

NBS International BIM Report 2013



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“We are unclear on the future of international BIM. This report is a first step towards providing that clarity... we hope that it will, like the UK BIM Report, become annual.”

Introduction

Adrian Malleson

Head of Research, Analysis and Forecasting, NBS

The future is international and the future is BIM. The UK is an example of BIM success:

“In a recent visit to the United Kingdom, I was impressed by what I saw in terms of the productivity benefits BIM delivers. There has been an 18% improvement in productivity on UK Government projects using BIM. We can learn from the UK’s Strategy.”

Hon Maurice Williamson,
New Zealand Minister for Building and Construction

The preceding statements are easier to make than they are to verify. They have the ring of truth but we lack impartial, reliable data about the state of BIM in different countries and continents. We are also unclear on the future of international BIM.

This report is a first step towards providing that clarity. In it we examine attitudes towards BIM across countries to see how each compares. We uncover adoption rates, beliefs about the future of BIM, as well as attitudes towards BIM.

But the number of countries running the International BIM Survey is, for now, small. Four countries took part in 2013, and we report on these.

This is our first report and we hope that it will, like the UK BIM Report, become annual. The report is a result of co-operative working across four countries: the UK, Canada, New Zealand and Finland. In many ways, these countries are among the world BIM leaders. For all the countries except Canada, we had a sufficient response to the survey to be confident that the data is representative. For Canada, the figures need to be treated with some caution.

Our thanks to Digicon, Masterspec and Rakennustieto for running the surveys in their countries.



Views from the countries

The UK

Adrian Malleson
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In 2011, NBS carried out our first UK survey into Building Information Modelling (BIM). We thought it important that there was an independent view of the place BIM had in the UK construction industry, and that we monitored trends in BIM adoption and use.

Looking back, we can see that 2011 was at the start of the BIM journey for the UK. At the time, around 40% of those we surveyed were not even aware of BIM, let alone implementing it in their projects. Four years later, we've come to see a very different picture.

In the UK, driven in part by the UK Government's construction strategy, we're now at a point where only 6% are unaware of BIM and 39% are actively using BIM on their projects. If the trends we have seen so far continue, this figure will rise. In the UK, 93% expect to be using BIM on at least some of their projects in five years' time.

The UK construction industry is international; many companies and individuals are working across different nations and continents. This brings with it challenges of different cultures, standards and legal frameworks. If BIM is a tool to allow collaboration through standardisation and information sharing, then it may have greater value yet for international working. So it's become important that we get an international view of BIM, not just of BIM in one particular country.

“It is gratifying to see that despite bad experiences (9% wish they hadn't started), 97% of respondents thought that BIM would dominate their future in five years.”

Canada

David Watson
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While there have been BIM surveys in Canada, this is the first 'international' survey designed to gauge not just BIM use in Canada, but also to benchmark our country against others. Unfortunately, distribution problems resulted in survey results that reflect the relatively low number of responses and the specific experiences of those who did respond. Most respondents were familiar with BIM, and the results reveal a state of affairs from their point of view and not a true 'average'.

We were able to confirm that those firms who use BIM practise a variety of project delivery methods. They utilise the obvious benefits of 3D CAD modelling (visualisation and schedules), but true collaboration still eludes even the experts among us. In particular, BIM specifications are still in their infancy (they are co-ordinated with drawings largely using manual methods).

Most projects still use a 'silo' approach to integration (the same BIM software), likely resulting from a basic distrust that BIM software can successfully exchange BIM data without data loss. The two secondary uses for CAD were visualisation and automated schedules; this suggests that the only 'integration' happening is between CAD models from the various subconsultants.

Publishers (like Digicon) will be interested to see that 83% of respondents create their BIM objects in-house and re-use them. Consistent re-use of objects makes the integration of those objects with external data sources (such as costing and specifications) much easier.

It is gratifying to see that despite some bad experiences (9% wish they hadn't started), 97% of respondents thought that BIM would dominate their future in five years. Digicon's research into BIM led to the development of BIMdrive; we continue to look for ways to improve tools for specifiers to do their job effectively, and look forward to improving the communication of project data between all project team members.



Finland

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BuildingSMART Finland published the results of the national survey on Building Information Modelling in August 2013. The results are especially interesting for two reasons. Firstly, Finland has a reputation for being the global BIM leader. Secondly, the same survey template has been used in the UK, New Zealand and Canada, which allows us to make interesting comparisons.

The questionnaire originates from the UK where RIBA Enterprises published the National BIM Report for the third time in 2013. How representative the results are depends naturally on the type and number of respondents who completed the survey. Here are the numbers of respondents from each country:

- UK: more than 1,350
- Canada: 78
- Finland: 400
- New Zealand: more than 400

The Canadians are clearly the underdog here, whereas Finland and New Zealand have been able to attract relatively more attendees than their market size would imply.

Many of the survey's questions are technical or operational, but there are a few that reveal the respondents' opinions on business related issues. I picked up the following results for those respondents that already use BIM.

Client requirements drive BIM adoption

Client requirements and pressure from contractors seem to be strong drivers for the use of BIM. Here are the percentages of respondents who agree, based on their experience, that clients or contractors will 'increasingly insist on us using BIM' (contractor percentages are in parentheses):

- UK: 73% (66%)
- Canada: 79% (72%)
- Finland: 84% (68%)
- New Zealand: 58% (46%)

That the highest client demand figure is for the UK is certainly a result of the government's decision to require the use of BIM on every publicly funded project by 2016.

Profitability increase is not yet reality for the majority

The adoption of BIM has not yet clearly increased profitability for the majority of users. Here are the percentages of respondents who unequivocally agree on the profitability boost claim:

- UK: 46%
- Canada: 43%
- Finland: 27%
- New Zealand: 33%

Many users experience cost efficiency improvements

Profitability is partly attributable to efficiency. How has the use of BIM brought cost efficiencies?

Again, here are the numbers for those who clearly agree that they have seen an improvement:

- UK: 55%
- Canada: 55%
- Finland: 24%
- New Zealand: 46%

It is noteworthy that the Finnish respondents have been most doubtful. Perhaps this is due to seeing BIM predominantly as a technical solution, not as a business opportunity. Another reason might be that Finnish A/E/C consultants already operate quite efficiently, and a radical productivity increase is therefore hard to reach.

BIM adoption has been mostly successful

Adopting BIM is demanding and a continuing process. It is the biggest change in work practices since the introduction of CAD. Not only does it require investment in new tools, but also new skills and changes in core business processes.

The success rates are high. In Canada 60%, Finland 68% and New Zealand 66% of BIM users consider their BIM adoption a success. This figure could not be found in the UK report.

Is BIM the future for project information? Definitely yes, since 75% to 86% of respondents agree, and over 90% in the four surveys claim that they will use BIM in five years' time.

New Zealand

Rolf Huber
www.masterspec.co.nz

The second New Zealand BIM survey shows that the industry has made significant steps towards accepting Building Information Modelling as the future for the construction industry.

The key results from the New Zealand BIM survey include:

- A reduction in those neither aware of nor using BIM (2% versus 12% in the earlier 2011 survey).
- A steep increase in those who currently use BIM (57% versus 38% in 2011).
- A more modest increase in those expecting to be using BIM in a year's time (72% versus 68% in 2011).
- However, 69% of respondents agreed that the industry is not yet clear enough on what BIM is.

The major roadblocks to the successful implementation of BIM-based technology continue to be lack of expertise (i.e. the need for training and support) and the lack of standardised tools and protocols, leading to difficulties in full collaboration through the design and construction chain.

The survey was conducted by Masterspec – New Zealand's leading specification and product information providers – with the support of New Zealand industry organisations and in collaboration with NBS.

Further information can be obtained from www.masterspec.co.nz

NBS International BIM Report 2013

Adrian Malleson
Head of Research,
Analysis and Forecasting,
NBS

This section of the report draws together and compares the findings of the national surveys. The results show areas of similarity, but also some stark differences.

“It’s worth bearing in mind that the survey did not give a definition of BIM. This opens up the possibility that ‘BIM’ has come to mean different things, or to have different nuances of meaning, in different countries.”

BIM usage and awareness

We asked whether people were aware of BIM. BIM awareness is high. We might almost say it’s near universal. With 87% awareness, Finland has the lowest level of awareness. New Zealand has the highest at 98% with Canada and the UK not far behind. Where we have run the survey for consecutive years (in the UK and New Zealand) we also found that awareness is rising.

Unexpectedly, we didn’t find a link between BIM awareness and BIM usage. Finland has the highest BIM usage at 65% but the lowest awareness at 87%.

The UK has the smallest number of those who tell us they are currently using BIM at 39%. Three out of the four countries have a majority who are now using BIM. Where we have run consecutive surveys, we can see that the numbers using BIM increase year on year.

We can expect BIM usage to continue to rise. BIM adoption has tripled in the UK over the three years we have run the UK survey.

Understanding of BIM

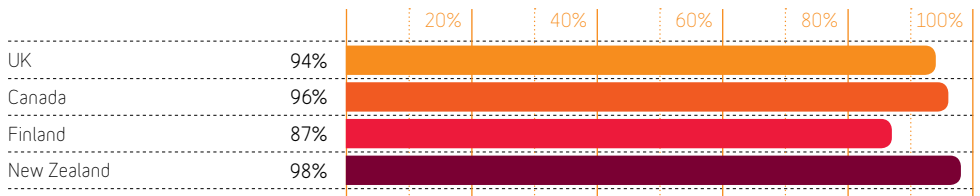
When looking at the national figures for BIM adoption, it’s worth bearing in mind that the survey did not give a definition of BIM. This opens up the possibility that ‘BIM’ has come to mean different things, or to have different nuances of meaning, in different countries. We explored people’s different feelings about BIM and we uncovered some national differences.

New Zealand construction professionals are more likely to equate BIM with 3D CAD and software. We would maintain this is mistaken. Whilst 3D CAD can provide geometric data, it does not provide the full rich data set a true Building Information Model requires.

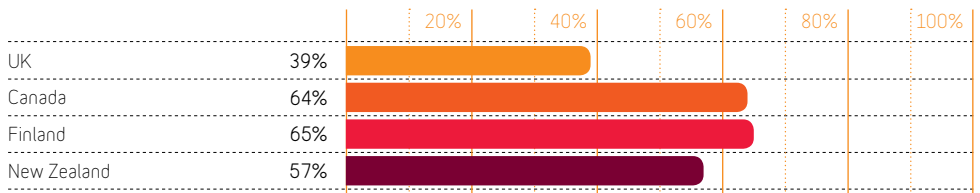
Attitudes towards BIM

The industry is not clear on what BIM is, according to those who have completed the survey. Perhaps this is related to an evident lack of trust about what people hear about BIM. Might it be that commercial organisations sometimes put their commercial interests before providing clear, dispassionate, descriptions of BIM?

Awareness of BIM



Respondents aware of and currently using BIM

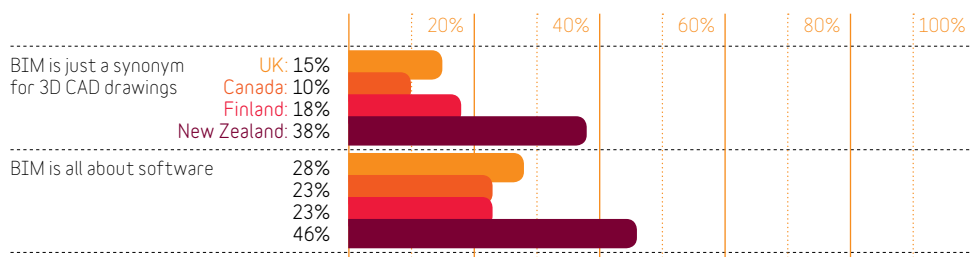




“We asked whether people were aware of BIM. BIM awareness is high. We might almost say it’s near universal... Finland has the lowest level of awareness. New Zealand has the highest with Canada and the UK not far behind... Unexpectedly, we didn’t find a link between BIM awareness and BIM usage.”

We do see distinct differences about government direction between the countries and this falls into two camps. In the UK and Finland, a majority feel their government is on the right track with BIM. In Canada and New Zealand it’s a minority (30% and 25% respectively). We can see that this coincides with whether a government will make people use BIM for public sector work. Where there is a feeling that the government will mandate BIM, there is also a feeling that the government is ‘on the right track’.

Agreement with statements...

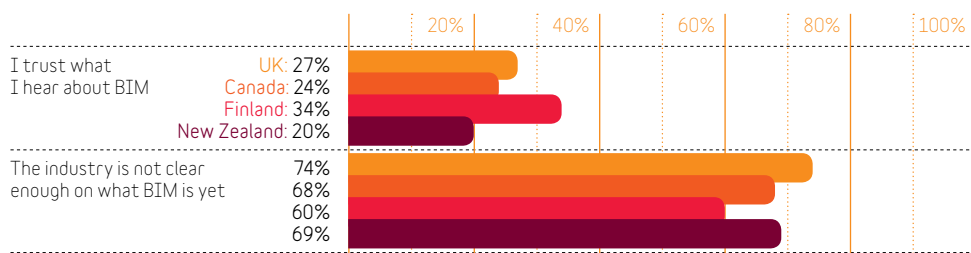


There is agreement that BIM is the future of project information, that it’s about collaboration and that it doesn’t stand in the way of bespoke design and construction.

Anticipated adoption reflects the belief that BIM is the future. We asked those who are aware of BIM whether they would be using it in the future. We found that whilst, overall, a majority use BIM now, in three to five years’ time some use of BIM will be near universal.

In every country, more than 90% of respondents expect to be using BIM within three years.

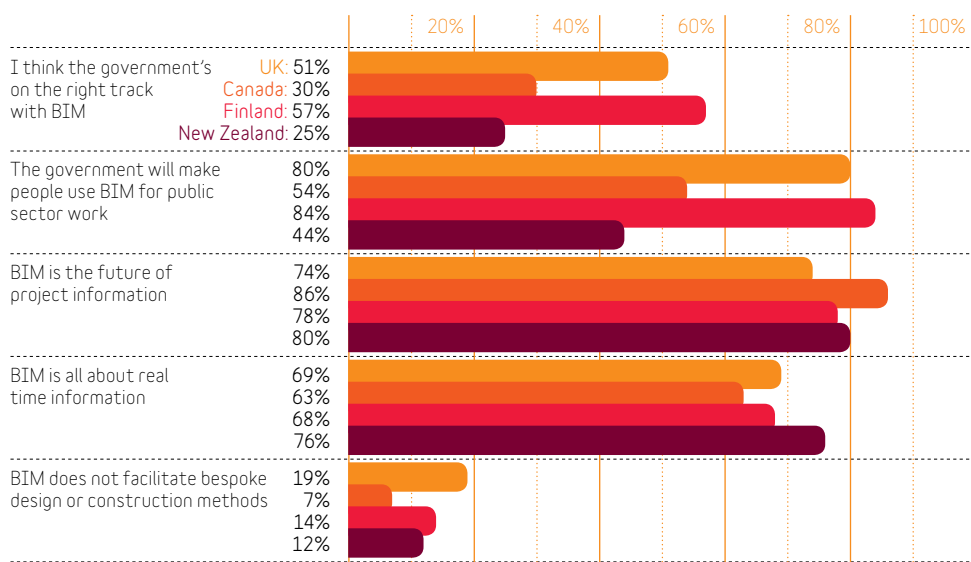
Agreement with statements...



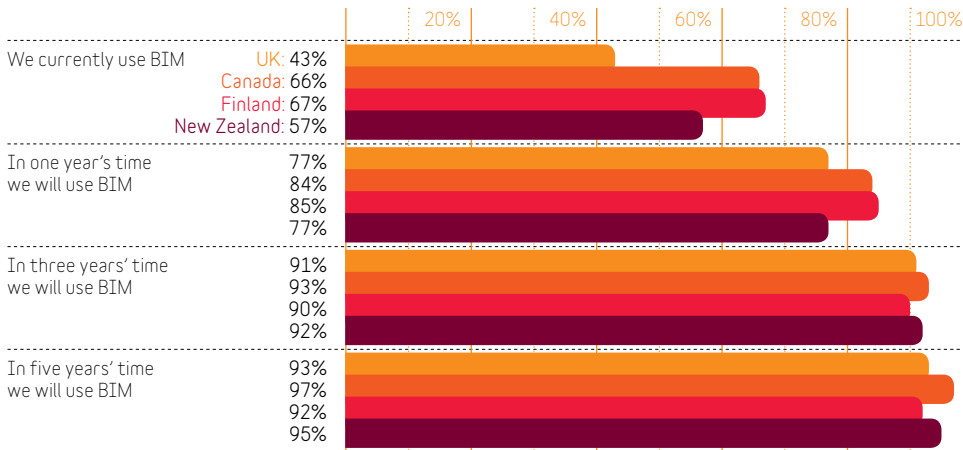
So, if the countries we have surveyed are indicative, we can expect that BIM will be required for international work in the medium term. Or, to put it another way, a failure to adopt BIM soon will mean an inability to work internationally in the medium term.

Having this level of international BIM adoption in a number of countries also makes clear the need for shared standards and the need for data to be freely exchanged between different applications.

Agreement with statements...

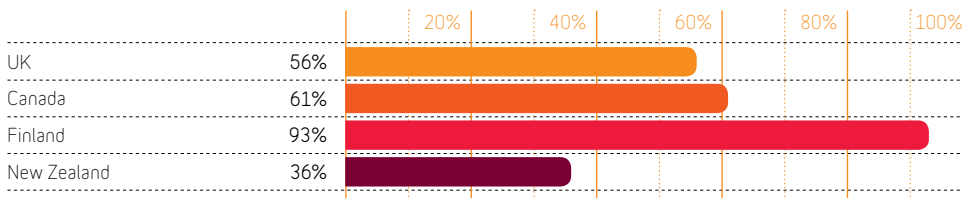


Future BIM adoption

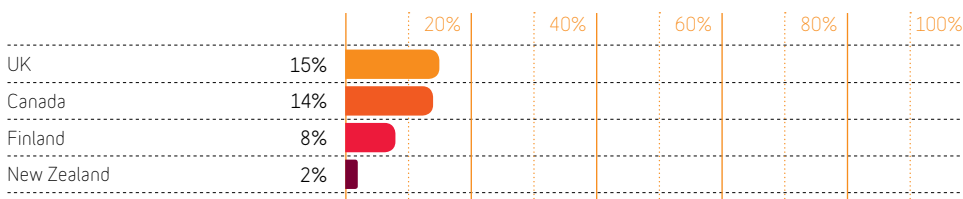


“The way in which Building Information Models can be shared across different proprietary software platforms is through Industry Foundation Classes (IFCs)... This ability to have a standardised form of information exchange may become increasingly important for inter-country working..”

Percentage of respondents who use IFC on their projects



Percentage of respondents who use COBie on their projects



IFC and COBie

The way in which Building Information Models can be shared across different proprietary software platforms is through Industry Foundation Classes (IFCs). This file format is vendor neutral and so allows models to be shared and worked on independently of any specific piece of software. This ability to have a standardised form of information exchange may become increasingly important for inter-country working.

We wanted to see if use of this file format is widespread. Firstly, it's worth noting that a significant number did not know whether they were using IFC formats, suggesting there is a need for greater communication here. Of those who did know whether they

used IFC formats, we found some marked regional variations. In Finland we can see that almost all respondents (93%) use IFC on their projects. This compares with many fewer (36%) of those in New Zealand. A majority of those in the UK and Canada use IFC.

One of the main benefits of BIM is delivering cost reduction, not only in the design stage, but also in the operation and maintenance of a building through its life. And it is in a building's life that the bulk of the cost is incurred.

Construction Operations Building Information Exchange (COBie) data sets are a way of delivering part of a Building Information Model to assist in managing and maintaining a building.

We found that only a minority of respondents use COBie on their projects. The UK is the leader here, perhaps encouraged by UK Government policy. But even in the UK, only 15% use COBie on their projects. In New Zealand, it is only 2%. We do expect these numbers to increase over the years in all countries.



The BIM adoption process

Across the countries we surveyed, we can see that there is strong agreement that BIM is much more than purchasing and using a piece of software. BIM requires changes in workflow, practices and procedures. We might well expect this, given BIM requires collaboration and information sharing with others and involves maintaining a single, extendable set of information through a building's lifecycle. The data suggests these changes are worthwhile.

Whilst BIM requires change, and whilst change is often resisted, we can see that overall people are not resistant to BIM. Across the surveyed countries, only around a quarter of those who have not yet adopted BIM say they would rather not. More significantly perhaps, among users across the board, fewer than 10% say they wish they hadn't adopted BIM. This suggests that adopting BIM turns out better than people might have expected. This is encouraging.

End note

In this report, we've seen that there are some differences in attitudes towards BIM in different countries. There are different attitudes toward government action and some variance in what BIM is thought to be.

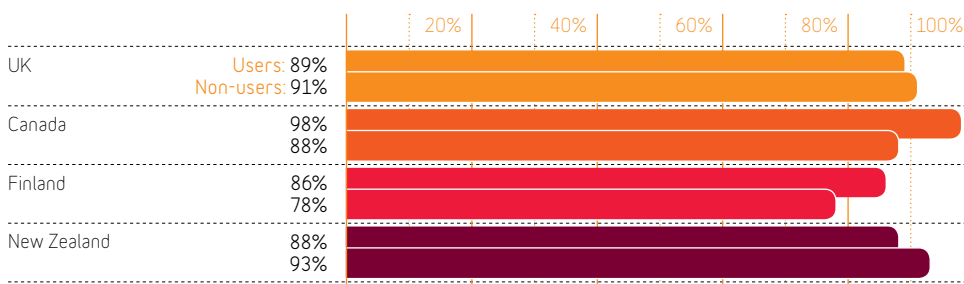
But there is more commonality than difference. In all countries, the professions see BIM as the future. We can expect an accelerating adoption rate. In three years, BIM will be the norm in all four countries.

Those who are looking to adopt BIM tend to be positive about it. Those who have adopted BIM are even more so.

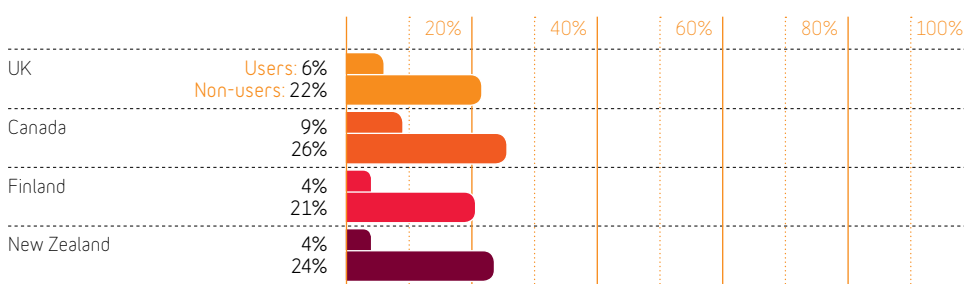
This is our first international view of BIM. We will be running our surveys again in 2014, and this will allow us to monitor trends. We invite other countries to join us. ●

“Across the countries we surveyed, we can see that there is strong agreement that BIM is much more than purchasing and using a piece of software. BIM requires changes... The data suggests these changes are worthwhile.”

BIM requires changes in our workflow, practices and procedures



I'd rather not adopt / I wish we hadn't adopted BIM



The Masterspec New Zealand BIM Survey 2013

Rolf Huber
 Chief Executive, Masterspec
 Construction Information Ltd,
 New Zealand
www.masterspec.co.nz

The August 2013 National BIM online survey followed an earlier New Zealand-wide survey in November 2011. Conducted by Masterspec in conjunction with NBS (UK) and with support from a number of local construction industry organisations - BRANZ, RMBF, NZIA, ACENZ and the MBIE-sponsored Productivity Partnership - the survey attracted 426 respondents.

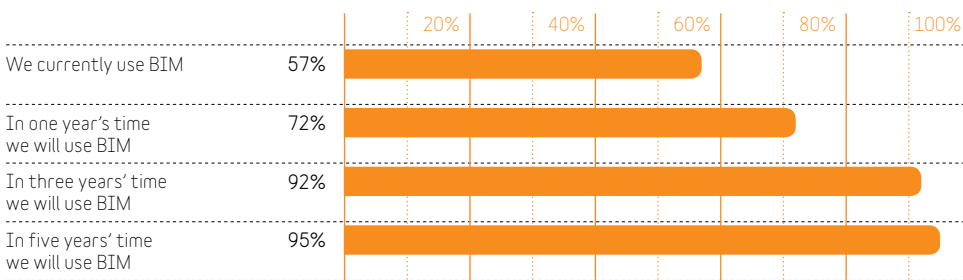
While there was a good spread of response among different industry groups there was a strong majority response from architects and architectural designers. This indicates that while the topic is of continuing interest, more work is needed before future surveys to spread the BIM word among the engineering professions and construction sector.

With the current survey following a similar pattern to the earlier survey in late 2011, it is possible to gain an insight into how the industry has advanced in its understanding and use of BIM technology.

One question in particular indicates that there has been quite significant movement:

'How would you describe your organisation's future use of BIM?'

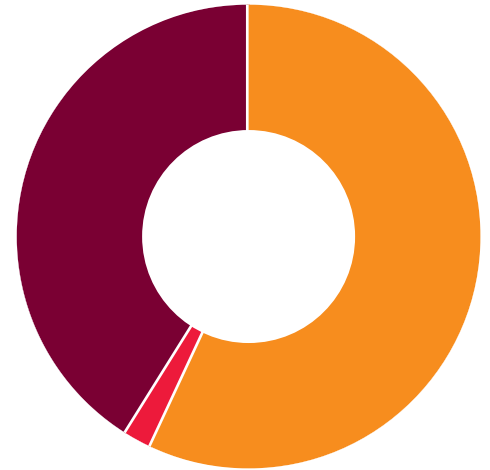
The future of BIM



This shows a steep increase in those who currently use BIM (up from 38% in 2011) and some increase in those who expect to use BIM in a year's time (up from 68% in 2011). However this result must be tempered by a continuing vacuum of uncertainty around whether BIM equals 3D CAD. Sixty-nine per cent of respondents agreed that the industry is not clear enough on what BIM is yet.

Clearly there is more work to be done to ensure that the real advantages of BIM are realised and that New Zealand avoids the danger of introducing a BIM-LITE version of this new technology. BIM requires a cultural shift; a new approach to how those involved in the built environment interact. This means that some, especially among smaller organisations, may lack the confidence to make what appears to be a radical change.

Both government groups and key industry organisations need to recognise this and ensure that appropriate support in the form of national guides and training schemes are available. Once the real benefits of BIM are revealed, confidence to make the change will follow.



Awareness and use of BIM

Aware and currently using BIM	57%
Neither aware nor using BIM	2%
Just aware of BIM	41%

Awareness and use of BIM

The answer to the survey question on current awareness and use of BIM shows that the industry is increasing its knowledge of the new technology.

A reduction from 12% to 2% among those neither aware of nor using BIM is a significant shift. This, coupled with an increase from 34% to 57% of those aware of and using BIM, indicates that respondents are not only more aware of BIM but are now actively using it, at least on some projects. The challenge will be to determine how deep the adoption is.

Moving ahead

A new question for the 2013 survey showed that not everyone's experience of BIM is the same. Nevertheless, a pleasing 36% are either reaping the rewards or going through the initial pains of adoption, with a further 49% at least considering a move.

Barriers to BIM adoption

In seeking what next steps the industry needs to take, we first need to be aware of what the current barriers might be.

Clearly the 'big three' issues are: lack of expertise (54%), lack of standardised tools and protocol (39%), and lack of collaboration (37%). Cost (34%) is a factor with any computer-based system and is not directly related to BIM adoption, which is



as much a change in attitude as the need for new, expensive tools. The high concern about 'lack of expertise' shows that industry guides and training are needed.

This question also allowed respondents to state, in their own words, what the barriers were, instead of selecting from the structured list of reasons. Fifty-three respondents answered in this manner. The responses were wide-ranging; 14 blamed finding the time, or expressed concern about the time taken to retrain, while another seven believed that BIM was not appropriate for their type/scale of project and six stated it was too early to consider adopting BIM.

While only a small snapshot of concerns, it does indicate that time and cost (17 of 53) is a significant issue for those yet to adopt BIM. Underlying this may be a need for readily available guidance and training, especially for the small and specialised consultant.

The way ahead

While the 2013 survey results indicate that the design and construction industry has moved closer to the effective implementation of BIM-based technology, there is still a lack of understanding around BIM versus 3D CAD. To be effective in leading growth in industry effectiveness and productivity, a Building Information Model must be interoperable among the current range of software tools and also capable of providing a rich source of data. It must be, and be seen to be, more than a simple geometric view of a building project. Government via MBIE, the Productivity Partnership, and the industry in general are beginning to address the challenges involved in coordinating a successful move to BIM. Work has commenced on a National BIM Guide document and the recent National Online Consenting Project report outlined the specific deliverables needed to ensure that rich project models can be accommodated. However there is still much more to do.

A. Agreement on a **national, neutral classification system for BIM objects**. With CBI (Coordinated Building Information) being currently the only national construction classification system in use, it would be logical for this to form the basis of any new approach to classifying construction objects and elements.

B. A **national library of BIM objects**, to provide both consistency and certainty. Significant advances have been made in the UK which could be readily adapted for New Zealand industry conditions. However, significant funding would be required as such a resource is unlikely to be financially sustainable.

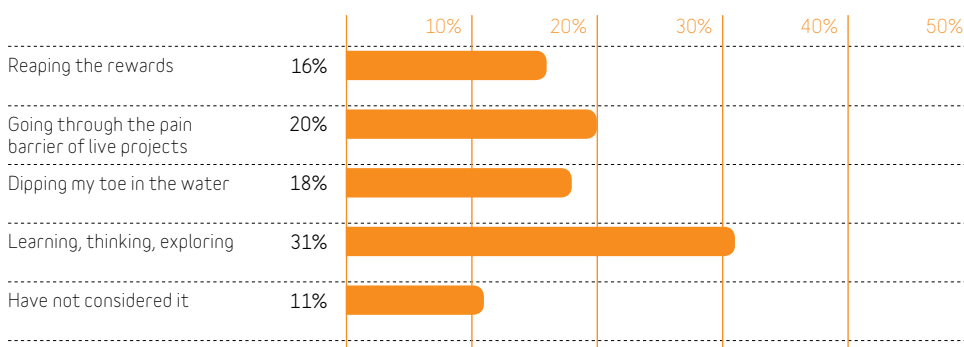
C. The need for **education and training** at all levels of using BIM technology.

D. **Research into what impact the implementation of BIM would have on design and construction teams** operating in this new environment. This work would highlight the challenges to be met under a more collaborative approach to design and construction, including the need for new forms of client/designer/contractor contracts.

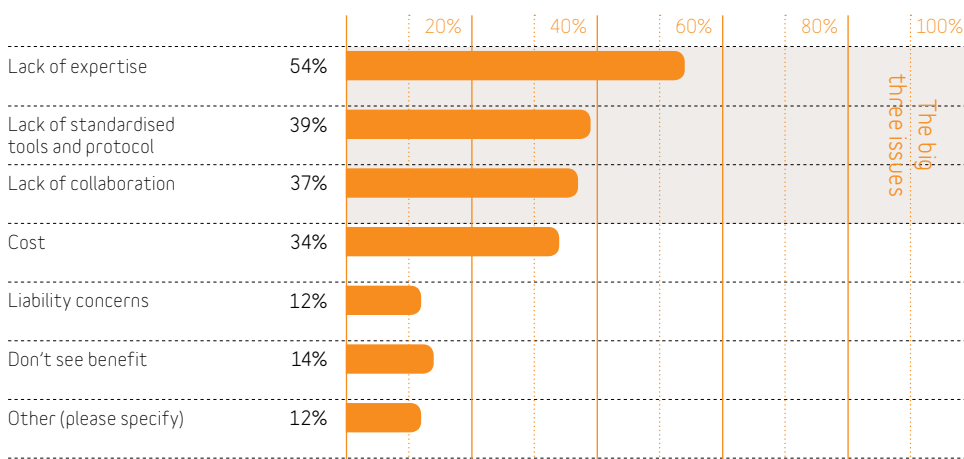
E. Investigate the establishment of **project-based liability insurance** cover to reduce the risks associated with an integrated approach to design and construction. This work would be affected by any move to change the current joint and several liability regime.

The key roadblocks to the successful implementation of BIM-based technology continue to be lack of expertise (i.e. the need for training and support) and lack of standardised tools and protocols, leading to difficulties in full collaboration through the design and construction chain. Cost is of concern to 34% of survey respondents, but this would be alleviated if appropriate support and guidance is available for participants to both see and then realise the full benefits of BIM. ●

Where on the BIM journey are you?



What are the main barriers to using BIM?



The Digicon Canada National BIM Survey 2013

David Watson
CET, FCSC, CSP President,
Digicon Information Inc.
www.digicon.ab.ca

Digicon/IBC 2013 National BIM Survey analysis

Digicon is very proud to have collaborated with the Institute for BIM in Canada (IBC) to conduct the latest survey on Building Information Modelling (BIM). The template for the questionnaire was the third National BIM Survey (NBS) developed in the UK and modified slightly for the Canadian market.

This survey is more detailed than the previous one prepared by the Canadian Construction Association (CCA) in 2011.

Completed between February and March 2013, 78 people from a range of disciplines and company types responded. The raw survey results may be viewed on the Digicon and IBC websites, in the format of a PDF slideshow. This analysis has been broken into two primary areas: an analysis of the people and an analysis of their adoption of BIM. As a result of the limited number of respondents and the relevant disciplines, the results of this survey are limited in their ability to be generalised to the industry as a whole.

Survey respondent analysis

The vast majority worked for 'multi-disciplinary' teams (32% or 25 people). This result is not surprising and in keeping with modern work environments. The exact composition of these multi-disciplinary teams is unknown and may have a significant impact on the role of architects, engineers and specifiers. A relatively low 4% of respondents have no idea what BIM is (and none of them came from the one- or two-person firms).

Significant results about the respondents

- A clear majority of respondents were aged 35-65 (79%).
- By far the most (94%) respondents work in Canada, a handful in USA/North America (5%) and only 1% overseas.
- The respondents' main disciplines include architects (12%), contractors (13%) and various types of engineers (26%). Although specifiers were not singled out as a discipline, 64% of companies (and 51% of respondents) indicated that they prepare specifications.

Type of business

- By far the largest type of business reported was multi-disciplinary (32%). Architects and Contractors were equal at 12% each while only 8% were Structural Engineers. These results are interesting since 'multi-disciplinary' does not identify any specific professional group. The various types of engineers constituted only 21% of respondents (excluding building services engineers) although 46% belonged to an engineering professional association.
- Excluding the multi-disciplinary team approach, only architects (12% or nine people) and Structural Engineers (8% or six people) are involved in the Project Development process from the conceptual stage to the end of the bidding process.
- Fifty-one per cent of respondents worked for large companies of 50+ employees. In fact, the largest percentage (23%) worked for companies of 501+ people. The large size of the companies suggests that respondents tended to come from government offices. This observation is borne out by the fact that the largest category of work was public housing (46%), health (65%), education (67%) and other public projects (82%); only work on private offices (70%) and other private (68%) reflected work in the private sector.

Within organisations

- This survey found the organizations that demonstrated the most labour-intensive activities associated with building documentation and drawing (17% of staff) were firms of 16-25 persons. This may be the turning point for organisations where the ratio of staff involved in these activities is greater than it would be as the firm grew bigger.
- On the other hand, organisations of sizes 26-50; 251-500; and 500+ reported that 12% of their staff were involved in building documentation and drawing. This translates into 1-2 people/firm: a finding that would not appear to be out of sync with common practice and may be associated with an economy of size.

Services provided by organisations included

- Twenty-two per cent produced hand drawings (presumably for early phase sketching).
- Development of project drawings was dominated by Autodesk, with 43% being generated by AutoCAD and 40% by Revit. The rest was split among a variety of others.
- Sixty-four per cent of firms provide specifications and 51% of respondent individuals indicated that they directly write specifications. Interestingly, almost half (47%) do not reference specifications on the drawings at all.
- Sixty-two per cent provided bid documents.
- Fifty-one per cent provided full design and build packages.

A relatively high percentage of firms use all popular procurement methods to deliver projects. While traditional Design-Bid-Build still holds top spot, Design-Build and Construction Management are very close behind. Partnering and Public Private Partnerships (P3) were the least popular procurement methods.

BIM activity

Today, 66% of respondents indicated that they currently use BIM. A high percentage of respondents indicated that they are hearing more about BIM and believe BIM is the future of project information, and 97% believe that they will be using BIM in five years.

With regard to the success of BIM (in today's environments and tools), more than half feel that there is not enough good information yet about what BIM really is. Only 24% of respondents



believe what they hear about BIM, and 10% believe that BIM is just a synonym for 3D CAD. The fact that 26% of respondents feel that models only work in the software they were built on suggests that BIM 'silos' are still common. Silos are two or more software applications, collaborating to communicate between themselves - to the exclusion of others. There is still a great deal of distrust that two or more software programs can successfully exchange BIM data. This is confirmed in a later question where only 52% of respondents reported exporting their data to an open format.

The two biggest secondary uses for CAD were visualisation and automated schedules. The fact that only half of respondents feel confident in using BIM further suggests that education is a very important factor to the industry's growth in this field.

A few questions inquired where designers were getting their CAD objects. It was gratifying to see that most people create what they need in-house and re-use them (83%), but we were a bit surprised to learn that some firms create objects on-the-fly for each project (54%). Of great concern is the use of bundled (pre-packaged) objects, which are typically short on detail, or manufacturer objects which may be either overloaded or lacking in detail. Digicon intends to use object 'type' information to automate specifications in BIMdrive; on the Revit side, this requires consistent and stable Revit Families.

While only 30% of people think that our government is on the right track with BIM, 54% feel that the government will insist on BIM delivery of projects. The mandatory requirements imposed by governments have proven to be the most effective in other countries (the most recent example being the UK, where BIM delivery of public projects has been mandated by 2016). In fact, the UK impetus goes a step further and requires delivery in some form of 'open BIM' format (non-proprietary data format).

This leads to the respondents' feelings about changes being brought about by the use of BIM processes. A vast majority feel that adopting BIM has improved visualization and document coordination, and it is interesting to note that those rewards rated much higher than profitability. Most feel that clients will increasingly insist on the use of BIM (although the survey did not indicate whether deliverables should be required in some form of BIM format). A majority (71%) said that contractors will insist on delivery

of BIM design files, although this won't carry much weight in a Design-Bid-Build procurement where the contractor takes whatever is offered.

When analysing the suggestion that BIM will somehow replace bills of quantities or traditional specifications, a majority of respondents disagreed. There is still a place for those activities in a BIM world. Of those firms who prepare specifications, a variety of approaches are used to link specifications to drawings:

- Three per cent use a Plug-in tool for Autodesk Revit.
- Twelve per cent automatically add keynote or specification references.
- Eighteen per cent manually add specification references to the drawings.
- Information is co-ordinated by:
 - Nineteen per cent by classification reference only;
 - Sixteen per cent by classification reference and title only; and
 - Twenty-six per cent put full descriptions on drawings without a specification.

The topic of BIM specifications is a relatively 'new' field globally; very few companies in the ICIS (International Construction Information Society) circle of members have operational BIM specification software. We suspect (somewhat from experience with development of our own BIMdrive software) that the major hurdle in the way of BIM specifications is the fact that drawings and specifications are complementary documents, and therefore common terminology (requiring two-way communication to enforce) **must** exist between them. Another major difference between us and the rest of the globe is that in North America, specifications are largely 'narrative' (natural

language) documents; European specifications are very concise and tightly structured documents (ideal for database implementation).

At the other end of the scale, 9% of those who adopted BIM felt that they wish they hadn't. No doubt these respondents exerted the effort to learn the new technology, and did not realise any benefit. In future, this question should be enhanced to find out why.

For firms who have not yet embraced BIM, it will be of interest to note that all but 2% of respondents indicated that adopting BIM required changes in processes.

Summary

The results of this survey may have been influenced by the number and experience of the respondents; it is this author's feeling that most respondents were familiar with BIM, and the results reveal a state of affairs from their point of view. What we did confirm is that those firms use a variety of project delivery methods, they utilise the obvious benefits of 3D CAD modelling (visualisation and schedules), but true collaboration still eludes even the experts among us. In particular, BIM specifications are still in their infancy (they are coordinated with drawings largely using manual methods).

It is gratifying to see that despite bad experiences (9% wish they hadn't started), 97% of respondents thought that BIM would dominate their future in five years. Digicon's research into BIM led to the development of BIMdrive; we continue to look for ways to improve tools for specifiers to do their job effectively, and look forward to improving the communication of project data between all project team members. ●

Notes

A series of horizontal dashed lines for taking notes.

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