

Enabling Digital by Default

A WHITE PAPER



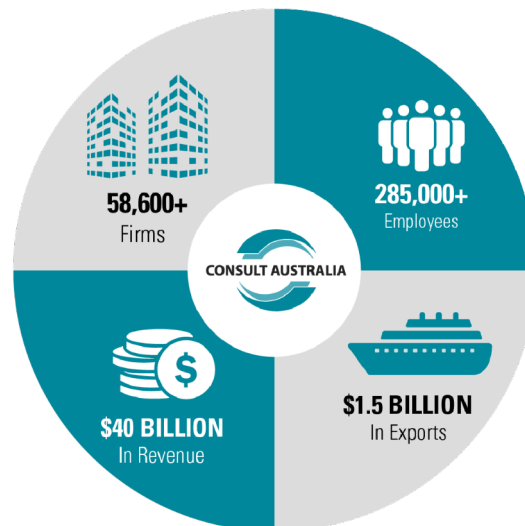
About us

Consult Australia is the industry association representing consulting businesses in design, advisory and engineering, an industry comprised of over 58,600 businesses employing over 285,000 people across Australia.

Our members deliver the solutions to the nation's most complex challenges helping shape, create and sustain our communities.

Our vision is for a thriving, competitive consulting industry that supports a prosperous economy and better outcomes for our members' clients including for governments and the communities they serve.

We believe there is no organisation better placed to champion digital by default as we represent the people and organisations engaged in projects from the earliest stages and throughout the entire lifecycle, developing digital assets rarely used to their full potential.



With thanks

Consult Australia is proud to collaborate in Enabling Digital by Default with:



*We acknowledge the Traditional Custodians of the land on which we work and live, which includes the lands of the Gadigal, Kaurua, Kulin, Turrbal and Wurundjeri people.
We pay our respect to Elders past and present.*

Executive summary

Australian governments have committed to a [\\$647 billion](#) investment in major public infrastructure over the next five years. The productivity opportunity in the construction sector, as it has failed to keep pace with general productivity improvements over the last thirty years, is now estimated at [\\$62 billion annually](#). Australia is ranked [16th in the world](#) by the IMD World Competitiveness Centre in capacity and readiness of economies to use digital technologies.

Billions of dollars of infrastructure projects around Australia are still being delivered with paper plans, wet signatures and PDFs. Everyone knows our industry must change. We can all see the consequences of being slow off the digital mark – decades of sluggish productivity and lost data insights that could help us make better decisions and build better infrastructure.

Governments and communities are demanding more from their infrastructure investments with a focus on delivering net zero objectives, circular economy outcomes, effective community engagement, and resilience to cyber threats and a changing climate. Alongside these ambitions, we cannot afford to squander nearly half a trillion dollars in lost productivity over the next decade. A digital by default approach is essential.

In June 2023, we released our [Digital by Default Green Paper](#) exploring how to increase productivity and deliver better outcomes from our infrastructure investment. Our consultation on this Green Paper included over 100 points of engagement involving over fifty agencies and leading businesses representing over 17,000 professionals working in infrastructure across Australia.

Our Digital by Default roundtables held across Australia connected digital champions who highlighted existing best practices. Our consultation revealed the breadth of digital initiatives occurring across Australia. Both industry and government representatives noted these initiatives are limited by common challenges exacerbated by the perils of a federated approach.

The feedback from our roundtables was invaluable in identifying an approach for digital by default that respects existing leadership, but is also **collaborative**, supports **harmonisation** and **coordination** with an **outcomes-focus**. Universally, **urgency** was a priority – the best time to act was yesterday and the next best time is now.

These principles underpin a new enabling environment for digital by default, with a clear pathway for governments to harness best practice already underway and catalyse change. Consult Australia's five recommendations provide a practical approach to leverage that enabling environment and achieve digital by default:

- 1 Build a Digital by Default Community of Practice
- 2 Invest in the business case
- 3 Harmonise standards and guidance for data and information management
- 4 Embed requirements through procurement with an outcome-led approach
- 5 Build capability and skills

Businesses are waiting for governments to lead the way. Governments are waiting for market forces to determine the pathway forward. We need everyone to come together, and this is why Consult Australia is leading collaboratively.

We invite you to join us.

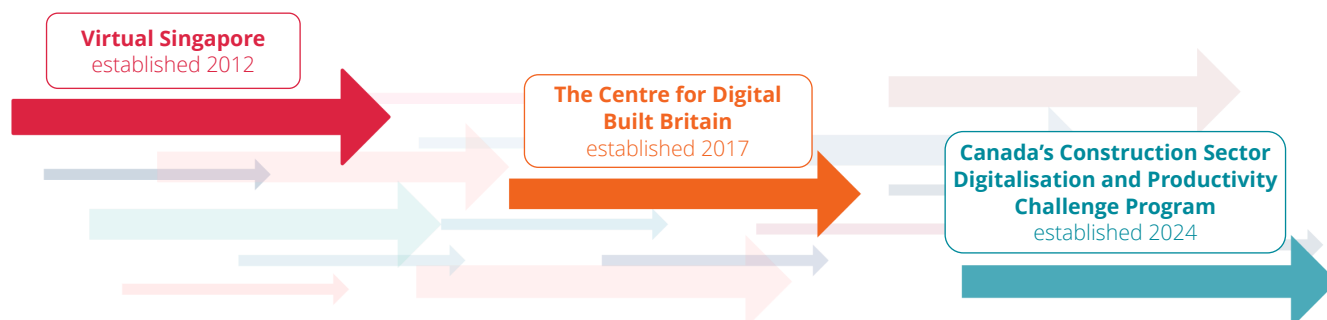
What is digital by default?

Through our consultation it was clear that digital by default for infrastructure and construction means different things to different people. The unifying view was an understanding of digital by default in delivering a business as usual approach to the integration of data and technology to secure better outcomes throughout the project lifecycle. Digital by default represents a significant shift away from current 'digital by exception' approaches.



Keeping pace globally

Globally we have seen the early development of enabling environments to support digital by default outcomes across infrastructure. The examples below showcase the importance of a coordinated approach that builds national scale for global competitiveness.



Virtual Singapore

Commencing in 2012 and completed in 2023, Virtual Singapore is recognised as the first digital twin of an entire country. The initiative is designed to help make better use of Singapore's scarcity of land and mitigate flood risk.

Laser-scanning aircraft and land vehicles recorded terrain and surface information to a minute level of detail. A single platform, allowing users to view and verify information now informs urban planning and design.

Accessible to the public, as well as private, government and research sectors, Virtual Singapore has the potential to stimulate a wave of innovation and integration across infrastructure – enabling policymakers, urban planners, and researchers to model various scenarios, test potential solutions, and make informed decisions, significantly enhancing the efficiency and resilience of urban development.

The Centre for Digital Built Britain

The Centre for Digital Built Britain was established in 2017 through a partnership between the UK Department of Business, Energy and Industrial Strategy and the University of Cambridge. The Centre pioneered new approaches to understanding how the construction and infrastructure sectors could leverage digital methodologies to enhance the design, build, operation, and integration of the built environment.

The Centre developed frameworks and tools that enable better data management, improved project delivery, and greater operational efficiency. It has also been instrumental in advancing the concept of the digital twin in the UK, promoting its adoption across various sectors to ensure that infrastructure projects are future-proof and sustainable.

Canada's Construction Sector Digitalisation and Productivity Challenge Program

Established in 2024, this program aims to support new solutions to increase innovation potential and productivity in the construction sector using digital technology. The program includes:

- Research to support performance-based construction codes, which are essential for ensuring that buildings meet safety and performance standards while also accommodating innovative construction techniques
- A roadmap to help guide the digitalisation of the construction sector, providing a clear pathway for stakeholders to follow in adopting digital tools and processes.
- R&D for environmental and productivity benefits from modular low-carbon solutions
- R&D for electronic building plans, permits and virtual inspections, which streamline regulatory processes and enhance efficiency by reducing the reliance on paper-based systems and physical site visits.

The recommendations of this report aim to capture the best of initiatives already underway globally while facilitating coordinated scale for national advantage. By integrating these best practices, we can ensure that the industry helping design and deliver our infrastructure remains globally competitive. This approach not only supports the efficient delivery of infrastructure projects but also drives innovation, sustainability and economic growth, positioning our nation as a leader in a competitive global market for skills and capability.

The enabling principles

Five clear principles emerged from our Digital by Default roundtables that underpin a new enabling environment for digital by default.



Consult Australia's National Digital roundtables with members and stakeholders

Recommendations – Snapshot

1

BUILD A COMMUNITY OF PRACTICE

Establish a nationally endorsed Community of Practice supported by governments, industry and academia to address the challenges of digital transformation.

By leveraging the expertise and commitment of diverse stakeholders, we can drive the necessary standards and innovations to build momentum and achieve digital by default.

Endorsement, resourcing, coordination and progress reporting can be facilitated through National Cabinet and the Infrastructure and Transport Ministers Meetings (ITMM).

INVEST IN THE BUSINESS CASE

Prioritise and invest in the development of business cases that clearly articulate the long-term value and benefits of a digital by default approach.

Effectively communicating these benefits to decision-makers will encourage investment and support the transition to a digitally integrated infrastructure sector.

2

3

HARMONISE STANDARDS AND GUIDANCE FOR DATA AND INFORMATION MANAGEMENT

Develop and harmonise technical standards and guidance for data and information management across all jurisdictions and all stages of the asset lifecycle. This should involve a collaborative effort between federal and state governments, industry and academia that supports data security requirements.

Establishing unified standards will ensure consistency, improve interoperability and streamline efforts across sectors.

EMBED REQUIREMENTS THROUGH PROCUREMENT WITH AN OUTCOME-LED APPROACH

Embed 'digital by default' requirements through greater consideration of collaborative contract models that align the interests of all stakeholders and provide flexibility to accommodate digital requirements.

This should include harmonised requirements for data ownership, storage and handover to mitigate risks and ensure smooth transitions between project phases across the project life-cycle.

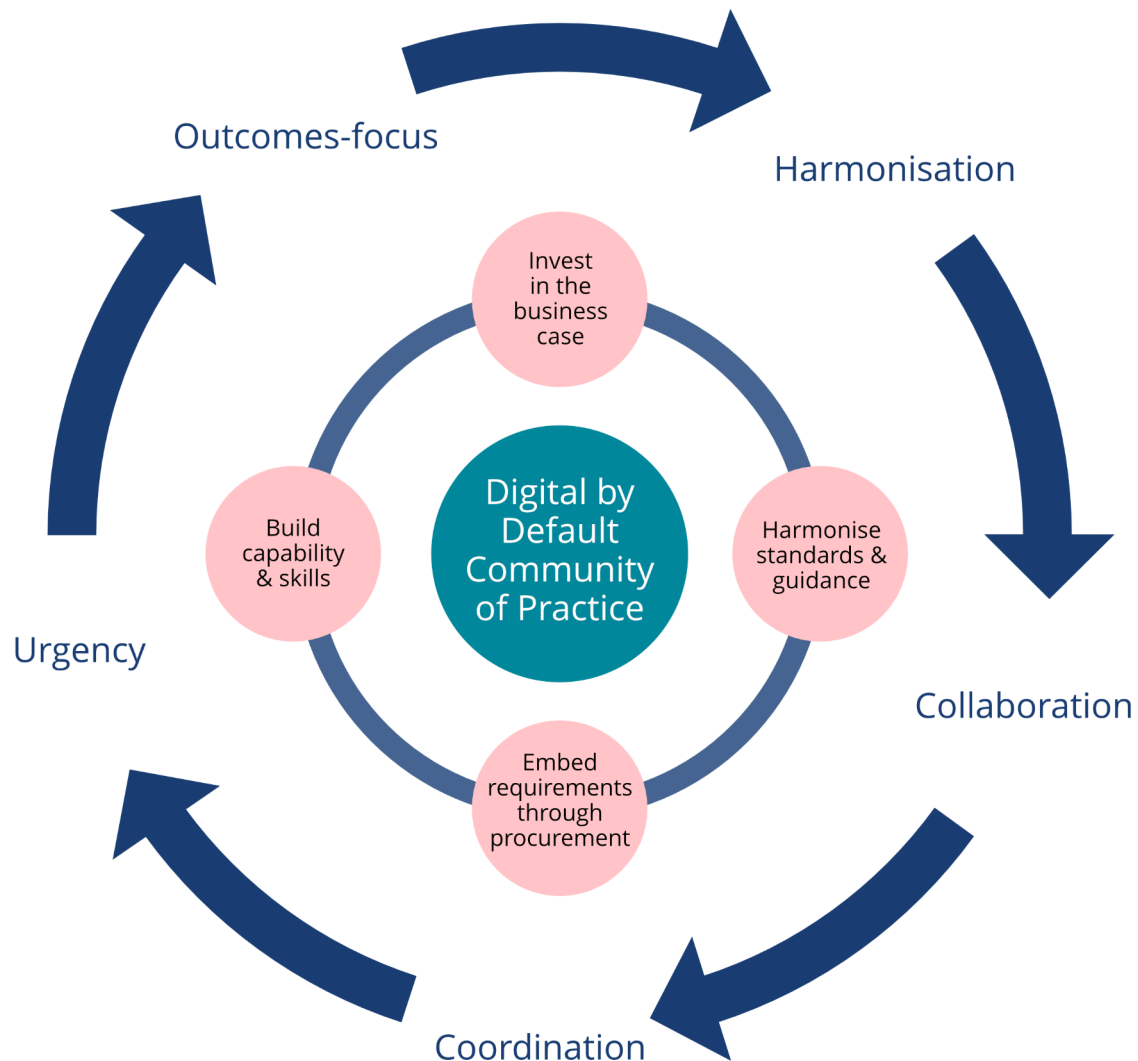
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5

BUILD CAPABILITY AND SKILLS

Training programs for both public and private sector stakeholders are required to enhance their understanding of digital technologies and their potential benefits. This includes upskilling staff and integrating digital literacy into professional development programs.

Support programs are anticipated to ease higher costs of tendering, training and capital investments. This could include grants, subsidies or partnerships that reduce financial barriers and build capability.



The Enabling Environment

*"What is the national enabling environment?
States do a lot of work themselves."*

Roundtable participant

Build a Community of Practice

Establish a nationally endorsed Community of Practice supported by governments, industry and academia to address the challenges of digital transformation. By leveraging the expertise and commitment of diverse stakeholders through targeted programs we can drive the necessary standards and innovations to build momentum and achieve digital by default.

Endorsement, resourcing, coordination and progress reporting can be facilitated through National Cabinet and the Infrastructure and Transport Ministers Meetings.

Establishing a nationally endorsed Community of Practice is paramount to address the multifaceted challenges of digital transformation.

Through our consultation, representatives from both industry and government agreed there is a need for coordinated leadership to drive digital by default in infrastructure that builds on existing initiatives and good practice across Australia.

Governments at all levels must prioritise and invest in digital initiatives, recognising the critical need for swift and decisive action now to ensure we capture global competitive advantage.

Stakeholders recognised the importance of building coordination and scale with a commitment to lead across both government and industry. Relative to the size of the infrastructure pipeline, it was considered that a small government investment shared across jurisdictions could build new capability, skills and critical relationships that harness what we are doing best.

This Community of Practice should include representation from agencies, leading peak bodies and alliances such as: the National Construction Industry Forum, Women in BIM, Digital Twin Partnership, the Australasian BIM Advisory Board, Standards Australia, Infrastructure Australia, the IOT Alliance, the Australasian Procurement and Construction Council.

The Community of Practice would also measure and report on progress on initiatives, including the other recommendations discussed below.

*“The client needs to own it,
the consultants drive it, and
the contractors implement it.”*

Roundtable participant

*“Connecting the moving
parts is needed to build
momentum.”*

Roundtable participant



A National Community of Practice

Understanding the challenge: The unknown unknowns

Roundtable participants highlighted the necessity of connecting various components to build momentum in digital initiatives. They noted that a lack of vision, characterised by grand aspirations without specific plans, creates downstream problems when transitioning to digital. Starting with smaller projects and setting clear purposes can mitigate these issues and lay a robust foundation for larger-scale digital transformation.

The discussion emphasised that Australia's context requires a national-level investment similar to Digital Built Britain to support multiplier benefits. Coordination through a national approach is essential, with the Australian government focusing on areas like productivity, net zero and skills development. Participants questioned what the national enabling environment should look like, given that states already undertake significant work independently. A unified national strategy would harmonise these efforts, ensuring consistency and efficiency across the nation.

The federal government's potential to drive change by setting standards, embedding them into contracts, and enforcing them through hierarchical structures was recognised. However, there were concerns about federal engagement, citing a lack of success where federal control was exercised without direct responsibility. It was noted that state-led initiatives often show greater commitment and success due to their direct responsibility and accountability.

Finally, the feedback pointed to "paralysis by analysis" as a significant barrier, stressing the need for prioritisation and decisive leadership to overcome these challenges. By establishing a robust community of practice, we can foster collaboration, streamline efforts, and drive the digital transformation of our infrastructure sector.

Invest in the business case

Prioritise and invest in the development of business cases that clearly articulate the long-term value and benefits of a digital by default approach.

Transparent metrics and reporting frameworks are required to quantify the benefits of digital initiatives. This will help in demonstrating the value of digital investments and build trust among stakeholders.

Effectively communicating these benefits to decision-makers will encourage investment and support the transition to a digitally integrated infrastructure sector.

“Being able to communicate the why and value to decision makers.”

Roundtable participant

Understanding the challenge: Cost and business cases

During our roundtable consultations, participants emphasised the critical need to effectively communicate the value and rationale of digital transformation to decision-makers. They highlighted that government struggles to invest in digital initiatives due to a lack of compelling business cases and clear use cases for co-investment.

Participants noted that small companies face significant barriers, such as the high costs associated with tendering and the requirement to secure tenders before making necessary investments. This often results in a substantial financial burden, with tender costs consuming up to 40% of their budget.

The importance of effective signposting and dedicated resources for sustained investment was underscored. However, it was also recognised that government entities need to accept that digital by default involves upfront costs and extended timelines. Participants observed that digital projects are often deprioritised when there's a risk of budget or time overruns, with the benefits not immediately evident to the agencies leading these projects.

There was a consensus that until digital by default becomes a mandatory policy, the potential for program and budget overruns will lead to the exclusion of digital objectives. It was also noted that asset owners and clients often lack the knowledge to request meaningful digital outcomes, resulting in inefficient efforts and cost overruns.

The challenge of quantifying the benefits of digital initiatives was discussed, particularly given the initial cost increases. Participants pointed out the complexities involved in getting systems fully operational, including managing legacy systems, integrating new systems and training personnel.

To overcome these challenges, it is crucial to develop and invest in robust business cases that clearly articulate the long-term value of digital transformation. Transparent metrics and reporting frameworks will help quantify the benefits, making it easier to demonstrate the value of digital investments. Effective communication of these benefits to decision-makers will foster greater support and investment in digital initiatives, paving the way for a digitally integrated infrastructure sector.

Harmonise standards and guidance for data and information management

Develop and harmonise technical standards and guidance for data and information management across all jurisdictions and all stages of the asset lifecycle. This should involve a collaborative effort between federal and state governments, industry, and academia that supports data security requirements.

Establishing unified standards will ensure consistency, improve interoperability and streamline efforts across sectors.

“There is an array of different maturity levels, requirements, approaches across our clients. Harmonisation nationally would be very helpful.”

Roundtable participant

Understanding the challenge: Fragmentation between jurisdictions

Roundtable participants discussed the significant issue of fragmented approaches to data and information management across different jurisdictions. They noted that data often does not transition effectively to the departments owning the assets, such as schools and community facilities. Additionally, data comparability between project operation and construction phases is lacking, leading to inefficiencies and miscommunication.

Participants highlighted the varied maturity levels, requirements and approaches among clients, underscoring the potential benefits of national harmonisation. They emphasised the need for backward data sharing and highlighted the differing challenges faced by stakeholders in sectors like health and transport. Concerns were raised about lost efficiencies if key stakeholders, such as those in the rail sector, are not on board with harmonised standards.

A common data model is currently absent, leading to interoperability issues. Participants called for a strong enterprise architecture around data modelling and a general framework starting from data modelling. While businesses may have their own models, a standardised approach is necessary to ensure cohesion and efficiency. The integration of legacy systems and data classifications takes time, yet benefits from connecting various agencies, such as transport, planning and utilities, are clear.

A common language and a data management system are essential to address terminology inconsistencies and a lack of national standards, which pose significant barriers to adoption. Additionally, there is no central repository to identify what hasn't worked on projects, further complicating efforts to learn from previous mistakes.

To overcome these challenges, a concerted effort must be made to develop and implement unified data standards. This will facilitate smoother transitions of data across project phases and jurisdictions, enhance comparability, and ultimately lead to more efficient and effective infrastructure delivery. By establishing a common framework and language, stakeholders can better collaborate and leverage data to drive innovation and improve project outcomes.

Embed requirements through procurement with an outcome-led approach

Embed 'digital by default' requirements through greater consideration of collaborative contract models that align the interests of all stakeholders and provide flexibility to accommodate evolving digital requirements.

This should include clarity on requirements for data ownership, storage and handover to mitigate risks and ensure smooth transitions between project phases across the full project life-cycle.

“Storage and ownership of data are risks.”

Roundtable participant

Understanding the challenge: Risks in pipeline and procurement

Roundtable participants highlighted several key risks in the current pipeline and procurement processes related to digital transformation in infrastructure. They pointed out that the lack of collaborative contract models means that, at present, stakeholders often do not get what they need or want. This issue is particularly pronounced in the Australian contracting environment, where traditional models fail to address the complexities of digital integration.

The storage and ownership of data were identified as significant risks. Without clear guidelines and frameworks in contracts, the handling and transition of data between different phases of a project, such as design and construction, can become problematic. This gap can lead to inefficiencies and potential legal disputes over data ownership hindering project progression and success.

The rapid shift towards digital methodologies introduces the risk of capacity bottlenecks. As the industry embraces 'digital by default', the strain on existing resources and capabilities can lead to new operational challenges. Careful planning and strategic management are essential to prevent these bottlenecks and ensure a smooth digital transition.

Given these insights, infrastructure contracts must evolve to better support digital transformation. Contracts need to explicitly address data ownership, storage and handover requirements, ensuring that all parties understand their responsibilities and expectations. Adopting an outcome-led approach that focuses on the benefits and goals of digital integration can help manage these risks effectively.

Build capability and skills

Training programs for both public and private sector stakeholders are required to enhance their understanding of digital technologies and their potential benefits. This includes upskilling existing staff and integrating digital literacy into professional development programs to ensure a workforce capable of meeting future challenges.

Training should prioritise opportunities to elevate leadership in both the public and private sectors, targeting enhanced digital outcomes, procurement skills for digital by default and pathways to transition workers from other industries. A holistic approach to industry training is necessary, encompassing all stakeholders, including project owners, designers, contractors and facility managers. Additionally, support programs for small/medium enterprises are essential to mitigate the higher costs associated with tendering, training and capital investments. These could involve grants, subsidies or partnerships to reduce financial barriers and build capacity.

“There is a need to provide training to smaller businesses in regional areas – government leaving it to regional centers to decide what level of BIM required will not work.”

Roundtable participant

Understanding the challenge: Skills availability and maturity

Roundtable participants highlighted significant challenges regarding the availability and maturity of skills necessary for digital transformation in infrastructure. They noted that while there is a substantial technology/information systems component, many critical roles require skills and expertise that are currently scarce within the industry. This gap may necessitate recruiting from adjacent industries rather than solely relying on training existing staff. Such a shift could also impact the business models of consulting firms, as these new roles may not fit neatly within traditional billing structures based on hourly professional services.

Participants underscored the importance of targeted training, particularly for smaller businesses in regional areas. Leaving it to regional centres to decide the level of BIM (Building Information Modelling) required was deemed ineffective. Engaging operators in the conversation was considered crucial to driving change, given their vital role in the process. However, it was acknowledged that resources are limited, adding to the challenge of building the necessary capabilities.

To bridge these gaps, it is imperative to develop and implement comprehensive training programs tailored to the specific needs of various stakeholders. Support mechanisms such as grants, subsidies or partnerships are vital to overcoming obstacles, enabling these enterprises to invest in necessary training and capital improvements. By fostering a culture of continuous learning and skill development, the industry can more effectively navigate the complexities of digital transformation, leading to more efficient and successful infrastructure delivery.

The time is now

“If it takes a long time the train will have left and very hard for people to catch up.”

Roundtable participant

Understanding the challenge: A lack of urgency

Roundtable participants expressed frustration over the lack of urgency and tangible action in digital transformation efforts. They noted that while there is much discussion, actual progress remains limited. Projects often have a specific slant driven by government investment, making it challenging to build a compelling business case and persuade stakeholders of the benefits of meeting digital benchmarks. Digital transformation of infrastructure must be mutually beneficial for both suppliers and the asset owners.

There is a critical need for clarity and focus. Participants questioned the benefits to clients, the meaning of digital, and suggested breaking down goals into achievable measures. They stressed the importance of defining whether the agenda is national or state-based, identifying key players, and understanding what influences need to be addressed. Standards for measuring and assessing progress are essential, with a focus on digital initiatives that drive future improvement, net zero goals and overall digital adoption.

Participants also noted that while striving to be global leaders is less of a motivator, achieving efficiency dividends could spur investment. Looking to mature industries like mining, which are ahead in digital adoption, could provide valuable insights and solutions.

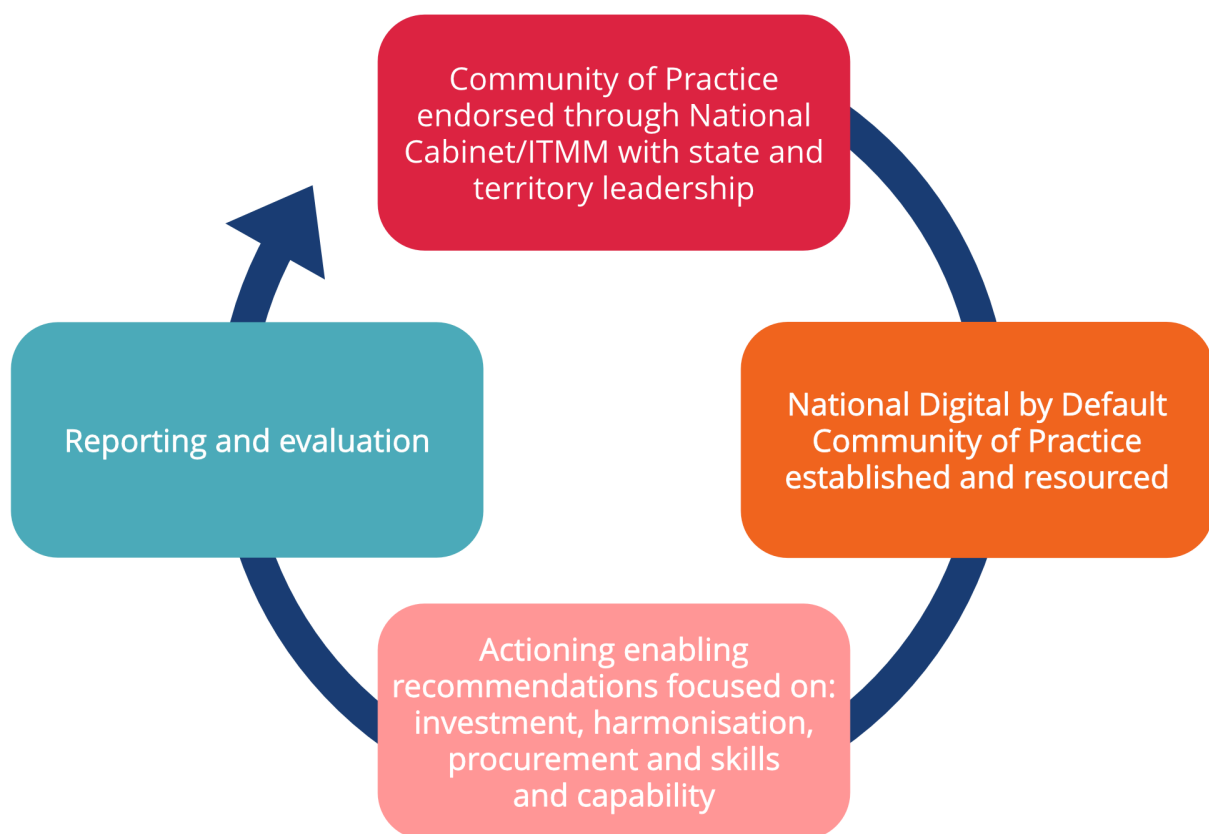
Our vision is to deliver better outcomes from our infrastructure investment.

We know that so many of these outcomes are dependent on our ability to fully leverage a digital approach.

The proactive creation of an effective, nationally coordinated enabling environment for digital by default is a logical step to supporting this vision. This is a step we have seen taken, over the past decade, by other governments globally.

Underpinned by clearly identified principles, we have outlined five enabling recommendations anchored by a National Cabinet endorsed Community of Practice that will provide a practical pathway towards digital by default.

As the pace of technological change accelerates so too does the urgency of action. The approach we have outlined requires determination and commitment from all governments and industry stakeholders. While our consultation highlighted a shared frustration with the status quo, our recommendations seek to translate this frustration into action.



The Time is Now

Connect with us

To join us as we advocate for Digital by Default, reach out:



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Thanks to our Industry Champions

For their outstanding leadership and engagement on behalf of the industry.



Photo credits

Cover image: Courtesy of Bentley Systems – Digital Twin London.

P2: 'Safe Passage', an artwork by Wiradjuri woman Kimberly Back depicts the movement of people between watering holes on country. The tracks were created by our ancestors and have been used for thousands of years. They provide guidance and safe passage through harsh terrain.

P6: Consult Australia - National Digital Roundtables

P8: iStock.