

NBS National BIM Report 2014



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“The UK is in an enviable position of being among the world leaders in BIM adoption and implementation. The industry backs the Government’s BIM direction. Through BIM, we now have the tools to create, use and share information effectively.”



We would like to thank the following organisations for supporting this report by circulating the survey to their members:

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Introduction

Richard Waterhouse

CEO, NBS and RIBA Enterprises

The release of this year’s NBS National BIM Report marks a watershed for the industry. BIM is now an industry norm.

We have two years until 2016, the year the UK Government’s mandate for Level 2 BIM for publicly funded work comes into force. The survey shows a majority of the industry has now adopted BIM, using it for at least one project in the last year. We have travelled some distance since we started monitoring BIM adoption in 2010, when only 13% were using BIM and 43% were unaware of it.

Those who have adopted BIM continue to tell us about the real benefits it delivers:

- For the design team, there are clear benefits of collaboration, visualisation, coordination and information retrieval. This readily translates into increased cost efficiencies and profitability.
- For manufacturers, accurate product information can be delivered into the heart of the Building Information Model through the creation and delivery of information-rich BIM objects. These objects have the potential to determine not only product choice in construction, but persistence and correct maintenance through a building’s life.
- For clients, an information-rich model allows design outcomes to be modelled and agreed early in the building lifecycle, at the briefing and design stages. The lifetime performance of a building can be maximised, and efficiencies delivered, with standardised information delivered in COBie drops. Landings are made softer. Client outcomes are improved.

The UK is in an enviable position of being among the world leaders in BIM adoption and implementation. The industry backs the Government’s BIM direction. Through BIM, we now have the tools to create, use and share information effectively and these tools are necessary if we are to realise the Government’s construction strategy.

But there is work to be done. In spite of continued development of UK BIM standards and protocols, there remains a lack of clarity in the industry about BIM. There is a real need for BIM training and professional development and this need will only increase as BIM becomes a reality for more practices and as we move deeper towards Level 2 and 3 BIM. Some small practices may feel excluded from the BIM journey and the report explores this theme in some detail. But among those small practices which have adopted BIM, real benefits are beginning to accrue.

Whilst the extent and depth of BIM adoption has changed over the last four years, the fundamentals have not. The heart of BIM is information. The extent to which the information in a model is accurate, content rich and standardised relates exactly to how useful the model will, or will not, be. 3D representations of geometric data draw the eye and are integral, but it’s the information that stands behind the representations that gives us real value in the design, construction and building handover stages. High quality information models reduce risk, and save time and money.

Here at NBS we continue to develop and improve tools to assist the BIM journey. In winning both the ‘Construction News BIM Initiative’ award for the NBS National BIM Library, and the ‘Digital Built Britain’ award for NBS Create, we have demonstrated our delivery of high quality, standardised information to support the industry in BIM adoption and use.

The journey continues. We’ve come a long way in four years, and we look forward to seeing the Government’s BIM strategy become reality. ●

Standardisation: The spice of life

Ian Chapman
Director of National
BIM Library, NBS



It is often said that variety is the spice of life, but the reality is that we live in a world that is defined by standards, many of which we take for granted. Where would we be without standardised batteries (IEC 60086-2), standardised car tyres (ISO 4000-1), standardised credit cards (ISO/IEC 7810), standardised MP3 audio files (ISO/IEC 11172-3) and standardised units of measurement (ISO 80000-1)? March 2014 saw MEPs approve a new EU directive aimed at reducing unnecessary electronic waste and replacing costs for consumers. It is estimated, for example, that the 30 different types of mobile phone chargers produce 51,000 tonnes of e-waste every year. Some disagree with this approach, claiming it will stifle innovation; but reducing the variety of chargers around the home has to be a good thing and innovation is only stifled if the standardised unit is not allowed to develop. Good standards provide clear requirements that set minimum conformity specifications and strike the right balance between too many and too few varieties; this works in the best interests of both the product supplier and the consumer. Whilst standards often define minimum requirements, products may often exceed these requirements and offer enhanced levels of performance. This is a good thing; successful innovation relies on improvements from a good common standards base.

Early standardisation examples include the British Standard Whitworth screw thread devised by Joseph Whitworth in 1841 and the standardisation of railway track widths which enabled mass production of track couplings and signaling devices. Standardisation is often driven by the need to mass produce, but standards serve many purposes. They enable trade, improve safety, facilitate efficient use of resources, reduce time, improve quality, permit compatibility and aid integration. Businesses and consumers benefit from them the world over. The benefits of standards for manufacturers include: streamlining the manufacturing process, reducing waste, lowering production costs and reducing variety of stock. For consumers standardisation offers greater value for money, fitness for purpose, safety, product quality and a means of accepting or rejecting goods or services based upon conformity to a standard.

Standards exist at various levels: international, national, regional, company and professional. There are over 30,000 current British Standards alone and NBS specification content is affected by an average of 150 British Standard revisions each month, a task that takes the NBS technical team many hours of updating work to complete.

In the world of BIM, the BIM Task Group has published a variety of standards including COBie 2012 UK, PAS 1192-2 (Specification for information management for the capital/delivery phase of construction projects using building information modelling) and PAS 1192-3 (Specification for information management for the operational phase of construction projects using building information modelling). These encourage standardisation and are focused on the production, exchange and use of information as the means of delivering improved performance across the whole life of a building. Vast amounts of information are created during the construction phase but much is lost or wasted. We need to safeguard against information loss and start managing and analysing information digitally. BIM is not architecture; it is data management.

The NBS National BIM Report 2014 shows more and more buildings are being 'built with BIM' and this provides us with a fantastic opportunity to revolutionise the way in which we interact with the information concerning a building. To achieve this we need to standardise the digital building blocks used to create virtual buildings. These building blocks are commonly known as BIM objects and they are valuable digital assets.

BIM objects represent the construction products that form a built asset. Unlike consumer products, there is very little information standardisation between construction products, which makes comparing them very difficult. Selecting and purchasing a camera is made easy by the retailer. They establish standard properties that are typical of these devices and representative of the primary purchasing decisions. For each product, they capture and share the values with the consumer, making camera comparison effortless. If cost is more important than megapixels then the choice is obvious. This is only possible through standardised information property sets. This standardisation of information is at the heart of the UK BIM strategy. The information exchange

Relevant survey statistics →

Only 24% agreed that the current level of standardisation is right, suggesting that the construction industry needs to implement a greater degree of standardisation for BIM adoption to be successful.

facilitated by the staged COBie data drops is all about collecting information that can be compared in various ways. With COBie, construction data can be compared across project stages; typical questions are: Has the cost changed? Has the delivery time improved or reduced? On a broader scale, being able to compare construction data across numerous built assets will help to achieve greater whole life value. By comparing project to project, data optimisation becomes possible, lessons can be learnt from what works well, and this knowledge can influence future projects, refurbishment works and maintenance activities.

A BIM object is a combination of many things:

- Information content that defines the product.
- Geometry representing the product's physical characteristics.
- Visualisation data giving the object a recognisable appearance.
- Functional data, such as detection zones, that enables the object to be positioned or behave in the same manner as the product itself.

For each of these BIM object essentials it's important that a standardised approach is taken, as creating digital buildings using a consistent kit of parts will yield all of the benefits that standardisation brings. Objects will be efficient to use, more easily comparable and will be interoperable.

From the outset, the NBS National BIM Library set an industry standard. NBS created objects with a core property set that:

- Aligned with COBie 2012 UK.
- Adopted a consistent approach to classification.
- Provided a simple integration with NBS Create.
- Applied a standard naming convention to objects for ease of use.
- Standardised approaches to the level of detail and object presentation.

All of which support efficient workflows and enable the creation of high quality digital building assets.

By standardising the information within objects, they can be compared and an appropriate selection for the project made. Common approaches to the modelling of the physical characteristics of products make the BIM objects simple to use, affording the designer a reliable, consistent and intuitive experience. The hard work is in the detail; for example, BIM objects in IFC format. These IFC files are manipulated so that they have their information properties consistently grouped and organised; this makes their use in various BIM softwares straightforward and consistent. Another example is the use of standardised properties. The benefits of this become obvious when using objects from more than one manufacturer in the same project. When creating schedules that span products from many manufacturers, the use of a standardised property set enables information relating to each of these products to be displayed in a single column, much in the same way as the number of megapixels is listed when comparing cameras. This is the start of the common data environment.

Whilst no two products are the same, the construction industry must work to achieve a common data environment, one that defines the important and useful characteristics, enabling information exchange and use. The work NBS has completed with its own information, together with the prototyping NBS provided to the labs area of the BIM Task Group (www.bimtaskgroup.org/task-group-labs-portal/) demonstrates that achieving standardised product templates with clear information requirements for each project stage is possible. Through Technology Strategy Board (TSB) funded activities, such as the recent 'A digital tool for building information modelling' competition, we can expect to see a comprehensive common data environment becoming a reality.

In the pre-CAD days, standardised pencil leads (ISO 9177-2) were used to create consistent line thicknesses on drawings so that information could be conveyed clearly and precisely, but times have changed. The shift from standardising the tools of the trade to standardising the information of the profession can and will make BIM a success. ●

“The NBS National BIM Report 2014 shows more and more buildings are being ‘built with BIM’ and this provides us with a fantastic opportunity to revolutionise the way in which we interact with the information concerning a building.”

Data validation and extraction: The challenge beyond geometry

Dave Monswite
Associate Director - Building
Information Modelling,
Turner & Townsend Cost
Management



“At Turner & Townsend, collaboration, understanding and communication are the most effective tools we have used so far on our BIM journey.”

Since the previous NBS National BIM report in 2013, Turner & Townsend have seen a rapid acceleration in both understanding and application of BIM in all our operating sectors. Across our global business we encounter every variant of BIM, ranging from 600,000 tonne offshore vessels to luxury car showroom rollouts.

Many are surprised to find that BIM is not new to our Cost Managers - BIM has been a fundamental part of how Turner & Townsend has operated for many years now, using techniques and toolsets developed in our Natural Resources sector where the concepts of data management, validation and extraction are commonplace.

From our experience, we know that good data and information management is the key to unlocking the real benefits of BIM, but the sheer diversity of the design team approaches, objects and platforms is still the real challenge facing quantification from BIM.

Counting bricks... or welds?

Cost consultants are often criticised for being late to the BIM party, but it's important to consider what we actually need to do with BIM data to make it useable in an industry that is still evolving around the idea of data alignment.

Traditionally, as a profession, we apply complex measurement rulesets, such as the RICS new rules of measurement, to design information in order to extract information from data in a format and taxonomy that can be utilised by the supply chain on a consistent basis. Remember, we don't design anything; we just receive and interpret information from others.

Taken a step further, carbon calculation, value and risk management, waste minimisation, and a myriad of other metrics are then dependant on this reliable, structured information to be effective.

It's easy to think of this as 'counting bricks', but the normalisation of design data through rules of measurement into information has been a cornerstone of QS practice for many decades. Consistent application of rulesets is essential to communicate commercial intent to all levels of the supply chain who make their business-critical decisions based upon the application of their data to our information.

Measuring the welds on the complex pipework of a gas platform in Toronto differs significantly from that of the mass concrete underpinning of a station concourse in Birmingham, but the datasets we interpret could have been authored in the same way, or federated from multiple sources, each with their own idiosyncrasies.

Variations in the way authoring platforms treat objects or export neutral formats, such as Industry Foundation Classes, can have a significant effect on our ability to interpret and extract data with the consistency we need to apply for procurement.

Every time a different practice then applies their own 'standard' to the upstream data, we have to start from scratch, and often it is this that drives the behaviours of the QS practitioner toward the traditional paper-based outputs.

The use of information to make commercial and operational decisions is a key activity at every project stage. Clients demand predictability of cost and schedule - often a business case or development appraisal depends on certainty of outcomes right from the beginning of the project process. We have had to evolve in the way we handle the 'big data' across all our offices, and the application of that, to facilitate the decisions our clients need to make.

Put simply, the inconsistent application of data in the modelling process can negate any benefit we get from the designers' BIM, as the resource and technical input needed to transform data each time can outweigh the cost and time constraints of traditional process. To compound this, the rulesets we apply are determined by location, sector and taxonomy.

In summary, what has changed is the type of data we are presented with from the designers, and when we get it. Typically this is rich 3D-based data with variable structure, defined earlier in the design process, from which the traditional process outputs of drawings or schedules are generated.

In other words: BIM.

Relevant survey statistics →

COBie allows the design team to use a Building Information Model to embed and then deliver information that supports the use and maintenance of a building... Only a minority use COBie, 23%, but the number is growing.



Validating an inconsistent world - our 5x5 approach

In our world, and that of our clients, the BIM authoring platform has to be irrelevant – we must deal with data in whichever form it comes, aggregating and transforming that data into information.

Cost Management is driven by consistency, and often this can be at odds with the rapid development of the tools, techniques and understanding of BIM in the wider construction industry. Change of this magnitude is often difficult to take on board, especially when design teams may not be entirely confident and settled into their own new production processes.

Data validation – five ways

We utilise a variety of processes to help the design team produce high quality data that can be used in a structured manner to achieve the client's objectives. The simplest one is that of early engagement – we communicate what is needed and help to embed it in team practice.

This has multiple benefits to all parties: once good data hygiene is established upstream, the efficiencies are cascaded throughout the project, right into the asset model.

Validating the suitability of that data for BIM beyond geometry is then a critical activity in the development of outputs from the model.

We apply a series of checks on extracted data and the model itself using in-house authored tools to five key areas of validation:

- Commercial metrics – does the extracted data benchmark favourably against established client KPIs such as GIFA or occupancy levels?
- Level of development – does the model data support the uses that are required of it at the right stages?
- Model quality and coordination – has the authoring been consistent and coordination applied?
- Commonality of components and design management – have efficiencies been driven into the process at every stage and are the right parameters embedded?
- Model data – is it complete and correctly structured and are parameters correct?

These checks are carried out at the five defined 'information exchange' (COBie drop) points to provide assurance both internally and to our client that the data is sound.

Critically, this should be a transparent process wherever possible; each team member needs to understand what is required of their data by the other users, and assurance checks should be part of a continual improvement cycle.

In our experience so far, Cost Management and BIM work together extremely well, with model data extraction supporting the development of cost information with structured conversion and interventions.

For Turner & Townsend, with the right data conversions and output consolidation processes in place, we are seeing real benefits, including improved efficiency and accuracy in bulk quantification, which allows us to enhance our service to clients.

For the QS profession, BIM must be embraced fully to get any real benefits from the data within the models. At Turner & Townsend, collaboration, understanding and communication are the most effective tools we have used so far on our BIM journey.

To conclude, BIM brings huge benefits to the cost manager, but only if we communicate our needs and understand how data is actually authored and structured by those that we need to collaborate with. The QS profession will lose those benefits if we rely on our existing ways of working in a new world. As LP Hartley wrote in *The Go-Between*: 'The past is a foreign country; they do things differently there'. ●



Validating the suitability of model information



Project OVE

Casey Rutland
Associate Director,
Arup Associates



Andrew Duncan
BIM Manager, Arup



Andrew's image has been produced through laser scanning



The study of human anatomy has traditionally been the domain of physicians, dentists, physiotherapists, nurses, paramedics, and other health professionals. What happens when you let building designers have a crack at replicating it?

Project OVE

Arup is globally renowned for challenging the norm and producing innovative solutions to complex problems. We identified the need for an exemplar BIM project to generate a global appetite for change, but with consistent methods and processes. This would then allow us to promote the benefits of BIM both internally and externally.

In order to do this properly, we needed two things:

- Engaging case studies that demonstrate the real advantages of BIM.
- Documented workflows from these case studies for other teams to implement on their own projects.

Arup has a number of projects that demonstrate advanced BIM solutions, but capturing best practice examples that articulate exactly how BIM provides tangible value on projects is a challenge. Upon completion, project teams are redistributed to the next project and documenting success stories from the last one tends to require a high-level appraisal. In addition, as in the wider industry, storing and sharing internal 'best practice' BIM guides for reference by the wider firm is rare. Project OVE is one solution Arup is using to address this challenge.

Project OVE provides a tangible, engaging and innovative example of the benefits that can be realised by fully embracing BIM workflows. The resulting processes are substantially more efficient than many of the legacy workflows that persist across the industry, and they are easily implemented on new projects using standard software.

Buildings exist to cater for the needs of humans and therefore replicate many of our anatomical systems. We're not the first to do this by any means, but with BIM in mind we mapped the body's systems to objects and systems usually found in buildings. Upon completing this process with relative ease, we concluded that our project 'had legs'!

Throughout the entirety of the project, we stuck to three main principles:

- Keep the project's geometry as true to the human anatomy as practically possible (in order to preserve the concept).
- Use BIM software and processes for as many applications as practically possible.
- Only use processes that we could reuse on real projects.

In that sense, the processes became the deliverables. The methods that we used to produce the model are the valuable elements of the project and the human aesthetic is the hook that gets people enthused to know more about it.

So what did we manage to achieve?

Architecturally, Arup Associates took the lead, and as we had the human form as a base point, we took Andrew Duncan and measured him using a laser scanner. The method of then processing and converting that data to usable, adaptable, parametric geometry was a valuable part of the project and the first of our 'best practice' guides. Having decided upon a use for the building (to determine MEP principles, etc.) we produced a 35-storey, 170m tall architectural concept that exposed a structural diagrid to represent the human form.

Once this solution had been agreed, the team was able to implement a highly efficient workflow that sought to simplify the design of complex steel structures by streamlining the transfer of modelled and analysed elements through a number of different structural software packages. In following the architectural concept, we automatically cut the mesh into 35 building storeys, defined a parametrically adjustable structure based on these contours, analysed each of the structural members created by this model, and exported each component as fabrication-ready building elements before finally passing them through to Revit (via IFC) for multidisciplinary coordination. This workflow allowed the team to draw on the benefits of each

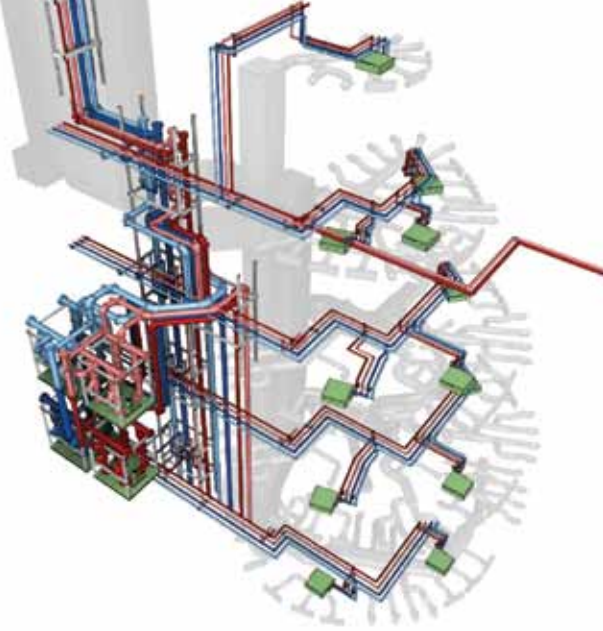
Relevant survey statistics →

61% of users found that BIM brought cost efficiencies, 52% that it increased the speed of delivery and 45% agreed that it increased profitability.

individual software package without limiting them to the disadvantages associated with any one of them. However, passing information between software in this way could have proven a significant disadvantage if the building design had changed, so the team also ensured that these processes were bidirectional.

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In terms of Project OVE's innards

We consciously decided to use Autodesk Revit for all of the building services as this is the primary platform used by Arup for MEP modelling, unlike structural modelling, which is more varied. Using the standard duct system features, we were able to calculate the total amount of air required by each ventilation system in the model; this is nothing special: many engineering consultants are now using this functionality.

However, we embedded formulae into the mechanical equipment families to automate a vast array of calculations that rely on the total airflow. We established that it was possible to use the total airflow to calculate the heating and cooling loads for each piece of equipment in the ductwork system, alongside the water mass flow rates required by this equipment to meet the calculated loads. This is innovative in many ways:

- It automates what would previously have been a series of manual calculation processes.
- It links the calculations to the geometry in the model, keeping both synchronised.
- It links the ductwork system to the pipework system so that a change in one automatically updates the other.

In addition to this, we used the airflow to automatically report the acoustic performance of each fan and air terminal in the ductwork system, and developed a workflow for splitting pipe or duct systems into chunks that were more representative of the way we lay out systems on a schematic.

Not only are the processes developed on Project OVE highly efficient and innovative, they also present a huge opportunity for us to improve the quality of the buildings that we design in the future. They demonstrate clear and tangible reasons to prioritise the production of a well structured and data-driven model over traditional 2D drawings with unlinked spreadsheets, specification and reports.

The reality for Arup, as with the rest of the industry, is that we exist in the space somewhere in-between BIM adoption and business normal, but we hope to keep using Project OVE (our engaging and slightly 'out there' BIM exemplar project) and other internal initiatives to keep driving the industry's capability forward, one BIM Man at a time. ●

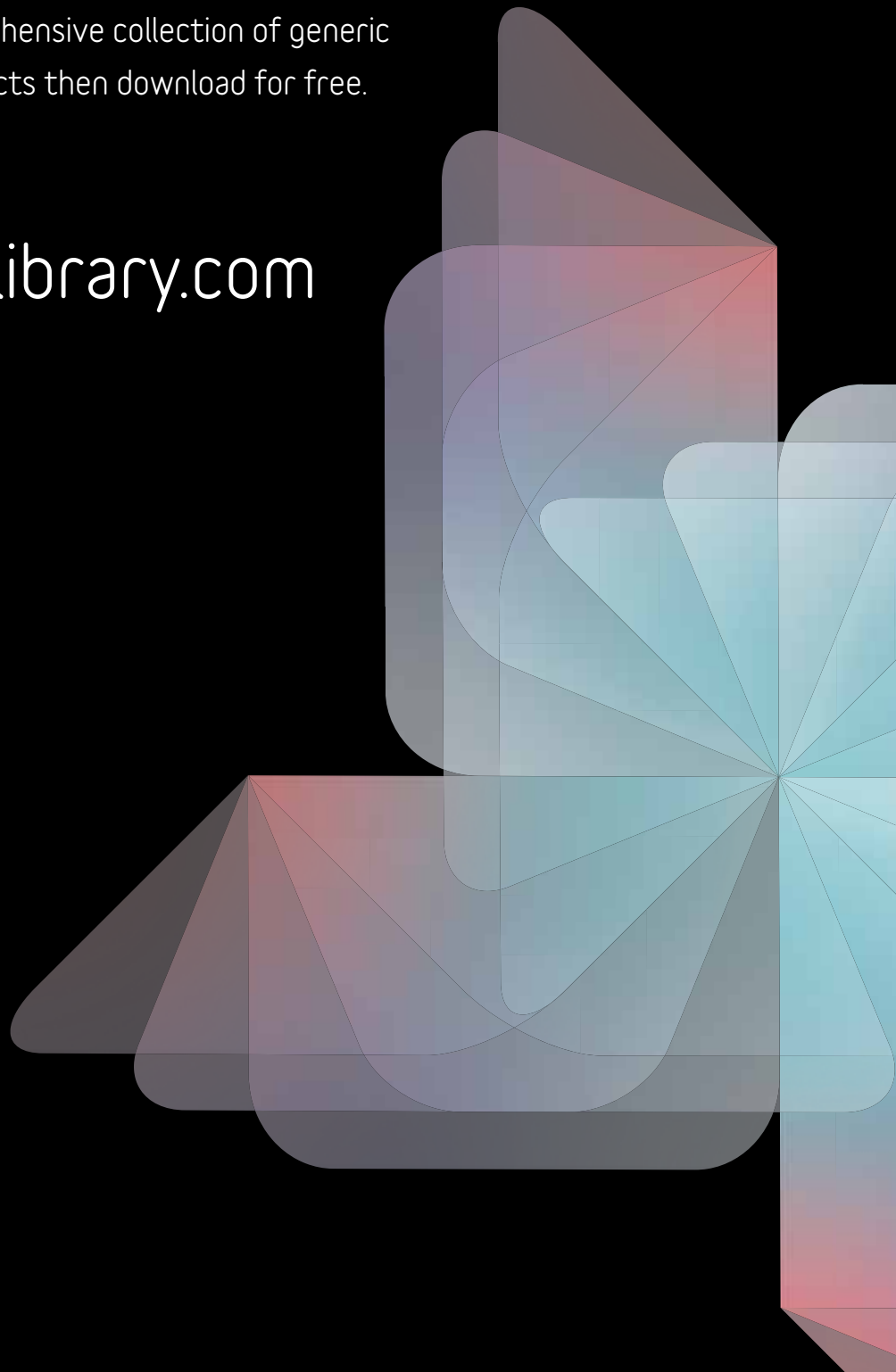


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and manufacturer BIM objects then download for free.

nationalBIMlibrary.com



BIM Survey: Summary of findings

Adrian Malleson
Head of Research, Analysis
and Forecasting, NBS



“BIM is already the
future - and it is here today.”

Introduction

This is the fourth NBS National BIM report. We first carried out BIM research in 2010. The results suggest we are at tipping point. BIM is moving from being a niche practice to a process adopted, for at least some projects, by a majority.

This is significant. Since we first ran the survey, we have seen the UK slowly emerge from the worst post-war recession, the publication of the UK construction strategy, and the rapid development of tools to support the BIM process.

The Government construction strategy sets out a range of ambitious targets:

- 33% reduction in the initial cost of construction and the whole life cost of built assets.
- 50% reduction in the overall time, from inception to completion, for new-build and refurbished assets.
- 50% reduction in greenhouse gas emissions in the built environment.
- 50% reduction in the trade gap between total exports and total imports for construction products and materials.

Improvements in productivity like these come from innovation. Much of the innovation we have seen over the last few years has come through advances in how we collect, aggregate and repurpose data so that we can both do new things, and do old things better. BIM is an example of this. An innovative construction industry is one ready to make up the ground lost in the recession. By mandating the use of BIM in publicly-funded projects by 2016, the Government shows that it sees this. BIM is a cornerstone of its strategy.

This report presents the findings of our fourth survey. We look at BIM adoption and professionals' attitudes to it. We look at how people have found the processes of adopting BIM, and how that compares to the attitudes of those who have yet to do so. This year, we also spend a little time exploring the views of smaller practices.

A clear picture emerges. BIM awareness is now nearly universal. BIM adoption is growing year on year and, for the first time, the majority of those who took part in the survey have used BIM on at

least one project in the last year. The expectation is that within three to five years, BIM use will be almost completely universal.

Professionals are positive about BIM and feel that the Government is on the right track. Confidence in BIM knowledge and skills is increasing, though still has a way to go. A minority remains unconvinced about BIM.

There is insufficient clarity about what BIM is, although this is improving, and there is much shared understanding. There is agreement that BIM is not just software. BIM is not just CAD, or geometric data. BIM is a collaboratively generated and maintained, data rich, information source for the life of the design process and beyond. In the future, we will see the greatest value derived from BIM in the use and maintenance of buildings.

We carried out the survey in late 2013 and early 2014. Once again, we had an excellent response, with over 1,000 construction professionals from a range of disciplines completing the survey. This makes it the most comprehensive, cross-discipline assessment of BIM in the UK.

The report gives us a description of where BIM is now. It also describes the changes that have been happening over the last four years. We can track these changes because the survey includes a set of core questions that we ask each year.

As in previous years, we are grateful to those of you who took the time to complete the survey – without the responses there could, of course, be no report. The comments people left in the text boxes gave us vivid illustrations of the individual views and experiences that lie behind the percentages. The BIM journey isn't a single path, and every practice has its own story to tell. We've used the comments to breathe a little life into the raw statistical findings.

We're also grateful to the many professional bodies that publicised the survey to their membership. This kind of assistance is vital to providing a rounded set of findings where all professions have a chance to put forward their views – particularly as collaboration is at the heart of BIM.

Let us now turn to the detailed findings.

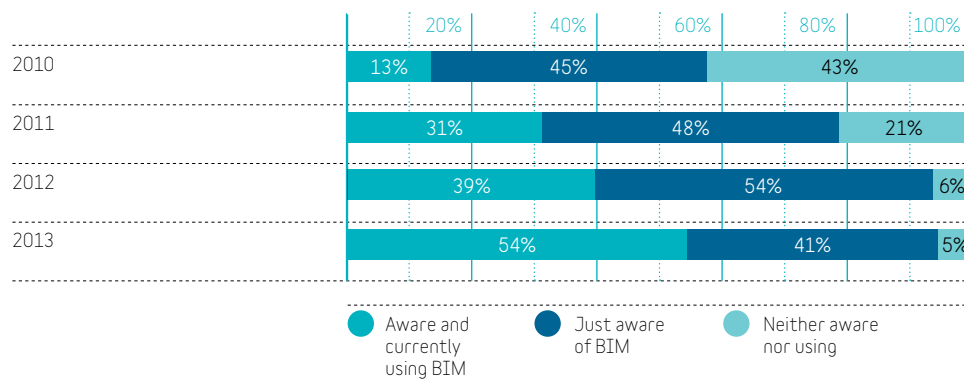
BIM usage and awareness

Awareness of BIM is now nearly universal. It has risen from 58% in 2010 to 95% in 2013. Now only 5% of participants are unaware of BIM. Contrast this with 2010, when 43% of respondents had not heard of BIM. This rise may be because the Government has mandated use of BIM for publicly-funded projects by 2016, less than two years away. Awareness has increased, and so too has adoption. In 2010 BIM was very much a specialism of a small number - 13% - of practices. Now the majority of practices have adopted BIM. In the last year, 54% had used BIM on at least one project. That's 15% more than last year.

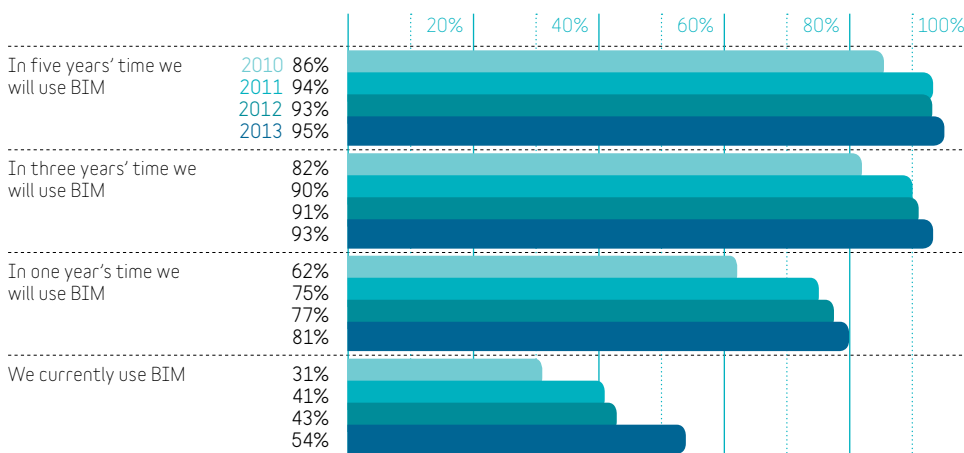
We went on to ask those (and only those) who were aware of BIM about their current and future BIM usage. We excluded those who were unaware of BIM, or unsure of their answer, from the percentages. Just over 93% predicted that in the next three years (i.e. by 2016) they would be using BIM, and 81% that they would be using it in one year's time. The Government's BIM mandate for 2016 may be a spur to BIM adoption.

The data from the last four years suggests that being aware of BIM is a stage on the way to BIM adoption. If intentions become reality, some degree of BIM use within practices will become the norm. Looking at the data, it's striking that the adoption rate now is more than that projected by those who were aware of BIM in 2010. The Government's target is not looking far-fetched.

BIM Usage and Awareness over time



Projected use of BIM among those aware of it



Percentages exclude those unaware of BIM or unsure of their answer

“I believe BIM will be required on Government projects from 2016. That is when we will be forced to adopt BIM.”

Attitudes towards BIM

We wanted to find out what people felt about BIM: their attitudes towards it. In the past, we have found that most (though not all) people are positive about BIM. This continues.

As last year, around four fifths of people tell us that BIM is the 'future of project information' and that 'the Government will make people use BIM for public sector work'. Forty per cent see that a Building Information Model needs links between geometric and specification information.

There is no evidence that the majority of people resent or want to resist the Government's BIM strategy. Fifty eight per cent agree that the Government is 'on the right track with BIM', whilst only 16% disagree with that statement.

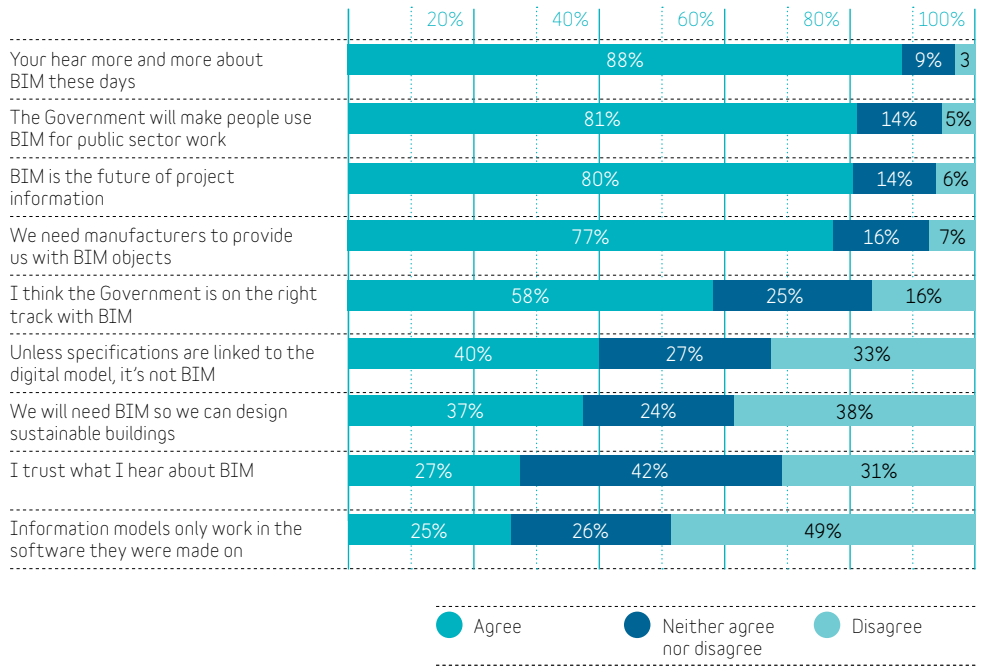
As designers move from BIM awareness to BIM implementation, they are starting to turn to manufacturers for details of their products in a BIM-ready format. More than three-quarters tell us that they 'need manufacturers to provide us with BIM objects'.

There is a level of scepticism about the information available for BIM. Only a third tells us that they 'trust what they hear about BIM'. This year we wanted to dig a little deeper here and find out, with such levels of distrust, where people turn for BIM information. So we asked.

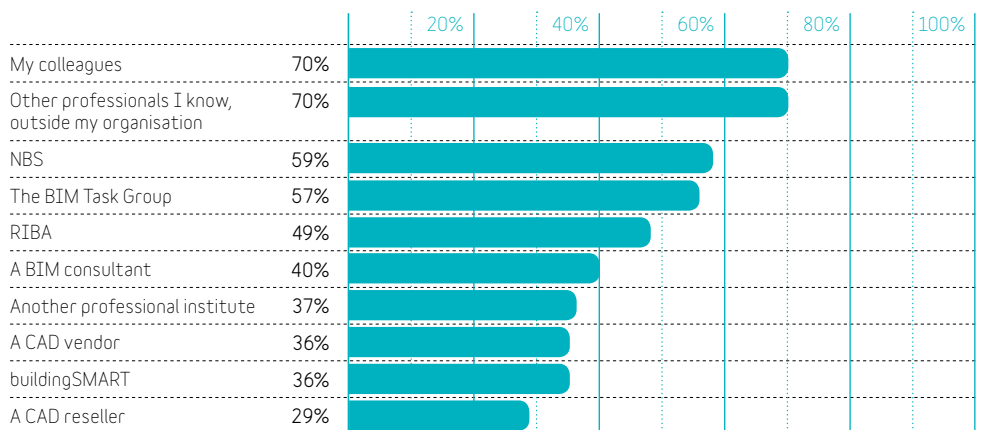
Fellow professionals, both within (70%) and outside (70%) organisations, are the preferred source of information. Beyond that, people turn to NBS (59%), the BIM Task Group (57%), RIBA (49%), and BIM consultants (40%). Less than a third turn to a CAD reseller.

"I would like to see more manufacturers providing content rich data."

How strongly do you agree or disagree with the following statements?



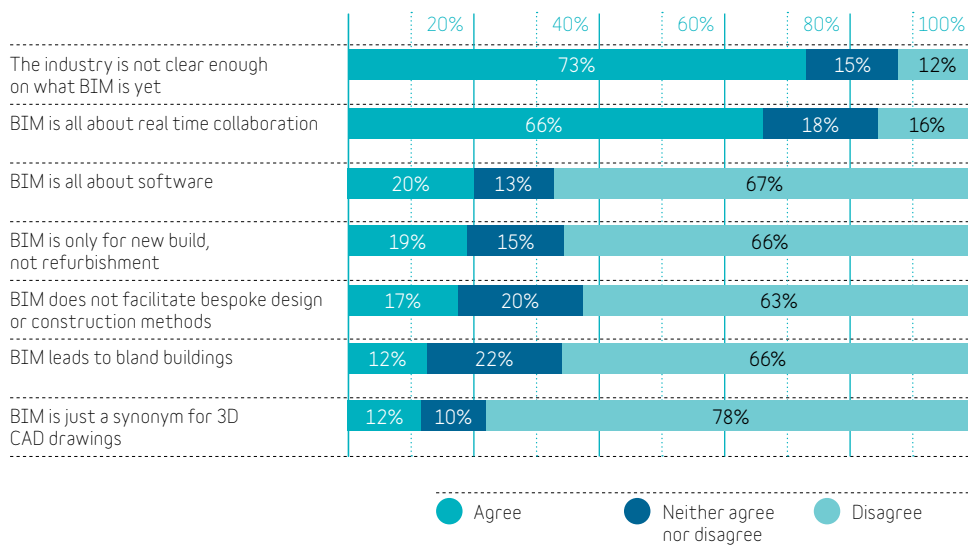
Which of the following sources are you likely to turn to for information about BIM?



We also wanted to get an appreciation of what BIM is and what it's not. There is some clarity. Respondents were clear that BIM is about real-time collaboration, and that it doesn't just mean CAD drawings: it's not all about software. There remains a strong feeling, though, that the industry is not clear enough on what BIM is yet, with almost three-quarters (only slightly less than last year) agreeing with the statement.

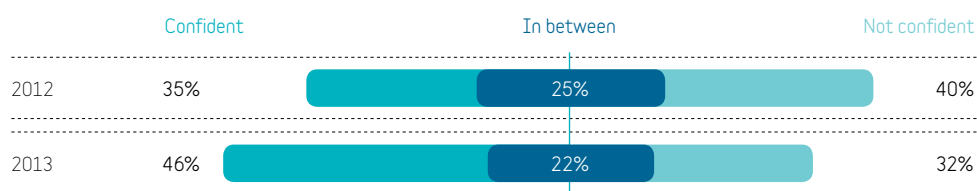
What to make of this? An extreme interpretation would be that people just have no idea what BIM is. But the consistency in responses to other questions suggests that's not it. Rather, there is a need for BIM education among actual and potential users, as the graph below suggests. A third of people describe themselves as 'not confident' in BIM knowledge and skills. But the picture is improving: we've gone from 35% who were confident in 2012 to 46% in 2013.

From your understanding of BIM, how strongly do you agree or disagree with the following statements?



“We are currently starting to adopt BIM on a number of Government funded education projects.”

How confident are you in your knowledge and skills in BIM?



“BIM remains a pretty loose term in my mind. It would be very valuable to be able to refer to a full BIM-compliant model which consultants could use as a benchmark.”

BIM maturity

We wanted to explore how use and awareness of BIM has developed among respondents. We can see that there is a broad awareness of the levels of BIM. Awareness has grown from 51% in 2012 to 73% in 2013.

Among those who were aware of the different levels, a majority have reached at least Level 2 and 7% tell us they have reached Level 3. That still leaves 42% who have yet to reach the level of BIM maturity required for publicly-funded work in 2016.

For collaboration to be successful, collaborating parties need to use agreed standards. Only 24% agreed that the current level of standardisation is right, suggesting that the construction industry needs to implement a greater degree of standardisation for BIM adoption to be successful.

The Government has described there being different levels of BIM. Are you aware of these different levels?



2012

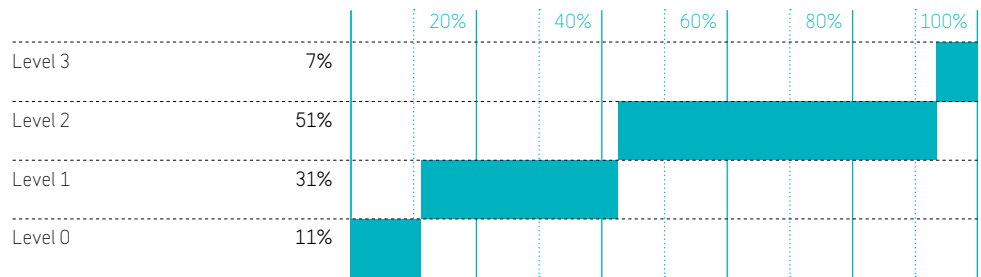
Yes	51%	●
No	49%	●

2013

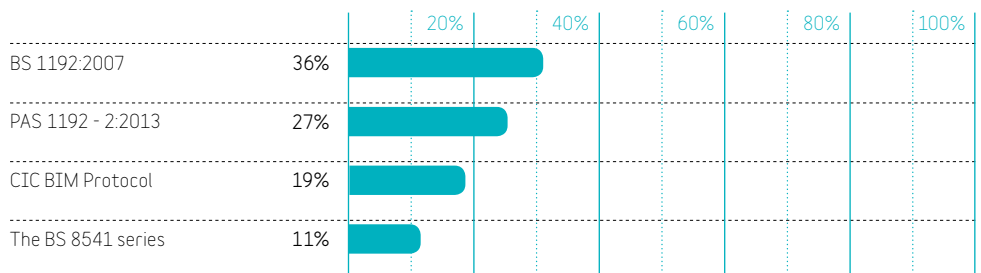
Yes	73%	●
No	27%	●

“This year we have achieved BIM Level 2 on most of our projects but are aiming for BIM Level 3 for our next project.”

What level would you say is the highest level your organisation has reached on a project?



Which of the following standards/publications does your organisation use?



“BIM will not be successful until there is a robust standard for the exchange of BIM information.”

With 36% using BS 1192:2007 and 27% using PAS 1192 - 2:2013, we can see that a significant number of respondents use standardised processes for the ownership, review and sign-off of information, before that information is more widely shared. This is crucial for larger projects and practices where information goes across and beyond the design team.

We also looked at how widely respondents used Industry Foundation Classes (IFC) and Construction Operations Building Information Exchange (COBie). As BIM maturity and collaboration increases, the need grows for open, sharable, non-vendor-specific data formats.

IFC, as a platform-neutral, open file format, allows models to be shared among the design team, irrespective of software choices. We can see that 45% now use IFC (an increase of 6% from last year). Awareness of this format is growing too, with those who ‘don’t know’ decreasing from 30% to 21%.

COBie allows the design team to use a Building Information Model to embed and then deliver the information that supports the use and maintenance of a building. It is perhaps here more than anywhere that cost savings for the client can be realised.

Only a minority use COBie, 23%, but the number is growing: up from 15% in 2012. Awareness of COBie is also growing, with the number who ‘don’t know’ falling from 28% to 20%. We expect the numbers generating COBie output to continue to grow over the coming years.

“It also needs to be clearly re-enforced that ‘collaboration’ means working to a set of agreed standards and processes.”

Do you use IFC on your projects?



2012

Yes	39%
No	31%
Don't know	30%



2013

Yes	45%
No	34%
Don't know	21%

Do you use COBie output on your projects?



2012

Yes	15%
No	56%
Don't know	28%



2013

Yes	23%
No	57%
Don't know	20%

BIM and small practices

In last year's report, we noted:

"If BIM is to be the new standard for project information, it must accommodate all practice sizes."

Towards the end of this year's survey, we asked if people had any other comments they'd like to make. Many of the comments were about small practices' experiences with BIM.

Some were overtly negative about BIM: "BIM is yet another discrimination against small independent practices in the built environment sector."

Some felt that BIM wasn't applicable to their work or practice:

"For small practitioners on tight fees BIM is little or no use."

"BIM is inappropriate for the nature and scale of private projects that are the mainstay of my work and income."

Others were concerned that information models should exist independently from any particular software vendor:

"I'm a bit uneasy by the degree to which BIM is in the hands of commercial outfits. I feel a truly collaborative BIM needs to be based around open solutions."

Others were positive about BIM:

"We needed something to uplift the construction industry, store and manage information which was unthinkable previously. BIM is not easy, but it will make your life a lot easier."

"BIM needs EVERYONE onboard."

One mentioned:

"I am curious to see the results of this survey among smaller firms."

We looked at the responses that people gave based on the number of people in their organisation. We found that there were significant differences between larger and smaller organisations.

Firstly, smaller practices are less likely to have adopted BIM. For organisations with six people or more, 61% have used BIM in the previous year. For those with fewer, the figure is just over a third, 35%. To put it another way, BIM adoption among smaller organisations is at the level we saw in the wider industry two years ago.

BIM usage and awareness, by number of people in organisation



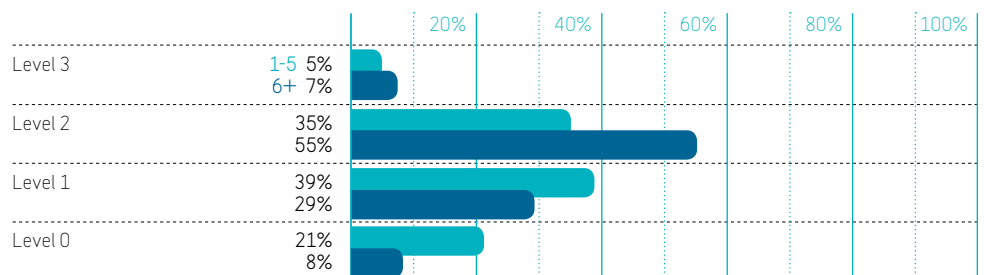
1 - 5

Aware and currently using BIM	35%
Just aware of BIM	58%
Neither aware nor using BIM	7%

6 or more

Aware and currently using BIM	61%
Just aware of BIM	34%
Neither aware nor using BIM	5%

Highest level of BIM used by organisation, by number of people in organisation



Even among those who have adopted BIM, use of BIM is less rich than in larger organisations. For example, 62% of those in larger organisations have used at least Level 2 BIM, whilst in smaller organisations that figure drops to 40%. We see a similar picture for use of COBie (33% for larger organisations, and 13% for smaller) and IFC (61% for larger organisations, and 41% for smaller).

We can also see that smaller organisations are less confident in their BIM skills. Whilst half of those working in larger organisations describe themselves as 'confident' in their knowledge and skills in BIM, this figure drops to a third for smaller organisations.

So we can see a relative lack of confidence among smaller organisations. What else stands in the way of BIM adoption?

The graph below right gives the top five barriers to BIM adoption among smaller organisations.

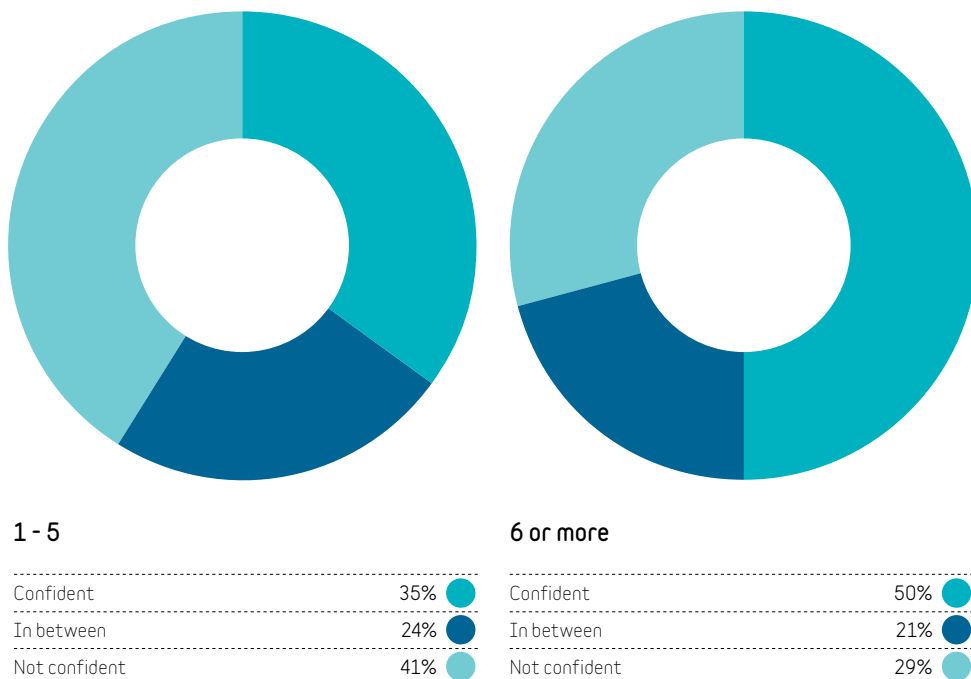
There is some commonality. For both smaller and larger organisations, cost is a barrier, with 67% of smaller organisations and 64% of larger ones citing it. A lack of in-house expertise is a barrier to both groups as well, with over three-quarters of larger organisations mentioning it and 62% of smaller ones.

For smaller organisations, client demand is the highest barrier to BIM adoption. Whilst the Government enforces BIM for publicly-funded work, clients of smaller organisations don't often make similar demands. Sixty three percent of small organisations tell us that the projects they work on are 'too small' to warrant BIM and 71% that BIM is 'not relevant to the projects we work on' - perhaps because the level of complexity just isn't there to warrant BIM.

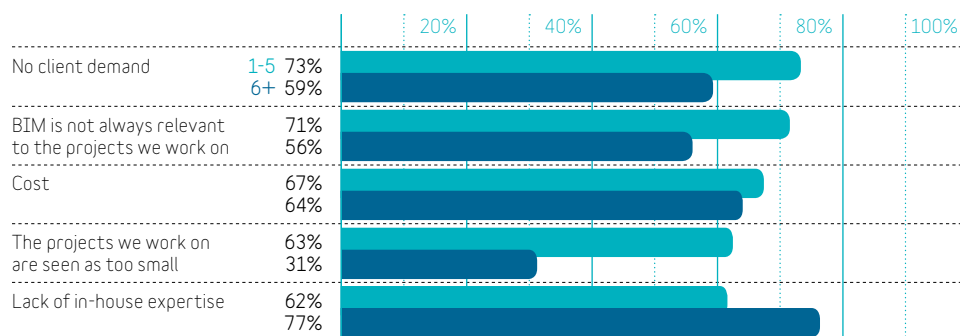
There is a risk here that we can describe in two ways: either that the Government, through its BIM strategy, is excluding smaller organisations from a significant source of revenue (publicly-funded work), or that smaller organisations need to adopt BIM to prepare themselves for 2016 (as many are already doing).

In any case, if BIM is to become a tool for all designers, there is work to be done, not only by smaller practices but also by the wider industry.

How confident are you in your knowledge and skills in BIM? By number of people in organisation



Barriers to BIM adoption? By number of people in organisation



“Personally, I feel there is still a lot of work to be done on BIM, especially in terms of the objects being produced in our field.”

Software use

Since we started running the survey in 2010, Autodesk AutoCAD has consistently been the most used software package for building design in the UK. This year it is Autodesk Revit.

This is consistent with increasing numbers producing fuller information models. Designers are more often using intelligent 3D model-based design tools to create their drawings. But Revit is not the only option: other modelling tools such as Graphisoft ArchiCAD and Nemetschek Vectorworks continue to have a loyal user base.

As designers adopt more advanced modelling tools, the need grows for a broad range of objects with which to populate the models. Through the NBS National BIM Library, NBS provides a service to help with this.

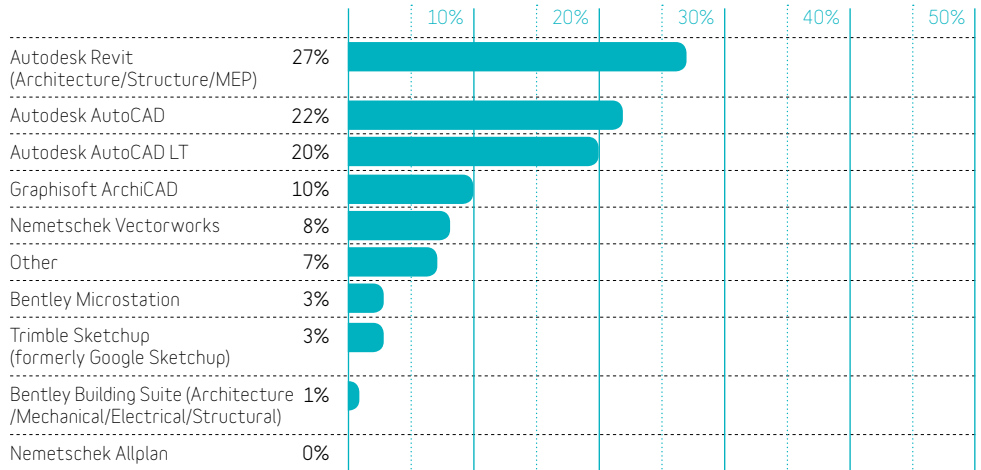
The most popular way of getting BIM objects is to create them in-house and then re-use them (77%), followed by creating them as needed (68%). There must be risks here, as information embedded within a re-used object created in-house can become outdated or obsolete. Creating models as needed leads to much duplicated work across the industry. We feel that a central, free-to-use resource of information-rich BIM objects is better. So it's pleasing to us that nearly a half (49%) turn to the [NBS National BIM Library](#) to get the up-to-date objects that they need, when they need them.

BIM experience

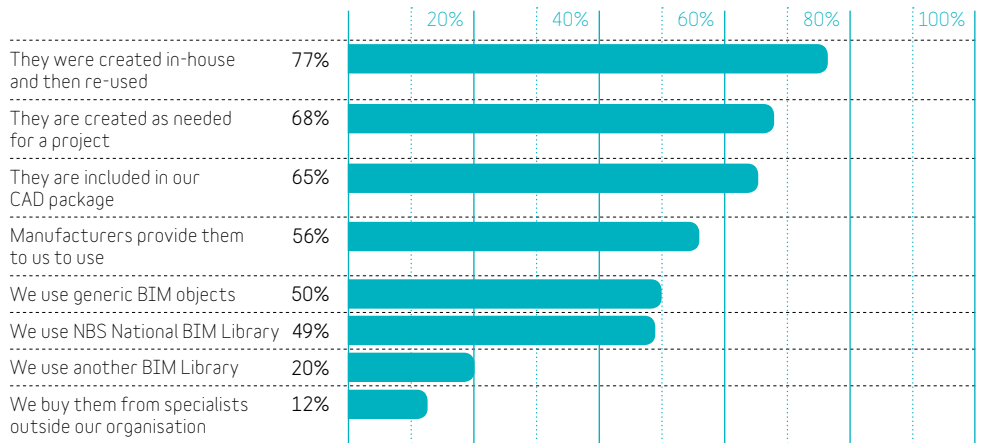
We asked those who were yet to adopt BIM what stood in the way of their doing so. The signs are that the economy, both generally and for the construction sector, is improving. This is reflected in a drop in those telling us they 'need to get through the downturn' before looking at BIM - from 47% to 37%. Cost remains a significant barrier though, with 60% telling us BIM is 'too expensive to consider'. But the majority will need to adopt BIM; 59% tell us that if they don't adopt BIM they'll 'get left behind'.

We looked at the views of those who have adopted BIM and compared them with those who were aware of BIM but who had not yet started using it. This allows us to compare expectation with experience. The experience is better than the expectation. Those who have adopted BIM are more likely to be positive about it than those who have yet to.

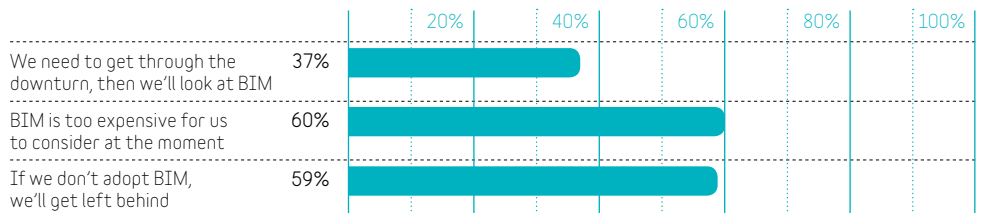
When producing drawings, which of the following tools do you mainly use?



Where do you get the BIM objects your organisation uses?



Attitudes of non-users

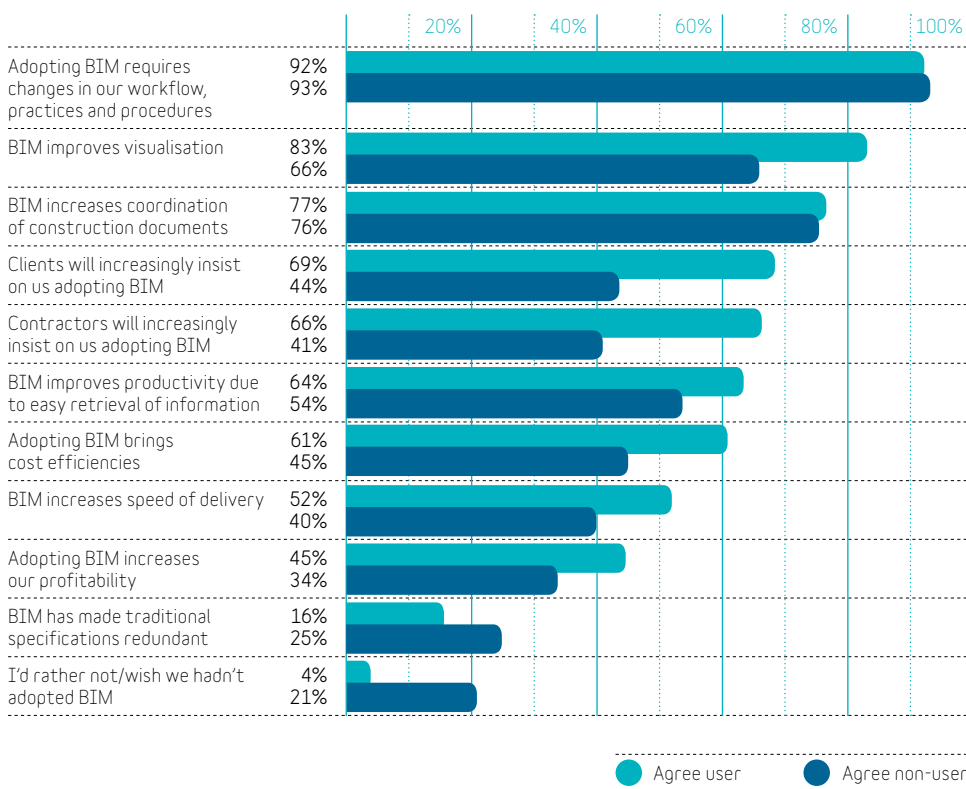


Only 4% wished that they hadn't adopted BIM, whilst 21% of non-users would rather not adopt BIM. More importantly perhaps, 61% of users found that BIM brought cost efficiencies, 52% that it increased the speed of delivery and 45% agreed that it increased profitability (16% disagreed; the remainder, 39%, were neutral). Those who have adopted BIM predict that both clients and contractors will insist on the adoption of BIM. With unremitting pressure on architects' and others' professional fees, it looks as if BIM may offer a way to getting more work, and making that work more profitable.

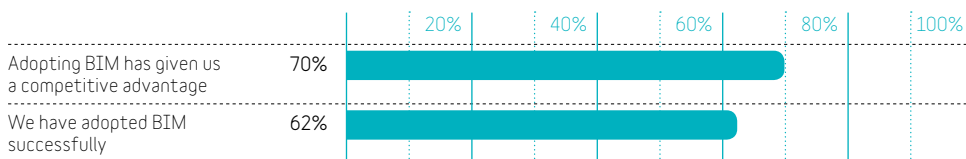
For those who have adopted BIM, the data is unequivocal. The experience of those who have adopted BIM shows us that the process, whilst not easy, is worthwhile. It delivers a competitive advantage.

"I'm excited about using BIM in the future as I can see its advantages. The problem at the moment is the initial cost of purchasing the software."

Attitudes towards BIM: A comparison of those who use it and those who don't



Attitudes of users



End note

In the UK, through BIM, we are at the forefront of a significant change in how buildings are conceived, designed, built and maintained. This change has the potential to bring improved efficiencies and profitability to the construction sector, and deliver better buildings to clients.

There remain significant difficulties though. Investment of time and capital is required. Smaller practices, in particular, see the BIM

journey as a difficult one to undertake. The industry lacks clarity. Some see BIM as exclusive to larger businesses. The industry has a responsibility to be inclusive through open, software-neutral standards.

Looking through the responses to the survey, a clear picture is drawn. Overall, the industry is positive about BIM and the real benefits it can bring. The Government mandate for BIM is welcomed. We are moving from a phase where

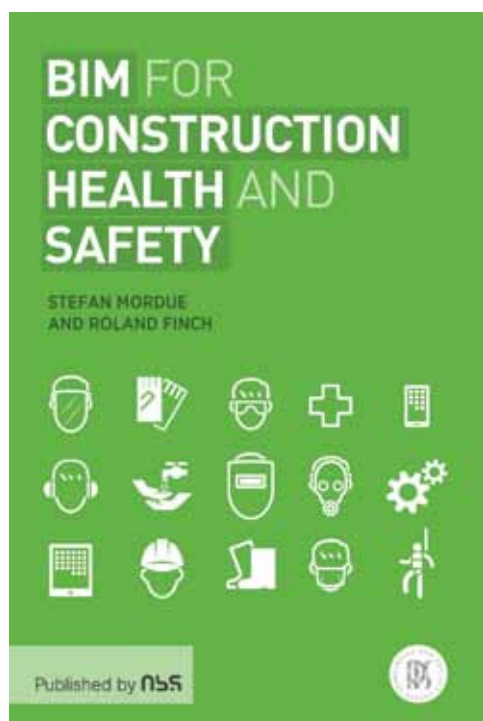
early adopters led the way, to one of BIM becoming the norm. There is a wide appreciation of the benefits that BIM will bring, and those who have adopted BIM are more positive about it than those who are yet to. The projections of BIM adoption (and previous projections have been realised) tell us that the UK can be world leaders in BIM.

Adopting BIM may be less risky and less cost-effective than not doing so. ●

Building Information Modelling Recommended Reading

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RIBA Bookshops has a wide range of key titles to support you. Below is just a selection. View the full range at ribabookshops.com.



BIM for Construction Health and Safety

Stefan Mordue and Roland Finch | NBS | Apr 2014 | Code 81928

A concise and practical guide, that aims to answer what is BIM, how does it affect the health and safety professional, how are BIM technologies used on a practical level, plus much more...

£19.95



What Colour is Your Building?

David H. Clark | RIBA Publishing | Jun 2013 | Code 77531

Offers practical and pragmatic guidance on how to calculate, compare and reduce the whole carbon footprint of buildings.

£35.00



BIM in Small Practices: Illustrated Case Studies

Robert Klaschka | RIBA Publishing | Jun 2014 | Code 80471

Blows apart the myth that BIM is only for large companies. Full of practical tips and hard-won experience.

£30.00



BIM in Principle and Practice

Peter Barnes & Nigel Davies | ICE Publishing | Jan 2014 | Code 80958

Covers the principles behind BIM, its current use in practice and how it may develop in the future.

£25.00



Rough Guide to Sustainability: A Design Primer 4th edition

Brian Edwards | RIBA Publishing | Feb 2014 | Code 80588

A simple, no-nonsense reference source for all students and practitioners of sustainability in the built environment.

£30.00



Guide to BREEAM

Stuart Barlow | RIBA Publishing | Dec 2011 | Code 76424

Provides a much-needed explanation of BREEAM for all building professionals, whether architects, clients, contractors or engineers.

£30.00

Bestseller



BIM Demystified: 2nd edition

Steve Race | RIBA Publishing | Nov 2013 | Code 81044

A short practical introduction to Building Information Modelling (BIM), a subject too often swamped by jargon and deluged with spin.

£19.99



Intelligent Buildings: Design, Management & Operations 2nd edition

Derek Clements-Croome | ICE Publishing | Sep 2013 | Code 77010

This unique book correlates the latest knowledge about the design, management, technology and sustainability of intelligent buildings, with the cultural developments affecting the way people live and work.

£40.00



BIM in Small-Scale Sustainable Design

Francois Levy | Wiley | Jan 2012 | Code 76713

Though they are rarely discussed in the same book, building information modelling (BIM) and sustainable design have a lot in common: both are changing the way architects think about the buildings they design.

£57.50



Green BIM

Eddy Krygiel | Wiley | Apr 2008 | Code 66041

Meet the challenges of integrating BIM and sustainability with this in-depth guide, which pairs two revolutionary movements to create environmentally friendly design through a streamlined process.

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BIM and the small practice

An insight from small and medium practices that have adopted a BIM process

“Adopting BIM should actually be easier for a smaller practice. Smaller organisations often have agility, whereas larger organisations often do not. The analogy ‘Is it easier for a speedboat to change direction or an ocean liner?’ is often used here. In addition, it is argued that BIM offers the opportunity for a smaller number of people working on a project to offer greater value.”

Introduction by Dr Stephen Hamil

Director of Design and Innovation, NBS



Each year, the NBS National BIM Report presents the findings, across the UK construction industry, regarding BIM attitudes and adoption. However, looking a little deeper at the findings, we can see that there is a split in results between those from small practices (five employees or less) and the rest.

An example of this can be seen by looking at the questions on BIM awareness and BIM experience. In small practices, 35% were using BIM, compared to 61% usage in larger practices. With respect to BIM maturity, of those small practices which have adopted BIM, 35 % have worked on a Level 2 project, compared to 55% in larger practices.

So, why is this the case? Speculating on the reasons behind these findings, it may be that it is more difficult for smaller practices to find the funds to invest in technology and training; it may be that there is less client demand or that the central UK Government mandate is less relevant; or it may be that collaboration is less important on projects of a less complex nature.

However, there is evidence to the contrary, indicating that adopting BIM should actually be easier for a smaller practice. Smaller organisations often have agility, whereas larger organisations often do not. The analogy ‘Is it easier for a speedboat to change direction or an ocean liner?’ is often used here. In addition, it is argued that BIM offers the opportunity for a smaller number of people working on a project to offer greater value.

Eight short opinion pieces are included here from those working in small or medium practices who have adopted a BIM process. They provide good insights into what is possible for those who embrace new technology and processes to put together more coordinated designs.

Relevant survey statistics →

For organisations with six people or more, 61% have used BIM in the previous year. For those with fewer, the figure is just over a third, 35%. BIM adoption among smaller organisations is at the level we saw in the wider industry two years ago.

Jonathan Reeves

Director, Jonathan Reeves Architecture

Some architects tend to think that BIM is only suitable for larger projects involving lots of coordination, with the entire design team all using the same software. However, the fact that smaller architects are not just one-stop house designers any more, and that they need to adhere to Building Regulations, environmental standards, and to satisfy local planning offices, clients and any other parties interested in local development, means that they need to call on experts in each particular area to support their work. This has been made easier, of course, by the ability to create coordinated 3D models of their designs and to share these with other people or companies drawn into the project, so that they can either view and comment on the plans, analyse the model to see if it meets local sustainable targets, or further the design by adding their own components – structural elements, MEP and so on.



Jeremy Poulter

Owner, Poulter Architects

One of my first investments when I established the practice in 2011 was BIM software. In spite of its expense, the benefits we have gained through its use have more than paid for this initial investment. It has allowed us to produce better quality information at every stage of the design process and has saved considerable time compared with my previous experiences of 2D CAD. From a basic 3D model as an underlay for an initial sketch design to coloured and shaded drawings for planning, from rendered images to fully coordinated working drawings and schedules, all can be generated from a single model file. The comfort you gain from knowing that information is consistent in plan, section and elevation and that updates are reflected through all of the project information is invaluable. Small practices should invest in BIM or risk being left behind.



Jonathan Munkley

BIM Manager, Niven Architects

From our Practice's perspective, BIM ensures that we give ourselves a competitive 'edge'. It has enabled us to win and deliver larger projects with more efficient 'in-house' resources, as well as providing improved clarity of design for clients.

We have learned that staff now prefer to work on projects utilising BIM protocols as they find it more engaging, and the technology inspires confidence in the work they produce. However, an SME considering changing to a BIM-based procurement and delivery process needs to be aware that the change impacts not only on their business but on that of all the consultants, contractors and suppliers in the project team. Based on our experience, once you are established, working collaboratively with other SMEs enables you to compete with the UK's largest consultant and construction organisations.



James Anwyl

Director, EUROBUILD

All of our projects since 2007 have been designed using BIM. We were able to get up and running very quickly (within a few weeks) by using online tutorials. This was vital to us as a small practice with limited resources. With the ability to work faster and with a reliably coordinated output, it soon became apparent to us that there was no turning back from working in 3D. It has changed our business environment because we can now work collaboratively with our consultants on a single model in the cloud. We are passionate BIM champions, having experienced the efficiency and resultant cost reduction of working in 3D. It has revolutionised our process and project outputs.



Tim Ball

Director, JHD Architects

Creating a virtual building has become nearly as easy as sketching, and far easier than physical model building. Imagine a pencil that could draw a wall construction, tell you the quantity and cost, how well it performs thermally, and give you every conceivable 3D and 2D view of it.

The drawback is that you need to work on your 3D design skills in the same way that you once worked on your sketching skills. To become fluent takes time, but it pays off quickly.

Clients love the idea of viewing a 3D model so that they can be involved in the design at an early stage. They understand the concept and value of BIM because it helps them visualise the building much better than with 2D drawings. However, they do not always see the value of the 'I' in BIM: embedded information.

Every practice should get involved and enjoy working in BIM.



Nick Allen

Director and RIBA Client Advisor, Metz Architects

With the Government's target for the adoption of Level 2 BIM now just two years away and counting, the uptake and implementation of BIM has now reached critical mass. BIM is unstoppable, and those consultants who are not en route are likely to suffer significantly with their inability to gain and service not only Government contracts but those of the ever-increasing number of informed commercial clients as well.

BIM opens up a whole new world of opportunity, and it's not just for the big guys; smaller practices need to get in on the journey. They are more nimble to adapt, will find the costs of implementation easier to bear, and can improve productivity and workflows with some of the fantastic new tools out there without spending a fortune.

Do your research well to find the best tools for you, talk to early adopters about the pros and cons of different solutions, and don't necessarily follow the crowd or your first instinct!

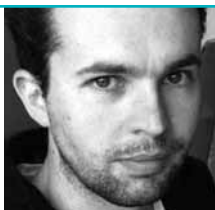


Rob Annable

Architect, Axis Design Architects

Since adopting BIM within our office, we have been able to improve the service we provide to clients across all aspects of our work. In difficult economic times for the profession, we have provided greater value by raising our game rather than cutting our fees. Value created from better service begets value across the whole discipline.

Initially the benefits to our investment in BIM were predominantly felt internally, with modest changes to our clients' experience. As our confidence grew, we were able to provide new types of information and experiences as a standard part of our service, and this in turn assisted us in winning more work and sustaining our ability to provide a service in all work stages, against competition from larger offices with more staff. This, in turn, has allowed us to push the boundaries of our BIM usage and find new ways for the whole construction team to benefit.



“One of my first investments when I established the practice in 2011 was BIM software. In spite of its expense, the benefits we have gained through its use have more than paid for this initial investment.”

Jon Moorhouse

Design Director, Constructive Thinking



constructive
thinking

As a means of communication, Building Information Modelling (BIM) offers new working methods, whereby the information that leaves the office can be three-dimensional and ‘live’ rather than two-dimensional and static. This surely enhances the quality of design and production information and thereby presents a streamlined approach to communication. Each member of the practice can work smarter, travel less and be better informed, freeing up all-important design time.

BIM is not the preserve of large practices. For the small practice, BIM holds a number of advantages, offering a medium to lead and manage teams that deliver larger projects, or to interact with larger partner organisations. Moreover, BIM augments the opportunities for collaboration with a wider design team, blurring the edges between the domains of different consultants and allowing for real-time communication, rather than a stratified design process with limited space for design improvements.

This means that we can work towards building hand-picked, multi-disciplinary (and international) teams for individual projects. In the longer-term, this might give rise to a leaner working method that has more in common with the ‘agile’ software design methods, with iterative and incremental time-boxed approaches through self-organising cross-functional teams.

In the interim, we can look forward to enhancing our internal workflow through smart scheduling, specification, coordination, clash detection and information control – and small practices can most readily embrace these opportunities as they are easily adaptable. ●



All of the contributors here have case studies in the forthcoming book ‘BIM in Small Practices: Illustrated Case Studies’, edited by Robert Klaschka.

<http://www.ribabookshops.com/item/bim-in-small-practices-illustrated-case-studies/80471/>

“BIM is not the preserve of large practices. For the small practice, BIM holds a number of advantages, offering a medium to lead and manage teams that deliver larger projects, or to interact with larger partner organisations.”

BIM and the manufacturer

Manufacturers offer their views on BIM and the importance of the survey's findings

Russell Yates

Managing Director, AluK GB Ltd

As one of the first aluminium building system manufacturers in the UK to embrace BIM, over the last 18 months we have been involved in the 'conversation' about how things should be done.

The NBS National BIM Report, along with our own experiences and feedback from the market, has made a positive contribution to how we have tailored our service to offer BIM solutions.

For our business, knowledge and technical ability are essential and we can now offer support with modelling and content creation, and have staff with accredited professional training in information management processes.

The next area that we are developing is to link the design and construction process with our supply chain of sub-contractors, ultimately enabling their CNC machines and production facilities to be programmed direct from the 3D model information.

As well as focusing on what we do, we are actively engaging the industry with our RIBA-approved CPD and enjoy evangelizing on the benefits of BIM.



Joris Smet

Director, SMET Building Products Ltd

Birthdays are always worth celebrating. It's now one year since we launched SMET BIM objects with the NBS National BIM Library. True to our tagline, 'Bringing European Innovation', we were the first company in the UK Dry Mortar industry to invest in BIM. Since then, SMET objects have become some of the most downloaded in the Library. Our high quality, data-rich object types include: Bedding & Underlay, Plasters & Renders, Mortars, Grouts & Slurries, Concrete, Adhesives, Admixtures & Additives; and these, while not particularly tangible on a finished building, form the substrate upon which all design is created. Moving forward, we will continue to monitor user needs, invest in and enhance our BIM catalogue, ensuring SMET Building Products Limited remains at the forefront of innovation and efficiency improvements in the construction industry. We're all well aware the UK Government has endorsed BIM, whereby all new Government-sponsored construction projects must use BIM from 2016. Thus, businesses adopting BIM should be in a superior position when contracts are being agreed, leaving non-adopters at a disadvantage. Happy BIM Birthday SMET.



“We decided to engage early with BIM as we understand the crucial role manufacturers' data plays in its success. We share the view that BIM is 'the future of specification' and have worked with RIBA to maximise opportunities for BIM as early as possible.”

Relevant survey statistics →

As designers adopt more advanced modelling tools, the need grows for a broad range of objects with which to populate the models... it's pleasing to us that nearly a half (49%) turn to the NBS National BIM Library to get the up-to-date objects that they need.

Andy Batterham

Design & Innovation Manager, Ibstock Brick Ltd

It is clear from the NBS National BIM Report that the last 12 months have been the most successful yet for BIM adoption. Our customers are embracing the challenges of a new technology and beginning to understand the tangible benefits it can bring to a project.

This reinforces the strategic decision as the county's biggest brickmaker to develop our BIM object library of over 200 brick types and justifies the investment we are making in expanding our library still further to give the specifier the widest possible choice for their buildings.

As a manufacturer, it is vital to keep at the forefront of this cultural shift. The industry is changing and we must change with it - BIM is here to stay.



Kevin Turton

Design Manager, Kalzip

Kalzip is BIM ready.

Regarded as a positive move in the right direction, and to support the Government's requirements for collaborative 3D BIM, Kalzip is ready to share data and work alongside customers and design teams. We have produced freely available 3D product and system models and have added to them with a rich set of information that can be used at concept, design, construction and building occupancy stages. Working collaboratively with its customers, Kalzip will also provide project-specific models when requested and is ready to supply full support. We are looking forward to the opportunities and efficiencies that BIM promise and will meet the inevitable challenges head-on.



Jon Roper

Product Manager, Celotex

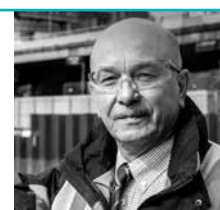
We decided to engage early with BIM as we understand the crucial role manufacturers' data plays in its success. We share the view that BIM is 'the future of specification' and have worked with RIBA to maximise opportunities for BIM as early as possible. Creating and hosting our entire product range through the NBS National BIM Library was the natural choice for Celotex. Being able to offer all of our products available in all major software formats was a key part of the decision-making process. The NBS National BIM Report, which played a salient role in our original decision to invest in BIM, has once again highlighted how adoption continues to be widespread across the industry year-on-year.



Paul Sweatman

Specifications Manager, Triton Systems

'A correctly assembled BIM object makes the design decision quicker and easier' - a typical comment we hear voiced by architects at project meetings across the UK since we became the first company in the waterproofing industry to implement BIM. We took the initiative after realising how beneficial it would be for end users to have the model as well as all the technical data for each product from one download. As no previous designs for BIM models of waterproofing products were available, the need for very close collaboration between the NBS BIM production team and our technical team was paramount. It took 12 months of information gathering and designing before we released 25 BIM objects to the NBS National BIM Library last December. Since then, many thousands have been downloaded into projects, justifying our efforts and saving many hours of specifiers' time! ●



BIM and the supply chain - a contractor's view

Peter Trebilcock
BIM Programme
& Design Director,
Balfour Beatty



Balfour Beatty

“We have been encouraging our supply chain partners to prepare themselves and join us on this important, industry-changing journey. In fact, there is a prerequisite in the Framework Agreements we have with a number of key manufacturers that they must be ready to commit to helping us achieve our objectives regarding BIM.”

Relevant survey statistics →

Those who have adopted BIM predict that both clients and contractors will insist on the adoption of BIM.

Following a drive to help industry prepare for Level 2 BIM, the Government's team is now starting the groundwork for Level 3. However, does that mean everyone is ready? In a recent industry-wide survey, when asked whether the industry will achieve Level 2 BIM capability by 2016, over 60% of the respondents said 'No'. This response demonstrates that there is still a way to go. It would appear that most mainstream designers are BIM-enabled and most main contractors are embracing BIM, albeit in different ways, so perhaps it's the supply chain community that has the farthest yet to travel?

If government spending is set to continue, even at its current levels, we cannot ignore Level 2 BIM requirements. Public Sector work makes up a large percentage of our work. It is essential that to meet our contractual expectations those in the supply chain play their part. Even if companies are not engaged in modelling, they will still need to contribute the component and maintenance data necessary to satisfy the outputs required by government departments.

At Balfour Beatty, we have been encouraging our supply chain partners to prepare themselves and join us on this important, industry-changing journey. In fact, there is a prerequisite in the Framework Agreements we have with a number of key manufacturers that they must be ready to commit to helping us achieve our objectives regarding BIM. We are pleased to note that nearly all of the manufacturers we have agreements with can now provide their products in BIM formats and are committed to enhancing its use.

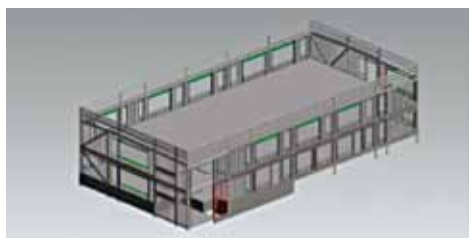
One example is Metsec. According to John Couldwell, SFS Technical Manager Framing Division, 'We have been BIM Level 2 for some time and, as with other responsible manufacturers, are able to share our design information with the construction team to ensure that the client receives the best in performance, quality and value for money. Metsec has heavily invested in BIM as we see clearly it is the way forward and our program of staff training and software updates will be complete at the end of 2014 meaning 100% of Metsec draughtsman and designers will be able to operate in a BIM environment.

Example of design to module to manufacture:



In design

'The use of BIM within our designs and detailing has clear advantages such as visualisation of the interfaces between elements, avoiding clashes, reducing the complexity of connection design and material scheduling. The advantages have been so clear that we have detailed many jobs which were not required to be BIM compliant as if they were. This has saved our supply chain partners' time, provided more accurate drawings and assisted in the ease of product installation.'



This illustration shows an image of Metsec's work on one of Balfour Beatty's Academy projects.

Our supply chain partners are also taking part in wider national initiatives. As part of its 2025 Construction Strategy (which amongst other things aims to lower costs by 33% and improve the speed of delivery by 50%), the Government has recently launched a 'Repeatable Rooms and Standardised Components initiative' through the NHS ProCure21+ group to launch a suite of pre-designed 'BIM-ready' solutions which designers and main contractors can use to implement in the relevant healthcare solutions.

According to the NHS, they have utilised evidence-based design to devise both consulting rooms and bedroom designs. These will enable ProCure21+ to deliver and even exceed up to 14% of the savings required by the Government Construction Strategy. The single bedroom with en suite shower room is available in three arrangements, to suit local choice, with each using the same standard components and being fully HBN and Design Manual compliant. There is also a four-bed bay version that is equally compliant. Each may also be utilised in refurbishment schemes. By integrating supply chain manufacturers, savings of up to 30% on components have been achieved through negotiation on behalf of six P21+ Framework contractors.

Architects are not used to being 'catalogue shoppers' but prefer to design from scratch, and utilise a suite of components at the appropriate



In design for manufacture

time. Concerns that leading designers might be reluctant to participate have not proven correct so far, according to the P21+ team. I have been informed that each of the BIM models set for release will also have been checked for COBie compliance before release.

Within Balfour Beatty

Balfour Beatty Engineering Services (BBES) is delivering BIM to both in-house and external main contractors. The company has a library of over 200 M&E components and members of the design team are able to create their own bespoke products in BIM as necessary, all of which carry the necessary BIM data. They are also able to link the models directly to their manufacturing centre to make the production process more efficient.

Most large M&E contractors are also developing their BIM skills; however, it has been reported that the smaller M&E companies are confused, not really knowing what is expected of them. The UK Main Contractors Group is working with them hoping to provide some guidelines.

BIM is more than just components. The modelling and simulation tools can play a significant role in assisting the subcontractors. Our ground engineering business, Balfour Beatty Ground Engineering, utilised these tools to simulate the safe access of plant through restricted space. At St. Helens Place, London, a 3m wide pile driving rig had to pass between two listed facades and then turn 90 degrees to pass through an aperture in the facade just 4m wide to access the main site area. Running the simulation first saved around three weeks of man-hours as the rig did not have to be dismantled as much as first thought. The simulation helped everyone communicate, and helped the main contractor understand exactly what was involved.

Balfour Beatty Footprint Furniture is also implementing BIM on its fit-out projects. Their Managing Director Wayne Scholfield says '[BIM] is showing its value even on a £96k fit-out project. The estimator was able to produce his schedules using the items contained within the models in 2 hours, instead of 2 weeks!'

Balfour Beatty Utility Solutions is delivering BIM solutions to their infrastructure clients and Balfour Beatty Investments is integrating BIM within every new project, which will link the data directly into FM packages for the FM companies to utilise.



On the factory floor



The Rig (at the end of the simulation exercise, only the top boom had to be removed)



The size of the challenge



The simulation

For those yet to embrace the world of BIM, I would say based on the evidence I have seen that with a structured collaborative approach, deploying the relevant protocols, enabling essential staff training and deploying the relevant software, using BIM can provide real business benefits to virtually every member of the supply chain who plays a part in realising any construction project across any sector on almost any scale. ●



Holyrood University: a 50-year concession for Balfour Beatty (JM Architects, Edinburgh)

International BIM

Adrian Malleson
Head of Research, Analysis
and Forecasting, NBS



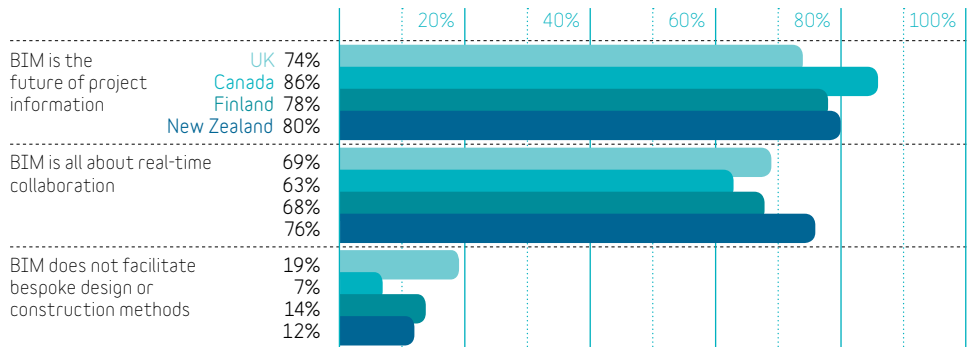
In 2013, NBS produced our first international BIM report. In it, we examined the attitudes towards BIM across countries to see how each compares. We uncovered adoption rates and beliefs about the future of BIM, as well as attitudes towards BIM. You can see the full results at theNBS.com (<http://www.thenbs.com/topics/BIM/reports>).

The report was a result of cooperative working across four countries: the UK, Canada, New Zealand and Finland. In many ways, these countries are among the world BIM leaders. We ran similar surveys in each country so that we could make comparisons between them.

We saw that there are some differences in attitudes towards BIM, but much commonality.

There is agreement that BIM is the future of project information, and that it's about collaboration. There is no strong feeling that it stands in the way of bespoke design and construction.

Agreement with statements



Anticipated adoption reflects the belief that BIM is 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. So we can expect BIM to be required for international working.

There are different attitudes towards different governmental approaches to BIM. In the UK and Finland, a majority feel that their government is 'on the right track' with BIM. In Canada and New Zealand, it's a minority. This coincides with the question of whether a government will insist on the use of BIM for public sector work. Where there is a feeling that governments will mandate BIM, there is also a feeling that governments are 'on the right track'.

But we found more commonality than difference. In all countries, the professions see BIM as the future. We can expect accelerating adoption rates. Those who are looking to adopt BIM tend to be positive about it. Those who have adopted BIM are even more so.

Having an understanding of approaches to, and adoption of, BIM in different countries is not only important because it provides a benchmark of a country's relative BIM maturity: it also allows us to understand what BIM requires to be the embodiment of common, international working practices.

The building design and construction industry is international. For example, architectural services

in the UK have an export value of £369 million and a positive trade balance of £339 million.* We need tools that help us to work internationally. BIM provides the tools and processes for collaboration across and beyond the design team, but BIM's potential is stunted if BIM processes and standards diverge from country to country.

Therefore we need open, shared standards. For information exchange, this is provided through the platform agnostic Industry Foundation Classes (IFC). For delivering information to support the use and maintenance of an asset, Construction Operations Building Information Exchange (COBie) gives us a standard, sharable data format. For ownership, review, and sign-off of shared information, adopting PAS 1192-2:2013 or BS 1192:2007 means collaborators know that the information they use can be trusted.

International BIM isn't about adoption of common software. It is about adoption of common standards and processes that allow collaboration.

We will be running the international surveys again in 2014, and this will allow us to monitor trends. We invite other countries to join us.

* Source: Office of National Statistics, International Trade in Services, 2011

Relevant survey statistics →
 Respondents were clear that
 BIM is about real-time collaboration,
 and that it doesn't just mean CAD
 drawings: it's not all about software.

David Shepherd BIM Manager, HOK



HOK

HOK has for many years been at the leading edge of developments in Design BIM. Initially, we modelled in object-based CAD, but since 2006 we do so almost exclusively in a full BIM software environment. Our work spans a wide range of sectors and building types, large- and small-scale, and across many countries, so our perspective is global.

For the most part, the designers with whom we have worked and collaborated realised long ago that committing to and investing in the emerging BIM standards and protocols, such as IFC and COBie, would lead to great benefits in design productivity and efficiency. The feedback from projects confirms that our firm-wide 'buildingSMART' policy of leveraging BIM-based open standards produces better detailed and more coordinated design documentation.

While the UK generally is not necessarily ahead of all other countries in this field (there is still something to be learned from the US and Scandinavia, to name just two regions), there are many places where investment has not kept pace with the opportunity. During a recent visit of the Malaysian Institute of Architects to our London office, delegates confirmed the relatively high cost barrier to entry that limits their BIM adoption rate. This truth is borne out by a recent UK survey, showing that the largest architectural and engineering consultancies



will annually spend over £30 million or 4% of turnover on IT and Telecoms (source: <http://www.kewassociates.co.uk/>).

So the value derived from BIM needs to be tailored to the country-specific stage of development to maximise the benefits in each locality. For example, in Singapore, municipal guidelines now require BIM e-submissions be delivered to the planning authorities.

While software vendors compete to deliver improved modelling capabilities and support for open file formats, our industry also has the buying power to seek their commitment to develop BIM software as a service (SaaS). Thereby, we can lower the hardware and administrative requirements of computationally demanding applications used by design teams across the world.

From an international perspective, we notice a number of key trends:

- 1 An emerging consensus that BIM tools and processes are the future – and that it's about collaboration, across and beyond the design team.
- 2 A recognition that because building design and the construction industry are international, BIM will be a requirement for working internationally.
- 3 The importance of open, shared standards to achieve this – and adoption of common standards and processes that facilitate collaboration.

Here in the UK, the Government's commitment to achieve BIM Level 2 by 2016 means we have had to ensure that our processes and infrastructure support the PAS-1192 Common Data Environment for coordinating and approving federated models. Meanwhile, private sector clients are more and more interested in using BIM to better manage their operations, reducing their operating costs and informing their facility and asset management decisions (a fact borne out by our research for the BCO). We have engaged with FM/AM groups to explore opportunities for helping them achieve this, and are developing the capabilities to assist contractors and owners.

The long-term aspiration must be for BIM to act as a virtual facility that will not only readily display maintenance information but will also spatially analyse Big Data: streaming real-time information on resource usage and occupancy. This sort of building intelligence will transform the discipline of optimising building performance, ultimately, wherever the project is located.

However, we should remember that BIM is not an end in itself, but rather a tool to help us achieve better design solutions. So while we believe that while BIM adoption can have a positive impact on our business processes, it is not a substitute for creative vision. As David King, HOK Director for Project Delivery has explained, 'We are engaged in a business that strives to integrate science and art; and much of the value in BIM is the collaborative process it engenders'. ●

Notes

A series of horizontal dotted lines for taking notes.

Construct your BIM future with NBS

At NBS we can provide you with the tools and expertise to manage the 'I' in BIM. From BIM specification software directly linked to geometry in your design, to our NBS National BIM Library, we can support both specifiers and manufacturers, guiding you to a successful and productive BIM future.

BIM OBJECTS

BIM SPECIFICATION

GEOMETRY & SPEC COORDINATION

PRODUCT INFORMATION

EXPERT GUIDANCE

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