5

Promoting smart ICT

5.1 The potential benefits of using smart ICT to develop smart infrastructure have been canvassed extensively in the evidence presented to the Committee, and outlined in earlier chapters of the Report. This chapter will focus on the actions government and industry can take to promote the uptake of smart ICT in the development of infrastructure.

Government leadership

5.2 Views on the best way to promote the adoption of smart ICT in infrastructure varied in the evidence presented to the Committee. Many industry representatives, influenced by the example of the United Kingdom, called for Australian Government leadership in the adoption of smart ICT, particularly in relation to Building Information Modelling (BIM). In its submission, Aurecon argued that:

> In the absence of any Australian construction digital strategy Federal and State governments are missing out on the commercial benefits in digitally procuring information on publically procured assets. Further, our recent consultations with government departments and agencies indicate to us that currently there is no coordinated BIM strategy.[1]

5.3 Aurecon believed that:

> As with some International Governments, including the UK, the Australian Federal/State Governments as a client can derive significant improvements in cost, value and carbon performance through the use of open sharable asset information that comes

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1   Aurecon, *Submission 22*, p. 18.

with adopting the BIM process as formal policy and embedded within procurement practices.[2]

5.4   Aurecon emphasised that 'poor and inconsistent procurement practices, particularly in the public sector are leading to waste and inefficiency'. This was compounded by 'low levels of standardisation, and fragmentation of the public sector client base'. Aurecon argued that:

> Australian government leadership can provide the right stimulus within the construction industry and increase economic productivity through leadership, policy and procurement measures which will enable the digital transformation of the construction industry.[3]

5.5   Mr Brian Middleton, of Bentley Systems, emphasised the need for government leadership in the adoption of smart ICT, stating:

> You have heard an awful lot about mandating of standards and formats and processes and policies and people for and against it. The one thing that we would say is that the rapid adoption of any improvements and the benefits realisation will only be accelerated through the involvement of clear government direction, and that is something we would like to help to inform and to shape as we move forward.[4]

5.6   Mr Middleton believed that the appetite within the infrastructure construction industry for the adoption of smart ICT 'is huge…They just need to be given a platform to deliver it by the government. They will not do it on their own, because they work on a risk base.'[5] Governments needed to update their own requirements and specifications relating to infrastructure procurement to make new technologies effective:

> If you say, 'Look, we're going to do BIM level one, the 3D modelling element of that', it is nothing new; it has been around for 20 years. It is far more advanced. All of your contractors who do major civil projects in Australia are designing in 3D today and just publishing in 2D to give to government, because you are not requesting the information. If you establish your employer's information requirements upfront, that is a critical element. Each project needs to say: this is the information that we require from this project to enable us to efficiently and effectively operate and

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2   Aurecon, *Submission 22*, p. 18.

3   Aurecon, *Submission 22*, p. 19.

4   Mr Brian Middleton, Senior Director, Transportation, Bentley Systems, *Committee Hansard*, 24 September 2015, p. 24.

5   Mr Brian Middleton, Senior Director, Transportation, Bentley Systems, *Committee Hansard*, 24 September 2015, p. 28.

maintain our physical infrastructure with minimum impact on the environment, lower cost of operations, achieving our service levels for our traveling public or for users of that particular infrastructure. If you do not, then how do you know that you are getting a good outcome?[6]

5.7   Mr David Burchard, of AECOM, argued that if government wanted industry to adopt new technologies, governments had to 'set that benchmark and the industry will align with the expectation'. He acknowledged there would be a cost to this innovation, but asked 'What is the cost of not doing this?'. He, too, argued strongly for the adoption of the UK model:

> We in Australia should not be so isolated in our thinking. We should take on what is happening in the rest of the world — because we will get left behind if we do not. There are already proven government and private sector collaborative arrangements that have been used to bridge these same sorts of challenges. I know that the UK — certainly in the way they publicise what they are doing there — are doing it very intentionally to market themselves as a highly competitive and technologically advanced economy. They are very keen to share their knowledge with us, I guess to show off what they have achieved. So, the offers are there, and we do have experts visiting the country regularly to share this information, but I guess we just need to create the forum for that information to be received for it to be acted on.[7]

5.8   buildingSMART believed that the market would 'eventually adopt BIM for all infrastructure and building projects', but argued that 'it would be short-sighted for the Government not to seek to accelerate that development'. buildingSmart emphasised the 'need for Government to take a strong stand to ensure national consistency'.[8] buildingSMART suggested that:

> Without government leadership, different states, government departments and industry players could adopt different standards — potentially the 21st century equivalent of states adopting different rail gauges, leading to missed opportunities and a loss of productivity.[9]

6   Mr Brian Middleton, Senior Director, Transportation, Bentley Systems, *Committee Hansard*, 24 September 2015, p. 26.

7   Mr David Burchard, Associate Director, Transportation, AECOM, *Committee Hansard*, 24 September 2015, p. 17.

8   buildingSMART, *Submission 10*, p. 9.

9   buildingSMART, *Submission 10*, p. 10.

5.9   buildingSMART emphasised the leading role governments were taking in the development of smart infrastructure around the world. It stated:

> Other nations around the world provide a framework, guidance and lessons learned for Australia and New Zealand, including the need for government involvement in smart ICT. In the Western world there is already a leader and great advocate in the use of BIM in the UK Government. The UK Government has provided leadership in telling the market what the Government wants; not how to do it. Aligning Australia to the UK's success in this field will drive reform, improve projects and set a new reputation for infrastructure delivery there.[10]

5.10   buildingSMART noted that 'other government jurisdictions that already require the use of BIM for government building procurement include the United States, Norway, Finland, Denmark, Germany and France'. It observed that in our region, 'China, including Hong Kong (SAR), South Korea and Singapore have taken steps to achieve BIM implementation through a planned approach'. It also noted that 'the Singaporean Government is progressing toward applying a mandate for BIM, offering incentives to those willing to be the early pathfinders towards a goal of increased industry adoption, and ultimately full BIM submissions'; and that 'the UK, France and Singapore all have Ministers who are responsible for BIM'.[11]

5.11   The Australasian Procurement and Construction Council (APCC) also highlighted the lack of coordination within government in terms of smart infrastructure development:

> In the public sector, jurisdictions (and their agencies) are moving at their own pace to adopt BIM as a tool to design and construct assets, including ongoing management after they are commissioned. Some agencies are more advanced than others: those that regularly commission projects to deliver new or refurbished assets, and have significant asset portfolios to manage (including Defence, health and education agencies), are more advanced in their thinking and development of internal policies and processes.[12]

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10   buildingSMART, *Submission 10*, p. 8.

11   buildingSMART, *Submission 10*, p. 8.

12   Australasian Procurement and Construction Council, *Submission 9*, Attachment 1, *A Framework for the Adoption of Project Team Integration and Building Information Modelling*, December 2014, p. 18.

5.12 In its submission, Lynnwood Consulting stated that it 'is our view that Australia should adopt world's best practice as quickly as possible to drive the adoption of BIM nationally'.[13]

5.13 Professor Keith Hampson, of Curtin University, argued that 'government has an intractable responsibility to lead':

> … to lead by way of helping in determining projects that are applicable for pilot projects; to lead in respect of providing incentives—not necessarily financial incentives, but they could be—for project proponents, such as owners, design and construction teams and, importantly, asset management teams, to get on board with national and international standards; and to provide a supportive environment for more advanced and consistent use of ICT or smart ICT in the infrastructure sector.[14]

5.14 The New South Wales and Queensland Governments also urged strong leadership from government to promote smart ICT in infrastructure. In its submission, Transport for NSW stated:

> In order to achieve a sustained increase in economic productivity, the government must act as the catalyst, by demonstrating leadership and commitment, and directing industry to unite, commit investment and follow. For the digital transformation of the infrastructure industry to be successful, this will require a vision, with clear objectives supported by appropriate policy and funding.[15]

5.15 Transport for NSW observed that it had been recognised that 'the countries with the most technologically advanced industries have typically been led by governments setting clear targets for digital engineering implementation and use'.[16]

5.16 The Queensland Department of Transport and Main Roads (TMR) argued that 'to expedite industry adoption, all levels of government must come together' to drive the development and adoption of technical, procedural and procurement standards for BIM. TMR supported 'the coordinated implementation of BIM as a critical component of a smart ICT framework' and was 'committed to working with government and industry to fast-track BIM'. TMR believed that 'Australia needs to make considerable

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13   Lynnwood Consulting, *Submission 16*, p. 13.

14   Professor Keith Hampson, Faculty of Humanities, Curtin University, *Committee Hansard*, 25 September 2015, p. 30.

15   Transport for NSW, *Submission 33*, p. 22.

16   Transport for NSW, *Submission 33*, p. 16.

efforts to match the pace of international BIM adoption by aligning itself to the time schedules of leading nations such as the UK'.[17]

5.17   Federal agencies were more cautious in advocating government leadership on Smart ICT. In evidence before the Committee, the Department of Communications indicated that consideration of the use of BIM was in an embryonic stage at the federal level. The Department highlighted a paper from the Spatial Industries Business Association, focussing on the use of BIM in the Christchurch earthquake rebuild which emphasised that 'there is a role for government because the building industry is so fragmented that it cannot get itself together to do this, even though the benefits flow mostly directly to them'. It noted 'a gap in the market there that potentially needs some sort of government policy to assist it along'. The Department noted ongoing discussions within government on the issue, but that 'policy leadership on building information management and how that occurs is yet to be determined'.[18]

5.18   The Department of Infrastructure and Regional Development (DIRD) emphasised the need for caution in adopting new technology, highlighting the importance of taking a case-by-case approach to the application of technology, and applying a cost-benefit analysis to each proposal. Nonetheless, the DIRD noted that the application of technology could actually help shape the assessment of a project by Infrastructure Australia:

> For example, the Australian government contributed $9.9 million towards the $19.8 million upgrade of the Monash Freeway in Melbourne. This project upgraded four kilometres of ITS systems between High Street and Warrigal Road. The new systems were formally commissioned into service on 14 August 2015. It is estimated that the project will improve traffic flow and reduce travel times by around 10 per cent and improve emergency response times by about 20 per cent. That is just one example where systems are actually being incorporated. Each of these projects, though, as they occur, is subject to the same cost-benefit analysis.[19]

5.19   DIRD observed that:

> …there are quite different capacities across the sector in using BIM. There may well be other tools that evolve over time as well. The importance of cost-benefit analysis certainly needs to be

17   Department of Transport and Main Roads (Queensland), *Submission 45*, pp. 1–2.

18   Ms Helen Owens, Assistant Secretary, Data Policy Branch, Digital Productivity Division, Department of Communications, *Committee Hansard*, 14 August 2015, p. 6.

19   Ms Nicole Spencer, Policy and Research Division, Deregulation Unit, Department of Infrastructure and Regional Development, *Committee Hansard*, 14 August 2015, p. 18.

mandated, and, whatever tool is used to derive that cost-benefit analysis, if BIM is involved in that then it is involved, but there may well be other tools also. So, I would not like to err on the side of mandating at this stage.[20]

5.20   DIRD suggested that 'the best way to promote the appropriate use of Smart ICT solutions' is 'to foster an environment in which projects are selected based on a robust assessment of the costs and benefits of alternative options to meet a recognised need'. It noted that through the Australian Government's Infrastructure Investment Programme, funding preference was already given:

> to projects which, amongst other things, have considered, and where appropriate applied, solutions which are alternative or complementary to construction which result in enhanced use of existing infrastructure. This includes the use of technological solutions and the use of innovative project delivery options.[21]

5.21   DIRD further noted that Australian Government already 'supports the use of new modelling technologies in the design and planning of major infrastructure and recognises the potential to reduce whole-of-life costs of infrastructure'.[22] Examples of this include:

> There are a range of existing formal mechanisms already in place. The Department works with the states, territories, local government, industry, and international partners to coordinate Smart ICT developments. The Council of Australian Government's (COAG's) Transport and Infrastructure Council and the Transport and Infrastructure Senior Official's Committee (TISOC) sets the agenda for our work on Intelligent Transport Systems (ITS).

> In 2011, federal, state, and territory transport ministers endorsed an Australian ITS policy framework targeting road transport. The Department is leading a review and update of the framework, which will include governance arrangements and an action plan, to be completed in 2016.

> The Department works closely with Transport Certification Australia, established to support state, territory and federal government needs in relation to the growing use of Cooperative Intelligent Transportation Systems.

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20   Ms Nicole Spencer, Policy and Research Division, Deregulation Unit, Department of Infrastructure and Regional Development, *Committee Hansard*, 14 August 2015, p. 21.

21   Department of Infrastructure and Regional Development, *Submission 28.2*, pp. 4–5.

22   Department of Infrastructure and Regional Development, *Submission 28.2*, pp. 4–5.

> Transport Certification Australia is working with the European
> Commission and United States Department of Transportation on
> Harmonisation Task Groups relating to the international
> deployment of Cooperative Intelligent Transportation Systems.[23]

5.22   The Australian Government believed that 'individual government
        delivery agencies' were 'best-placed to consider the benefits of using such
        technology, on a case-by-case basis'.[24]

Mandating use of smart ICT—BIM

5.23   While there was near unanimity amongst industry for government
        leadership in smart ICT, there was less agreement on the issue of whether
        government should mandate outcomes, especially in relation to BIM.
        NICTA recommended that the Australian Government 'mandate use of
        Smart ICT in upgrades and new infrastructure', suggesting the federal
        government 'require that only projects demonstrating use of smart ICT
        can access its infrastructure funding'. NICTA believed the federal
        government should 'also use its influence in national and state regulations
        to encourage the use of Smart ICT'.[25]

5.24   Aurecon also called upon 'the Government to mandate the use of BIM in
        all public infrastructure projects', and do so 'consistently across all
        construction works'. It urged the Australian Government to 'take the lead
        in developing national guidelines' and work with the States and
        Territories 'to achieve a uniform national position on the use of BIM,
        including standardised bidding approaches for public infrastructure
        projects based on digital engineering/BIM'.[26]

5.25   Mr Alex Shuttleworth, of Lynnwood Consulting, advocated adopting a
        similar approach to the UK, where BIM is mandated at a national level:

> They have mandated for 2016 that it has to comply with a level 2
> capability or competency level, based on the frameworks that they
> have defined. Everybody is working towards that specific point in
> time for any new facilities that are constructed so that they comply
> with the requirements. Therefore, through that, they are driving
> certain processes, efficiencies and cost savings through the design
> and construction process.[27]

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23   Department of Infrastructure and Regional Development, *Submission 28.2*, p. 6.
24   Department of Infrastructure and Regional Development, *Submission 28.2*, pp. 4–5.
25   NICTA, *Submission 23*, p. 3.
26   Aurecon, Submission 22, p. 10.
27   Mr Alex Shuttleworth, Principal, Lynnwood Consulting, *Committee Hansard*, 21 August 2015,
      p. 12.

5.26   The UK strategy first addressed construction, then 'cascaded down to the actual data environment'. It 'defined the whole data environment, framework and processes around how to go through' ensuring 'that you can support your assets from a digital perspective'.[28] Mr Shuttleworth noted that:

> The UK is now one of the leading countries in terms of being able to support these types of activities within industry. You will even find in Australia that expertise from the UK is coming down here and advising asset owners on how to go about adopting these methodologies to get to a certain level of competence and capability.[29]

5.27   Lynnwood Consulting noted that in addition to the UK, the Netherlands, Denmark, Finland and Norway 'already require the use of BIM for publicly funded building projects'.[30]

5.28   Laing O'Rourke emphasised the importance of the UK's BIM legislation 'in giving the industry confidence that there is no going back in terms of the investment in new tools, skills and technology'. The company noted that:

> We have proven that the use of smart ICT in our own operations has made us more efficient, it has made the assets we have created more valuable and it has increased our clients' confidence in delivery. We have a clearer line of sight over the project's performance during planning, design, construction and into its operation.[31]

5.29   Laing O'Rourke 'now mandates a digital engineering and smart ICT requirement in all its tenders and projects within Australasia'.[32]

5.30   In contrast, the Australasian Procurement and Construction Council (APCC) noted that 'the state and territory governments who are responsible for this space' are not currently 'at a stage where they are able to consider mandating'. Likewise, many in the construction industry were 'not in a position at this point to endorse a mandate'. Rather, what the industry wanted was an acceleration of the adoption of BIM, 'and that they will actively work with government to try and accelerate the

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28   Mr Alex Shuttleworth, Principal, Lynnwood Consulting, *Committee Hansard*, 21 August 2015, p. 13.

29   Mr Alex Shuttleworth, Principal, Lynnwood Consulting, *Committee Hansard*, 21 August 2015, p. 12.

30   Lynnwood Consulting, *Submission 16*, p. 10.

31   Mr Josh Murray, General manager, Corporate Affairs, Australia and Asia, Laing O'Rourke, *Committee Hansard*, 21 August 2015, p. 25.

32   Laing O'Rourke, *Submission 15*, p. 10.

adoption of BIM because there are obvious benefits'. APCC argued for a case-by-case adoption of BIM:

> Every project is bespoke. You need to look at it on a project-by-project basis and whether it makes sense for that project, rather than looking at a holistic view on mandating.[33]

5.31   Likewise, Engineers Australia (EA) did 'not think it is a good idea for government to mandate. They should facilitate, they should encourage and they should lead'. EA agreed, however, that if government was to provide leadership in the application of smart ICT to infrastructure, it should be using smart ICT in its own projects.[34]

5.32   Mr Roger Somerville, of Autodesk, noted that the Government of Singapore had mandated that 'any structure over the size of 5,000 square metres needs to be submitted to the Singaporean government using a BIM or 3D model before the permissions will be granted for that construction to proceed'. Other ASEAN countries, including Vietnam, the Philippines and Indonesia were 'mandating, or considering mandating, the use of BIM for their public infrastructure'. Further north in the region, South Korea had a relatively mature BIM mandate', while China was in the process of implementing a BIM mandate. Autodesk also noted that 'a number of United States government agencies have mandated the use of BIM for a number of years' and that globally 'a large number and a growing number of governments that are mandating, or in the process of mandating, the use of BIM'.[35]

5.33   Mr Somerville observed that typically governments 'would not mandate immediately', but 'would develop a multi-year road map that involved the development of a BIM standard…the provision of training or upgrading to their national infrastructure or construction industry' and the development of 'guidelines and materials for industry to follow'. This involved upfront costs to government, but 'projected savings from the use of BIM over time would certainly outweigh that funding outlay by a significant degree'.[36] This 'phased approach', involving a number of pilot

33   Ms Teresa Scott, Executive Director, Australasian Procurement and Construction Council, *Committee Hansard*, 14 August 2015, p. 15.

34   Mr Peter Hitchiner, Immediate Past Chair, Information, Telecommunications and Electronics Engineering College Board, Engineers Australia, *Committee Hansard*, 14 August 2015, p. 26.

35   Mr Roger Somerville, APAC Government Affairs, Autodesk Asia Pty Ltd, *Committee Hansard*, 9 September 2015, p. 4.

36   Mr Roger Somerville, APAC Government Affairs, Autodesk Asia Pty Ltd, *Committee Hansard*, 9 September 2015, p. 4.

projects, would 'ensure that when the mandate occurred it was meaningful and one that industry could indeed follow.[37]

5.34   Bentley Systems also rejected the mandating of smart ICT, arguing that:

> …the mandating of BIM in the 3D modelling sense is not sensible and mandating standards in an environment where technological advancements significantly outpace the ability for governments to legislate may inhibit achieving the desired outcomes.[38]

5.35   Nonetheless, Bentley Systems believed that governments had an important role to play in the implementation of smart ICT:

> The broader benefits of Smart ICT and / or BIM in our opinion will not be achieved in a reasonable timeframe without the government infrastructure owners acting as the driving force for change and we encourage them to focus on the standards regarding the collection, federation and validation of information across the whole asset lifecycle.[39]

5.36   Bentley Systems thought that the 'primary drawback of mandating a specific set of policies and processes for use in BIM is that requirements vary significantly between infrastructure disciplines and technology changes rapidly':

> What may be cutting edge in terms of design and project development process and tools today may well be obsolete in 18 months. Being wedded to a prescriptive delivery method can actually decelerate innovation as there's reduced opportunity for service providers to bolster efficiency or productivity by developing creative solutions as part of their contract delivery which could further cut down on time and expense.[40]

5.37   Rather than creating a mandate, governments should ensure that:

- Government project delivery teams are required to create and specify their Information Requirements for each project.
- There is a common data environment established where this information can be stored and managed for the life of the Asset
- The information be provided in a format relevant to the specific project (Road, Rail Bridge, Building etc) and that the data format delivered is

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37   Mr Roger Somerville, APAC Government Affairs, Autodesk Asia Pty Ltd, *Committee Hansard*, 9 September 2015, p. 6.

38   Bentley Systems, *Submission 29*, p. 10.

39   Bentley Systems, *Submission 29*, p. 10.

40   Bentley Systems, *Submission 29*, p. 11.

both forward and backward compatible to enable reuse throughout the asset lifecycle.[41]

5.38 Laing O'Rourke noted that generally smart ICT outcomes were being driven by clients rather than contractors at this stage, and offered the option of improved digital outcomes as a precursor to a more substantial transformation. Mr Josh Murray, representing Laing O'Rourke, explained:

> In terms of whether that should be introduced in Australia, we certainly see that BIM and digital engineering are becoming more apparent, but it is client driven at this point, unless the contractor or the designer take the view that they will do it on all of their projects, which is something that we have done, because we believe in the internal certainty and the client's certainty that that delivers. We believe it is tracking that way. The other option we have canvassed as an organisation is the ability to ask for digital outcomes, if not full BIM or full digital engineering—but to take a significant piece of national infrastructure and say, 'The government and the taxpayer expect that at the end of this we will have this digital outcome that is relevant to that project, relevant to its location and its workforce.' At least that would be a minimum step off the mark to start raising the profile of those assets.[42]

5.39 Australian Government representatives rejected mandating BIM or other smart ICT. The Department of Communications took the view that 'if people have a strong awareness of the benefits of smart ICT, in whatever capacity, they will make a cost-benefit analysis as to the merits of using them'. The Department suggested that:

> Rather than reforming regulations to enforce such provision, education and awareness raising may be more appropriate, particularly given the risk of mandating one-size-fits-all solutions that do not adequately address specific project requirements.[43]

5.40 The Department of Communications' view was that 'some collaboration between stakeholders is already occurring, but more will be needed in future to realise the most potential of smart ICT in infrastructure'. It preferred to 'pursue a cooperative approach rather than mandate the use of Smart infrastructure in developments'.[44]

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41   Bentley Systems, *Submission 29*, p. 12.

42   Mr Josh Murray, General Manager, Corporate Affairs, Australia and Asia, Laing O'Rourke, *Committee Hansard*, 21 August 2015, p. 25.

43   Department of Communications, *Submission 27.1*, p. 5.

44   Department of Communications, *Submission 27.1*, p. 6.

5.41   DIRD observed that the States and Territories 'are primarily responsible for the delivery of major public infrastructure projects'. The Department noted that the jurisdictions had indicated that 'whilst they consider the use of smart ICT on a project-by-project basis, they would not support moves which reduced their flexibility in selecting the most appropriate design mechanism for each project'. However, DIRD also noted that it was 'common practice for Commonwealth-supported upgrades to urban freeway projects to incorporate ICT elements' enabling more efficient use of these assets, 'thereby helping generate the greatest benefits for the Government's investment'; and that the 'Commonwealth also funds stand-alone ICT projects through its Infrastructure Investment Programme'.[45] DIRD's position was that 'mandating for or against specific technologies is likely to constrain governments' capacity to develop the most efficient solutions', and that it was 'important that proposed solutions, including the use of ICT, are assessed for fitness of purpose on a project-by-project basis'.[46]

Linking project funding to technological innovation

5.42   Alternatives to mandating the use of smart ICT in infrastructure were proposed in the evidence presented to the Committee. In its submission, Brisbane City Council noted 'a change to Council's ICT procurement approach through the use of a problem statement in Requests for Tender rather than a specified list of mandatory requirements'. This approach was designed 'to encourage greater innovation in responses from industry'.[47]

5.43   Bentley Systems proposed a system, utilised on major government projects in Perth (Perth Children's Hospital and New Perth Stadium), whereby 'infrastructure owners would be able to mandate measurable outcomes' focused on whole-of-life management of assets. This allowed 'the project delivery partners to use their subject matter expertise, based on the latest best practice processes to work out the best way to achieve the specified outcomes'.[48]

5.44   Professor Keith Hampson suggested a similar solution— 'an appropriate and workable middle-ground that provides for encouragement of the industry to step up to use typical open, interoperable formats for their design construction bids'. He suggested that governments could 'make a requirement that does not specify particular platforms … provided the platforms are interoperable, it does not need to identify a Bentley or an

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45   Department of Infrastructure and Regional Development, *Submission 28.2*, p. 5.
46   Department of Infrastructure and Regional Development, *Submission 28.2*, p. 5.
47   Brisbane City Council, *Submission 34*, p. 5.
48   Bentley Systems, *Submission 29*, p. 10.

AutoCAD brand for the software'. He noted that 'bidding consortia need to understand that this is something that will flow through not just in the very short-term'. It would provide a long term horizon for government procurement around which industry could structure project bids. He stated:

> Most transport or infrastructure authorities at the state level have the ongoing responsibility for the road network and they will need to have integrated asset management systems that are populated by the private sector design and construction organisations. In my view there needs to be an encouragement and a continuity of expected business conditions, without necessarily imposing a mandate that absolutely determines that if you do not use this particular software brand then you will not have a look in. So I think there is a midway point that can be workable and can demonstrate leadership and help to give the industry the sense of confidence that there is an investment to be made here for the future productivity of the industry, and, I might say, the health of the nation.[49]

5.45   NICTA proposed linking project funding to innovation, recommending that:

> … government could mandate the use of smart ICT in any future infrastructure, upgrades of existing infrastructure or greenfields development. For example, you could mandate that a minimum two per cent spend be on smart ICT. You would have to define it, of course.[50]

5.46   Planning and construction of infrastructure assets could be significantly improved through the use of 'integrated optimisation and planning techniques' to make the building process more efficient and 'minimise disruption to surroundings during construction'. Integrated design and construction activities would also minimise 'optimism bias'—the tendency to underestimate costs, impacts and risks and overestimate revenues and use. NICTA suggested mandating that 'such empirically calibrated methods be used for all major infrastructure projects', and that federal funding be linked 'to the demonstration of these techniques in project proposals'.[51]

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49   Professor Keith Hampson, Faculty of Humanities, Curtin University, *Committee Hansard*, 25 September 2015, p. 32.

50   Professor Bob Williamson, Interim CEO, NICTA, *Committee Hansard*, 21 August 2015, p. 1.

51   NICTA, *Submission 23*, p. 8.

5.47   Intelligent operation of infrastructure assets through the use of sensors, analytics and optimisation techniques would increase operational efficiency and allow infrastructure to be integrated with 'other parts of the network and activities using the asset'. NICTA proposed linking funding 'to project proposals that incorporate this kind of Smart ICT and demonstrate integration into the wider infrastructure base', and that 'operating data is made widely available for the most efficient operation of the asset and to guide future investment'.[52]

5.48   Asset life could be extended using 'predictive analytics to ensure assets last longer, reducing costs and improving safety and efficiency'. NICTA suggested linking project funding to require that proposals for upgrading existing infrastructure 'be based on fine-grained data relating to specific maintenance actions, rather than crude whole-of-asset analyses', and that improved instrumentation be requested when upgrades occur. [53]

5.49   The National Committee for Information and Communication Sciences (NCICS), Australian Academy of Science, proposed targeted incentives across a range of technologies and infrastructure assets, including:

> … action that encourages more use of the full set of features of smart meters in homes and the incorporation of smart meters into a more effective smart grid; require car manufacturers to include smart navigation and collision-avoidance technologies in all new vehicles; and encouragement of local government to use smart technologies for data gathering on infrastructure for effective and timely maintenance and efficient delivery of services.[54]

5.50   NCICS also suggested that governments 'consider whether the existing legislative framework is sufficient to protect privacy in an Internet of Things age'.[55]

5.51   The APCC recommended a more nuanced approach than imposing a mandate, in which governments developed their smart ICT capabilities and requirements in stages, focussing first on major projects. APCC suggested:

- That Government agencies should consider adoption of BIM for major projects (noting that the definition of 'major' is at the discretion of each jurisdiction therefore variations are expected in regards to possible thresholds);

52   NICTA, *Submission 23*, p. 8.

53   NICTA, *Submission 23*, p. 8.

54   National Committee for Information and Communication Sciences, Australian Academy of Science, *Submission 5*, pp. 4–5.

55   National Committee for Information and Communication Sciences, Australian Academy of Science, *Submission 5*, pp. 4–5.

- When adopting BIM on the project, consideration should be
  given to the procurement strategy implemented for the project;
  and

- At completion of any BIM enabled government project, clients
  should be requiring a 3D view of the asset with embedded data
  and materials for use across the asset life cycle.[56]

5.52   In its submission, DIRD noted that the Australian Government already
        plays a role as a strategic investor in infrastructure 'to support state and
        territory governments to implement new technologies':

> The $42 billion Infrastructure Investment Programme, which is
> overseen by the Department, has provisions for investment in ICT
> upgrades to infrastructure. In addition, the Government has
> committed to giving funding preference to future projects where
> they have considered and incorporated ICT and other mechanisms
> to improve the efficiency of fixed infrastructure.[57]

Coordinating body—UK model

5.53   The need for adopting some form of coordination within government and
        between government and industry for the development and
        implementation of smart ICT in infrastructure was highlighted in much of
        the evidence presented to the Committee—with much attention focussed
        on the UK model. In its submission, Transport for NSW noted the success
        of the UK's BIM program, which was 'well documented and may be
        attributed to the following key drivers':

> a) Government Mandate—This sent a clear signal demonstrating
>   the commitment by government, and the expectations for
>   industry to respond and transform.
>
> b) Government Leadership—This strategy has been led from the
>   top down with the Government's Chief Construction Adviser
>   acting as champion and leading advocate.
>
> c) Established Working Group—The government funded UK
>   BIM Task Group established a centre of excellence and
>   advocacy for BIM, providing an open channel for engagement
>   and collaboration with industry.
>
> d) New Industry Standards—Since 2011, the UK Government has
>   published a number of new standards outlining the new
>   processes and obligations to meet the requirements of fully

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56   Australasian Procurement and Construction Council, *Submission 9*, Attachment 1, *A Framework
      for the Adoption of Project Team Integration and Building Information Modelling*, December 2014,
      p. 12.

57   Department of Infrastructure and Regional Development, *Submission 28*, pp. 4–5.

collaborative BIM. These standards are now upheld as global best-practice and are currently being re-written as ISO standards.

e) Standardisation—The UK Government has invested heavily into standardised asset classification and open file formats, to ensure a common platform for interoperability across industry…

f) Mega-projects—In recent years the UK Government has announced a number of mega-projects such as Crossrail and High Speed 2. These projects have been developed to harness the long-term benefits of DE and as such, have provided significant opportunity for large-scale education and upskilling of industry.[58]

5.54   Transport for NSW observed that the 'UK BIM Task Group is recognised for playing a pivotal role in the success of the UK strategy':

Established in 2011, the group formally aims to "drive adoption of BIM across government". They have now become the public face of the strategy and lead the on-going engagement with industry through their four work streams, as follows:

- Stakeholder and media engagement—broadcasting the vision and value through guidance and publications, stakeholder engagement and regional awareness campaigns.
- Delivery and productivity—development of standardised file formats, data exchange and business processes.
- Commercial and legal—contracts, copyright and IP / PI
- Training and academia—Academic forums, construction skills, accreditation and supply strategies.[59]

5.55   Transport for NSW recommended that:

Australian Governments, through COAG, replicate the UK model, and where possible, utilise and build on the established UK Standards, supporting technologies, training modules, accreditation frameworks and contract models.

This will allow Australia to leverage off global leaders and ensure we maintain alignment with international best practice.[60]

5.56   Transport for NSW further recommended:

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58   Transport for NSW, *Submission 33*, p. 22.
59   Transport for NSW, *Submission 33*, pp. 22–3.
60   Transport for NSW, *Submission 33*, p. 23.

1) That the Council of Australian Governments (COAG) appoints a single 'Champion' that will lead a task group for smart ICT and digital engineering innovations for infrastructure.

2) That the task group develop a measurable, medium term national plan identifying policies and strategies to accelerate domestic implementation of new technologies and innovations.

3) That the task group engage with industry and advise Governments on global innovations that will achieve broad productivity benefits.

4) To maximise the relevance and utility of its work, the task group should:

- Learn from International government best practice for digital engineering strategies
- Develop its plan to align with best international best practice
- Be given a mandate from COAG or the Transport and Infrastructure Council (TIC) that clearly defines a vision for the adoption of smart ICT, goals and timeframes.[61]

5.57   Transport for NSW noted the success of the UK's strategy, stating:

> The response to this mandate has been significant, leading to considerable investment and up-skilling of industry throughout the local supply chain in the past four years. The resulting impacts are already retaining benefits, with the UK government reporting a 20% savings in capital construction costs over a three year period, creating an overall reported saving of approximately £840 million. In the long-term it is expected these savings will be realised many times over, due to improved efficiencies for operations and maintenance over the life of the new assets.
>
> The UK Government has now commenced the next stage of their strategy, which is to export their skills globally, under the banner of "Digitally Built Britain". If Australia is to remain competitive when bidding for global mega-projects, we must ensure our local industry continues to drive innovation and are not left behind.[62]

5.58   Other submissions endorsed the UK option. Bentley Systems stated that 'rather than reinvent the wheel…we would recommend the adoption of the investment made by the UK government'. Bentley believed that 'regarding best practice, it was difficult to go beyond the UK's adoption of

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61   Transport for NSW, *Submission 33*, p. 7.
62   Transport for NSW, *Submission 33*, pp. 16–17.

BIM'; and that while 'developed originally for vertical buildings, many elements of BIM are appropriate and relevant to Civil infrastructure'.[63]

5.59   Autodesk identified the United Kingdom 'as probably the most advanced country for their vision in the reform of the construction sector'. The UK has adopted a whole-of-government approach to the planning, procurement, construction, delivery and management of building and infrastructure projects. Autodesk believed that 'Australia could certainly harness some of the lessons learnt from the UK experience'.[64]

5.60   Aurecon recommended 'Australian Governments look at policy reform similar to the UK', which would 'improve the value offered by public sector construction as a way to improve performance of infrastructure and to meet the requirements of those that use them'.[65] It urged the Australian Government, in conjunction with the States and Territories, to establish:

> … a Digital Infrastructure Task Group over a multi-year programme to enable government as a client to derive significant improvements in cost, value and carbon performance through the use of open sharable asset information.[66]

5.61   Aurecon believed that Australia had:

> … a window of opportunity to create a domestic programme and to take on a regional leadership role in BIM exploitation, BIM service provision and BIM standards development. In taking on the role it will greatly enhance the global image of Australian designers, contractors and product manufactures which in turn will translate into winning new work, growth opportunities and increased employment.
>
> This will require the Australian Federal and State governments to work together to create a national Digital Task Group. Without this collaboration each individual state will create their own digital requirements, standards, and thus creating unnecessary complexity and confusion within the supply chain.[67]

5.62   Mr John Mitchell, representing buildingSMART, highlighted the risks of failing to get coordination between governments in Australia. He stated:

> What worries us here in Australia at the moment is that we see several state government agencies all working separately. Some of

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63   Bentley Systems, *Submission 29*, p. 10.

64   Mr Brett Casson, Infrastructure Development Executive, Autodesk, *Committee Hansard*, 9 September 2015, p. 3.

65   Aurecon, Submission 22, p. 19.

66   Aurecon, Submission 22, p. 10.

67   Aurecon, Submission 22, p. 19.

them are doing excellent work. There is no criticism of what they
are doing but it is not being discussed and collaborated and we are
not getting a common position. We are just getting individual little
silos of reasonably good work that are undervalued for the
potential that we could get. So if we have a Commonwealth
commitment, if we get the engagement of the states then the
industry will avidly support this process. If we are the best users
of this technology, which we can be, then we will compete very
strongly in our Asian sector and internationally.[68]

5.63   In Australia, Transport for New South Wales has formed a BIM task
        group. Drawing heavily on the UK experience, the task group had 'formed
        over the past 12 to 18 months and are quite mature in the understanding
        of not only delivery but how the technology will assist in productivity
        gains for the operations and maintenance of the rail network in Sydney, in
        New South Wales'.[69] In addition, the WA Government has undertaken the
        development of the new Perth Children's Hospital 'under WA Treasury's
        mandate of a full BIM model':

> It has produced an exceptional level of BIM and has certainly
> upskilled and leveraged up the industry design and engineering in
> the construction industry in Perth on the basis of that, which is
> acknowledged through some of the software companies as
> leading-edge BIM in the whole Australasian region.[70]

5.64   The question of where best to host a national smart ICT task group was
        raised by a number of witnesses. Mr David Burchard (AECOM) noted that
        the UK model was 'driven by Treasury, with a number of industry-
        focused strategic focus groups that advise government, and also
        secondees from private industry to government departments'.[71]

5.65   Mr Burchard also highlighted the central role of Infrastructure Australia in
        the procurement process , noting that 'they certainly are a very important
        stakeholder in this':

> Probably their most important contribution will be in cost data
> benchmarking in their governance role for endorsing
> infrastructure projects. They will be able to access data from all

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68   Mr John Mitchell, Chair, buildingSMART Australasia, *Committee Hansard*, 21 August 2015, p.
     19.

69   Mr Brett Casson, Infrastructure Development Executive, Autodesk, *Committee Hansard*, 9
     September 2015, p. 6.

70   Mr Donald Cameron, IPD and BIM Systems Manager, John Holland Group, *Committee
     Hansard*, 21 August 2015, p. 20.

71   Mr David Burchard, Associate Director, Transportation, AECOM, *Committee Hansard*, 24
     September 2015, p. 16.

projects and be able to compare proposed projects against national cost data benchmarks.

5.66   He stated that 'there needs to be leadership provided by… the federal government, and Infrastructure Australia plays an important role in that'.[72]

5.67   Professor Hampson supported Infrastructure Australia playing a leading role in the coordination of smart infrastructure development, stating:

> I think it would seem that Infrastructure Australia is an institution that is being supported for the future. Not only should Infrastructure Australia look at which projects should be delivered across the states and territories but it should provide a performance framework for — for example — the use of building information modelling in integrating the various elements of the supply chain and looking towards performance assessment that can be carried on from phase to phase within a project and from project to project across the nation. I think we have an opportunity on our doorstep that is there.[73]

5.68   Mr Brian Middleton, of Bentley Systems, suggested that 'there is probably going to be a little bit of a combination' of agencies involved — 'I think business skills and innovation is an obvious place to be involved in this, as well as Treasury'.[74] In the end, however, Mr Middleton did not believe it was important where the coordination between agencies, governments and industry occurred, so long as it did occur:

> There needs to be the procurement change. Finance currently holds that responsibility under the public works conference rules. It just needs collaboration between the agencies to make sure it happens. APCC already has an integrated state and New Zealand perspective. We do not mind where it happens, or if it is called the Department of BIM, which it is called in France — a 20 million euro investment was just made at the beginning of this year, and it is run by the minister for housing, or 'ministress' for housing. In the UK it is a mandate. They set up a construction working party called the BIM working group, I think. They set up a special group in the Commonwealth. It was already in part of Treasury. So I do not think it will be hard to quickly decide where that body should

72   Mr David Burchard, Associate Director, Transportation, AECOM, *Committee Hansard*, 24 September 2015, p. 14.

73   Professor Keith Hampson, Faculty of Humanities, Curtin University, *Committee Hansard*, 25 September 2015, p. 30.

74   Mr Brian Middleton, Senior Director, Transportation, Bentley Systems, *Committee Hansard*, 24 September 2015, p. 27.

be located and focused. I think from then on you will see rapid progress, much greater adoption and benefits throughout the entire supply chain.[75]

Promoting the development of relevant skills

5.69   The incorporation of smart ICT into the design and planning of infrastructure, as well as its construction and management, will demand the development of a range of skills. The Department of Communications acknowledged that 'greater emphasis on STEM skills, and particularly data analysis qualifications, will be an important resource in making use of Smart ICT in infrastructure in future';[76] while the National Committee for Information and Communication Sciences (NCICS) of the Australian Academy of Science stated:

> Widespread adoption of smart infrastructure across Australia will require a supply of skilled professionals with expertise in Science Technology, Engineering, and Mathematics (STEM), and more specifically in ICT and its application to infrastructure. NCICS is concerned that there is a growing shortage of ICT professionals in Australia, and as smarter infrastructure is developed and implemented, this shortfall could increase. This shortage of ICT professionals could hold back the growth of smart infrastructure.[77]

5.70   In its submission, the Department of Infrastructure and Regional Development (DIRD) observed that 'Smart ICT require a new wave of technical expertise in transport'. While traditional engineering skills would be required 'increasingly software and computer engineering as well as data analysts will be needed to transition Australia to broader use of Smart ICT'.[78]

5.71   The development of these skills will require greater cooperation between industry, government and the education sector. The Australian Technology Network of Universities, noted that 'building new capabilities in smart ICT must integrally involve the higher education sector, with training elements forming an importance component of multi-partner initiatives'.[79]

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75   Mr John Mitchell, Chair, buildingSMART Australasia, *Committee Hansard*, 21 August 2015, p. 20.

76   Department of Communications, *Submission 27.1*, p. 7.

77   National Committee for Information and Communication Sciences, Australian Academy of Science, *Submission 5*, p. 5.

78   Department of Infrastructure and Regional Development, *Submission 28*, p. 6.

79   Australian Technology Network of Universities, *Submission 18*, p. 2.

5.72 Professor Rod Tucker urged higher standards of education in maths, sciences and technology in schools, but also highlighted the need for a growing nexus between universities and industry to promote engagement with new technology:

> There is a need for greater collaboration between universities and industry to give students more of a sense of engagement in the technologies that they are likely to be working in when they finish their university education. There is quite a lot of scope for the universities to engage with industry and students in university engineering, science, mathematics and computer science courses, but they need to work more closely with industry perhaps through industry placements and industry-based projects and so on.[80]

5.73 Focussing primarily on emergency management, Mr Geoff Spring, of the Senior Research Adviser, Centre for Disaster Management and Public Safety at the University of Melbourne, urged 'the provision of training and qualifications required at both vocational and tertiary level to be able to plan, design, implement, operate and maintain broadband infrastructure'. He noted that:

> The submission from ARCIA[81] that you received addresses this issue at the vocational level, while the CDMPS is planning professional tertiary level qualifications coupled with executive level short-course training for senior executives in the emergency management sector.[82]

5.74 Mr David Purnell of BCE Surveying, who works 'with Curtin University, as part of their advisory committee, and with the Royal Institution of Chartered Surveyors international body on the structure of courses', was optimistic about the uptake of technology training at the university level:

> The uptake and the training at that level has increased significantly. So what we are seeing is students emerging from the universities who actually have a very good grappling and understanding of the fundamentals around these systems. They are quite complex. So the talent pool is, fortunately, increasing.

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80 Professor Rodney Tucker OAM, Chair, National Committee for Information and Communication Sciences, Australian Academy of Science, *Committee Hansard*, 25 September 2015, p. 1.

81 Australian Radio Communications Industry Association, *Submission 37*.

82 Mr Geoff Spring, Senior Research Adviser, Centre for Disaster Management and Public Safety, University of Melbourne, *Committee Hansard*, 25 September 2015, p. 37.

> That is a benefit not only to the surveying industry but then all the affiliated industries around it.[83]

5.75   Focussing on BIM and Project Team Integration (PTI), the APCC noted that 'fundamentally there is a need for education and training designed to increase the understanding of PTI and BIM technology and processes':

> The focus for education needs to include the benefits of PTI and the pathways to achieving integration together with BIM awareness, technical skills, knowledge and understanding BIM as a collaborative working tool. It is important to highlight that BIM is more than technology changes; it provides significant collaboration and competiveness benefits.[84]

5.76   The APCC noted that 'PTI and BIM education and training is being integrated into education courses with universal adoption, secondary, trades, universities, TAFE's, polytechs, vocational etc.' The key aim was 'consistent baseline training … to build a shared understanding across the industry with learning outcomes resulting in transferrable skills'. APCC argued that universities and other educators needed 'to incorporate consistent BIM education and training into degrees and coursework (more than the basic principles of BIM technology)', and that 'web based training is an important option that needs to be accessible and available'.

5.77   The APCC believed that the 'traditional silos of architecture, engineering and building and construction schools' was not 'conducive to the delivery of education and training programs that facilitate a consistent approach to BIM service delivery'. Integrating the principles of PTI and BIM into existing course curriculum can reduce the need for developing new courses and drive consistency of delivery.

5.78   The APCC noted that 'PTI and BIM training is ongoing and all industry stakeholders need to acknowledge that those who are skilled and trained require continuing support and a thorough understanding of the PTI and BIM process' The APCC highlighted the Perth Children's Hospital as 'an excellent example of how PTI and BIM training can be seamlessly and effectively facilitated at the project level with minimum effort and disruption for all project stakeholders'.[85]

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83   Mr David Purnell, Perth Survey Manager, BCE Surveying Pty Ltd, *Committee Hansard*, 4 September 2015, p. 1.

84   Australasian Procurement and Construction Council, *Submission 9*, Attachment 1, *A Framework for the Adoption of Project Team Integration and Building Information Modelling*, December 2014, p. 22.

85   Australasian Procurement and Construction Council, *Submission 9*, Attachment 1, *A Framework for the Adoption of Project Team Integration and Building Information Modelling*, December 2014, pp. 22–3.

Current capabilities and future skill needs within government agencies

5.79   The importance of government agencies having the requisite skills to achieve optimum outcomes in the application of Smart ICT to infrastructure was highlighted in the evidence presented to the Committee. Aurecon observed that:

> An intelligent client is critical to the success of procurement and in unlocking value for all stakeholders through a digital approach. This can be a challenge for government where relatively few public servants have substantial experience and expertise in this emerging digital approach. Developing commissioning skills is key to creating intelligent customers in government. There can be a language gap between engineers and public servants, and this barrier to communication needs to be acknowledged and addressed to support successful outcomes to engineering procurement projects.[86]

5.80   Unfortunately, the absence of these skills in government was also highlighted to the Committee. Mr David Burchard, of AECOM, noted the lack of technical capacity, either inside Infrastructure Australia or elsewhere, to manage smart infrastructure of projects;[87] while Dr Ben Guy, of consulting firm Urban Circus, argued that the technical skills required to manage smart infrastructure projects did not currently exist inside federal government departments. He told the Committee:

> I worked really hard with a particular state government agency … to try to build up the capability from the inside, and it was too difficult. Culturally, it was too hard. Too many rubber bands in the way, so we just pulled out.[88]

5.81   Nonetheless, Urban Circus had supported 'capability development within government agencies':

> There are multiple staff now operating on a full time basis with advanced smart planning capability within Victorian government. We have trained and enabled these capabilities.[89]

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86   Aurecon, *Submission 22*, pp. 19–20.

87   Mr David Burchard, Associate Director, Transportation, AECOM, *Committee Hansard*, 24 September 2015, p. 14.

88   Dr Ben Guy, Chief Executive Officer, Urban Circus Pty Ltd, *Committee Hansard*, 24 September 2015, p. 7.

89   Urban Circus, *Submission 3*, p. 3.

Committee conclusions

5.82   The need for government to engage at some level with the smart ICT in infrastructure design and planning is evident from the evidence presented to the Committee. The question is 'to what extent and in what form?'

5.83   The evidence presented by Australian Government agencies indicates that engagement is already occurring but, by accident or design, there seems to be little urgency or coordination in this engagement. State departments and agencies appear to be well in advance of their federal colleagues in engaging with the complexities of smart ICT, as are sections of industry.

5.84   Elements of the construction industry and some State Governments are calling for the adoption of the UK model of infrastructure procurement, which mandates the use of BIM. They regard this as the quickest and most efficient way of advancing the adoption of smart ICT and producing smart infrastructure. Others have urged caution, noting that neither government nor industry have reached a level of maturity in their use of smart ICT, particularly BIM, to warrant a mandate. They urge a more graduated approach to new technologies beginning with major projects or particular technologies and working out from there. The Committee believes there is much to commend this approach, not least being that it is inherently more flexible than a mandate. The industry consensus appears to be that projects exceeding $500 million in cost is the optimum starting point for implementing smart ICT through procurement processes.

5.85   Almost everyone who has contributed to the inquiry has agreed that there needs to be greater coordination within and between levels of government, and between government and industry, on the design, planning, procurement, construction and management of smart infrastructure, and that this coordination must operate from a national level. The UK model of a BIM task group—coordinating the efforts of government agencies and industry—has been advanced as an ideal. The success of the UK model is widely acknowledged. Adapted to Australian conditions, it can and should be replicated here.

5.86   The Committee advocates the formation of a Smart Infrastructure Task Force, representing governments at all levels, academia and industry to provide for the coordination and implementation of smart ICT in infrastructure. The Task Force will act as a coordinator and conduit for the development and implementation of policy nationally, including the development of industry and product standards and training and education. The Task Force would have responsibility for the development of a national strategy to accelerate the adoption of new technologies and

innovations; and engage Australia with international experience and best practice globally.

5.87   The Committee is also conscious of the need to develop the requisite skills to take advantage of new technology and practices. The key to this is ensuring that government agencies have the necessary knowledge and skills to effectively engage with the private sector in the development of smart infrastructure. Essentially, government agencies must know what to ask for in order to get it. This in turn means engaging with industry effectively to see what it can provide.

5.88   A graduated approach to the implementation of smart ICT will allow industry to adapt to new requirements while learning on the job. The implementation of new technologies and practices, such as BIM, on major projects will see the development of a skill base and the dissemination of knowledge and skills throughout the construction sector. The Committee is confident that if government procurement sets the right direction, industry will rise to the challenge and competitive pressures will mean that enterprises will adapt or fail, as the case may be.

Recommendation 6

5.89   **The Committee recommends that the Australian Government leads the formation of a suitably qualified and resourced Smart Infrastructure Task Force, led by Infrastructure Australia, on the model of the UK BIM Task Group, representing governments at all levels, academia and industry to provide for the coordination and implementation of smart ICT in the design, planning and development of infrastructure, and in the maintenance and optimisation of existing infrastructure. The Task Force will act as a coordinator and conduit for the development and implementation of policy nationally, including the development of industry and product standards and training and education. The Task Force will have responsibility for the development of a national strategy to accelerate the adoption of new technologies and innovations; and engage Australia with international experience and global best practice.**

Recommendation 7

5.90   **The Committee recommends that the Australian Government, as part of its infrastructure procurement processes, require BIM to LOD500 on all major infrastructure projects, exceeding $50 million in cost, receiving Australian Government funding, including projects partially funded by**

Federal Government in partnership with state, territory and local governments, and that it focus on tendering mechanisms that will facilitate this outcome, on a project-by-project basis, with a view to ultimately establishing BIM as a procurement standard.

Recommendation 8

5.91   The Committee recommends that the Department of Infrastructure and Regional Development adopts a practice of examining whether the use of Smart ICT, in optimising the operation and maintenance of existing built infrastructure assets, can provide a more cost-effective solution than their physical replacement or upgrade.

Recommendation 9

5.92   The Committee recommends that the Australian Government, through COAG, works with state and territory governments to develop a national approach to the application of Smart ICT in the design and planning of infrastructure, particularly with respect to state government responsibilities in land management, utilities, and transport systems.

Recommendation 10

5.93   The Committee recommends that the Australian Government invite Infrastructure Australia to consider the use of smart ICT in infrastructure as a means of identifying savings that can be made in the short term.

Mr John Alexander OAM MP

Chair

9 March 2016