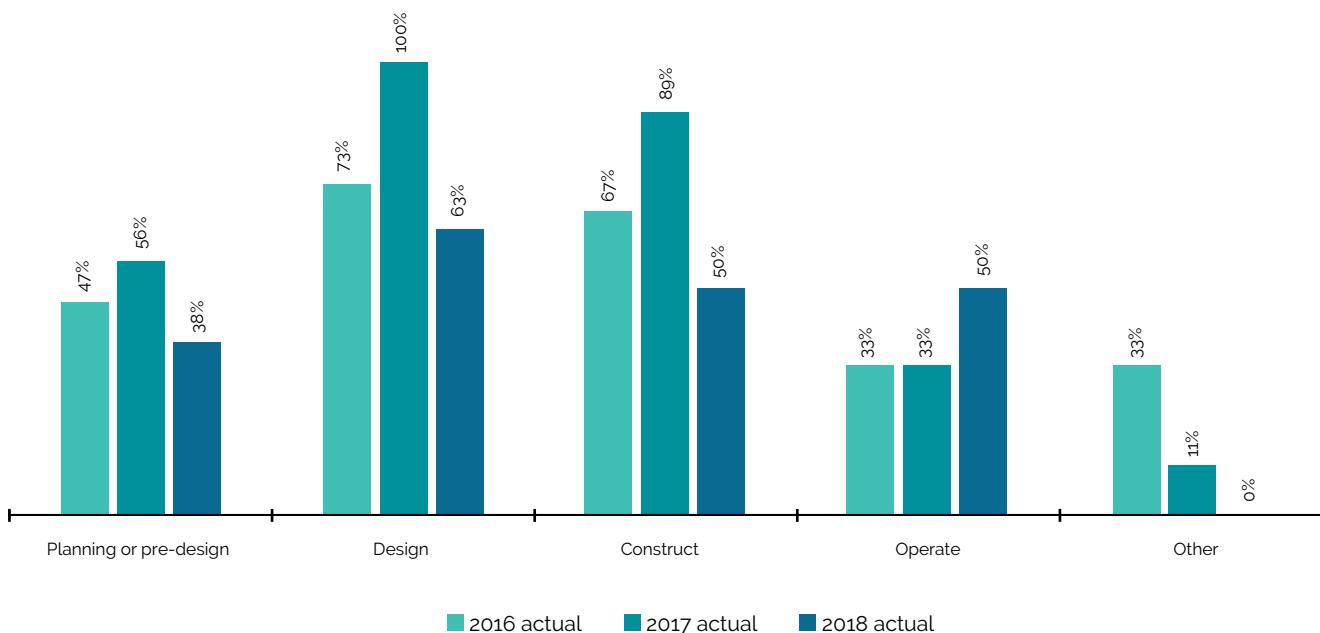
Base: All respondents 2014 n=46; 2015 n=40, 2016 n=43, 2017 n=40, 2018 n=37

Q. Which of the following BIM uses have you used in the last 12 months and how do you predict you will use in the 12 months ahead? Please select all that apply for each option.

# What are clients using BIM and integrated spatial information for?

The client survey group were asked at what stages they are using integrated digital spatial and/or asset information. This differed slightly to the question in 2016 and 2017 – which referred specifically to BIM. In 2018, just over three in five (63%) use integrated information at the design stage, while half use it at the construct or operate stages. Fewer than two in five (38%) use integrated information at the planning or pre-design stage.

## Client BIM use/ integration of information across project lifecycle



■ 2016 actual ■ 2017 actual ■ 2018 actual

Base: Clients using BIM now 2016 n=15, 2017 n=9  
Q. At what stage are you currently using BIM for?

Base: Clients integrating digital spatial and/or asset information now 2018 n=8  
Q. At what stages in the investment, construction and operation of built assets are you using integrated spatial and/ or digital asset information?

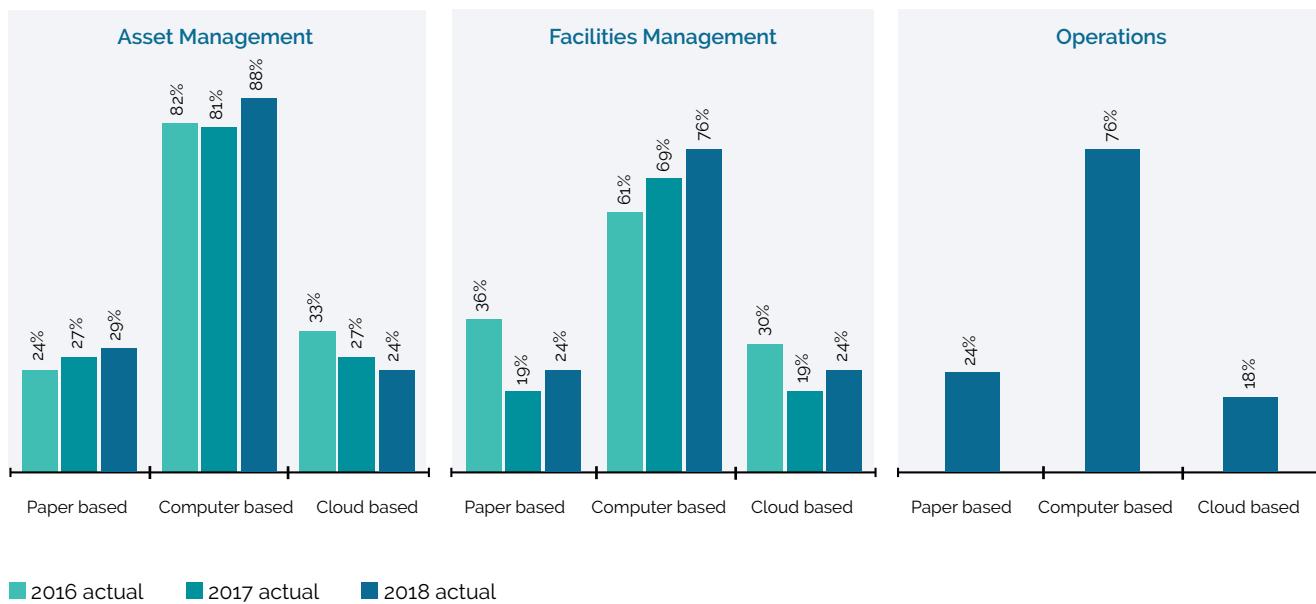
NOTE: this question was changed in 2018:  
2016/2017: Stages using BIM  
2018: Stages integrating digital information

## Clients' asset management

Clients were asked what types of systems they use for facilities and asset management (paper, computer, or cloud-based), and in 2018 clients were also asked an additional question about operations management.

The majority of clients use computer-based systems for each of asset, facility, and operations management. Use of computer-based systems for asset and facility management has increased slightly since 2016 and 2017.

## Systems used by clients for asset, facilities and operations management



Base: All clients surveyed; 2016 n=33, 2017 n=26, 2018 n=17

Q. What kind of information management processes or systems do you use for asset, operations and facilities management?

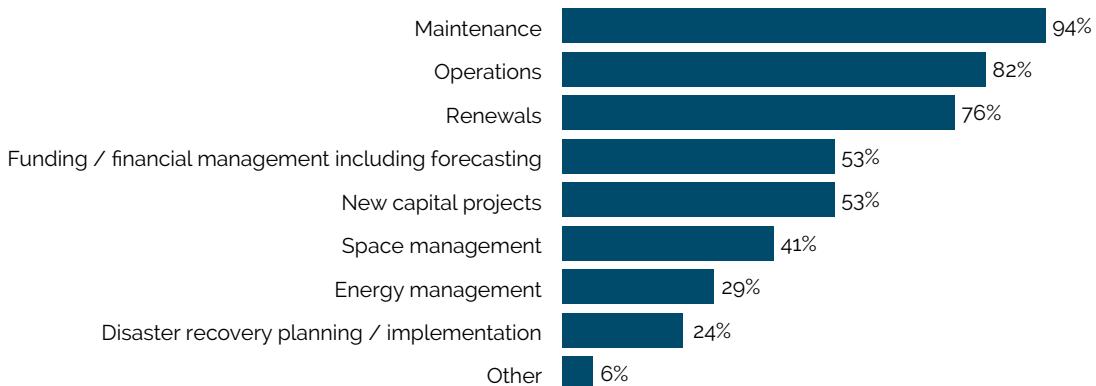
NOTE: Clients can use more than one type of system (and could be using all three)

NOTE: 2018 Operations not asked 2016 or 2017

Those clients who use computer or cloud-based systems were asked which ones they use. As in 2017, many businesses are using a blend of systems selected to suit their specific needs (rather than relying on just one or two). However, the key systems that several were using include SAP, RAMM, SPM, and BEIMS.

The client group was asked what their systems are being used for, regardless of the type of system. From the list given, the majority said that their systems are being used for maintenance, operations, and renewals. Around half are using their systems for funding/financial management and new capital projects, and fewer than half are using systems for space management, energy management, and disaster recovery planning.

## What the systems are being used for



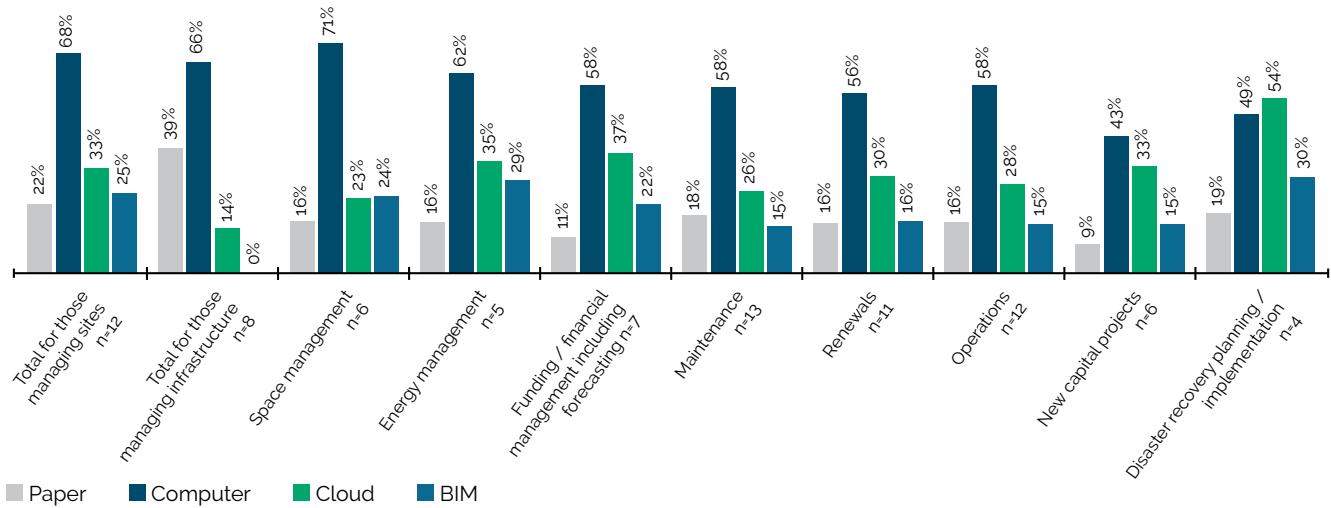
Base: All clients surveyed 2018 only n=17  
Q. What are you using these systems for?

The client group was asked to specify what proportion of their business systems used for managing constructed assets are paper, computer, cloud, or BIM-based systems. This was split by building-focussed systems (sites) and horizontal infrastructure systems (infrastructure). Participants could write more than 100% for each.

Both sites and infrastructure systems are largely computer-based (at least two thirds of the systems used). On average, one quarter of sites are managed with BIM-based systems, though none of the infrastructure systems were BIM-based among this group.

BIM-based systems form more of the management system for those focussed on disaster recovery, space management, and energy management. Please note the sample sizes are small and results are indicative only.

## What proportion of business systems use paper, computer, cloud, or BIM-based systems



Base: refer n =

Q. What are you using these systems for?

Q. What percentage of your business systems for managing constructed asset are paper, computer, cloud, or BIM -based systems? (combines building sites and infrastructure)

NOTE: Based on proportion using asset, operations, or facilities management systems for each reason.

NOTE: % for each activity adds to more than 100% as they may be using multiple systems for each activity.

Members of the client group who are using integrated digital spatial and asset information were asked what decisions this information is used for. Visualisation for communication with stakeholders is the main response (63%). At least half are using integrated information for modelling existing conditions to integrate new facilities, or 3D coordination to reduce construction cost.

## The decisions using integrated digital spatial asset information



Base: Use integrated information now 2018 only n=8

Q. What decisions are informed using integrated spatial and/ or digital asset information (including BIM processes)?

# The benefits in increased use of BIM to the industry group

Comments from the industry group around the benefits of BIM in 2017 centred on:

- Increased coordination between parties,
- Improved efficiency, and
- Better accuracy and understanding within complex designs.

In 2018 the increased coordination remains a main theme, alongside enabling businesses to be more competitive and profitable, better outcomes, faster processes, and happier, more engaged staff.

Increased coordination is a critical component in better outcomes, faster processes, and less doubling-up of effort (therefore more efficient design). 27% of participants mention this:

**"We are seeing better results onsite, better coordination occurring and less RFIs."**

**"BIM allows the ability to explore designs to a greater extent for the benefit of the client, allowing our design teams to explore the intricacy of the design to ensure coordinated documentation is available to the contractor at IFC."**

**"Higher quality of design due to better coordination, better ownership of the buildability of our designs."**

**"Those consultants or practitioners who are of a similar level of expertise are easy to deal with and the sharing of BIM models is much better. Clash detection and services integration has improved greatly."**

**"We have a centralised system for the model on the A360 cloud, all parties involved have complied to the BIM plan and coordination has become much simpler."**

**"Coordinating between many different trades, especially services and seismic bracing."**

Making business more competitive and profitable, and able to work on better or bigger projects (mentioned by 24% of participants):

"BIM allowed projects to be more enjoyable, aided staff retention and made us more profitable."

"We are better practitioners and our staffing skill has improved. We are also receiving an increased market share/recognition because of our ability."

"Our approach to providing services to clients outside of the design and construction phases has helped us to pick up some clients who have had bad experiences with BIM and become disillusioned with it. We are directing our clients back to BIM, but more on their terms."

"BIM enables design phase milestones to be achieved significantly quicker than traditional process. This secures our fee and enables high value support to projects and clients."

"Our in-house BIM capability is valued by clients, and is a powerful marketing tool when promoting the company."

"We now work on large high-profile projects. Coordination has helped with constructability finding issues at the model stage rather than on site."

"We have gained more clients, kept existing clients, impressed and helped deliver more complex designs in tighter timeframes."

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The definition of better outcomes may vary by company, but ultimately the themes within this are about better efficiency and cost effectiveness (mentioned by 24% of participants):

"Proactive approach instead of being reactive – identifying and avoiding issues before they become costly. Improved QA capability. More transparency through design process. Issues identified more readily. Subcontractor buy-in. Greater programme and cost certainty."

"Higher quality of design output. Ability to link into post construction data management."

"Unexpected additional uses for the BIM information. Example: the Revaluation of the Building (600+) portfolio used the BIM floor-plans as a source of information. As a result, errors in the previous valuation were corrected."

Another benefit of BIM is the ability to speed up processes and get information in a more timely manner (mentioned by 19% of participants):

**"Faster data collection and transfer, less risk on projects, laser scanning has made a big difference."**

**"Fast tool for estimation, quick GFA checks and quality assurance"**

**"Consistency of documentation, useful communication tool internally and externally, automation of some processes, scenario testing/optimisation."**

**"Transparency of information has lead to improved decision making across our development program. Projects have also finished ahead of schedule. Questions about our facilities have been answered quicker than we would have otherwise with 2D documents."**

**"Where we have had 3D models of complex buildings this has allowed us measure in 3D being easier. Where some models have been partially completed, information has been able to be extracted quickly and used in cost estimation."**

Using BIM can help to in creating happier, more engaged staff (mentioned by 11% of participants):

**"Greater engagement from others who traditionally were not directly involved in the creation of model data. i.e. positive feedback and encouragement from management and engineers that what we create in terms of BIM is useful and truly beneficial to projects."**

**"Much better collaboration with contractors, larger service offering and a more engaged design team."**

**"Staff only want to work on BIM projects, because of better information management and a more transparent process."**

# Barriers to BIM uptake

## Industry

The 2017 survey found the obstacles to using BIM included factors such as:

- The cost involved in changes, keeping models up to date, chasing input, and the lack of desire of clients to pay for this (30% of respondents mention this);
- A lack of full awareness of the processes BIM requires in order to be efficient (30% of respondents mention this);
- Contractors and stakeholders not working together or taking a siloed approach (28% of respondents mention this);
- Lack of clarity around what BIM is and is not, and what is actually desired when "BIM" is requested as a part of a project (25% of respondents mention this); and
- Lack of contractor use and awareness of BIM (15% of respondents mention this).

In 2018 there are some similar issues, although we are seeing a lot more detail around the lack of effective interaction or collaboration between parties. The lack of co-ordination and poor interaction between parties is a strong theme, this includes sub-contractors ignoring models already built (or models not built with subcontractors in mind) so that there is a doubling-up of efforts.

This lack of coordination and effective collaboration then has impacts on the client desire and perceived value in using BIM processes. In particular, if each set of sub-contractors is having to re-work models, or move to 2D documents (ignoring the BIM models), this creates a perception of high cost for not a lot of payoff.

The use of 2D documents by some parties is seen as an obstacle to BIM uptake alongside the cost involved in creating BIM models.

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Lack of coordination or quality interaction between parties  
(41% of participants mention this):

"Not all projects have an associated BIM Execution Plan. By not having a document that details each consultant's responsibilities when disagreements do arise it makes for awkward conversations. Collaborative ways of thinking and working are not yet ingrained in all design teams."

"The different levels of expertise on the project. Collaboration with consultants and to what level they use BIM."

"Project manager's lack of understanding and poor specification for projects. Negative consequences being unclear deliverables for the team, construction teams missing out on the value of passing the information down the chain."

"Failure to provide/comply with defined deliverables at the appropriate design phase. We are also expected to resolve coordination items which (traditionally) fall outside of our scope."

"We are in the Land Development and Infrastructure space. In general, we are on the outside looking in on the BIM process. Whether it prevents us using BIM more frequently is up for debate, but it creates a negative perception of BIM, and by extension less eager to become more involved in it. As we operate on the periphery of the BIM process the biggest obstacle is applying BIM principles and processes internally, taking some kind of ownership of the threshold between the services below ground and how the building above interfaces with these, and also making implementation of these processes and principles as painless as possible. Our clients have expressed a level of disillusionment in the "all care, no responsibility" attitude that seems to proliferate in the current BIM environment."

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A lack of skills and knowledge (mentioned by 14% of participants):

"Skill shortage within the industry at both the design and construction interfaces, this is focused on the creation and use of the model. Another issue could be considered 'weaponised BIM' where models that have not been an agreed deliverable to contractor are 'clash detected' without consideration for what is best for project and coming up with 1000s of clashes, when in reality it is due to the way in which the model has been created i.e. no penetrations modelled for MEP going through walls as this was not an agreed deliverable. Pure understanding of what BIM is and that it means different things for different projects, it isn't a one size fits all approach."

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Subcontractors re-working BIM models, adding cost and reducing perception of value (mentioned by 8% of participants):

"Architects making numerous design changes to the same elements, expecting structure to follow every design iteration causing structure to use up all their fee in the early stages and the projects aren't profitable. Unrealistic Project Managers not amending deliverable dates to suit workload. Consultants happy to blame each other for delays to get an extension of time to get work done which they couldn't achieve in the time allowed."

"As sub-contractors we are facilitated with the design model for our development into construction, and in the production of shop drawings. There appears to be fallacy in the current NZ market in the belief that a design model can transcend into construction with a gradual increase in the level of detail (LOD). Cost and time associated in the remodelling process adds considerable programme pressures at the tail end of the construction journey."

Perception of costs (mentioned by 19% of participants):

"The costs required to produce a properly verified, quality BIM model are not appreciated by the Construction phase team."

"Client perceived cost barrier."

Switching between 3D models and 2D documents (mentioned by 14% of participants):

"Incomplete and inaccurate models. 2D'ing to cover up poor or inadequate modelling not modelling as the building is to be built (walls columns spanning multiple levels). Models not being updated due to design changes/variations."

"A seamless translation of the model from different software is always a challenge, this doesn't prevent use but is an obstacle. BIM collaborators who don't follow through the model the entire design process ie (run out of time let's bail to 2D)."

"No common approach used. The models are really updated by the consultants, the 2D documents are followed and the consultants manually edit them to save time. No one point of truth federated model is used."

"Implementing BIM in a paper based process/workflow is hard. It means you have to convince, train and guide too many people. These issues have not prevented us from using BIM more often, since using BIM is usually a client requirement. Receiving BIM models from designers and consultants that have disclaimers does not help implementing BIM. It only makes it harder."

# Barriers to BIM uptake

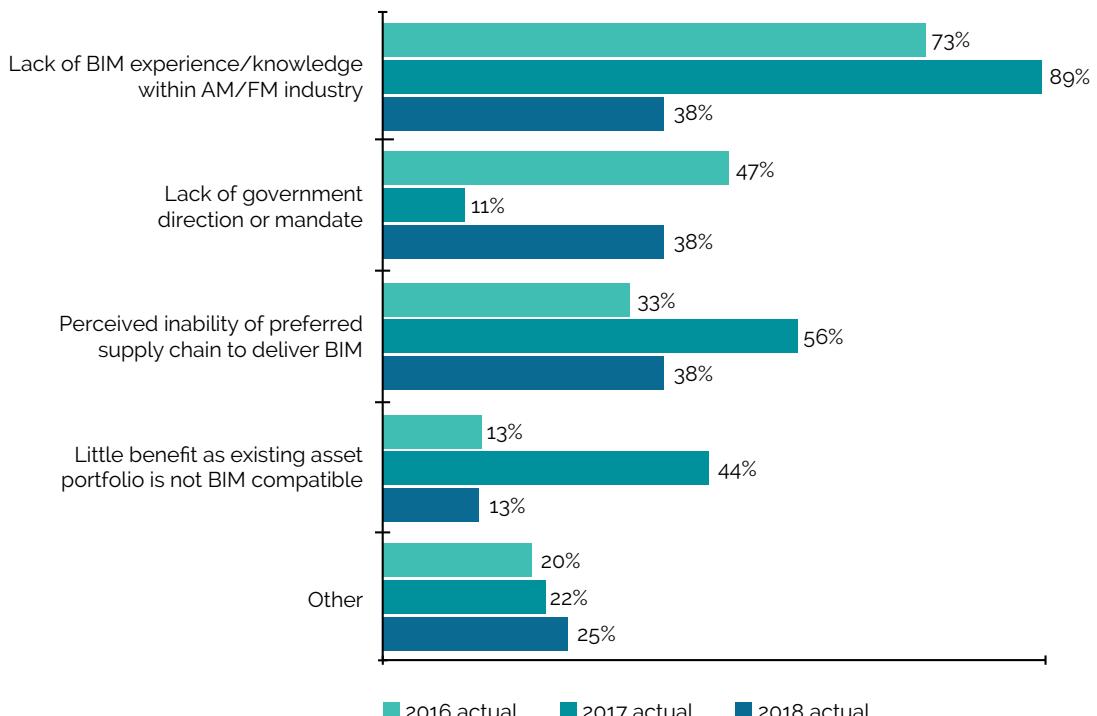
## Clients

Those who are not integrating digital spatial and asset information now cite a lack of knowledge and the cost outweighing the benefits as key reasons in not considering integration.

Among those who are integrating information, some of the challenges they have experienced with integration is a lack of experience or knowledge integrating data, difficulty integrating different systems, and existing tools not meeting their requirements (each selected by 38% of those who have integrated systems). A further 13% say that their preferred supply chain cannot deliver to the desired level.

Both the lack of knowledge and the existing systems provide definite barriers to BIM uptake. As seen in previous sections, clients often have multi-layered systems, frequently customised to their requirements. It is not a smooth process to integrate information across these, and hard to do so without the experience or knowledge from having done it before.

## Clients' benefits and challenges using BIM or integrating information



NOTE: this question and the responses were changed in 2018.

2016/2017: Challenges experienced in using BIM models:

Base: Clients using BIM now 2017 n=15

Q. What challenges have you experienced in using BIM models?

2018: Challenges experienced integrating information:

Base: Clients integrating digital spatial and/or asset information now 2018 n=8

Q. What challenges have you experienced in integrating spatial and/or digital asset information with other asset information?

# What is required for greater use of BIM by the industry & client groups?

## Enabling increased use of BIM within an industry practice

Industry group respondents were asked what would need to change for their company to use BIM more often. The main points raised are very similar to 2017 and include:

- Wider industry acceptance so that everyone is on the same page or equally open to using BIM;
- More training around BIM and how to use it;
- Better client education around BIM – setting expectations;
- Improved procurement processes for BIM

In addition, 14% of the industry group said they're fully committed to BIM and therefore don't require any assistance in increasing uptake.

### Wider industry acceptance and use (19% of participants mention this):

"Industry use of 3D models. Consultants update their models and confirm accuracy."

"Other designers truly committing to the process."

"Wider acceptance from a greater cross section of consultancies that BIM is not an onerous additional cost to a project. That in fact working in a collaborative sense using existing BIM tools comes at very little cost. Greater advertisement, acceptance and use of the NZ BIM Handbook across all parties at a design level."

"More contractors utilising the work we do in BIM/3D modelling after the design is complete. Better awareness without clients about what level of detail they require and therefore what additional cost/benefits apply."

### More training (19% of participants mention this):

"More training is required to other sectors/ contractors who are on Revit."

"Education across the industry around best for project BIM, that it isn't a one size fits all approach."

"Educate people and train people. Get the overall ICT skill up to a standard level. NZ is a paper based society. Better quality designs (that are actually buildable is a safe and responsible manner) and BIM models without disclaimers."

Further education for clients  
(16% of participants mention this):

"Better education of clients on procurement practices that allow for BIM and its benefits."

"Our company is utilising CostX software that is BIM ready, we just need a good model and commitment from Client and designer to enable a BIM ready experience."

"Leaders and decision makers need to see BIM as an opportunity to add value to the entire business, rather than as a cost or threat. There needs to be time invested in developing a strategy, followed by upfront investment, with a long-term focus and a willingness to explore ways of extracting value from the data models in ways previously unimagined."

Nothing – we're fully committed  
(14% of participants mention this):

"We use it on all projects now."

"Nothing we are fully committed."

"Our use of BIM has become standard on all but the smallest of contracts."

Improved procurement processes for BIM  
(14% of participants mention this):

"Greater discussion pre-contract to agree who is doing what and to what standard."

"Clarity around contract deliverables at the procurement stage of a project, that these are communicated clearly to all parties, including the future contractor (when on board)."

"A shift to D&C contracts."

Fees to support BIM use  
(11% of participants mention this):

"The race to the bottom pricing models are the norm in NZ and this is a real disincentive to investment and productivity improvement (such as BIM)."

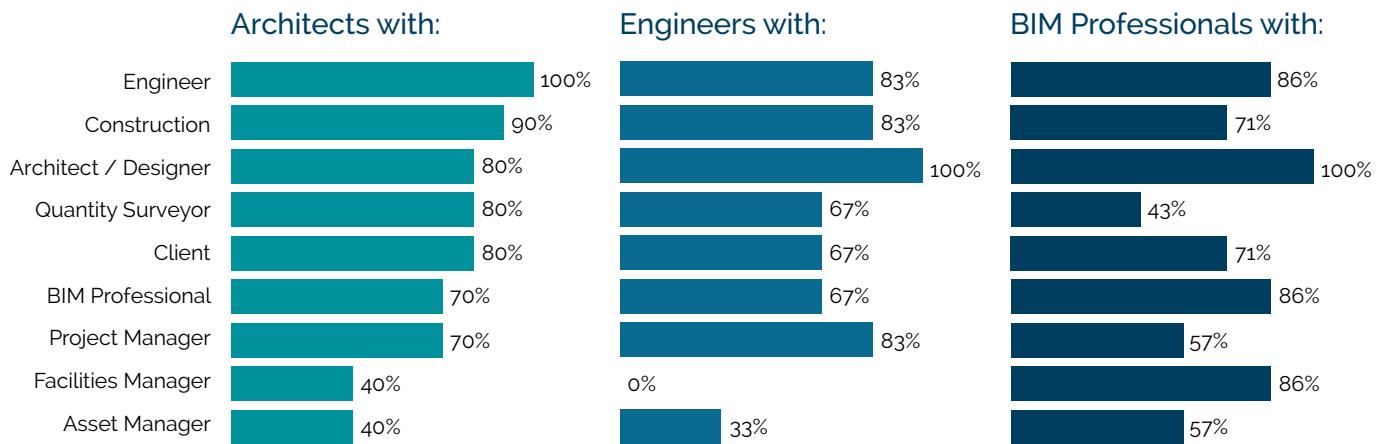
"Bigger fees, more time, more realistic BIM expectations."

## Collaboration between industry parties using BIM

The industry group comments in prior surveys indicates respondents believe collaboration between parties in the design and construction processes is critical to increasing the acceptance and use of BIM across the industry.

Industry group respondents were asked which professions they collaborate, or share information with on projects (not BIM specific information – collaboration in general). The chart below shows the networks of collaboration. (Note the low sub-group sample size which restricts us providing a direct comparison to 2017).

### Industry collaboration with other parties



Base: Architects n=10, Engineers n=6, BIM professional n=7

Q. Which professions do you collaborate with or share information with on projects?

Industry group participants were also asked how often they share BIM models with other professions. As in 2017, over one third (36%) always share their models with other professions. A further 45% are sharing often, higher than the 33% recorded in 2017. Architects are sharing BIM models most frequently, with half always sharing their models. Only 29% of BIM professional always share their BIM models.

Enabling increased sharing of models comes down to having agreed standards and protocols, a common data environment, and all participants in a collaborative system that enables many people to work at once in real time.

Comments made by the industry group on the need for common data environments (CDE) and collaborative systems include:

**"Common Datum."**

**"One common data environment that everyone uses."**

**"Working in the same project data space in real time."**

**"All participants on collaborative cloud systems (either same or ones with integrations between)."**

**"Consistent common data environments where access is easy and uninterrupted."**

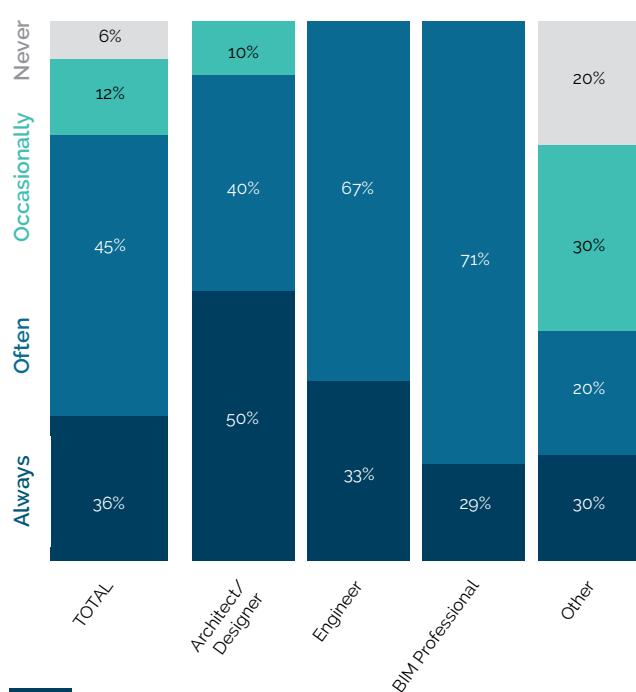
**"Our model in on the BIM 360 cloud."**

**"As a QS, the culture of design phase collaboration is certainly improving, common data environments and access is almost a given on all our projects that we work on."**

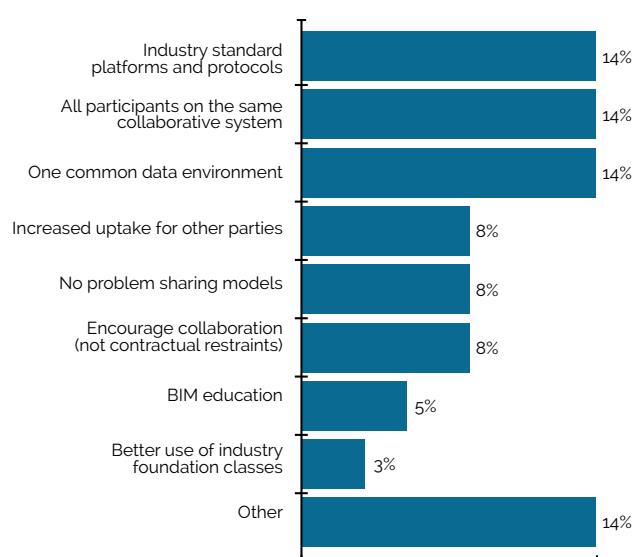
**"Universally accepted & structured document system (something like BIM360 but that works the way we want it to also with local (NZ) server) to enable model sharing & cloud based projects work seamlessly."**

## Industry sharing BIM Models

How often do you share BIM models with other professions?



What would make it easier to share BIM models with other professions?



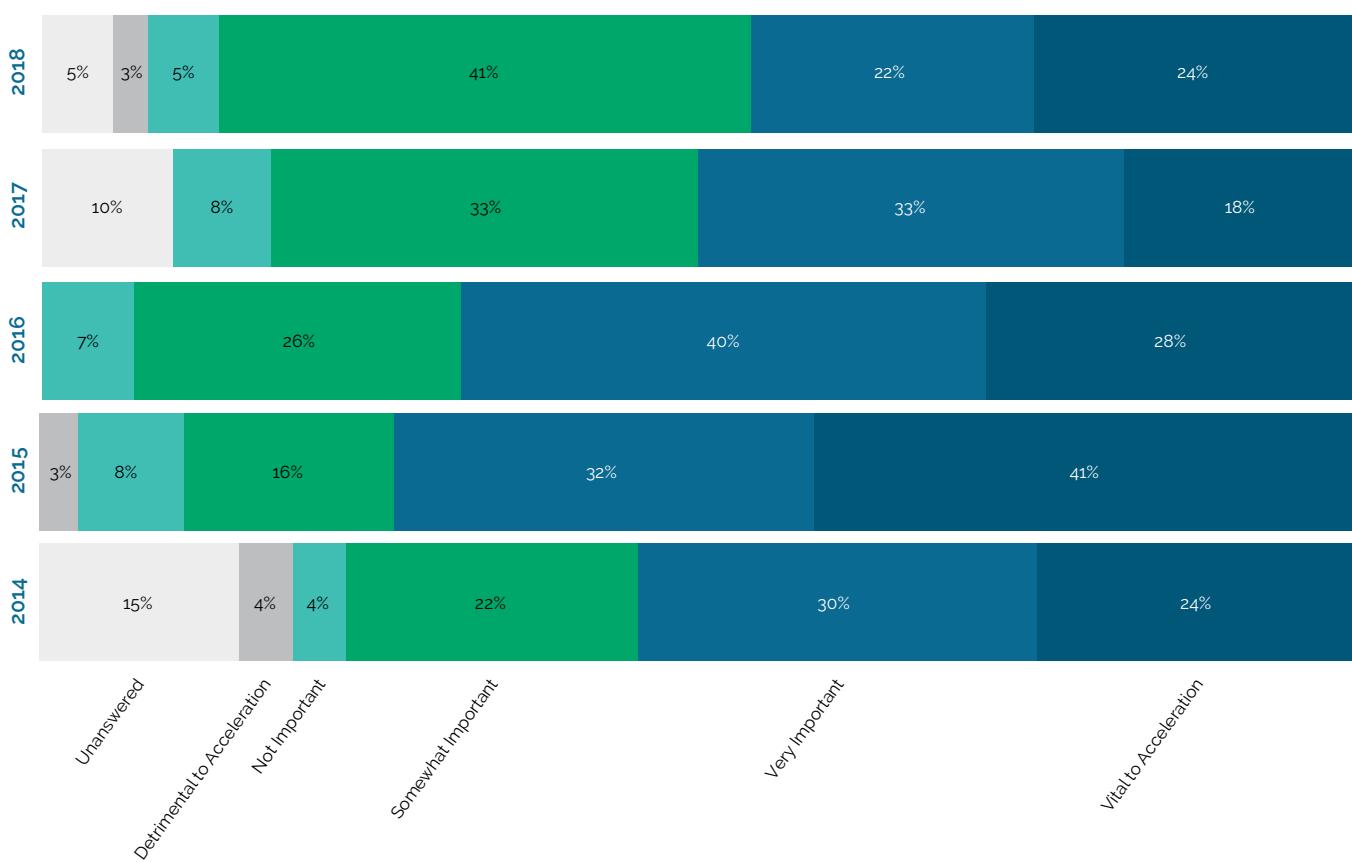
Base: Total n=37, Architects n=10, Engineers n=6, BIM professional n=7, Other n=14

Q. How often do you share BIM models with other professions?

# Industry's view on government's role in BIM

The industry group was asked about the importance of government's role as a client in accelerating the development and use of BIM in New Zealand. As the chart below shows, the government's role as a client remains important, but continues to decrease as vital or very important (combined), and settles more into "somewhat important" territory. The proportion stating that government and industry partnerships play a very important or vital role in accelerating development and use of BIM has dropped again this year, from 51% in 2017 to 46% in 2018. Again a consistent 8% thought the government's role was unimportant or detrimental to accelerating the use of BIM.

## The importance of the government's role as a client in accelerating the development and use of BIM within New Zealand



Base: All respondents 2014 n=46, 2015 n=40, 2016 n=43, 2017 n=40, 2018 n=37

Q. Do you consider government's role as a client to be an important factor in accelerating the development and use of BIM within New Zealand?

Respondents were asked what the government should be doing to accelerate the use of BIM.

The responses have focused on government's role in:

- Mandating the use of BIM,
- Leading by example and using BIM on all government contracts (with consideration of asset and facilities management, not just construction), and
- Changing the procurement process and reducing the focus on documents as an output.

Comments around mandating and leading by example focus on a more consistent approach from government in procurement and requirements for BIM.

"Follow suit of the UK and other leading BIM countries in requirement of BIM in procurement routes."

"Mandate a BIM for FM of all new construction of state owned buildings, beginning in 2020. In 2019 develop/specify a BIM standard that NZ should use."

"Require BIM to be mandatory for all new builds and retrospectively convert all old drawings to BIM. This one-off cost will save money and help ensure Facility Maintenance."

"Mandate use for some pilot projects. Accept that it won't provide the miraculous gains bandied about overnight and that doing appointments like the MoE one are not that smart. Accept there is a local learning curve. Sponsor, support, nurture, share some costs in its introduction."

"Government is already asking for BIM components on public projects – this should continue."

"I would like to see the government as a client procure its construction projects using BIM not from a project based approach, and certainly not allowing AEC to drive what it is to them. In order to accelerate its growth and development, it is time for the government to specify and direct BIM from a lifecycle perspective, not a design and construction perspective."

"1-2 government departments commit to BIM. Education or health are the primes. All projects over \$10M have to have BIM enabled."

"Encourage all private commercial construction works to employ BIM practices. Financial incentives to use BIM workflow."

"Lead by example – use BIM on their projects and standardize this across all departments/ministries. Currently only isolated fragmented pilot projects and test cases – results of these need to be shared and spread widely to show the success of these initiatives."

Supporting the government leading the way, several comments focus on changing the procurement model so that BIM is seen as acceptable outputs contractually (rather than documents).

"Continue to fund the Acceleration Committee, with a focus on getting the construction firms onboard."

"Focus on enabling regulatory and compliance acceptance of BIM inputs. The local, central government and legal need for 'documents' are a significant hindrance to BIM models being seen as contract/project records."

"The recent demise of major players in the NZ construction industry has highlighted how risk is disproportionately distributed down the supply chain. The use of BIM in a flatter contractual structure could facilitate better project collaboration, and hence better risk mitigation. Such a lead should be demonstrated by the government on their construction projects, or by offering funding for R&D on projects willing to try new procurement routes."

"I think the government should develop a strategy for the digital built environment and help answer questions that the industry can't solve such as open data requirements, data ownership, data security and privacy when it comes to digital models. This requires our local councils to also develop strategies for how they can utilize BIM models to build a digital twin of our towns and cities and as a central database of our built environment. Consenting and permission processes need to be disrupted and new innovations made to facilitate improved decision making. Public and private institutions need to work together to support innovation and build a digital built environment ecosystem that everyone can build on top of. This would see government funding that is open to the market to apply for grants to support new and existing companies to develop new solutions."

# Control Group Organisations

## Industry group organisations include:

22 Degrees Ltd	Hawkins 2017 Ltd
AECOM	Holmes Consulting
Aquaheat NZ Ltd	Ignite Architects
Archaus	Jasmax
Architectus	KTA Ltd
asBUILT	Maltbys Ltd
Assemble	Mott MacDonald New Zealand Limited
Auckland Airport Ltd.	MSC Consulting Group Ltd
Barnes Beagley Doherr	Naylor Love
Beca	Patterson Associates Ltd
BGT Structures LTD	Peddle Thorp
Dominion Constructors	Structex
Envivo	University of Otago
Fletcher Construction	Wellington City Council

## Client group organisations include:

The University of Auckland	Citycare Limited
The Warehouse Limited	Fulton Hogan Ltd
Argosy Property No.1 Ltd	NZ Transport Agency
Auckland Transport	

Some organisations in both groups wished to remain anonymous and we have not published their names in this report.

Both control groups are made up of organisations that have been identified as key users of BIM, or likely to use BIM to manage a portfolio of property or other constructed assets.

Each year, the same organisations are invited to take part in the survey, to see how BIM use and acceptance has changed over time.