

BIM EDUCATION - GLOBAL - 2026 UPDATE REPORT**ISSUE VERSION:** V13.0**ISSUE DATE:** May 2026**COMPILER:** Ken Li (NATSPEC)**CONTRIBUTORS:** See list at end of report**EXECUTIVE SUMMARY**

In January 2014 NATSPEC issued the first version of a report summarising the status of BIM education in several countries and regions across the globe. The report has been updated and reissued each year since, with this report being the thirteenth edition of what is now an annual update to the original report.

Each year the countries and regions included in previous versions of the report are given the opportunity to update their section. This 2026 update provides a snapshot of BIM education, training, initiatives and market uptake across 24 countries and regions, including a new section on Peru.

As reported in previous years, the report shows that BIM education is continuing to mature globally, with more universities, vocational institutions, industry bodies and government agencies embedding BIM, digital engineering and information management into curricula, training pathways and implementation frameworks.

A clear global trend is the shift from software-focused BIM instruction towards broader capability development in digital delivery, open standards and information management. Countries such as Australia, Singapore, Chile, Finland, Norway and China demonstrate increasingly sophisticated ecosystems in which academia, government and industry collaborate to align education with practice. Education is expanding beyond basic modelling to include 4D and 5D workflows, common data environments, ISO 19650, digital twins, AI-enabled processes and sustainability-focused applications.

At the same time, the report shows that BIM maturity remains uneven both between and within countries. In many regions - including parts of Africa, Latin America and Europe - awareness is rising, but formal educational integration is still limited and often dependent on individual universities, software vendors, professional champions or short-course providers. Common barriers exist across most jurisdictions, including shortage of trained educators and practitioners, limited curriculum space, high software and implementation costs, fragmented standards and inconsistent client demand.

Public procurement continues to be one of the most influential levers. Where governments require BIM or digital engineering on public projects, education providers and industry bodies respond by updating curricula, publishing guidance and creating targeted training.

The buildingSMART International Professional Certification program continues to be implemented in many jurisdictions. Generally, the number of individuals and organisations being accredited under various certification schemes continue to grow.

The overall outlook is positive. Across most jurisdictions, BIM is increasingly seen not simply as a modelling tool but as a foundation for digital transformation in the built environment. The strongest signals of progress are the growing use of national competency frameworks, accredited certification pathways, public-sector pilot projects, standards aligned to international practice and stronger industry-academic partnerships.

INTRODUCTION

Question

In October 2013 Richard Choy (NATSPEC) sent an email to a global group of parties with an interest in BIM, asking for a brief paragraph outlining the current status of BIM education in each of their respective countries/regions. This question was interpreted in two ways, with the respondents either describing the current level of BIM awareness/use or the current level of training/higher education available. Some respondents also provided a much more detailed response than a brief paragraph.

Original report

A report summarising the responses received was compiled by NATSPEC and issued in January 2014. The report only included countries/regions from which a response was received and was based purely on the responses provided. It did not attempt (or claim) to fully research and document the status of BIM education/awareness in each country/region.

Updated report

The report has been updated and reissued each year since, with this report being version 13.0 of what is now an annual update to the original report. In the updated versions since the original 2014 report, additional countries have provided input, expanding the scope of the original report. This thirteenth edition of the report includes information for 24 countries/regions.

Early in 2026 NATSPEC again contacted the respondents who had contributed to the previous versions of the report, offering them the opportunity to update their information. Where no response was received from a previous contributor, it was assumed that the status of BIM education in their country or region has remained unchanged. Where a response received only partially updated a section of the report, it was assumed that the remainder of that section was still current.

This report again summarises the responses received. As per previous versions, this report is based purely on the responses provided; it does not attempt to fully research and document the status of BIM education/awareness in each country/region.

BIM EDUCATION - BY COUNTRY/REGION

AFRICA

Education/Training

There is broadly a slow uptake of BIM in education institutions across Africa. The major challenges are related to the inadequate knowledge and exposure to BIM of University lecturers influenced by a culture of resistance to change. The status of BIM Education in the 5 regions in Africa are summarised below.

West Africa

Discourse on BIM in education is more popular in Nigeria and Ghana than in other countries in the region. There are no full courses or programs specially for BIM in this region. However, BIM is being taught as topics within courses in some of the tertiary institutions. BIM-related topics are also now increasingly being undertaken as research projects by undergraduate and postgraduate students in these countries. Also, the use of BIM tools for design in training undergraduate students is gaining momentum against the use of the traditional approach for architectural and engineering disciplines. Over the years, there has been a growing number of organisations providing training for students, professionals, and firms in this region. The BIM Africa Initiative has been pushing for BIM curriculums and working closely with some tertiary institutions across the globe.

Southern Africa

More South African institutions are involved in BIM education than other institutions in the region. There has been ongoing discourse on the need for the institutions to be producing BIM compliant graduates in the South African AEC industry (for further information on the country of South Africa refer to the South Africa section of this report). The BIM Academy Africa has been engaging with some of these institutions in implementing BIM curriculum to the institution's core curriculum. The introduction of BIM tools to students has been on the increase through stand-alone or short courses. Similarly, there are student's research on BIM-related topics at the undergraduate and postgraduate level in South Africa. BIM trainings are also provided for professionals through various bodies such as the African academy and BIM institute.

East Africa

The training of BIM in institutions across many Eastern African countries is still lagging. BIM education and training is mostly by software vendors and associations of built environment professionals, with little overlapping effect and engagements in tertiary institutions. Kenya and Ethiopia are experiencing the highest level of industry conversations on BIM strategies in the region. This is largely driven by membership-based organisations such as the Ethiopian Construction and Project Management Institute as well as the Architectural Association of Kenya.

Central Africa

Countries across central Africa have very little to no engagement with BIM across both industry and education. While individual expertise may exist, there are no industry engagements or interactions. With the majority of the countries having French as the official language, knowledge sharing with other African regions is largely hindered. The BIM Africa Initiative is now focusing on various engagements in French to ensure knowledge transfer to the vast African populace who do not communicate in English.

North Africa

There is a high level of educational engagements across many North African countries. One of such is Egypt, with the highest level of publications and academic research on BIM across the continent. The introduction of an M.Sc. in Integrated Engineering Design Management (IEDM) at Cairo University also exemplifies the strong training and education engagements in the country. Tunisia, Morocco and Algeria also have various levels of educational engagement, which is broadly driven by industry expertise overlapping to tertiary institutions.

Initiatives/Organisations

There are many organisations and bodies pushing for the adoption and implementation of BIM across Africa, as follows:

BIM Africa

The BIM Africa initiative is a non-profit civil society organisation formed to enable and regulate the adoption and implementation of BIM in the AEC industry across Africa. The African-wide advocacy for BIM adoption and implementation is reinforced by extensive

academic and market research programs, certification programs, round-table meetings, seminars and webinars, formulation of locally adapted standards, chapters, volunteering and professional development opportunities. Monthly roundtable and #BIMTalks are hosted by the organisation featuring experts from across the globe and conversations on digital construction. The organisation also initiated the Student Advocacy Program, designed to create BIM awareness amongst students of tertiary Institutions in Africa.

In collaboration with BIMcommUNITYAfrica, the initiative hosted BIMHarambee.Africa, the longest virtual BIM conference in Africa featuring 42 Presentations and Case Studies, 6 Learning sessions, 5 Panel discussions, 6 Discussion Forums, 58 Speakers, 2881 Registrations, 3300 Views, and 436 hours watched.

The Research and Development (R&D) Committee of the organisation produced the first continental-wide report on BIM in Africa which features the summary of findings from the Africa BIM Survey 2020. A project showcase consisting of carefully selected projects across the various regions in Africa that have implemented digital technologies with details of implementation, challenges and lessons learnt, and experts' opinion consisting of articles from notable authorities on the central theme of digital construction.

The R&D committee also provides research support for students (Undergraduate and postgraduate) working on BIM related projects. The committee is presently working towards fostering research collaboration and supervision between BIM academics of African descent and tertiary institutions across Africa.

BIM Institute

The BIM Institute is one of the early non-profit companies advocating for the adoption and implementation of BIM across Africa. The institute has been working on the South African National BIM Guide in a bid to align itself with international standards. It hosted the 'BIM BAM BOOM' workshop in Durban, South Africa in 2017 which focused on BIM implementation and BIM case studies. Also, the organisation encourages BIM implementation through BIM competitions for architects, designers, and students

In January 2019, a book titled 'BIM – It's your move' was published by BIM institute founder, Vaughan Harris. The book discusses the introduction of common global standards and modus operandi of use showing how Africa stands to benefit. The book contributes to the

extant knowledge of BIM in Africa and encourages professionals to reinvent themselves. The institute also founded the BIM Academy Africa in 2017 which has been providing various BIM courses for professionals and students.

BIM Community Africa

The BIM community began in 2018 to encourage BIM adoption across the continent by providing information about technologies and solutions and allowing the community to choose what suited them and their context best. The organisation hosted the 'BIM unconference 2019' in Cape Town in collaboration with Aurecon and the University of Cape Town where issues surrounding collaboration, implementation of ISO, and BIM for FM were discussed passionately. In May 2020, the organisation started a BIM podcast that features information sharing, and conversations on BIM. Similarly, in collaboration with BIM Africa, the BIMHarambee.Africa conference was hosted. The conference was a month-long event that brought together BIM practitioners from related industries to learn, share knowledge, promote, and highlight BIM practices across the continents.

Awareness/Uptake

There has been an increase in the level of awareness and adoption of BIM across the African continent, though at a slow pace when compared to other continents of the world. The slow uptake of BIM in the African AEC industry could be related to the culture of the industry, lack of infrastructure, and lack of expertise. BIM Africa with collaboration from BIM practitioners and researchers across Africa produced the first African-wide report on BIM (ABR) in 2020. The report provided the status of BIM on the continent and presented projects that had successfully implemented BIM.

The updated African BIM Report (ABR) 2024 presented key insights into BIM adoption across 32 African countries, it examined the major challenges slowing BIM adoption: limited infrastructure, skill gaps, and resistance to change while outlining the technologies shaping Africa's digital future. ABR 2024 also explored how AI and Digital Twins to IoT and Big Data can enhance decision-making and improve project performance. It further emphasized the rise of local BIM startups, public-private partnerships, and research initiatives that are creating context-specific solutions and driving the industry toward a more sustainable and innovative future.

The major challenges facing the adoption of BIM on the African continent are:

- Lack of experts and training: There is inadequate trained professionals in the industry, although organisations and academic institutions are proffering short term (trainings, conferences, and seminars) in lieu of long-term solutions (BIM compliant graduates).
- Lack of government support for BIM: In most of the countries in Africa, there is largely a lack of government support for BIM. A few government institutions are however formulating policies and strategies in Ethiopia, Morocco, and Egypt.
- Cost: The high cost of BIM implementation is still a major challenge in Africa where most of the firms are small and medium-sized enterprises (SMEs).
- Lack of contractual framework: Extant contractual frameworks are not in tandem with the technological pace which often makes the execution of BIM difficult.
- No client demands: Although there is an increase in BIM awareness, this does not equate to BIM implementation on the continent. The government in most of the countries are the biggest client in the AEC industry and a lack of government support has a debilitating effect on the demand. There is a need for the government to be supportive of the BIM crusade in Africa.

ARGENTINA

Education/Training

BIM has not yet been a subject addressed by the official education plans. Even as we lack precise information, we know that very few secondary technical education proposals include parametric modelling of buildings as part of the curricular plan.

Based on a survey carried out in 2020 by the SIBIM (BIM Implementation System, on which we will elaborate), only twelve out of thirty-three universities in which the Architecture degree is taught - are offering some type of training linked to BIM, while the introduction of the subject in Civil Engineering careers is even lower.

The offering in universities is very varied. Only the University of Buenos Aires offers a "Specialisation Career in BIM" with an official title. This lasts two years and has been taught since 2017. As a direct antecedent, there was a one-year postgraduate course taught from 2013 until the specialisation career was approved. Since then, there has been a growing demand for the degree, which demonstrates the increased interest from the country's youngest professionals on BIM issues.

Other postgraduate training options available include: *Integration and collaboration in architecture projects* (National University of Litoral), *Introduction to BIM Systems* (National University of Tucumán), *Collaborative BIM Processes, BIM tools for sustainable design, and Building Information Modelling (BIM)* (National University of San Juan), *Diploma in digital technologies for Architecture* (National University of Córdoba), *Diploma in BIM implementation in works* (Agreement between the National Technological University and the School of Management of the Argentine Chamber of Construction), the executive program of *Higher Training in BIM* (University of Palermo), the executive program of *BIM methodology* (Argentine Catholic University – UCA), and *Diploma in Advanced Studies in BIM* (National University of Moreno).

BIM training at the undergraduate level, has been growing slowly and almost exclusively based on the personal initiatives of some professors who have the freedom to propose content for their undergraduate subjects (generally optional).

Of the eighteen different courses (sixteen Architecture and two Civil Engineering) at twelve universities where a survey was conducted, only one of these courses (at the University of Avellaneda) was included in the curriculum as a compulsory subject. In any case, the elective courses receive a large number of students since interest in learning parametric modelling of buildings is very high among students.

Initiatives/Organisations

Since 2013, the BIM FADU Academic Conference (Faculty of Architecture, Design and Urbanism at the University of Buenos Aires) has been held every year, with the participation of professors and professionals from all over the country with the aim of disseminating the BIM methodology from the academy towards all the productive sectors of the AEC Industry.

In 2016, from the awareness of various professionals and institutions in recognising the historical moment that the AEC industry is going through in Argentina and the opportunities offered by BIM in our context, the BIM Forum of Argentina was created, to become the organisation that leads the transformation of AEC processes for the generation of economic, environmental, and social benefits derived from the implementation of BIM.

In 2019, the Ministry of Public Works founded the SIBIM, a team of professionals who work on the definitions that will allow the contracting of public works using the BIM methodology. The SIBIM has drafted a large number of documents vital for the first experiences of BIM tenders carried out by the provinces of San Juan and Mendoza with the support of the SIBIM professional team.

That same year, the SIBIM organised the first meetings of the BGP (BIM Public Management) roundtable, a consensus space made up of representatives of the national, provincial, municipal and academic public sectors, which aims to promote the digital transformation of the public construction sector through BIM. The BGP-table is organised into several working groups. Currently the Training Working Group is drafting a BIM guide for students in order to unify the basic criteria in all educational institutions in the country that wish to align under a general criteria.

Since 2020, the IRAM Institute (Argentine Institute for Standardisation and Certification) has been working on the translation of the ISO 19650 series, having concluded part 1 and is close to releasing a version of part 2 for public discussion.

Since 2022, the Professional Council of Architecture and Urbanism (CPAU) has organised introductory courses on BIM methodology that it offers free to enrollees. The Central Society of Architects (SCA) has also organised introductory courses on BIM methodology.

Since 2023, the Ministry of Public Works of Argentina, through SIBIM, launched the first four "pilot projects" to start implementing BIM in areas dedicated to road, water, transportation, and housing projects.

AUSTRALIA

Education/ Training

BIM education and training in Australia continues to evolve across universities, TAFE colleges, and industry-led programs. A combination of federal funding initiatives and strategic state-level policies accelerated the incorporation of BIM and digital engineering practices into curricula, helping to ensure that graduates are equipped to drive digital transformation in the built environment. Australian institutions have expanded their offerings, with dedicated BIM courses and integrated subjects, focusing on 3D, 4D, and 5D modelling, as well as digital engineering and data management. New microcredential programs and specialised training centres, developed in partnership with industry and government, have also begun to bridge the gap between academic theory and practical application, while addressing key challenges such as change management and educator upskilling.

Australia's 43 universities have long integrated Building Information Modelling (BIM) into their curricula, and this integration extends well beyond higher education into vocational training, TAFE colleges, and government and industry-led programs. Australian institutions continue to offer both dedicated BIM courses and subjects in which BIM is embedded within broader curricula. These courses, which span from AQF level 6 to level 9, emphasise the practical application of popular software (e.g., Autodesk, Bentley Systems, and Revizto tools) for 3D modelling, 4D scheduling and 5D cost estimation as well as common data environment platforms supporting collaboration. Teaching methods typically include traditional lectures, computer laboratory sessions, collaborative projects, and targeted workshops on specific BIM standards and software.

The Federal Government's Higher Education Microcredential Pilot Program has provided targeted support for the development of agile, short-form courses that directly address current industry needs, thereby bridging the gap between academic theory and practical application. Additionally, state infrastructure agencies are sponsoring dedicated microcredential courses for their staff, aimed at enhancing digital engineering proficiency across all levels of project delivery. These courses offer practical, hands-on training in advanced BIM and digital engineering

methodologies, data management practices, and integrated project delivery techniques. By investing in such targeted training, state agencies are empowering their workforce with the latest digital skills but also fostering a culture of continuous improvement and innovation that directly translates into more efficient, cost-effective, and sustainable infrastructure projects. An example of this is evidenced by the partnership between Transport for New South Wales and the University of Technology Sydney (UTS) to establish a Digital Engineering Microcredential program. As a result, UTS has significantly broadened its curriculum by integrating dedicated subjects across multiple programs. In its Bachelor of Construction Management, courses have been introduced that focus on advanced 3D, 4D, and 5D BIM techniques. Similarly, the Bachelor of Civil and Environmental Engineering now includes subjects specifically addressing BIM as a digital engineering tool for civil infrastructure, while the Masters of Engineering Management has been updated to incorporate modules on Digital Engineering Management that support government digital engineering frameworks. These subjects have been designed to equip graduates with the ability to navigate and lead digital transformation initiatives in large-scale infrastructure projects.

Government and academic partnerships are being established at a range of other university institutions. Western Sydney University continues its collaboration with NSW TAFE and is expanding its offerings under the Institute of Applied Technology, thereby broadening its BIM course portfolio. This strategic alliance has fostered the integration of practical vocational training with academic learning, equipping students with hands-on skills and industry-relevant experience in digital engineering. Western Sydney University has introduced new units such as their Digital Construction unit that merges BIM with cutting-edge digital technologies, reflecting a strategic shift toward Construction 4.0.

Western Sydney University has pioneered the establishment of the Centre for Smart Modern Construction (c4SMC), positioning itself at the forefront of 4th Industrial Revolution education. By integrating BIM and other digital construction technologies, c4SMC enables real-life simulations of construction processes through the university's advanced industry-research Digital Construction (DigiCon) lab, which is dedicated to construction activities

and site operations. This initiative bridges design, construction, and operation, ensuring students and industry professionals engage with cutting-edge technologies to drive innovation and efficiency in the built environment sector.

Within the Western Sydney University context, the *CIVL4015 Complex Building Project* unit, delivered as part of the Construction Management and Design Management programs, is structured to simulate a real-world industry environment, where students operate as integrated project teams, reflecting the structure and dynamics of professional practice. To facilitate an authentic and industry-aligned collaborative experience, the unit incorporates Autodesk Forma as a central working platform. Through this environment, students develop and coordinate design models, quantity take-offs, reports, and project schedules within a unified digital workflow, enabling real-time collaboration in line with industry standards. Furthermore, the assessment approach extends beyond traditional PowerPoint-based presentations to platform-based delivery, where students present their work within integrated digital environments. This aligns with Common Data Environment (CDE) principles and the information management framework defined in ISO 19650, ensuring that students gain practical experience in data-driven collaboration and are well-prepared for contemporary construction and design management practices.

Western Sydney University's commitment to BIM education extends to its partnership with the Institute of Applied Technology Construction (IAT-C) in the design and delivery of Microskills and Microcredentials in BIM and digital skills, serving as a model for integrating BIM education with real-world industry applications. This partnership between government, industry, and academia facilitates the development of industry-specific BIM training programs, covering the various BIM uses across the whole construction value chain.

In addition, Western Sydney University, in collaboration with Autodesk and PrefabAUS, is actively shaping the future of BIM education and prefabrication in construction. The university collaborates through the Centre for Smart Modern Construction (c4SMC) as part of the School of Engineering, Design, and Built Environment and serves as a steering

committee member for the Autodesk Challenge Cup. This university-based team competition engages students from Architecture, Engineering, Industrial Design, and Construction Management, aiming to identify the next generation of built environment design professionals and foster innovation that drives the construction industry forward using BIM tools.

A key advancement in Western Sydney University's BIM curriculum is the introduction of Advanced Digital Construction, a subject designed to enhance students' capabilities in 6D and 7D BIM modelling. This course provides a deep understanding of BIM-driven lifecycle management, incorporating virtual and augmented reality, spatial information and reality capture technologies, and performance management systems. Students gain hands-on experience through practice-based workshops and computing labs, reinforcing their proficiency in virtual design and construction (VDC) methodologies.

Academic members from Western Sydney University have also played an active role in the Chartered Building Information Modeling Project Manager (CBIM™) certification program, contributing to both its development and international delivery. Their involvement extends across multiple regions, including Australia, Canada, the African continent, and New Zealand. Through this engagement, they support the advancement of globally aligned BIM competencies, bridging academia and industry practice while reinforcing the application of international standards such as ISO 19650 in diverse professional contexts. Notably, the program is recognized as one of the prestigious certification initiatives globally, delivered in collaboration with leading institutions such as Harvard University.

The University of New South Wales has established the Arch Manu Industry Transformation Training Centre (ITTC) to further catalyse industry transformation in the Architecture, Engineering, and Construction (AEC) sector. Funded with \$15.5 million over five years and officially launched in February 2024, the centre aims to meet Australia's strategic productivity and climate targets by integrating state-of-the-art research surrounding the use of advanced model-based design into practice and education. The ITTC leverages partnerships between academia, industry, and peak professional bodies to develop industry-embedded PhD programs,

postdoctoral projects, and short courses that upskill the workforce and foster lifelong learning. With a focus on reducing material consumption, waste production, and carbon emissions, the centre champions a twin transformation approach – where digitalisation and sustainability converge to fundamentally reshape the design and manufacturing processes in the built environment.

Melbourne University, Victoria, has begun to offer a cutting-edge Master's program in Digital Engineering that is designed to prepare graduates for the rapidly evolving demands of the construction and infrastructure sectors. This program emphasises the integration of advanced digital tools and methodologies, including Building Information Modelling (BIM), 4D scheduling, and 5D cost estimation, enabling students to manage complex projects with a digital-first approach. Monash University in Victoria is also now offering master's course focused on Building Prefab, which emphasises modular construction and interdisciplinary collaboration. In this unit, students are expected to integrate architectural, structural, mechanical, and electrical components into comprehensive BIM models, thereby fostering sustainable and efficient building solutions. Alongside these curricular enhancements, a growing emphasis is being placed on incorporating industry standards, such as the AS ISO 19650 series, to address previous shortcomings in information management within BIM education.

Although significant progress has been made, challenges persist in change management, curriculum overcrowding, and the upskilling of educators. Strategic partnerships between industry and government are addressing these issues by providing targeted funding, resources, and collaborative frameworks to integrate BIM and digital engineering as core elements of educational programs. Such partnerships facilitate the implementation of comprehensive professional development initiatives, ensuring that educators remain current with rapidly evolving digital practices. In this context, the UTS Digital Engineering Industry Fellows program plays a pivotal role by offering advanced training and hands-on experience in digital engineering. This program not only enhances educators' capabilities but also helps institutions shift BIM and digital engineering from peripheral subjects to essential components of the curriculum, ultimately overcoming entrenched barriers in change management.

Established programs across universities, TAFEs, and industry training providers are now being bolstered by federal and state funding initiatives and the development of targeted microcredentials to address skills shortages in industry. With comprehensive curricular updates at institutions such as UTS, University of New South Wales, Western Sydney University, University of Melbourne, Curtin University and Monash University, and with a deliberate move toward integrating industry-standard frameworks and advanced digital engineering concepts, Australia is making substantial progress in preparing graduates to lead the digital transformation of the built environment.

Initiatives/ Organisations

Australia continues to advance its leadership in BIM and digital engineering through a robust and coordinated set of initiatives. The latest developments have been spearheaded by federal and state government agencies, industry associations, and academic institutions, all working together to drive the digital transformation of the construction and infrastructure sectors. Concerted policy and funding initiatives – such as the Austroads ‘AAM6326 Guide to Digital Engineering 2024’ – have integrated diverse state infrastructure agencies into a cohesive framework that supports learning, development, and standardised practices. Concurrently, targeted training programs, certification initiatives, and collaborative efforts between government and industry are enhancing both internal and contractor competencies.

At the Federal level, the Austroads ‘AAM6326 Guide to Digital Engineering 2024’ has provided a unified framework for all major state infrastructure agencies in Australia. Austroads therefore encompasses state infrastructure agencies including Transport for NSW and NSW Public Works, Department of Transport and Planning Victoria (Transport Victoria), Queensland’s Department of Transport and Main Roads, Main Roads Western Australia, Transport Canberra and City Services Directorate, Australian Capital Territory, South Australia’s Department of Planning, Transport and Infrastructure, as well as corresponding agencies in the Northern Territory and Tasmania, including: Department of State Growth Tasmania, and Department of Infrastructure, Planning and Logistics Northern Territory. Among other areas of implementation support, the Guide provides

important advice for state agencies about the learning and development (L&D) that is vital for supporting an agency’s digital engineering evolution. The framework is designed to ensure that the development of an agency’s digital engineering L&D framework is both standardised and adaptable to their unique needs and maturity levels, fostering a coordinated, nationwide enhancement of digital engineering capabilities. The framework underscores that as agencies increasingly rely on advanced digital processes and new technologies to achieve strategic objectives, a systematic L&D framework becomes essential. Key elements of the framework include tailored training modules, competency benchmarks, and regular assessments, all designed to align with the agency’s digital transformation goals. It also advocates for a blended learning model that combines instructor-led training, online courses, hands-on workshops, and collaborative projects, ensuring that the training is both flexible and impactful.

State government infrastructure agencies across Australia that have introduced BIM and digital engineering frameworks are also increasingly investing in training programs designed to enhance both internal capabilities and contractor competencies. These initiatives typically encompass a range of training modules that address the latest digital workflows and data management practices to support collaborative processes essential for modern infrastructure projects. By delivering structured internal training, agencies aim to ensure that their personnel remain up to date with evolving agency BIM and digital engineering standards and can effectively implement industry best practices across project lifecycles. Simultaneously, dedicated contractor training programs facilitate the adoption of these frameworks throughout the supply chain, fostering a common understanding of digital protocols and enhancing overall project coordination. This dual approach not only improves operational efficiency and reduces risks but also drives a more integrated, resilient construction ecosystem that is well-equipped to meet contemporary digital engineering challenges.

buildingSMART Australasia’s PCERT trainer certification program has also continued to grow. This has contributed to a consistent delivery of training in line with openBIM best practice and National and International standards. buildingSMART Australasia have also increased their education agenda by

hosting industry events and hosting an annual conference series called Xchange, which includes a dedicated training day focused on the practical application of openBIM methodologies and innovative digital engineering solutions. Academics from the University of Technology Sydney together with well-known buildingSMART experts from industry developed an in-depth course structured into progressive units that build from foundational openBIM concepts to advanced applications, culminating in an international project showcase. In Unit 1, “Getting Started with openBIM,” participants are introduced to the core buildingSMART technologies including IFC, IDM/MVD, BSDD, and BCF, exploring what openBIM is, its benefits, and the essential information requirements through practical demonstrations of the buildingSMART Data Dictionary and Information Delivery Specifications. Unit 2, “Moving Ahead with IFC 4.3,” delves into the application of the latest IFC 4.3 standards, covering new classes, attributes, relationships, and model setup, along with hands-on training in exporting and importing IFC files, and an introduction to programming for IFC using modern toolkits, geometry engines, and BlenderBIM. The course then advances to Unit 3, where an expert panel session focuses on openBIM project solutions and provides critical industry feedback on overcoming technical barriers. In Unit 4, participants gain insights from industry best practices through vendor-led sessions that demonstrate how leading organisations, including Transport for NSW, are adding value with IFC, optimising highway design, and implementing infrastructure digital twins; sessions also cover advanced workflows in IDS implementation using Archicad and Solibri. The course concludes with Unit 5, an IFC Project Showcase, highlighting buildingSMART International Award winners and exemplifying successful global openBIM implementations.

The Australasian BIM Advisory Board (ABAB) also continue to consolidate efforts across government, industry, and academia to develop consistent standards, methodologies, and digital roadmaps for BIM and digital engineering. As an executive member of ABAB, buildingSMART Australasia is also able to support government representatives across Australia and New Zealand at various levels of government.

Collectively, these new federal and state initiatives represent a coordinated effort not only to update curricula and professional training but also to position Australia at the forefront of digital transformation in the

construction and infrastructure sectors. By harmonising BIM and digital engineering frameworks, standards, and best practices across diverse agencies and regions, these initiatives have fostered a more resilient ecosystem where innovation, efficiency, and collaboration are given priority. This unified approach is helping to ensure that government, industry, and academic stakeholders can collectively address challenges while capitalising on opportunities presented by BIM and digital engineering. In doing so, Australia is laying the groundwork for sustained improvements in project delivery, cost management, and operational performance, ultimately driving long-term productivity gains and reinforcing its leadership in BIM practices.

Awareness/ Uptake

BIM awareness and uptake in Australia has built on the previous decade of steady integration and growth in both major capital projects and smaller regional initiatives. Recent advancements can be seen to be driven by a combination of enduring practices – such as the widespread use of established resources like the NATSPEC National BIM Guide – and the introduction of targeted federal and state policy initiatives. These new measures are enhancing BIM and digital engineering adoption through rigorous compliance frameworks, robust digitalisation governance, and strategic partnerships across the construction industry. This evolving landscape not only standardises best practice in information modelling and data management but also leverages model-based technologies to improve project efficiency, reduce costs, and deliver enhanced sustainability and social outcomes.

In previous years, BIM adoption across Australia steadily matured, with its use becoming prevalent not only in large-scale building and infrastructure projects, but also across smaller consultancies and regional projects. The upward trajectory established in the previous decade has strengthened, and can be observed across various sectors of construction and geographical regions - from major capital cities to regional locations – fostering an ecosystem where practitioners actively exchange expertise, collaborate on innovative projects, and continually adapt to emerging digital engineering methodologies.

Resources such as the NATSPEC National BIM Guide and its Execution Plan templates

play a pivotal role in both project delivery and educational development within the BIM ecosystem. These resources provide a standardised framework that ensures consistency in BIM implementation, offering clear guidelines and best practices that help project teams integrate digital processes across all phases – from design and planning to construction and maintenance. These resources also serve as essential teaching tools that bridge the gap between theoretical knowledge and practical application. They are frequently incorporated into academic curricula and professional training programs, equipping emerging practitioners with the skills and competencies needed to excel in a rapidly evolving digital engineering landscape. Ultimately, by continuously updating and refining these standards to reflect industry advancements, the NATSPEC resources contribute significantly to driving widespread BIM adoption and fostering a culture of continuous learning and innovation across Australia's construction sector.

Building on these established foundations, increasing federal and state policy initiatives have contributed to increasing awareness and uptake of BIM and digital engineering across various sectors of construction. New South Wales stands out as an exemplar state in BIM and digital engineering awareness and uptake, underpinned by comprehensive frameworks and compliance requirements across its major infrastructure projects. The NSW Department of Education and Schools Infrastructure NSW has set clear project information requirements that categorise capital projects into tiers based on value, mandating the creation of detailed BIM models for Tier 1 and Tier 2 projects – and selected Tier 3 projects – thereby ensuring a rigorous approach to digital asset management. In parallel, the implementation of Transport for NSW digital engineering requirements continues to mature, with its project pipeline showcasing over 200 digital engineering enabled rail and road projects, a clear indication of the state's commitment to leveraging digital technologies to enhance project delivery. Transport for New South Wales is also breaking new ground in sustainable infrastructure development and delivery through its Engineering, Cost and Carbon Library (ECCL) – a library of over 4,000 construction resources that defines baseline carbon – and the (soon to be launched) Carbon Portal. This pioneering initiative is an Australian first, setting new benchmarks for 3D model-based carbon assessment, management, and monitoring. By

leveraging openBIM protocols and IFC standards, the Carbon Portal seamlessly integrates carbon data into digital models, enabling precise and real-time analysis of environmental performance throughout a project's lifecycle. This innovative tool not only streamlines cost and carbon management but also positions New South Wales as a leader in advancing sustainable infrastructure practices on a global scale.

Similarly, in 2023 NSW Public Works developed its own Digital Engineering Framework, which obtained ISO19650 certification in 2024. The framework promotes a standardised approach to digital engineering across internal designs and projects managed on behalf of local government agencies, particularly in regional NSW. Additionally, NSW Health enforces the Standardised Project and Asset Information Requirements (SPAIR), mandating full BIM and dRofus compliance for larger capital projects while providing structured guidelines for smaller projects to ensure consistent application of digital engineering principles. Collectively, these initiatives reflect a state-wide commitment to advancing BIM and DE, resulting in high compliance levels and positioning New South Wales at the forefront of digital transformation in public infrastructure.

Infrastructure NSW continues to support these agency initiatives through the development of policies and guidelines including its Digitalisation Roadmap, designed to expedite the adoption of digital processes, systems, and technologies throughout the entire public infrastructure lifecycle. This strategic framework aims to significantly enhance productivity, sustainability, social outcomes, and service levels by standardising best practice data management and fostering robust collaboration between government and the construction industry. By enforcing whole-of-government policies in NSW, including the implementation of comprehensive digitalisation governance frameworks, the establishment of common data environments, and the development of digital-ready procurement practices, these initiatives are helping to ensure that information and material usage is optimised through enhanced data reliability, security, and interoperability. The integration of emerging technologies such as artificial intelligence, automation, modular construction, and robotics is poised to accelerate project delivery, reduce safety, cost, and schedule risks, and improve decision-making.

Coordinated efforts to harmonise digitalisation practices nationally are also underway and aim to streamline procurement processes and alleviate industry capacity constraints. Underpinning these efforts are initiatives to develop robust standards and guidelines, including the previously mentioned Austroads' AAM6326 Guide to Digital Engineering, which collectively create a consistent framework across jurisdictions. In addition, the AS 7739 series 'Digital Engineering for Fixed Rail Infrastructure,' was released in 2024. This standard builds on the foundations established in ISO 19650 and introduces more advanced data management concepts and principles. Recent policies, standards and guidelines are harmonising the approach to BIM and Digital Engineering across Australia, ensuring that each state can tailor its strategy to local needs while benefiting from a shared vision of improved efficiency, reduced costs, and enhanced project outcomes. This policy-driven transformation aligns with key productivity objectives – creating a dynamic and resilient economy, building a more skilled and adaptable workforce, and harnessing data and digital technology – and also lays the groundwork for long-term productivity gains and innovation across the built infrastructure sector.

Whilst the innovative BIM and digital engineering initiatives emerging from NSW exemplify a transformative shift in the Australian AEC landscape setting a high benchmark for public infrastructure projects, they are also representative of similar unified approaches have been developed in Queensland, Victoria, South Australia, and Western Australia, where corresponding state agencies have implemented tailored policies, training programs, and governance frameworks to support BIM and digital engineering initiatives. Collectively, they signal a strategic convergence of government vision, industry collaboration, and academic rigor, driving the sector toward a more integrated, efficient, and sustainable future. The commitment to comprehensive digital frameworks and robust training programs underscores an industry-wide recognition of the critical role that advanced data management and BIM practices play in modern construction. These coordinated initiatives are fostering a cohesive ecosystem that standardises best practices, promotes innovation, and drives enhanced efficiency, sustainability, and cost-effectiveness throughout Australia's construction and

infrastructure sectors. This not only sets a benchmark for public infrastructure projects but also reinforces Australia's position as a global leader in BIM and digital engineering, paving the way for continuous innovation and enhanced performance across the built environment.

CANADA

Education/Training

The number of colleges and universities offering BIM programs in the last couple of years has increased in Canada, both at the undergraduate and graduate levels, in Engineering and Architecture departments. This is in addition to the numerous BIM courses offered by continuing education departments at many institutions. As well, private initiatives are offering online and face to face training sessions on subjects ranging from collaboration to execution plans to a specific BIM subject matter. Several construction associations have also launched their own training programs, focusing on their perspective.

The goal of the buildingSMART Canada (bSC) and Building Transformations Education Committee is to support and aid the development of BIM educational initiatives in Canada, to ensure that a consistent and relevant BIM education and training landscape responds to, meets, and is relevant to the realities of an ever-evolving industry.

In a focussed effort to enrich the Canadian BIM-ecosystem, the Building Transformations *CanBIM Professional Certification Program* was launched in 2014, with the intention of understanding BIM-related skills and knowledge as well as professional competencies and capabilities in the AEC industry, in order to provide a point-of-reference and benchmarking to inform educational and training objectives. This program spawned the emergence of the Building Transformations *CanBIM Foundations Certification Program* which, through the establishing of course and program outcomes, assists educational institutions in aligning curriculum in response to industry needs and expectations. To date, the Building Transformations *CanBIM Foundations Certification Program* has certified upwards of 30 national and international BIM-related courses or programs. A further goal of the bSC/Building Transformations Education Committee is to provide a national and international benchmark for openBIM training.

Initiatives/Organisations

bSI Professional Certification Program

bSC launched its Professional Certification program across the country in 2020, with several training providers. Formerly known as

Qualification Program, this program will attest to the knowledge of the candidates through an online test provided by buildingSMART International (bSI).

The aim of the program is to provide standard essential knowledge of Open BIM and data management. It provides clear standards and promotes quality training by supporting and accrediting training content that meets a defined body of knowledge. Most importantly, it provides the standards upon which training organisations can develop their course content. This structure ensures fundamental knowledge is acquired and it allows for a uniform online testing certification for individuals. It will therefore guarantee a benchmarked level of knowledge across the country and the world.

bSC also relays information about the COBie certification offered by bSI. The international scope of these programs is complementary to Building Transformations' certification program at the national level. The buildingSMART Program is a proof of competence for professionals working with BIM. Certified professionals can demonstrate their knowledge is consistent with international standards and best practices.

Practice Manual

The *Canadian Practice Manual for BIM* was launched in 2017 and continues to provide direction on the application of BIM practices and processes in Canada. It is being used to develop Module 6 of the Learning Outcome Framework. The practice manual is multi-disciplinary, multi-volume and is a comprehensive guide that reflects both international best practice as well as the use of BIM in Canada. It builds on the Roadmap to deliver value to industry. The National Research Council of Canada (NRC) launched the process to update the Canadian Practice Manual for BIM in 2025, with the steering committee starting work on this at the end of March 2026.

Building Transformations CanBIM Certification

The Building Transformations *CanBIM Certification Program* continues to be well supported. It was launched in 2014 with the objective of bridging BIM education and the AEC industry's implementation and use of BIM through the pursuit of excellence in certification. The pillars of the Building Transformations *CanBIM Certification Program* are:

- Professional Certification: A tiered, four-level certification program for BIM Professionals assessing knowledge, skill and professional workplace experience.
- Foundations Certification: Assessment and certification of courses and/or programs offered by:
 - . Educational Institutions both private and public.
 - . AEC industry training providers for industry professionals.
- Company/Organisation Certification: Assessment and certification of BIM-enabled companies and organisations.
- Provision of guidelines for a Continued Professional Development framework for certified individuals.

Satellite Sessions

These sessions are a joint event where Building Transformations/bSC, industry partners and academia present on relevant topics within the host region. These events are intended to bridge the gap and unite the interests between academia and industry. The host academic institution has the opportunity to highlight its BIM related programs, a student from the host school is invited to present a BIM-relevant topic and the remainder of the agenda is filled out with industry leaders from the host region. It is an opportunity to educate and connect all stakeholders over the course of an evening, while also showcasing the latest developments of the educational institutions across Canada.

Student Affiliate Memberships

Building Transformations/bSC now have 20 post-secondary education institutions in its membership. As a Building Transformations /bSC member, educational institutions can offer FREE student affiliate membership to all their students. The student affiliate membership opens up opportunities for students to engage with industry leaders across Canada and globally. Students can participate on and engage with one of the following nine Building Transformations/bSC committees:

- Technology Committee.
- General Contractors Committee.
- Trades Committee.
- Designers Committee.
- Owners Committee.
- Education, Research & Certification Committee.

- International Committee.
- Legal Committee.
- Marketing Committee.

Students are asked to participate in a monthly call to help keep the committees organised through meeting minutes and agenda creation and dissemination. Students are also asked to participate in working on various industry-based tasks giving them direct exposure to the challenges facing our discipline-based committees. Further to the Building Transformations/bSC committees, students are continuing to engage as volunteers at the Building Transformations/bSC regional and satellite sessions. This is a great networking opportunity to be at an event meeting the industry leaders and learning from the many presentations and panel discussions about the most relevant subject matter.

Student Connect: An Online Networking Platform

Student Connect is an online portal hosted on the Building Transformations/bSC website. This portal allows students to log in and explore industry-based research opportunities made available by Building Transformations /bSC members. These research opportunities are posted within the portal by Building Transformations/bSC member companies looking to investigate the value proposition for market ready technologies. Students volunteer or apply to be hired, as research interns, to help deliver on the research goals around the technology or project.

Additionally, Building Transformations/bSC offer functionality within the same portal for Students to upload a profile and store information and documents relating to their background and experience. This is a place where students and employers can connect for the purpose of research and or potential employment opportunities.

Building Transformations/bSC are working to create opportunities to deliver significant value for students, educational institutions and its industry members.

BIM Training: Course Directory Quebec

It is wise to list the BIM training courses offered in Quebec to document the beginning of a process that ultimately aims to mobilise, empower, and enhance the skills of stakeholders in the construction industry. A centralised directory will contribute to creating cohesion within a diverse range of offerings and will help users find training courses that meet their needs.

This directory is useful to educational institutions and training companies who wish to have an overview of the BIM training offerings. The identification and categorisation of training programs according to standardised criteria has highlighted the breadth of the existing offerings and helped identify gaps. This information has been useful in assessing whether the training programs cover all the topics to be addressed within the context of a digital transformation that affects the entire industry.

A working group composed of representatives from the industry, educational institutions, and public clients was formed with the aim of strategically structuring the training offered. The group set a four-step work plan to be executed over a period of three years:

1. Identify all existing training programs in Quebec.
2. Identify the needs of the industry and public employers.
3. Identify missing training programs in the existing offerings.
4. Establish typical training paths aligned with the principles of the Roadmap.

The directory created includes training courses offered in Quebec by recognised educational institutions or associative organisations (professional associations). The total number of courses and training programs identified was 113. In addition to this, there are courses offered on a customised basis by private companies registered in Quebec. The training courses offered by solution providers or software developers, as well as information capsules or seminars published on streaming platforms were not considered in the creation of this directory.

Some preliminary observations have been made by examining the directory of existing training programs. For example, there is a lack of diversity in teaching methods, as most courses are delivered online. Furthermore, there are few courses focused on interdisciplinary management compared to technical courses focused on operations and asset maintenance. Stakeholders involved in the creation of the directory acknowledged that the courses currently offered do not meet all the needs of the industry.

Groupe BIM du Québec, the provincial community of practice dedicated to supporting and promoting the digital transformation of the construction industry in Quebec, launched its BIM training program in January 2026. The University of Sherbrooke launched its continuing studies program dedicated to BIM and innovative practices in the construction

industry. Cégep du Vieux Montréal is developing partnerships with French-Speaking African countries to export BIM knowledge and help raise BIM maturity in sub-saharan Africa.

Awareness/Uptake

Jurisdictions have taken an interest in implementing BIM practices and requirements in official policies and public contracts. It is the case both at the federal and provincial levels, with Quebec, Ontario and Alberta as the main players. The federal government is now considering whether to mandate or encourage BIM processes in public procurement procedures and is currently polling industry players.

Other important progress has been made in Quebec, where an industrial cluster was put in place to unite the value chain stakeholders and provide a forum with a plan to encourage best practices with regards to digital processes. This cluster brings together professional associations of architects, engineers, contractors and unions which have highlighted that education institutions at all levels must integrate digital practice and collaboration. One key focus is to better train workers and professionals to be able to master collaboration tools and practices with regards to data management in a life cycle management perspective.

There is a global trend that sees governments and public owners as influential actors capable of influencing the adoption of industry-wide innovations. The government of Quebec supports this trend by promoting the implementation of BIM among various public owners in the province. The Quebec infrastructure plan for 2022-2023 included nearly \$150 billion in infrastructure investments over the next 10 years.

Eight of the largest public owners in Quebec, namely the *Société québécoise des infrastructures (SQI)*, the *ministère des Transports et de la Mobilité Durable du Québec (MTMD)*, the *Société d'habitation du Québec (SHQ)*, *Hydro-Québec (HQ)*, The city of Longueuil (VLG), the City of Montreal (VMtl), the City of Quebec (VQc) and Parc Olympique (PO) have developed and implemented the Government Roadmap for the implementation of BIM in projects. The Roadmap identifies the actions, divided into six axes, to be undertaken by all stakeholders involved in the life cycle of Quebec's public built assets.

The lack of training and skills is one of the main factors slowing down the implementation of BIM in the industry. Recognising the importance of skills development for the success of the initiative, the Quebec government has targeted the training aspect and integrated it into Axis 2 of the Roadmap. This axis is devoted to the mobilisation, empowerment, and skill development of stakeholders. It examines, among other things, the impact that changes brought about by BIM have on a wide variety of tasks and processes.

Increased cooperation is necessary to develop a coherent training offering across Quebec and meet the needs of a vast industry with diverse requirements due to the extent of tasks impacted by BIM and the variety of disciplines involved in the production and management of digital information. Over the next year, an industry wide survey will be conducted to identify stakeholder skills needs and determine the gap between the skill requirements and training currently available.

CHILE

Education/Training

A survey conducted by Planbim in 2021 on *Advances in the inclusion of BIM in undergraduate programs in Chile* revealed that from 2016 to 2021, there was substantial progress in the adoption and application of BIM in construction related careers in Chile. This evolution was observed both in programs taught by universities (52.7% in 2016 to 83.5% in 2021), and in professional institutes and technical training centers in the country (15.2% in 2016 to 79.7% in 2021). Data from this survey and its comparison with previous years were compiled in the document *First Report of the BIM Observatory: Advances in the inclusion of BIM in Higher Education, 2016-2021* that was published by Planbim in June 2022.

The Observatory, which examines the evolution of the introduction of BIM in undergraduate education, provides academic institutions and industry in general with relevant and necessary information for decision-making around the teaching of BIM in the country. In addition to showing quantitative data, the publication contains information about the qualitative aspects of current BIM teaching. It sets out the barriers and benefits perceived by teachers and administrators in the process of incorporating BIM into academic curricula. This allows academic institutions to detect trends and plan education strategies in the medium and long term. Finally, the Observatory seeks to facilitate a broader and more productive conversation between teachers and professionals about the inclusion and improvement of BIM education in the curricula. The report emphasises that the dialogue between all actors is essential for BIM education to advance aligned with the digital transformation needs of the industry.

Regarding graduate education, the availability of courses and training continues to grow in quantity and new approaches. According to a survey carried out by Planbim at the beginning of 2023, there were 155% more BIM diploma programs than in 2016. The emergence of programs focused on strategic issues for the implementation of BIM stands out.

At the secondary education level, the e+bim project - led by Planbim and the Ministry of Education, with the support of professional associations, academic institutions, and private companies – focuses on two aspects: the

preparation in BIM of students and teachers in the short term, and the formal incorporation of BIM in the curricula of high schools in the long term. The first pilot of this curriculum update was implemented in 2023 and aimed to include BIM within the Technical Drawing program. This adaptation was developed between 2020 and 2021 by a team of teachers and industry experts from Planbim, the Ministry of Education, educational corporations (COREDUC and COMEDUC), and professional institutes (DUOC UC and INACAP).

The private sector has also developed several activities related to education in the past years. One of them was a lecture series called *How is BIM taught in Chile?*, developed by BIM Forum Chile's Technical Education Group. This group is mainly comprised of academics from universities and professional institutes interested in promoting BIM education and research in the country. After these open sessions, in 2023, they published a document that compiled the experience of 24 universities and professional institutes that introduced BIM in the undergraduate curricula of Architecture, Engineering and Construction careers. The report notes that each institution has adopted a different strategy for including BIM, adapting to its mission and the formative purposes of its curriculum. The strategies can be grouped into three categories:

- i. The modification and adaptation of existing subjects.
- ii. The creation of new, either compulsory or elective, subjects.
- iii. The integral introduction of BIM in the core subjects, claiming a more complete and comprehensive vision of its impact on the curricula.

In this sense, the various strategies set out in the document constitute a catalog of options, which can be used as a reference by other careers that are beginning their inclusion of BIM. Additionally, almost all the institutions that reformulated their curricula have used the BIM Roles Matrix prepared by Planbim, as a guide to define the competencies that students must acquire, according to the role they will play in their future professional practice.

Another action led by the Education Group was the second version of the BIM Collaboration Competition. The objective of this competition was to promote the use of BIM methodology and technology for the collaborative development of construction

projects in the academic field, at an undergraduate level. This contest allowed 20 teams to have a first approach to collaborative and multidisciplinary work, in addition to complementing their formal learning with more practical experience.

Initiatives/Organisations

BIM ecosystem update

Over the past year, the BIM ecosystem in Chile has undergone a process of consolidation, marked by institutional developments, sector-wide initiatives and collaborative efforts involving industry, academia and the public sector. This trajectory reflects a growing emphasis on structured information management, interoperability and alignment with international standards.

Planbim

Planbim is a 10-year State initiative (2016 to 2025) promoted by the Economic Development Agency (CORFO) and created within the framework of the Strategic Program for Productivity and Sustainable Construction, Construye 2025. Planbim promotes BIM methodology at the industry level and supports public organisations in their implementation of BIM in a standardised way. The initiative also completed the development of the two BIM Observatories mentioned in this report, to understand and gather information regarding the impact that the establishment of BIM as a public policy has had, both at the level of public projects tendered and at the academic level. This work was presented at a hybrid-format seminar organised by Planbim in April 2022, that was attended by 650 people.

National BIM Survey

During 2025, the results of the fifth edition of the National BIM Survey were published. Conducted by the University of Chile, this triennial study characterizes BIM adoption among private-sector professionals in the construction industry.

The 2025 results show continued growth in BIM adoption in Chile's private sector, although at a slower rate than in previous survey cycles. Regular users represent 46% of respondents, up from 41% in 2022. Occasional users account for 26%, while non-users and indirect users together represent 28%.

The survey also shows greater sectoral maturity. Advanced BIM uses have expanded, particularly in design stages. Relative to 2022, the use of IFC increased from 29% to 38%,

formal role definition from 29% to 41%, and the use of common data environments from 28% to 39%. The results also indicate further professionalization of BIM-related human capital: 76% of regular users report formal postgraduate-level BIM training.

Persistent disparities remain across the sector: adoption is higher in architecture and engineering than in construction, higher in metropolitan areas than in non-metropolitan contexts, and higher in design stages than in construction phases.

Overall, the results indicate that BIM in Chile has progressed beyond an exploratory phase and entered a stage of consolidation. In this context, the principal challenge is no longer limited to increasing adoption, but rather to strengthening organizational integration, advancing process standardization, and translating accumulated maturity into more consistent and measurable outcomes across the full project lifecycle.

ISO publications – NCh

Through a mirror committee created by the National Institute for Standardisation (INN), in the past years Chile has adopted and published: NCh ISO 12006-2 and 3, NCh ISO 29481-1 and 2, NCh ISO 19650-1, 2, 3 and 5, and ISO 16354. In 2023, the committee worked on adding ISO 19650-4 to this list.

Also, as a member of the ISO/TC59 SC13 Committee, the country has been part of the development of international standards: ISO 19650-1, 2, 3, 4 and 5, ISO 16354, ISO 23262, ISO 29481-3, ISO 12006 3 and ISO 12911. Currently, the national committee is participating in the study of ISO/DIS 7817.

BIM Observatory: Study of Public Tenders with BIM in Chile, 2013-2020

The First Report of the BIM Observatory for Public Projects is a document developed and published by Planbim Corfo in April 2022. It presents the results of the analysis of 1990 tenders for projects executed between 2013 and 2020 by the ministries of Public Works, Health and Housing, and the Administrative Corporation of the Judiciary Power.

The study showed that the percentage of public tenders requiring BIM has grown steadily since 2013. Despite this increase, the number of projects remains low, reaching only 7%. However, when analysed from the perspective of the amount of investment, this 7% of projects represents 70% of the estimated expenditure for the 1990 tenders

examined. This shows that BIM is being used in higher complexity projects that involve a greater expense for the State. The data also confirms the launch of the BIM public mandate in 2016 has led to an increase in the number of BIM projects. This can be seen especially during the years 2016, 2017, and 2018, when the number of tenders requiring BIM doubled each year.

Regarding the qualitative aspect, the specificity of the requirement and the standardisation of the requested information progressed during the studied period. This shows that the strategy of promoting BIM by the State and the creation of a BIM standard has had a positive impact on the organised adoption of BIM in the country.

Publication of BIM Indicators

Planbim published the Information Impact Indicators. These indicators focus on evaluating the fulfillment of the objectives related to BIM, and therefore, the benefits derived from the application of the selected BIM Uses to meet these objectives.

In the proposed methodology, KPIs are established as metrics to evaluate the performance of a process in which BIM has been introduced, compared against a dataset of a baseline or a defined goal. This helps understand whether BIM has an impact on achieving the objectives originally set, and whether its introduction has helped improve the projects processes and information, in comparison to similar projects of the same organisation.

Connecting the indicators to the purposes of BIM allows measurement efforts to be focused on those benefits that come exclusively from BIM Uses, and for which reliable data can be collected.

This set of indicators are part of the tools that Planbim publishes to support public institutions and industry in general, such as the BIM Standard for Public Projects, the MIDE Entity Matrix, the MIBIM Maturity Matrix, and the different BIM Guides.

BIM Forum Chile

For over a decade, BIM Forum Chile has been a central player in advancing the adoption of Building Information Modeling (BIM) across the country, particularly through its BIM Education Network. This network, which brings together over 100 participants from various higher education institutions, has been pivotal in shaping BIM education and research in Chile.

In the past year, the BIM Education Network has concentrated on research development, which has positioned Chile—alongside Brazil—as a leading nation in scientific publications on BIM-related topics. Three Chilean universities are ranked among the top ten institutions globally for BIM publications indexed in Scopus, with collaborations extending to North America, Europe, and Oceania.

BIM Forum Chile has also been instrumental in promoting the exchange of best practices in BIM education throughout the country. This exchange reflects the transformation of BIM instruction—from an initial focus on software proficiency to a broader emphasis on collaborative methodologies and information management strategies.

In 2025, BIM Forum Chile (BFCh) reinforced its institutional standing through its formalisation as a non-profit organisation, thereby strengthening its governance framework and enhancing its capacity to coordinate initiatives across the sector. This transition ensures continuity in the collaborative work undertaken since 2014, whilst providing a robust platform for stakeholder engagement and the promotion of BIM adoption throughout the construction industry.

The fourth edition of the International BIM Forum Chile Congress, convened in August 2025, exemplified this trajectory. The event emphasised the evolution of BIM from a modelling tool towards a comprehensive Building Information Management methodology, reflecting the increasing importance of structured information management across the entire project lifecycle. Complementing this, BFCh organised a technical series on Common Data Environments (CDE), framed within ISO 19650, which facilitated dialogue among specialists and technology providers regarding best practices and the challenges inherent in implementing collaborative data environments.

buildingSMART Chile

A major milestone in 2025 was the establishment of the Chilean chapter of buildingSMART International, currently recognised as a Chapter-in-Formation. This initiative, driven by BIM Forum Chile together with a range of stakeholders, aims to promote the adoption of openBIM standards, strengthen interoperability, and connect the Chilean construction industry with international networks focused on standardisation and digitalisation.

The creation of the chapter represents a significant step towards aligning the national ecosystem with international information management standards and strengthening Chile's participation in global BIM initiatives.

BIM Adoption Roadmap

At a sectoral level, the BIM Adoption Roadmap in Chile (HdRBIM), led by the Chilean Chamber of Construction in collaboration with 17 public, private and academic organisations, continued to progress during 2025. The roadmap establishes a national goal of achieving 70% BIM adoption by 2028 and is structured around three strategic pillars—Influence, Coordinate and Align—supported by four action areas focused on strategy, communication, training and promotion.

By the end of 2025, all strategic actions had been initiated, approximately half had been completed, and around 65% of planned activities had been delivered, reflecting a transition from strategic planning to active implementation. More than 80 companies have participated in initiatives aimed at strengthening capabilities and demonstrating the value of BIM adoption. These include BIM case studies to document productivity and coordination benefits, as well as the BIM Challenge for SMEs, which supports small and medium-sized enterprises through structured workflows and technical mentoring.

Additional initiatives have focused on strengthening strategic BIM leadership within organisations and improving digital information continuity between planning and construction phases, including the development of BIM-related roles at site level. In terms of standardisation and international alignment, the ISO 19650 Mirror Committee has been reactivated, reinforcing Chile's participation in global discussions on information management and supporting alignment with international standards.

Awareness/Uptake

Chile has taken important steps towards establishing BIM as a common practice in the industry. Both Observatories mentioned above report on this progress. In academia, progress has been made in the adoption and application of BIM in undergraduate programs related to the field of construction between 2016 and 2021. For this, higher education institutions have employed multiple approaches for incorporating BIM into curricula. However, the subjects where BIM has been included in undergraduate programs are still linked to

software and representation applications. Therefore, the teaching of fundamental methodological issues, such as implementation strategies and standards management, has been relegated to the background.

At the graduate level, there seems to be awareness regarding the need to generate training for the different professional roles in the industry. Academic institutions have begun offering diploma programs focused on the direction and management of projects with BIM. This complements the broad range of modelling and coordination courses available.

Public sector initiatives continue to play a key role in shaping the national BIM ecosystem.

The Ministry of Public Works (MOP) has advanced BIM adoption through the development of its BIM Implementation Plan 2025–2028, aimed at integrating BIM at an institutional level within the delivery of public infrastructure projects. The plan adopts a comprehensive approach addressing strategic, organisational, technical and change management dimensions, including the development of standards, information requirements aligned with the ISO 19650 series, CDE structures, pilot projects, and institutional capacity building. These efforts strengthen the role of the MOP as a client in driving BIM adoption and support more efficient, collaborative and transparent project delivery.

Meanwhile, the Ministry of Housing and Urban Development (MINVU) is advancing BIM adoption through the development of its institutional BIM Implementation Strategy, currently under preparation. This initiative aims to define a comprehensive framework for BIM adoption across housing and urban development programmes, including the assessment of current maturity, identification of gaps, and the design of a long-term strategy (2025–2035), along with an initial implementation plan (2025–2028). The work addresses organisational, methodological and technological dimensions, establishing the foundations for a coordinated and progressive adoption of BIM, with a focus on improving information management, inter-agency coordination, and the efficiency of housing and urban projects.

Finally, the private sector has also made progress in this area, as evident from the results of the National Survey which showed

that BIM has strongly penetrated different areas and professionals.

Conclusion

These developments reflect a shift in the Chilean BIM ecosystem towards approaches increasingly focused on information management, interoperability, open standards, digitalisation and sector-wide collaboration. They are also influencing the evolution of professional training and capacity development in the country, positioning Chile as an active participant in the global BIM community.

CHINA

Education/Training

Overall development stage: A comprehensive transition from Course introduction to Systematic construction

In 2025, BIM education in China completely bid farewell to the initial stage of offering a single BIM software course and fully entered the systematic construction period and interdisciplinary integration period. The core hallmark of this transition is: BIM is no longer viewed as an isolated tool skill, but rather as the digital foundation for civil engineering and architecture majors, deeply integrated into new talent cultivation systems such as intelligent construction, digital design, and whole-process engineering consulting.

From the perspective of policy drivers, the Ministry of Education updated the *Undergraduate Major Catalogue of Regular Higher Education Institutions in 2025*, adding 29 new majors such as digital drama and simultaneously released 758 newly revised (formulated) professional teaching standards for vocational education, explicitly requiring precise alignment between course content and industry needs. This top-level design change has elevated BIM talent cultivation from software operation ability training to a key component of the digital and intelligent transformation of civil engineering majors.

From the perspective of academic research, the academic book *Building Information Modelling (BIM) Adoption - Learning, Competition and Practice* published in 2025, Systematically studied student learning behaviour, educational effectiveness, and competition-based learning in BIM education at Chinese Universities. Combining theoretical models like UTAUT, SCT, TAM, and TPB with large-scale empirical data from Chinese Universities, this research revealed differences in how students engage with BIM in classroom learning versus national competitions, providing theoretical support for curriculum design and talent cultivation.

Undergraduate education: Deep restructuring of curriculum systems and cultivation models

Curriculum system: From single-point courses to whole-process embedding

In 2025, the BIM curriculum in undergraduate institutions formed a three-tier system of foundation + core + integration.

At the foundation level, majors such as civil engineering, engineering management, engineering cost, and architecture have

incorporated basic BIM modelling and collaborative design principles into compulsory courses, achieving the popularisation goal of everyone understands BIM. At the core level, BIM application modules are embedded into professional core courses. For instance, 4D construction simulation is integrated into Construction Organization Design, 5D quantity extraction into Engineering Valuation, and MEP clash detection into Building Equipment. At the integration level, through graduation designs and comprehensive course designs, students are required to complete the full-process BIM application from modelling and collaboration to delivery.

Some universities have established the 2025 version of the intelligent construction major cultivation plan, where the curriculum explicitly emphasizes the integration of AI basics, mechanical control, construction robots, and BIM-related applications. Aiming at the needs of smart cities and intelligent infrastructure construction, it cultivates applied talents with capabilities in intelligent design, intelligent construction, intelligent operation and maintenance, and project management.

Teaching reform: From classroom lecturing to diversified models

In 2025, undergraduate BIM teaching exhibited distinct characteristics of being project-driven, competition-led, and school-enterprise collaborative.

- *The competition-driven effect is significant.* National BIM competitions have become an important platform for talent cultivation. Events like the "Longtu Cup" National BIM Contest not only reflect the application levels of different regions and units but also provide channels for talent exchange among universities, enterprises and industry organisations. Research indicates that students participating in national BIM competitions significantly outperform non-participating students in comprehensive abilities, teamwork, and solving complex engineering problems. In the national industry vocational skills competition plan for 2025-2028 released by the Ministry of Human Resources and Social Security, BIM was selected as a Category I competition.
- *The rise of the micro-major model.* Some universities are breaking down major barriers and cultivating interdisciplinary talents through micro-majors. Take China University of Mining and Technology-Beijing as an example: The university officially implemented the Intelligent

Construction micro-major in 2025, setting up 5 courses including Fundamentals of Intelligent Design, BIM Forward Design, and Intelligent Construction with 9.5 credits, open for selection to all students. This model allows non-civil engineering students (such as computer science, automation, etc.) to systematically learn BIM and intelligent construction knowledge, facilitating the cultivation of cross-disciplinary talents.

- *The effectiveness of teaching reform is quantifiable.* A study on BIM course reforms in 12 Chinese universities from 2019 to 2024 showed that in institutions adopting the four-dimensional reform framework - combining theoretical teaching, software practical training, project practice, and competition participation - students' ability assessment scores improved by 1.41%, the pass rate of BIM level exams increased by 2.39%, and the proportion of participation in real enterprise projects grew by 3.43%. These quantitative data confirm the actual improvement effect of teaching reform on talent cultivation quality.

Employment orientation: Diversification of job types

In 2025, the employment outlets for undergraduate BIM talents have significantly broadened. Employment tracking of graduates from institutions like Beijing City University shows that graduates of civil engineering majors are no longer confined to traditional construction jobs but have expanded into multiple directions.

- *Design jobs* include BIM forward design posts, digital design posts, etc.
- *Construction jobs* include construction enterprise BIM engineers, digital construction engineers, smart construction site technical posts, etc.
- *Consulting jobs* include BIM consultants, whole-process engineering consulting BIM specialists, etc.
- *Management jobs* include construction unit project digital management posts, government construction management department digital supervision posts, etc.
- *Development jobs* include BIM software development engineers, BIM platform product managers, BIM system architects, etc. These jobs require combined computer knowledge.

This indicates that the goal of BIM talent cultivation in universities has shifted from

enabling students to use BIM software to equipping students with the comprehensive ability to serve the digital transformation of engineering construction.

Vocational education: Equal emphasis on job orientation and practical skills

Cultivation Positioning: Oriented towards Job Clusters

Higher vocational colleges highlight job orientation and practical skills more in BIM talent cultivation, mainly targeting job clusters such as on-site digital application, model detailing and application, and intelligent construction equipment operation.

Taking the intelligent construction technology major as an example, the curriculum mainly includes BIM modelling, construction organization, prefabricated construction, Python programming basics, and intelligent mechanical equipment operation and maintenance, equipped with BIM certification training, virtual simulation training, and enterprise collaborative practice. This integrated model of 'teaching, learning, and doing' enables students to quickly adapt to job requirements after graduation.

Integration of industry and education: School-enterprise collaborative education

BIM cultivation in the vocational education sector relies heavily on school-enterprise cooperation. Leading enterprises such as the China Institute of Building Standard Design & Research and the China Academy of Building Research have established targeted training relationships with vocational colleges for the promotion and application of BIM technology, providing training bases, corporate mentors, and real project cases. Some colleges are also exploring the modern apprenticeship system, where students complete some credits within enterprises, achieving employment upon enrolment and taking up posts upon graduation.

Existing problems and challenges

Despite significant progress in China's BIM education in 2025, there are still prominent problems.

First - uneven development across regions and institutions

Eastern coastal areas and key universities have higher levels of BIM education, but central and western regions and regular colleges remain at the software teaching level,

with some offering only one or two elective courses and lacking systematic cultivation.

Second - a severe shortage of compound teaching staff

Teachers who understand engineering professional technology and are also proficient in data science, algorithm development, and project management are extremely scarce. Most existing teachers have transitioned from traditional civil engineering majors and have limited mastery of new technologies like AI, digital twins, and IoT.

Third - insufficient alignment between curricula and enterprise needs

The course content of some institutions lags behind industrial practice, and there is a gap between the software versions and application scenarios students learn and real enterprise projects, especially regarding the popularization education of domestic BIM software, which remains inadequate.

Fourth - an imperfect transformation mechanism for practical results

The mechanism for translating student competition results and course design works into employability and job competency has not been fully established, and the phenomena of learning for competitions and learning for certificates still exist.

Initiatives/Organisations

Industry organisations: From promoters to organizers, connectors, and evaluators

In 2025, BIM-related industry organisations in China have formed a collaborative pattern of national societies as leaders, professional committees as pillars, and local organisations as extensions. Their organisational functions have also shifted from an early emphasis on concept promotion and software training to standard leading, collaborative delivery, capability evaluation, and compound talent cultivation.

National Organisations

The BIM Professional Committee of the China Graphics Society continues to play a core role. In March 2025, it released the notice for the 25th National BIM Skill Level Examination and organized the exam in June, keeping the national capability evaluation system continuously operational. The 14th BIM Lecture & CDE Conference held in Shenzhen in March focused on discussing the role of the Common Data Environment (CDE) in unified

BIM data management and collaborative sharing, marking that industry organizations have shifted the focus of talent cultivation from knowing how to model to understanding collaboration, data, and delivery.

buildingSMART China continues to carry out activities around openBIM, CDE, digital twins, intelligent construction, and AI integration applications, promoting the alignment of Chinese BIM standards with international standards such as ISO 19650.

Chinabidding.com and the China Famous Enterprise Ranking Network jointly released the 2025 Top 50 Comprehensive Strength Ranking of Whole-Process Engineering Consulting BIM Consulting Companies. The China Institute of Building Standard Design & Research Co., Ltd. The China Academy of Building Research Co., Ltd. and The Beijing Institute of Architectural Design Co., Ltd. ranked top three. Such selection activities not only provide references for construction units to compare and select BIM consulting agencies but also objectively promote the capability building and talent cultivation of BIM consulting enterprises.

Regional Exchange Platforms

In 2025, cross-regional and cross-professional exchange mechanisms became more normalized. The 3rd BIM Innovative Application and Digital Construction Technology Exchange Conference held in Changsha in April, and the 12th International Conference on BIM Technology held in the Hengqin Guangdong - Macao In-Depth Cooperation Zone and Macao, China in June, brought design, construction, scientific research, owners, and IT service providers into the same communication framework. The trend of joint participation by industry associations, research institutes, universities, and enterprises is increasingly obvious.

Capability Evaluation and Competition System

Regarding skill level examinations, the National BIM Skill Level Examination continues to operate, becoming an important benchmark for industry talent evaluation. In terms of competition platforms, the 14th "Longtu Cup" National BIM Contest continues to function as a showcase for achievements and talent discovery, providing channels for talent exchange among universities, enterprises, and industry organizations. In terms of textbook construction, textbooks published in 2025, such as *BIM Technology and Application-Revit Skills Chapter*, reflect the continuous updating

of teaching and pre-job training resources, and the industry cultivation content is gradually bridging with vocational education.

Enterprises: Scenario-based, Project-based, Platform-based, and Compound Talent Cultivation

In 2025, the BIM talent cultivation of construction enterprises formed a systematic model of "headquarters coordination + business department organization + project backbone participation," shifting the cultivation goal from single modelling personnel to compound talents who understand engineering business, digital tools, and data collaboration.

Systematic Cultivation by Leading Enterprises

China State Construction Engineering Corporation (CSCEC)'s BIM talent cultivation system is the most representative. In May 2025, the CSCEC Party School (CSCEC Management College) and the CSCEC Industrial Research Institute (CSCEC Technology Centre) jointly hosted the "CSCEC 2025 Professional and Technical Training Class (Phase I) Domestic BIM Comprehensive Application Workshop." 82 BIM engineers, BIM managers, and key project leaders from subsidiaries participated in the training, covering the development trends of domestic BIM, typical engineering applications, and software operations. Through the "headquarters coordination + business department organization + project backbone participation" method, the enterprise can quickly transmit new tools, new standards, and new methods to frontline projects.

In September 2025, CSCEC released the "Jianzheng" large model, indicating that enterprise knowledge acquisition, experience reuse, and business assistance are evolving towards intelligence. The capability boundaries of BIM talents have consequently extended from modelling and application to data understanding, knowledge invocation, and AI collaboration.

The practice of China Construction Fifth Engineering Division Co.,Ltd. (CSCEC5B) reflects a complete path of "centralized training + platform empowerment + project mentoring + competition evaluation." The Civil Engineering Company organized the "Chaoying Cup" technical skill competition, and the municipal engineering project of the Changsha Airport expansion project formed a mechanism to enhance comprehensive application capabilities based on real projects through the BIM studio and project combat.

Professional Development of Consulting Enterprises

The "2025 Top 50 Comprehensive Strength Ranking of Whole-Process Engineering Consulting BIM Consulting Companies" shows that a group of professional BIM consulting companies has risen, such as Shanghai Blue Planet Technology Co.,Ltd. BIM (Shanghai) Building Data Technology Co.,Ltd. and Tongyan Digital Intelligence Technology (Chongqing) Co.,Ltd. These enterprises not only provide subdivided services such as model detailing, collaborative management, and standard formulation but also undertake substantial socialized cultivation and job training functions for BIM talents.

Existing Problems

Enterprise-side BIM talent cultivation still faces challenges. Small and medium-sized enterprises have insufficient investment, and some training still focuses too much on the tool level. There is a structural shortage of compound talents who both understand engineering management and are proficient in BIM technology and digital tools, especially a lack of chief project consultants with cross-stage integration capabilities. The linkage mechanism between training outcomes and job promotion or project results is not yet perfect.

Awareness/Uptake

Industry Consensus Driven by Policy

By 2025, the perception of BIM (Building Information Modelling) technology within China's construction industry has evolved from an "optional tool" to a "core enabler of digital transformation." This paradigm shift has been catalysed by sustained policy interventions at both national and local governmental levels.

Strategic Positioning at the National Level

In 2025, the National Development and Reform Commission, the Ministry of Industry and Information Technology, and the Ministry of Housing and Urban-Rural Development jointly promulgated strategic policy documents, including the 2025 Work Points for Coordinated Digital and Green Transformation and the "Opinions on Continuously Advancing Urban Renewal Actions". These frameworks unequivocally position BIM as: (1) a vehicle for deepening application scenarios; (2) a foundational data infrastructure for technology integration; (3) a cornerstone for cultivating an indigenous software ecosystem; and (4) a fundamental substrate for urban governance.

Specifically, regarding application scenario expansion, policies mandate the deployment of BIM throughout the entire lifecycle of housing design, construction, and facility management. Concerning technology integration, BIM is designated as the data substrate for converging advanced technologies such as artificial intelligence and robotics. With respect to indigenous ecosystem development, policies emphasize top-level planning for proprietary BIM technologies to establish a self-controllable software ecosystem. Regarding urban governance foundations, policies advocate for the development of City Information Modelling (CIM) platforms and city-scale three-dimensional data substrates within the context of new urban infrastructure initiatives.

Local-Level Implementation and Promotion

Municipal policy implementations exhibit distinctive regional characteristics:

Beijing promulgated the “Beijing Science and Technology Support for Innovation and Development in the Construction Sector Action Plan (2025–2027)” and the Guiding Opinions on Promoting Intelligent Construction Development in Beijing's Sub-Centre (Trial). These documents emphasize R&D in BIM-AI integration and have solicited 36 exemplary BIM demonstration projects spanning hospitals, educational institutions, and rail transit systems.

Shanghai successively issued the “Notice on Piloting BIM Model-Based Bidding in Construction Project Procurement” and the “Notice on Upgrading BIM-Enabled Intelligent Auxiliary Review Systems”. These initiatives incorporate BIM requirements into tender documentation and implement intelligent two-dimensional/three-dimensional integrated review mechanisms.

Guangzhou articulated in the “Implementation Opinions on Vigorously Developing Intelligent Construction and Industrialized Buildings to Accelerate Modernization of the Construction Industry” a commitment to indigenous BIM software adoption, complemented by the publication of the “2025 Guangzhou Indigenous BIM Application and Development White Paper”, advancing the synergistic integration of prefabricated construction and BIM methodologies.

Shenzhen released the “Shenzhen Intelligent Construction Technology Catalogue (Third Edition)”, expanding both the breadth and depth of BIM applications, and designated five exemplary BIM projects encompassing

residential complexes, medical facilities, and transportation hubs.

Standardization Development: From “Existence” to “Excellence”

National Standards

The GB/T 45393 “Information Technology—Building Information Modelling (BIM) Software” series standard was formally promulgated in 2025. This comprehensive standard comprises five constituent parts: general requirements, parametric modelling, model view definition, mesh modelling, and data interchange interfaces. The cardinal objective of this standardization framework is to facilitate interoperability among BIM software platforms, enable exchange and sharing of BIM models, enhance the usability, applicability, and maturity of BIM software, and ultimately support the assetisation of BIM models.

The Ministry of Housing and Urban-Rural Development has incorporated seven core BIM technical standards into its revision agenda, including the “Unified Standard for Building Information Modelling Application” and the “Storage Standard for Building Information Modelling”. These standards span the entire project lifecycle from design through construction to operations and integrate requirements for emerging technologies such as AI and CIM, thereby fostering the development of “BIM+” implementation models.

Local Standards

In 2025, multiple provincial and municipal jurisdictions promulgated BIM standards with distinctive regional characteristics:

Guangdong Province: “Standard for Municipal Engineering Information Modelling and Delivery” (December 2025)

Fujian Province: “Standard for Prefabricated Building Information Modelling Delivery” (December 2025)

Jiangsu Province: “Data Specification for BIM-Enabled Planning Permit Applications in Construction Engineering” (November 2025)

Shanxi Province: “Application Standard for Building Information Modelling in Municipal Underground Space Engineering” (October 2025)

Anhui Province: “Information Modelling for Urban Road Engineering” series standards, comprising classification/coding and delivery components (July 2025)

These local standards maintain alignment with national frameworks while accommodating

regional industrial characteristics and engineering exigencies, thereby constituting a preliminary multi-tiered standardization architecture.

Conclusion

By 2025, BIM education and application in China have entered a critical phase characterized by scaled, systematic, and intelligent development.

Educational Dimension: BIM has achieved deep integration within higher education and vocational training systems, establishing a differentiated landscape wherein "undergraduate programs emphasize interdisciplinary competency while vocational programs prioritize operational proficiency. "Curricular content has transitioned from isolated software training modules to comprehensive embedded course clusters spanning entire project lifecycles. Pedagogical models have shifted from classroom-based instruction to "project-driven, competition-motivated, and industry-academia-collaborative" frameworks. Career pathways have diversified from singular technical positions to multifaceted roles including BIM engineers, digital construction managers, and whole-process consultants. Quantitative research demonstrates that pedagogical reforms generate statistically significant positive effects on student competency development.

Institutional Dimension: Industry organizations have transformed from "promoters" to "organizers, connectors, and evaluators." Enterprises have established systematic competency development pathways encompassing "headquarters coordination, project-based practical training, skills competitions, and platform enablement. "National BIM skills certification examinations, competition platforms, and textbook development continue to mature. The publication of the "Top 50 Whole-Process Engineering Consulting BIM Consulting Firms" ranking signifies the emergence of a leadership-driven market structure within the BIM consulting sector.

Awareness Dimension: Industry-wide cognitive depth and application breadth of BIM technology have substantially advanced. At the policy level, BIM has been definitively established as the core enabler of digital transformation. At the standardization level, a preliminary multi-tiered architecture has materialized. At the academic level, research on BIM adoption has become increasingly sophisticated and theoretically grounded. The

industry has universally recognized that BIM has evolved from a "visualization tool" to a "data substrate" and "collaborative platform."

Nevertheless, current BIM education and application continue to confront challenges including uneven regional development, shortage of interdisciplinary faculty, immaturity of indigenous software, and the need for strengthened data governance and security management. The structural shortage of interdisciplinary professionals proficient in both engineering management and BIM/digital technologies has emerged as a critical bottleneck constraining industry high-quality development.

Future Directions: Moving forward, it is imperative to deepen industry-education integration, promote systematic integration of BIM with AI, digital twin, and intelligent equipment technologies, and construct higher-quality, industry-adapted BIM talent cultivation and application ecosystems. Concurrently, efforts must be directed toward standardization alignment with international frameworks, refinement of BIM data governance mechanisms, exploration of value realization pathways for "BIM + whole-process engineering consulting" models, and the transition of Chinese BIM development from "scale expansion" to "value creation."

CZECH REPUBLIC

Education/Training

In the Czech Republic, BIM education and training have generally been widely available in recent years through seminars, workshops, and presentations organised by the Czech Standardisation Agency (CAS), CzBIM (Czech BIM Council), universities, companies, software vendors, technical chambers, and others.

Following the disruption caused by COVID-19 in 2020–2021, BIM education continued to develop, supported by increased digitalisation and the transition to online formats. BIM has been gradually integrated into university curricula, both as standalone subjects and through updates of existing courses. The content varies depending on the field and level of study, and interdisciplinary collaboration remains a challenge. BIM is also being introduced into secondary technical education, mainly within 3D CAD-based subjects.

A significant shift has occurred since 2024, driven by the need for a more systematic and standardised approach to BIM education. In 2025, CAS, in cooperation with CzBIM and buildingSMART Czech Republic, piloted a national BIM education system for public administration, involving more than 200 participants from ministries, regions, municipalities, and other public institutions. The system is structured around four pillars: motivation, BIM and facility management, BIM in public procurement, and lifelong learning.

The pilot confirmed the relevance of the system but highlighted the need for further development, particularly in terms of practical training, unified methodologies, and ongoing expert support. In the same year, CAS published a methodological document defining the required knowledge and skills related to BIM and construction information management, providing a structured competency framework across roles and lifecycle phases.

Further development is ongoing. A comprehensive methodological framework for the BIM education system for public administration is currently being prepared and is expected to be finalised and published in 2026. CAS has also published overviews of BIM- and Facility Management-related study programmes, supporting better alignment between education and labour market needs.

Initiatives/Organisations

CzBIM – Czech BIM Council (www.czbim.org)

CzBIM is a nonprofit organization that supports the implementation of BIM in the Czech Republic, focusing on promotion, education, standardization, and collaboration with public authorities and international organizations such as buildingSMART. CzBIM organizes an annual conference called “BIM DAY.” Several documents have been published under its auspices, and many others have been prepared. It also plays a key role in negotiations with ministries and standardization bodies.

CAS – Czech Standardisation Agency, BIM Policy (www.bimkonceptce.cz)

The Czech Standardisation Agency (CAS) remains the key organisation responsible for BIM implementation at the national level. Since 2017, it has coordinated BIM activities under the BIM Policy and its updates.

A major milestone is the adoption of Act No. 330/2025 Coll., which establishes a comprehensive legal framework for BIM and introduces mandatory use for selected public entities in above-threshold projects from 1 January 2027. The Act defines key concepts such as the information model, digital model, data standards, information containers, and the use of a Common Data Environment (CDE).

This legislative framework is supported by the updated BIM Implementation Plan, confirmed by Government Resolution No. 519 (2024). CAS has published a number of new and updated methodological documents focusing on standardisation of processes, data requirements, and contractual frameworks.

These methodologies are currently being verified through pilot projects involving public contracting authorities. The aim is to test their applicability and establish unified and validated procedures for BIM implementation across the public sector.

CAS continues to develop national BIM standards and tools, including the Construction Data Standard (DSS), methodologies for information and digital models, and CDE requirements. The State Fund for Transport Infrastructure (SFDI) remains important for BIM implementation in infrastructure projects.

SFDI - The State Fund for Transport Infrastructure (www.sfdi.cz)

The State Fund for Transport Infrastructure is a major organization that supports BIM. In 2020, the SFDI, in cooperation with the

Ministry of Industry and Trade, the Ministry of Transport, the Czech Standardization Agency, and other organizations, issued the Regulation on Building Information Modelling (BIM) for the Construction of Transport Infrastructure. The document defines the minimum required information that must be included in BIM models at various design stages—Data Standards for Roads and Railways (approved in 2021 and updated in 2022)—and specifies formats (IFC), units, etc. It was introduced based on experience from pilot projects and is being used for further pilot projects.

Awareness/Uptake

Both public and private investors have increasingly adopted BIM through pilot projects and practical implementations. A clear shift can be observed from initial interest toward real application and integration into project processes.

However, BIM adoption remains uneven. While some organisations are more advanced, many are still at an early stage. Key barriers include: lack of qualified professionals, costs related to implementation and software changes, the need for training and organisational transformation and previously limited availability of national standards (now improving).

Since 2024, BIM uptake has been increasingly driven by legislative requirements and national coordination, particularly in preparation for mandatory BIM use from 2027. Organisations are therefore actively investing in pilot projects, education, implementation of CDE, and development of internal BIM standards.

At the same time, there is growing involvement of manufacturers, software vendors, and facility management stakeholders, reflecting a broader understanding of BIM as a lifecycle information management approach, rather than only a design tool.

A rising consciousness of BIM in the Czech Republic is also supported by the need of society to search for modern technologies and their use. In addition to BIM, there is an awareness of the need for electronic communication and digitisation.

Overall, BIM implementation in the Czech Republic is transitioning toward a systematic, standardised, and legally driven approach, supported by national methodologies, pilot verification, and structured education.

FINLAND

Education/Training

BIM education in Finland has notably advanced through collaborative efforts among educational institutions, industry, and national programs. Universities, universities of applied sciences, and corporate actors have developed a variety of curricula and courses specifically targeting information modeling and digital construction competencies. Educational institutions and external training providers both play a key role; however, recently, the importance of companies' internal training has grown substantially. Many companies have invested in internal BIM software and process development, for which suitable external expertise is often unavailable. That's why companies have elevated internal competence management and "train-the-trainer" models, where select staff are trained to educate colleagues. This model has proven very effective for sharing and maintaining in-house expertise.

A major ongoing initiative is the BIMOK – Building Information Modeling Competence Development Program, encompassing the entire Finnish construction sector and targeting the recognition and continuous development of BIM and digital skills. Its aim is to create a recognized framework for digital construction competence, with clearly defined professional profiles and abilities using a KSA (Knowledge, Skills, Abilities) matrix. The first phase, the [BIMOK - Competence Roadmap](#), is currently mapping out the theoretical basis for BIM competence, as well as methods for defining and recognizing competence in the field. The project is also researching how current education meets industry demands in BIM-related topics.

At the European level, the BIMPACT project, led by Finland's Metropolia University of applied sciences, is working to create an international framework for digital construction competence and a cross-institutional platform to support learning and teaching in this field.

Close collaboration between academia and industry enables rapid adaptation to the evolving needs of BIM education, especially as technological advances and regulatory changes continue to shape required competencies. In addition to formal education, there is a growing body of scientific research in Finland focused on BIM competence and the pedagogy of BIM. These research activities are closely linked to the BIMOK program, ensuring that the findings and innovations from ongoing research are integrated directly into

the development of BIM education and competence frameworks.

Furthermore, both the RYTV project and the BIMOK competence development initiative are actively engaged in defining national BIM competence levels and learning outcomes. This work aims to establish a clear and uniform competence framework for the entire construction sector, enabling more consistent evaluation of BIM expertise in the future. As these frameworks develop, they will support the creation of standardized assessment methods and potentially formal certification systems for BIM skills, further strengthening the quality and comparability of digital construction competence across different organizations and regions.

Initiatives/Organisations

Several national and European initiatives play a significant role in promoting BIM education and implementation in Finland. The RYTV project program, led by buildingSMART Finland (bSF), has multiple beneficial effects on BIM education. Its work in joint information standardization enables smooth and broad information sharing across the field. Within BIM standardization, RYTV also supports research, learning, and the adoption of international BIM standards. The key objective of RYTV is to update and publish new national BIM requirements for the built environment, which also cover educational and competence development as well as change management. RYTV's education sector has launched a comprehensive survey of BIM teaching in Finland, aiming to unite educators from different institutions and share experiences and knowhow on the challenges of teaching BIM and construction digitalization.

[The Client Guide for Information Modeling in Construction Projects](#) is a part of the RYTV program, aiming to standardize and harmonize BIM practices across the Finnish construction sector. The guide is based on international standards, particularly the ISO 19650 series, and is tailored to meet the needs of the Finnish industry. Its primary goal is to enable clients to consistently define project objectives, requirements, and quality standards, enhancing the effective use and transfer of information throughout a project's lifecycle. By establishing a unified framework with clear and easily applicable information management principles, the guide helps overcome current inconsistencies across different sectors and organizations.

The "[Rakennetun ympäristön digitalisaatio](#)" (RYD) project, commencing in early 2026, is

the largest digitalization initiative in the Finnish built environment sector to date. This multi-year project aims to transform the entire construction value chain—from design and production to on-site execution and lifecycle management—by developing standardized, interoperable, and machine-readable data foundations. The RYD project tackles key industry challenges such as fragmented data systems, manual information transfers, and poor interoperability, with the goal of boosting productivity, quality, and transparency across the sector. By focusing on areas like digital product information management, supply chain digitalization, and compliance with emerging EU requirements (such as the digital product passport), RYD will deliver open-standard, structured data solutions benefiting all stakeholders throughout the industry. The project brings together a wide network of companies, experts, authorities, and educational institutions, and its results and models will be made available for the whole sector to leverage.

In addition, there is an increasing focus on circularity in construction: new projects such as DIPUPILOT and RETAKE have been launched to address circular economy themes, with notable involvement and interest from the sustainable construction community.

Awareness/Uptake

In Finland, BIM awareness and uptake have become widespread, especially among large companies and public sector clients. Major construction firms like Skanska, NCC, YIT, SRV, and others utilize BIM for virtually all their own production. Public sector clients are increasingly defining their own detailed BIM requirements and are using BIM in more of their building projects. Among architect and design companies, BIM has become the principal tool and concept for building design. However, there remains a disparity in BIM usage between larger and smaller companies. While large organizations and companies in urban or more developed regions routinely use BIM, many smaller companies and those in rural areas continue to use 2D design methods. The same pattern appears across all BIM use cases, from building owners to site workers.

A significant regulatory development is the new Ministry of the Environment Decree on the content of construction design models and municipal building inspections, which, from the start of 2026, will allow building permit applications to be submitted based on BIM models. This change has generated strong

interest in BIM and is accelerating development and implementation, particularly among smaller companies and rural areas.

Furthermore, various R&D projects and emerging use cases continue to broaden the awareness and perceived value of BIM, including its contributions to aspects such as building safety, automation, and sustainability. As a result of these trends and new initiatives, there are increasing and diverse demands for BIM competences at all levels of industry.

FRANCE

Education/Training

For more than a decade, France has been undergoing a profound transformation of its construction sector centered on the digitization of construction processes, with BIM serving as the starting point. This movement, driven by public policy, industry professionals, and the education sector, is now structured around a coherent training ecosystem, ranging from vocational high schools to specialized master's programs, and linked to an international professional certification system led by buildingSMART France.

Initial training governed by the French National Education

Initial Level

The reform of the vocational track, launched at the start of the 2023 school year and which continued to gain momentum in 2024–2025, led the French Ministry of Education to restructure pathways around occupational clusters, with a common vocational track shared across multiple specializations. Within these programs, the use of digital tools and the collaborative BIM approach has grown. The Éduscol STI (Industrial Sciences and Technologies) portal provides a number of resources for teaching. At the two-year post-secondary level, several BTS programs have incorporated the BIM approach into their curricula.

Higher education

A new Level 6 certification (bachelor's degree level) was registered with the RNCP in August 2024: the title "Building Information Modeling Designer in Science and Technology for Architecture (BIM)." In addition, professional bachelor's degrees in the fields of "Construction Economics and BIM Management" and "Design Office and BIM Project Management" are being developed. And many higher education institutions (apprenticeship training centers, engineering schools, architecture schools, universities) now offer master's or specialized master's® programs incorporating BIM.

Continuing Education

Short-term continuing education (1 to 5 days)

Short-term continuing education is the most developed segment of the BIM offering in France. It is aimed at industry professionals

seeking to acquire or update their knowledge of BIM and openBIM, and notably includes preparation for individual buildingSMART International certification through organizations accredited by buildingSMART France. These courses are eligible for funding from OPCOs (Skills Operators), which makes them more accessible to employees, job seekers, and

Long-term training: professional certifications

Long-term continuing education leads to certifications recognized by the state and registered in the National Directory of Professional Certifications (RNCP). As the national regulatory authority for professional certification, France Compétences plays a central role in structuring the BIM training offerings in France. The series of re-registrations carried out in 2024 (BIM Modeler in July, BIM Coordinator in July, BIM Designer in August, Digitalization Expert in June) demonstrates a continuous updating of standards to respond to market developments and the requirements of the RE 2020 and the sector's digital transition.

- BIM Building Modeler Level 5 - 2-year post-secondary degree 07/02/2024
- BIM Building Coordinator Level 6 - 3-year post-secondary degree 07/19/2024
- BIM Designer in Architecture Science and Technology Level 6 - 3-year post-secondary degree 08/26/2024
- Expert in Building Digitalization and Operations Level 7 - Master's degree 06/27/2024
- Construction Project Manager (BIM) Level 7 - Master's degree 04/25/2024.

Continue: Certificates and Certification

There are very few academic BIM certificates, which are primarily institutional certificates not registered with the RNCP. The market is dominated by two players: CNAM and ParisTech, each with a different focus: one on technical and operational skills; the other on BIM coordination and management. Each school defines its own standards: there is no national harmonization.

The buildingSMART International (bSI) "Fundamentals" professional certification is the benchmark for validating basic openBIM knowledge in France. Developed since 2018 by buildingSMART International (bSI), this program is managed in France exclusively by buildingSMART France.

Initiatives/Organisations

The Role of buildingSMART France

A non-profit association established in 1989 under the French Law of 1901 and becoming the French chapter of buildingSMART International in 1996, buildingSMART France – Mediaconstruct is a key player in promoting digital continuity through openBIM and, more broadly, in supporting digital transformation as a performance driver across the construction and operations lifecycle. The "Skills" focus area is an integral part of the initiatives developed by buildingSMART France in various forms:

- *openBIM Training Label: One of a Kind.* This certification, created by buildingSMART France, aims to promote an authentic openBIM approach within educational systems, in both initial and continuing education. This certification applies to training programs - not organizations - and is evaluated based on six criteria: The project component (work on real or realistic projects); Interoperability (use of open formats such as IFC, BCF, etc.); Tools (use of openBIM-compatible software); Process (implementation of a structured BIM approach); Innovative transition (integration of technological advancements); and The openBIM ecosystem (knowledge of and participation in the openBIM community).
- *Accreditation to Administer the Certification.* To administer the "Fundamentals" certification exam issued by bSI, a training organization must obtain accreditation from buildingSMART France, the sole accreditation authority recognized by bSI in France. These organizations are listed in bSI's international directory and on the website <https://bsfrance.org/fr>
- *Learning: A Key Focus Area for bSFrance.* Despite the progress made, the construction industry in France remains heterogeneous in its level of digital and BIM integration. The fragmentation of the economic landscape, composed mainly of SMEs and craftsmen, is the main obstacle to faster adoption. The RE 2020 (2020 Environmental Regulations), which came into effect in January 2022, serves as a powerful catalyst for BIM adoption, as it promotes the extraction of quantity takeoffs and life-cycle analyses - processes that BIM naturally facilitates. That is why, to reach micro-enterprises and SMEs - which often employ apprentices - more quickly, and to provide training in openBIM from a young age, the CCCA BTP (Consultation and

Coordination Committee for Apprenticeship in Building and Public Works) has entered into an agreement with buildingSMART France to develop various initiatives—including the openBIM Game Challenge, held regionally during “Digital Construction & Apprenticeship Forum” days to explore solutions; a user-trainer club; training modules; support for training certification and accreditation of organizations, to ensure that openBIM is practiced and integrated into learners’ educational pathways.

- *In partnership with EduBIM, the University BIM Network.* bSFrance is partnered with EduBIM, the leading French network dedicated to education and research in BIM and digital modeling. Emerging from the MINnD research project (Modeling of Interoperable Information for Sustainable Infrastructure, launched in 2014), it brings together trainers, researchers, and construction professionals at all levels of education (universities, engineering schools, architecture schools, high schools) and across all subsectors (construction, civil engineering, social sciences). The results of this network’s meetings - which take the form of an annual conference - are published by Eyrolles with each edition.

- 48% of construction industry players say that BIM is a strategic issue for their company.
- 66% of professionals working with BIM are convinced of its benefits and effectiveness.
- 17% have implemented BIM actions in their company.

The most common level of BIM maturity observed among French construction companies is level 2. It is estimated that 35% of real estate companies use BIM and 50-60% of construction companies work with this process.

Awareness/Uptake

In France, the construction industry remains very heterogeneous in terms of integration of digital technology and BIM, due to the fragmentation of the player types, which are mainly SME’s.

Upcoming challenges include, in particular, the dissemination of these “digital data continuity” skills:

- To SMEs and micro-enterprises in the sector, the integration of artificial intelligence and digital twins into training curricula.
- Among public procurement professionals - those responsible for tenders and asset management specialists - so that they request and work with open formats and interoperable processes that ensure, in particular, the long-term viability of digital assets.

According to the latest study published by the government’s plan for the adoption of BIM by 2022:

GERMANY

Education/Training

The number of colleges and universities in Germany offering BIM programs has increased in recent years. This applies to both bachelor's and master's programs in engineering and architecture faculties. In addition, many BIM courses are offered by construction industry associations and chambers. Likewise, there are numerous private initiatives on the market that offer online and classroom training on digitalisation topics in general and BIM in particular.

The Jade University of Applied Sciences in Oldenburg observed the state of BIM education in the years of 2014-2016, a period in which the implementation of BIM started in all of the surveyed federal states, both in university curricula and in further education. Here, differences with other European countries emerged. In England for example, a large number of BIM master's degree programs consider the BIM methodology in the entire life cycle of the building object. Compared to this, in Germany only individual modules on BIM were integrated into the curricula of the universities.

In general, the majority of BIM education and training concepts in Germany focused on the use of specific BIM software. The application of the actual methodology, the changed communication structures within the framework of an OpenBIM concept, was far behind in international comparison.

Initiatives/Organisations

BuildingSMART Germany aims to support and promote the development of BIM education initiatives in Germany. This is to ensure that a consistent BIM education landscape emerges in this country.

bSI Professional Certification Program

With its Professional Certification Program (bSI PCert), buildingSMART International offers a globally valid quality benchmark for evaluating and comparing knowledge and competencies in Building Information Modelling. In Germany, buildingSMART Germany cooperates with the Association of German Engineers (VDI). Together they have developed the guideline VDI/bS-MT 2552 8.1, as the basis for this program. Sheet 8.2, also a joint product of buildingSMART and VDI, has also been published. Within the framework of this

certification program, buildingSMART itself does not offer any training or courses, but rather defines minimum requirements of course content and learning outcomes, regulates the approval of training providers as well as the testing and certification of individuals. For the actual professional training the training provider is responsible.

The bSI PCert has a two-tier structure. The first level of the buildingSMART certification program - the Professional Certification - Foundation - aims to provide a common understanding of BIM fundamentals. It is designed to provide basic knowledge in Building Information Modelling and to test and certify the acquired knowledge by means of a central, internationally coordinated examination. This basic program has been offered to training providers in Germany since May 2018 as the buildingSMART/VDI Certificate BIM Qualifications - Basic Knowledge. Approximately 40 training providers, including universities, private trainers, chambers and companies, have since offered this certification to their training participants in Germany. More than 2500 participants have been certified so far. The second phase, the advanced level called Professional Certification - Practitioner focuses on teaching application-related BIM skills.

In addition to buildingSMART Germany, there are other institutions in Germany that pursue the goal of advancing digitalisation in the construction industry and supporting companies in the construction industry in this process.

Mittelstand 4.0 Centre of excellence Planning and Building

Since 2018, the Mittelstand 4.0-Kompetenzzentrum Planen und Bauen has been working in Germany with the aim of supporting the digitalisation and networking of medium-sized companies in the value chain of project development of planning, construction and operation. This centre of excellence is funded by the German Federal Ministry for Economic Affairs and Energy as part of the funding priority "Mittelstand-Digital - Strategies for the digital transformation of business processes".

The overriding concern of the centre of excellence is to promote the increased use of the BIM method as well as to achieve a successful implementation of digital planning

methods in the construction industry. This means that the BIM debate among builders, project managers, architects, engineers and software developers is to be extended to the phases of project development and operation. In this way, related sectors of the banking, insurance and real estate industries, facility management and the skilled trades are to be made aware of the new possibilities.

Planen-bauen 4.0 GmbH

Planen-bauen 4.0 GmbH has been coordinating and accelerating the digitalisation of the German construction industry since it was founded in 2015. It supports the federal government's BIM pilot projects in the areas of building construction, road, rail and waterways. In addition, the company is involved in numerous national and international projects for the standardisation and implementation of the model-based way of working.

BIM Deutschland

The German federal government wants to accelerate and actively shape the digitalisation of business processes in the construction industry. For this reason, the Federal Ministry of Transport and Digital Infrastructure, together with the Federal Ministry of the Interior, for Construction and Home Affairs, founded BIM Germany in the summer of 2019 as the center for the digitalisation of construction. The most important goal of BIM Germany is to create coordinated and uniform specifications in infrastructure and high-rise construction. All information and tools developed are to be made available openly and free of charge.

Awareness/Uptake

Building Information Modelling as a planning method does exist in Germany. Nevertheless, studies show that many companies do not use this method or use it insufficiently. This entails the risk that they jeopardise their competitiveness because they lose touch with new business areas. The demand from private clients for the use of BIM is still low. Increasingly, however, more and more tenders are calling for digital design and construction.

In Germany, the federal government is now taking on a pioneering role. In the future, BIM will be increasingly used in the awarding of public contracts for federal infrastructure construction and infrastructure-related high rise construction. The biggest challenge here is the lack of rules and standards. That is why, at a hearing in the German Bundestag in

January 2020, representatives of business, science and associations called for reliable framework conditions to be created for planning and construction companies in the digitalisation process.

HONG KONG

Education/Training

The Construction Industry Council (CIC) is dedicated to promoting and facilitating the wider adoption of Construction Digitalisation and related technologies across architecture, engineering, construction and operation, as well as formulating strategies for market transformation and encouraging cross-discipline collaboration within the industry. The CIC maintains its momentum in BIM education, training, certification and accreditation, developing standards and other publications, Research and Development (R&D) and promotion in pursuit of abovementioned objectives, with significant achievements in 2025.

The School of Professional Development in Construction (SPDC) is the professional education arm of the Hong Kong Institute of Construction (HKIC) under the CIC and it is established to provide professional and continuing education pathways for industry practitioners in construction. SPDC has been developing various professional education & development programmes in the areas of Construction Digitalisation, Industrialisation, Innovations and New Technologies. In particular, SPDC has offered a wide range of programmes covering BIM Manager, BIM Coordinator, BIM Modelling and BIM Viewer. These programmes enable the construction practitioners to pursue relevant and recognised qualifications not only satisfying industry's needs but also providing them with continuous learning opportunities and pathways for their career and professional advancement in construction. In addition, in support of CIC's 2026 theme on "Artificial Intelligence" ("AI"), SPDC has been developing new training programmes in AI to equip construction practitioners and professionals with AI application skills. The official website of SPDC: <https://www.hkic.edu.hk/en/about/spdc>

The CIC worked closely with local Higher Education Institutions (HEIs) and conducted yearly BIM Competition to facilitate broader education of BIM in Construction-related disciplines. For the seventh year, the CIC BIM Competition has promoted the practical applications of BIM through a collaborative and competitive learning approach among higher education students. This year's challenge invited higher education students to redesign the Hong Kong Institute of Construction - Tai Po Training Ground into a NextGen

Construction Centre using Building Information Modelling (BIM) technologies. The competition attracted more than 160 students from 11 institutions to participate in, forming teams of 3 to 6 members from at least 2 construction related disciplines.

The Hong Kong Institute of Construction (HKIC), a member organisation of CIC, successfully organised the "STEAM x BIM Construction Model Creative Design Competition 2025". Related workshops, presentation sessions, and award presentation ceremony of the competition were held between October 2025 and February 2026. Senior and junior secondary students were divided into two groups for the Competition. Under the guidance of HKIC's instructors, students participated in workshops to learn Building Information Modelling (BIM) software, integrated with TwinMotion applications, to create a series of imaginative architectural works, which were then produced as 3D-printed models. Another highlight of the event was the opportunity for students and guests to visit the "Immersive Hub" in Centre for Future Construction where they enjoyed 360° immersive videos created by the students. Through the blend of imagery and spatial experience, the students' works extended from 2D designs to fully three-dimensional encounters, perfectly embodying the theme of "Immersion • Construction.". The award-winning student works will be showcased in a roving exhibition in 2026, including the Education Bureau Education Centre and the STEAM UP Learning and Teaching Materials briefing session. The event highlight of the "STEAM x BIM Construction Model Creative Design Competition 2025": https://www.hkic.edu.hk/en/news-and-events/event-highlights/details.2026-02-07_BIM_Competition_2025

The CIC BIM Certification and Accreditation Schemes aim to ascertain the competency of BIM personnel and the quality of local BIM training courses. The Certification Scheme for BIM Personnel aims to set standards and ensure relevant construction professionals and practitioners have appropriate skill levels and competency for the jobs. The Accreditation Scheme for BIM Training Courses aims to ensure the scope, contents and quality of the BIM teaching will meet the industry's needs, uphold the accreditation quality of BIM training and facilitate practitioners to obtain certification of their competence by the CIC. Since the launch of the Schemes, more than 770 CIC-

Certified BIM managers (CCBMs), 990 CIC-Certified BIM coordinators (CCBCs) and 440 CIC-Certified BIM Coordinator (Associate) (CCBC(A)s) have been certified or registered by the CIC. Additionally, more than 20 BIM manager courses and 30 BIM coordinator courses have been accredited by the CIC. Completion of a relevant accredited course is a mandatory requirement for certification as CCBMs, CCBCs or CCBC(A)s.

To equip practitioners with basic BIM viewing skills, the CIC also developed a “Teaching and Learning Kit” for BIM Viewer training available in both self-learning and instructor-led training. A new BIM Viewer platform was introduced in 2023, achieving a total of four different BIM Viewer platforms together with an openBIM (IFC compatible) platform. From its launch in 2021 to the end of 2025, over 43,000 individuals completed the online training package and received the BIM Viewer certificates. BIM Viewer Training Kit download link:

<https://bim.cic.hk/en/resources/publications?cate=52>

In pursuit of the CIC dedication to promoting Construction Digitalisation and facilitating wider technology adoption, a new online BIM Self-learning Kit was released in December 2025. This initiative features a curated series of five video clips designed to provide practitioners with flexible, on-demand training across various BIM software platforms. Since its release, the kit has already achieved over 700 view counts, further supporting the industry's continuous learning opportunities and career advancement pathways. The BIM Self-learning Kit link:

https://www.bim.cic.hk/en/training/page/BIM_Self_learning_Kits

The CIC has also been promoting exchanged in BIM knowledge between Hong Kong and the Mainland through Guangdong-Hong Kong-Macau BIM Competition. There are more than 70 submissions from Hong Kong, which comprised applications from the Student Group and all other groups. BIM experts from Hong Kong, Macau, and Guangdong will collaboratively assess all competition submissions, fostering professional exchange and advancement in BIM knowledge. The award ceremony of the competition will be held in 2026.

The CIC launched the signature Master Class series for industry practitioners since 2022. In 2025, the CIC launched a one-day Master Class series on advanced construction technologies, featuring Systems Thinking and Digital Leadership in May and July respectively, which trained around 60 industry leaders. The programme introduces systems thinking principles, such as interconnectivity, and demonstrates how to leverage digital technologies to drive transformation and address project challenges, while building smart cities through interactive workshops and discussions.

To further enhance the efficiency and quality of the construction industry, the CIC established the Centre for Future Construction (CFC) with its grand opening celebrated at the Kowloon Bay Campus on 29 May 2025, to continue promoting innovative technologies within the industry. More than 8,000 visitors have visited CFC within approximately six months of its grand opening. Spanning over 10,000 sq. ft., the CFC features five innovation Hubs: Digital Twin Hub, 4S Hub, AI Hub, Robotic Hub, and Immersive Cave. These Hubs showcase advanced technologies such as BIM-integrated digital twins, AI-driven safety systems, robotics, and immersive VR/AR training tools. It offers an extensive range of opportunities for professional, students and other visitors to experience the latest technologies in an interactive and engaging way.

Initiatives/Organisations

In 2026, the theme for CIC will be “Artificial Intelligence” (“AI”). The Year of AI will accelerate AI adoption across Hong Kong's construction industry. It aims to build industry-wide AI capability, foster collaboration among government, academia, and technology partners, and deliver practical AI use cases that enhance safety, productivity, quality, and sustainability.

JAPAN

Initiatives/Organisations

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) established the *BIM guidelines for government buildings* in 2014. The focus was on the use of BIM, from the schematic programming phase to post-project maintenance.

As mentioned above, BIM utilisation started in the national government building procurement field, but CIM (Civil Information Modelling and Maintenance) which is BIM of the civil engineering field began in earnest. CIM aims at new construction linked with robot introduction ICT, IoT, AI, and are redefined as *i-Construction* with the goal of increasing the productivity of the construction sector by 20% no later than 2025. *i-Construction* in public procurement up to now was defined by the Cabinet Office as one of the government growth strategies in 2016. In 2018, the Cabinet Office announced that it will aim to realise *Society 5.0* aiming for a data-driven society as a next-generation social vision.

In the roadmap prepared for government growth strategies in 2019, BIM in private construction will be promoted by 2025, and the goal is the same as *i-Construction*, that is, 20% productivity improvement.

To achieve BIM promotion in the private construction sector, the BIM Promotion Roundtable was established under MLIT, Housing Bureau Building Guidance Division in April 2019. At the BIM Promotion Roundtable, 5 WGs on the following themes were set:

- Establishment of standard BIM workflows.
- Development of an object library.
- BIM support for building confirmation.
- Investigation of quantity survey and building classification code for BIM.
- Development of common data environment (CDE).

The BIM Promotion Roundtable revised the standard BIM workflow and released the 2nd edition in 2022. From FY2020 to 2022, the MLIT Housing Bureau Building Guidance Division conducted a demonstration experiment with a total budget of 600 million yen with the purpose of demonstrating and improving the workflow. Based on the results of these efforts, the MLIT took measures to accelerate the social implementation of BIM,

and a subsidy of 8 billion yen was secured to support the use of BIM for SMEs, and a total of 900 million yen was budgeted over three years as a BIM comprehensive promotion project.

As for the MLIT's measures related to the BIM comprehensive promotion project, it has stated that it will begin a trial application of BIM building confirmations by 2025, with full-scale implementation around 2028. The Building BIM Promotion Roundtable has decided to establish a task force-type study system in addition to subcommittee-by-subcommittee studies and has established a Building Confirmation TF, Standardisation TF, and also a Strategy WG as a management organisation.

As technology development for *i-Construction*, research and development investment is being carried out by the Public/Private R&D Investment Strategic Expansion Program (PRISM), a budget of 2.3 billion yen was spent on R&D investment in FY2022. In this R&D, a BIM object library as a providing environment and a draft code of practice for BIM building confirmation was developed.

Starting from FY2025, a new growth strategy will be formulated with the goal of carbon neutrality by 2050, and the BIM promotion budget will be integrated with Green Transportation (GX), which can be considered the Japanese version of the Green Deal. The budget size is about 7 billion yen for FY2025.

PRISM finished at the end of FY2022, and the goal is to develop a common BIM usage environment for building production. The next phase of the R&D program is now under preparation. The name of the program is BRIDGE (programs for Bridging the gap between R&D and the *IDEal* society (*Society 5.0*) and Generating Economic and social value) program, which is the successor to the PRISM program, was originally a five-year plan but ended in FY2024, and no large-scale research and development programs are currently being implemented.

Awareness/Uptake

Most parties including contractors, designers and constructors engaging in private sector buildings and government agencies participate in the BIM promotion roundtable and make very enthusiastic arguments for promoting BIM.

The role of the consortium is growing with respect to PRISM and BRIDGE R&D investment. The BIM Library Consortium was established for the development of the BIM object library before starting PRISM investment, and a research committee was established for the BIM building confirmation for PRISM investment, and the related construction related organisations, private companies involved in design, construction and parts production, and software vendors cooperated with the consortium and committee. They are working to develop a common BIM usage environment.

JORDAN

Education/Training

BIM has not been officially integrated into the core curriculum of higher education institutions, leaving a significant gap in formal academic exposure to this crucial aspect of modern architectural and engineering practice. Despite this, there has been considerable enthusiasm and proactive engagement with BIM tools and methodologies, particularly within architectural colleges and departments. These departments have established robust partnerships with industry giants like Autodesk, providing students with opportunities to acquire certification and hands-on experience with BIM software. This initiative reflects a strong belief among students that proficiency in BIM will enhance their job prospects and enable them to contribute more effectively to the architectural and engineering fields.

However, the discourse around BIM has been predominantly confined to the realm of architecture and design, sidelining other critical disciplines such as civil, mechanical, and electrical engineering. Recognising this imbalance, some progressive institutions, such as Al-Ahliyya Amman University, have begun to broaden the scope of BIM education. They aim to encompass engineering disciplines by focusing on its multifaceted applications, including project management, aligned with ISO 19650 standards.

At the forefront of integrating advanced technological tools into engineering education, the Faculty of Engineering at Al-Ahliyya Amman University has embarked on a significant update to its Civil Engineering Department curriculum. This update introduces undergraduate students to the practical applications of BIM tools, marking a pivotal shift towards more interactive and industry-relevant learning experiences. Within the unit named *Civil Engineering Modeling and Drawings*, the curriculum now incorporates Autodesk Revit for structural design, transitioning to Robot Structural Analysis for comprehensive structural analysis. This educational strategy is designed to bridge the gap between conceptual design and practical analysis, preparing students for the complex demands of the civil engineering field.

Further expanding the curriculum's scope, the unit *Computer Applications in Civil Engineering* has been tailored to leverage the common data environment offered by Autodesk BIM

360. This approach not only facilitates a hands-on learning experience in design and analysis but also promotes collaboration and active feedback, closely mirroring the collaborative workflows prevalent in today's engineering industry. Beyond structural modelling, the focus expands to include infrastructure and civil works design, utilising BIM tools not just as conceptual aids but as integral parts of the design, analysis, and project management processes.

Additionally, the *Construction Project Management* unit has been specifically designed to explore the advantages of 4D BIM in project scheduling and cost estimation. This focus allows students to directly apply their theoretical knowledge to practical, real-world project management scenarios, thereby enhancing their understanding of project lifecycle and delivery principles.

The *Contract, Specifications and Quantities* unit has been enriched with the principles of BIM to offer a forward-thinking perspective on construction management and economics. This strategic integration focuses on the transformative potential of BIM to streamline quantity take-offs and cost estimation processes, providing a more accurate, efficient, and automated approach to managing project finances. By leveraging BIM technologies, students gain insights into how digital models can significantly improve the precision of quantity surveys and cost control, setting a new standard for budgeting in construction projects.

Furthermore, this unit explores the relationship between BIM methodologies and international contract standards, particularly from the perspective of delivering digital models. Students are introduced to the concept of the 'kit-of-parts' approach and its relevance to prefabrication and modular construction, emphasising how these methods can influence contractual arrangements and project delivery. This approach not only aids in understanding the structural aspects of building manufacturing but also in grasping the legal and procedural frameworks governing modern construction projects.

By dissecting the intersections between BIM, contract specifications, and quantity surveying, the course equips students with the skills needed to navigate the complexities of contemporary construction management,

ensuring they are well prepared to contribute to the industry's future with innovative solutions and a deep understanding of digital engineering principles.

In addition to foundational coursework on BIM technologies, the Faculty of Engineering at Al-Ahliyya Amman University has introduced an innovative unit within its civil engineering program titled *Special Topics in Civil Engineering*. This advanced unit is specifically designed to explore the cutting-edge applications of BIM tools in the realms of prefabrication, modularity, and regulatory compliance, emphasising the 'kit-of-parts' approach. This method, which breaks down complex structures into manageable, prefabricated components, represents a significant leap forward in construction efficiency and sustainability. Central to this unit is the application of Autodesk's latest software, Informed Design, which supports the students' understanding of modular construction from both a standards-based and a practical perspective.

By focusing not just on the modelling aspects but also on understanding the regulatory and standardisation processes involved in prefabrication and modular construction, the course aims to provide a comprehensive view of this innovative construction methodology. Moreover, *Special Topics in Civil Engineering* delves into the utilisation of BIM tools for enhancing sustainability in construction projects. It introduces students to the principles of digital engineering, enabling them to apply these concepts towards achieving greater efficiency and sustainability through automation. This part of the unit not only broadens students' understanding of BIM's capabilities but also encourages them to consider the environmental impact of their designs.

For postgraduate studies, particularly within the *Master of Structural Engineering and Project Management* program at Al-Ahliyya Amman University, the integration of BIM marks a pivotal advancement in engineering education. The program introduces specialised units that delve deeply into the theory and practice of BIM, digital engineering, and the intricacies of international construction contracts, offering a comprehensive overview of BIM's application in the modern construction industry. One of the key units, *BIM Theory and Practice* is designed to guide students through the entire lifecycle of BIM operations. This

includes everything from crafting the initial business case to applying BIM in real-life scenarios. It emphasises the importance of understanding ISO 19650 standards for information management and provides practical, hands-on experiences that enable students to adeptly manage projects using BIM technologies. This dual focus ensures that graduates possess a robust understanding of both the theoretical underpinnings and practical applications of BIM, preparing them for leadership roles that require both management and technical expertise.

Another critical unit, *Digital Engineering and Structured Data for Semantic Interoperability* investigates the essential role of structured data in digital transformation within the construction industry. It focuses on achieving semantic interoperability through the Common Data Model (CDM), equipping students with the knowledge to use tools like data flow diagrams, taxonomy, and entity relationship diagrams effectively. Practical applications, such as parametric design with BIM visual programming tools like Revit Dynamo, are included to help students apply structured data concepts in real-world projects, enhancing their capabilities as digital project managers.

Additionally, the *Model International Construction Contracts* unit explores the integration of standard forms of contracts, such as FIDIC, NEC, and JCT, with BIM processes. This unit sheds light on the contractual dimensions of BIM, preparing students to manage the legal and procedural aspects of international construction projects. By examining how BIM methodologies align with contract protocols, the course provides students with a holistic understanding of the intersection between advanced technologies and traditional contract practices, further enriching their skillset for managing complex projects on a global scale.

Al-Ahliyya Amman University has significantly expanded its role in BIM education, strengthening collaborations with industry leaders and professional bodies. This shift underscores the university's commitment to bridging academia and practice, ensuring that BIM is not only viewed as a design and construction tool but also as a critical component of supply chain management and platform-based approaches. Furthermore, Al-Ahliyya Amman University has introduced Autodesk Tandem into its curriculum to enhance digital twin technology, reinforcing the

importance of data-driven decision-making in construction and infrastructure projects. These advancements align with global best practices in modular construction, smart cities, and digital transformation.

In recent developments, the Al-Ahliyya Amman University has signed multiple agreements with industry partners to enhance practical applications of BIM and support standardization efforts aligned with ISO 19650. Through its partnership, the university is actively engaging in training programs, joint research, and knowledge-sharing initiatives aimed at promoting best practices in digital construction. By focusing on these strategic collaborations, Al-Ahliyya Amman University continues to position itself as a regional leader in BIM education, equipping both students and industry professionals with the skills needed for the future of digital construction and smart infrastructure.

Initiatives/Organisations

The Al Ahliyya Amman University - Jordanian Engineers Association (JEA) –, through its Engineers Training Centre (ETC), is undergoing a significant transformation in BIM education. Traditionally focused on BIM as a toolset for design and construction, JEA is now shifting towards BIM as a comprehensive process and professional practice, ensuring that engineers and construction professionals gain a broader, multidisciplinary understanding of its applications. Bringing together architects, civil engineers, mechanical engineers, electrical engineers, and infrastructure specialists to simulate real-world workflows and challenges. Implementing hands-on, practical learning experiences that mirror real-world industry collaboration, ensuring engineers are job-ready with the latest BIM methodologies. Through the ETC, JEA is not only equipping professionals with technical BIM skills but also fostering a new generation of engineers who understand BIM's role in supply chain management, modular construction, and digital twin applications. This strategic shift reinforces Jordan's position as a regional leader in digital construction and smart infrastructure, ensuring that BIM education aligns with global standards and industry demands.

In parallel and aligned with the role of the JEA, a recent initiative has been introduced to develop a specialized program in Building Information Modelling (BIM) for infrastructure and smart cities. This initiative expands beyond the traditional focus on building-scale projects, placing greater emphasis on land

development, large-scale infrastructure, and smart city applications. This development reflects the growing demand across the MENA region to address infrastructure-focused projects, where the complexity of assets, networks, and systems necessitates more advanced digital approaches. The program aims to strengthen capabilities in design, modelling, asset management, and clash detection within infrastructure environments, while promoting the implementation of the Common Data Environment (CDE). These practices are aligned with international standards, particularly ISO 19650, ensuring a structured and collaborative approach to information management throughout the project lifecycle.

NETHERLANDS

Education/Training

BIM is taught in all three technical universities of the Netherlands at both bachelor and master levels. All 14 universities of applied science with a built environment department are organised in the BIM Education Network by the national Building Digitisation Council (BDR). The network aims to exchange and develop educational approaches, experiences, and teaching materials. In practice, the member universities tend to stick to their own approach.

The Netherlands has over 40 institutions for intermediate vocational education (ROC's). BIM adoption by these institutions is also rising.

There are many commercial post-educational training providers, often connected to software companies. Their training is often considered to be more up to date than the courses taught in formal education.

In general, it is noticed that there is an abundance of education and training at the level of mastering specific (software) tools. There are considerably less courses focussing on roles, such as modeller, work planner or BIM coordinator and there is a fundamental lack of approaches that place the building process at the core, and how digitisation changes that process.

Initiatives/Organisations

The BDR is the successor of the former Building Information Council (BIR) and aims to develop strategic policies for BIM in the construction and civil works industry.

In 2019, the *DigiDealGO* was launched as an initiative to speed up the digitisation of the built environment. One of its main objectives is to foster the development of a digital framework for the built environment (DSGO).

The BDR's BIM Education Network was created in 2013 to raise BIM awareness among lecturers. In 2017 the network presented its first version of the minimum BIM level for BIM knowledge graduates of all 14 universities of applied science. The BIM Education Network organised its first annual BIM education conference in 2017. This

conference was successfully repeated in 2018 and 2019.

Awareness/Uptake

There is strong growth in the diversity of educational offerings. In particular, the essential ‘soft skills’ and organisational change are increasingly being discussed. There is also a strong undercurrent in the development of BIM-based quality assurance.

The development of knowledge leaflets by the BIR has helped create greater awareness in the industry about opportunities and possibilities created by using BIM. At this moment 5 knowledge leaflets have been developed and translated into English.

NEW ZEALAND

Education/Training

BIM education activity in New Zealand continues to expand across both tertiary institutions and industry-aligned training programmes.

buildingSMART Australasia has introduced the PCert course, a new international standard for BIM training. While NZ institutions currently do not offer this training, Australian universities and training providers provide these certified courses with international accreditation from buildingSMART.

Tertiary delivery remains strong, and has embraced BIM and incorporating BIM-specific content into their curriculum with BIM now integrated into coursework at University of Auckland, Victoria University of Wellington, Otago Polytechnic, Ara Institute of Canterbury, Auckland University of Technology, Massey University, Toi Ohomai, Unitec, and Wellington Institute of Technology. Programmes typically include BIM-specific courses, model-based assessment, and applied learning using current industry software.

The National BIM Education Working Group (NBEWG) continues to coordinate BIM curriculum consistency across the tertiary sector. Member institutions apply the New Zealand BIM Handbook (v4.1), updated in 2023, which aligns with ISO 19650 processes and terminology.

Local Revit User Groups in Auckland, Wellington, and Canterbury continue to host industry events and practical learning sessions. The national group BIMinNZ organises industry and learning seminars predominantly in Auckland, with recent events focusing on IFC and ISO 19650 discussions.

Professional training demand continues to grow, with New Zealand practitioners increasingly undertaking buildingSMART International pCERT & Operam Academy ISO 19650 training and pursuing the certification via Australian providers.

Initiatives/Organisations

Industry collaboration remains a core strength. In early 2023, MasterBIM (Masterspec) introduced the Properties Selector tool, now available for free as open-source software in

New Zealand and it continues to mature. This tool aligns with Waka Kotahi (NZ Roads) and the NZ Waters standards, allowing users to select and save property characteristics as custom schemas. It provides access to national and international metadata schemas (CBI, NZ Asset Metadata, IFC, COBie) and supports consistent information management practices across education and industry. For more information, visit: <https://bim.masterspec.co.nz/>.

The New Zealand BIM Handbook version 4.1, was released in November 2023, incorporating industry feedback to serve as a valuable resource for BIM practitioners in New Zealand. This edition emphasises alignment with ISO 19650 terminology and processes to enhance information delivery efficiency.

The New Zealand Construction Industry Council *NZCIC Guidelines* have been digitised and made available to the New Zealand construction sector since November 2023. The updated content integrates BIM processes into the wider commercial project roles and tasks, facilitating seamless project execution from initiation to handover.

BIMinNZ, operating through five regional chapters but that may merge into a new national entity later in 2026, supports practical training alignment and industry readiness. Joint academic–industry working groups continue to develop training materials and guidance to promote national consistency in BIM competency development.

Awareness/Uptake

Despite steady progress, capability gaps remain. Reported constraints related to curriculum depth, staff upskilling, and alignment of learning outcomes with industry expectations - particularly regarding higher-order BIM competencies required by the New Zealand BIM Handbook.

NORWAY

Education/Training

The high implementation of digital solutions in the AEC/FM industry is well represented in education. The use of digital solutions, including BIM-based tools, is implemented in the curriculum for architecture and engineering students at the university level in Norway. This covers dedicated courses at the bachelor, master, and PhD levels. We also observed increased use of digital tools in the “traditional” education at architectural and engineering universities.

The Norwegian University of Science and Technology (NTNU) educates around 100 bachelor's and 250 master's students in buildings, construction, civil engineering, and infrastructure engineering each year and offers BIM education at bachelor's, master's, and PhD levels. At NTNU, BIM education includes the use of software like Revit, ArchiCAD, Novapoint, Solibri, and others in engineering course. However, no other universities have integrated pervasive and holistic progress in using digital tools and processes in their study program like NTNU, which offers a 2-year master's specialisation in digital design and construction processes. A new master's program from August 2025 includes a “Digitalisation sting” – one course each semester with a strong focus on the utilisation of BIM, digitisation, and AI in general.

Students also generally have good access to software. Most universities have good facilities for working with digital tools and processes, BIM labs with large active screens for teamwork, VR glasses, and other equipment. Students also take the initiative for increased digitalisation of their education. At NTNU, students in collaboration with buildingSMART Norway, established a student community for digital-related activities like courses in software, industry presentations, and lending out digital equipment like VR glasses, drones, screens, 3-D cameras, and more for free for students and researchers.

Norwegian software developers play an active role in offering free software, courses, project examples from the industry, and feedback for further development. Another trend is the increased use of tools for visual programming like Dynamo and Grasshopper, in addition to Python for Machine Learning, for exploring content in BIM models. So far, this has only

been used in a limited number of student projects. Still, this opportunity indicates a trend where students with construction backgrounds explore software solutions in a way that traditionally has been dominated by informatics students.

The increased priority of sustainability enforces the use of more data and can be seen as a driver for developing and using more integrated processes. The Virtual Design and Construction (VDC) framework is used actively at two universities (NTNU and Oslo Met) to utilise digital tools to support improved processes.

The next challenge is the increased integration of BIM-based processes in existing (traditional) courses in an integrated way. Dedicated tools for a defined task, like authoring tools for design, calculation for structural analysis, and the simulation of energy are used in many traditional courses. A newly developed textbook called *BIM! Program and Process* has been developed by professors at NTNU and OsloMet. It has been developed to increase the awareness of change in the way of working and collaboration, supported by digital solutions.

BIM-related standards are to an increasing degree included in the curriculum. In this respect, the ISO 19650 series of standards has an integrating role to include other standards, requirements and processes. Increased priority of sustainability has been supported by new standards within product data templates (PDT) and environmental product declarations (EPD). This type of integrated solution is mostly at the Master and PhD levels. The number of PhD students within the digitalisation of the AEC industry has increased significantly in the last few years. For these students are the combination of digitalisation and sustainability a clear profile in most studies.

Oslo Technical Vocational College (Fagskolen Oslo) has offered a one-year, full-time BIM education in a multidisciplinary environment since 2008. The BIM education, which is mainly full-time, is for people with a certificate in construction, but is also open to engineers and architects who want to be good at BIM.

The curriculum focuses on both practical implementation of BIM software and digital enhanced collaborative processes. Through close cooperation and integration with the AEC

industry, students get hands-on experience with ongoing real-life projects.

The BIM education is interdisciplinary, with students from the subjects of technical installation, building construction and from outdoor. VDC methodology with ICE sessions is trained in dedicated ICE rooms. Fagskolen Oslo integrates therefore training in specialized BIM disciplines like MEP, structural, architectural and infrastructural categories.

Fagskolen Oslo is educating approximately 50 BIM students each year. BIM-technicians are sought after and receive jobs with entrepreneurs in the AEC industry, consultants, architects, software companies and more.

There are BIM technician education programs at around 7 technical vocational colleges in Norway.

Initiatives/Organisations

The buildingSMART Professional Certification program has been available since 2023 in Norway. The program is an international education benchmark with focus on openBIM format and is based on ISO 19650. The goal is for Professional Certification to become a requirement in the building and construction industry for BIM projects.

buildingSMART Norway has 140 plus member organisations, representing 25% of the total AEC industry turn-over. 10% members in buildingSMART Norway members are from the educational sector. buildingSMART Norway coordinates several industry initiatives and BIM User Groups for all disciplines, in a series of arenas. buildingSMART Norway's network activities has strongly increased during 2020. Together with several Norwegian organisations and members, buildingSMART Norway is involved in the development and revision of National and International standards for digitalisation of business processes. In order to achieve a better understanding of BIM, open standards and digitisation processes and to promote best practices from the industry, buildingSMART Norway has started a webinar series in collaboration with our members organisations.

Awareness/Uptake

The Government and its legislative body the Norwegian Building Authority are fully aware of the need for digitalisation in the building and construction industry. The Building Authority

runs and supports several initiatives in collaboration with industry.

Several projects that show a good use of openBIM are on-going in Norway. In 2020 three Norwegian's were nominated as finalists at the buildingSMART Awards Program with two of the three Norwegian finalist winning a prize under the categories Client Leadership and Technology Leadership.

Finally, the focus on the use of open BIM and data interoperability is moving from the project phase to include also the operational and maintenance phase of a building, with asset and facility management integration. Extensive work is also going on for potentiating an open data flow for construction product information.

The challenge within education is to increase interaction and collaboration between professional topics. The Norwegian University of Science and Technology (NTNU) can serve as an example of how digitalisation fosters collaboration across multiple faculties and departments. Practical examples of hardware include handheld scanners, VR, and MR glasses, and 3-D printers. NTNU has also developed its own LLM for safe use of their own data. NTNU offers BIM courses at the bachelor's, master's, and PhD levels. BIM is also included in our industry courses (200 persons) in Virtual Design and Construction. However, the demand for BIM competence exceeds what universities can offer.

PERU

Education/Training

BIM capability in Peru continues to develop, but training remains one of the key constraints to broader adoption. The BIM 2024 National Survey indicates that while a significant proportion of professionals are active BIM users, there is still a noticeable gap in formal education and structured training pathways.

Universities and academic institutions are increasingly incorporating BIM into architecture and engineering programs, contributing to foundational knowledge among new graduates. However, the depth and consistency of this training vary across institutions, and industry feedback suggests that graduates often require further practical development when entering the workforce.

For professionals already in practice, upskilling is largely driven by workplace demand rather than formalised national training frameworks. Many users acquire BIM skills through on-the-job experience, internal company training, or self-learning. This has resulted in uneven skill levels across the industry.

A key issue identified is the shortage of trained BIM specialists. This includes not only modellers but also higher-level roles such as coordinators and managers. The lack of adequately trained professionals is consistently cited as a major barrier to adoption, particularly for smaller organisations.

Cost is another limiting factor. Training programs and software licensing are often perceived as expensive, which restricts access - especially for SMEs. As a result, investment in training is not yet widespread across the sector.

Overall, while awareness of BIM is growing, the development of structured, scalable education and training systems remains an important priority for advancing BIM maturity in Peru.

Initiatives/Organisations

BIM development in Peru is strongly supported by a combination of government-led initiatives and industry collaboration. The national BIM adoption strategy aligns with broader efforts across Latin America to modernise the construction sector through digital transformation.

Public sector leadership plays a critical role. Government initiatives promote the use of BIM in public projects and provide a framework for implementation, helping to drive consistency and long-term adoption. These policies are

supported by collaboration with academic institutions and professional organisations.

Universidad Peruana de Ciencias Aplicadas (UPC), in collaboration with the University of Chile, has been instrumental in producing the BIM 2024 National Survey. This ongoing effort provides a structured evidence base for understanding BIM adoption trends and informing policy and industry decisions.

Industry organisations and professional bodies also contribute to BIM development by promoting best practices, supporting knowledge sharing, and encouraging collaboration across disciplines. These groups help bridge the gap between policy and implementation, particularly in areas such as standardisation and professional development.

Despite these efforts, challenges remain in coordination and standardisation. While initiatives exist, a more unified national approach - particularly in terms of standards, guidelines, and consistent implementation frameworks - would further strengthen BIM adoption.

Overall, Peru demonstrates a collaborative ecosystem, but continued alignment between government, academia, and industry will be critical to sustaining progress.

Awareness/Uptake

BIM adoption in Peru is progressing steadily, with the BIM 2024 National Survey indicating that approximately 71% of respondents are BIM users. Regular users represent a significant portion of this group and apply BIM across a majority of their projects.

Adoption is more advanced in engineering disciplines than in architecture, and is generally higher in medium to large organisations. Smaller firms, while increasingly aware of BIM, face greater barriers to implementation, particularly related to cost and access to skilled personnel.

BIM is most commonly used during the design phase, including visualisation, coordination, and documentation. More advanced applications - such as facility management and post-construction uses - are less common, indicating that BIM maturity is still developing.

The perceived benefits of BIM are clear. Users report improvements in coordination, reductions in errors, and better cost control. These benefits are strongest among regular users, suggesting that value increases with experience and integration into workflows.

However, several barriers continue to affect uptake. The most significant include:

- High software and implementation costs.

- Lack of trained professionals.
- Limited standardisation across the industry.

Among non-users, awareness of BIM concepts exists but is often limited to a general understanding. Many non-users cite cost, lack of training, and insufficient demand as reasons for not adopting BIM.

Looking ahead, projections are positive. Most current users expect to increase their use of BIM over the next 18 months, and there is growing interest among non-users in learning BIM. This indicates strong potential for continued growth in adoption.

In summary, BIM in Peru is transitioning from early adoption to broader industry uptake. While momentum is evident, further progress will depend on addressing training gaps, reducing barriers to entry, and strengthening alignment across the sector.

SINGAPORE

Education/Training

In line with the refreshed Built Environment (BE) Industry Transformation Map (ITM), Singapore's BIM education continues to evolve from software-centric modelling training towards a broader emphasis on Integrated Digital Delivery (IDD), interoperability, regulatory readiness, and digital workflow capability across the built environment value chain.

BIM, VDC (Virtual Design & Construction), IDD and related digital delivery concepts continue to be embedded across Singapore's built environment education ecosystem, including the Institutes of Higher Learning (IHLs), BCA Academy, and industry-facing continuing education and training pathways. At the pre-employment level, ITE, the polytechnics and the universities have incorporated BIM and digital delivery content into built environment programmes, with increasing attention to cross-disciplinary coordination, sustainability, DfMA, facilities management, and data-enabled workflows.

As the education and training arm of the Building and Construction Authority (BCA), BCA Academy (BCAA) continues to play a key role in developing digital delivery competencies across the sector. In addition to academic programmes, career conversion pathways and continuing education and training (CET), BCAA supports the upskilling of industry practitioners through short courses, workshops and sector-focused learning initiatives related to BIM, IDD and digital project delivery.

Singapore's workforce development approach is increasingly anchored to the Skills Framework for the Built Environment, which defines job roles, career pathways, and the skills maps relevant to the sector, including the Digital Delivery Management track. This provides a clearer linkage between education, workplace capability development, and professional progression.

Professional competency recognition has also become a more visible part of the BIM education landscape. The Digital Delivery Management (DDM) Accreditation Scheme, administered by buildingSMART Singapore, is aligned to the Skills Framework for the Built Environment and provides a structured pathway for recognising skills and experience across different digital delivery roles. The

scheme uses tier-specific logbooks mapped directly to the key tasks in the Skills Framework, with applicants required to demonstrate evidence of having performed at least 75% of the relevant tasks, verified by supervisors. As at November 2025, the scheme had accredited 200 professionals, comprising 23 Tier 1, 77 Tier 2, 51 Tier 3, and 49 Tier 4 accredited personnel.

The DDM scheme also reflects the increasing need to align education and assessment with emerging national and international requirements. For example, the Tier 4 assessment now incorporates an IFC+SG export competency, requiring applicants to create a model based on a test brief and export it in a standards-compliant IFC format. This supports workforce readiness for CORENET X, openBIM workflows, and standards-based digital submissions.

Initiatives/Organisations

Singapore's BIM education landscape is strongly influenced by national digital transformation initiatives in the built environment sector. In particular, CORENET X is driving a shift towards upstream multidisciplinary coordination, structured data exchange, and greater familiarity with open standards and digital regulatory workflows. This is pushing both education providers and industry training bodies to move beyond BIM authoring skills alone and to strengthen capabilities in collaboration, information management, and digital submission readiness.

BCA Academy continues to support this transition through sector-wide training and outreach, particularly for consultants and practitioners involved in the new regulatory process. At the same time, buildingSMART Singapore's DDM Accreditation Scheme provides an industry-facing competency benchmark that complements formal education and training by recognising applied capability in live project environments.

The DDM scheme has also seen stronger market recognition in recent years. It is recognised in selected public-sector tender requirements, which has contributed to meaningful uptake particularly at Tier 2. However, Singapore continues to face a structural challenge common to many markets: technical modelling competencies are essential, but are not yet consistently valued

by employers, HR frameworks or procurement criteria at the same level as management-track roles. This affects demand for technical-track accreditation, even though such capabilities are increasingly important for digital delivery and regulatory compliance.

To strengthen the pipeline and long-term impact of BIM education, buildingSMART Singapore is working with IHLs and industry stakeholders to sustain entry pathways into digital delivery roles, while also stepping up engagement with employers, project stakeholders and HR teams to build stronger recognition of digital delivery competencies. Current priorities include the establishment of a Community of Practice for DDM-accredited personnel, stronger industry profiling of accredited professionals and firms, and exploration of cross-certification opportunities with recognised bodies and skills platforms in the region.

Awareness/Uptake

Overall, BIM education in Singapore is no longer focused solely on model authoring. It is increasingly oriented towards career pathways, evidence-based competency development, collaborative digital delivery, open standards, and regulatory transformation, supporting a more integrated and future-ready built environment workforce.

SOUTH AFRICA

Education/Training

The University of Johannesburg, through the Centre of Applied Research and Innovation in the Built Environment (CARINBE) has introduced the first ever digital infrastructure delivery in the continent. The Master of Philosophy (MPhil) in Digital Built Environment, is being offered by the University to accelerate and raise the BIM tide in South Africa and beyond. The program is accredited the national body SAQA and carries 120 credits. This program is suitable for professionals who hold a degree at NQF level 7 in any engineering or computer science program and would like to become experts in digital infrastructure delivery.

In addition, the University of Johannesburg offers continuing education programs, such as *Building Information Modelling* and *Digital Infrastructure Delivery*. The goal is to raise the digital infrastructure delivery awareness in the built environment. The program covers, building information modelling, digital design and management, digital asset management, building performance analytics, sustainable design and reality capture as well as principles of digital infrastructure delivery. In addition, hands on training on authoring tools is offered within the program.

At Nelson Mandela University, architecture and built environment programs have been integrating BIM in various ways. For example, at the third-year level, BIM principles are incorporated within the *Architectural Computer Usage* module. The focus is on software tools and basic theoretical understanding of BIM at third year level and at honours level a collaborative project involving Honours Architecture, Construction Management and Quantity Surveying students has been introduced. Partnerships with architectural firms have led to presentations on BIM and real-world insights for the students. In 2023 a standalone BIM training course for both Construction Management and Quantity Surveying students was introduced as a pilot, which was very successful. Exploration into the introduction of short learning programs and qualifications aimed at BIM Management, BIM Coordination and BIM Modelling is currently underway.

Initiatives/Organisations

The CARINBE, set up within the University of Johannesburg, South Africa, is an established research centre to provide credible information

to the built environment supported by robust scientific research. Comprehensive and industry-applied research in digitalisation, sustainability, and safety is the main focus. The Centre has partnered with the BIM Community to drive digital infrastructure delivery in South Africa. In 2022/2023, the centre conducted a comprehensive digital transition survey using BIM as a proxy, across the country. The survey explored the current state of BIM implementation in South Africa and associated challenges. The survey findings were used to develop a position paper on digitally transitioning the South African built environment.

The Centre recently launched its Virtual Reality lab in partnership with Cype to drive extended reality applications and integration in BIM, and train students and professionals on industry use cases. To provide a socially sustainable digital transition in the built environment, the Centre, in partnership with the South African Local Government Authority, is piloting digital applications to provide security to infrastructure assets in municipalities, with the core focus of the program being training programs on the usage of digital technologies to secure government assets. The project covers waste management, power distribution, and water infrastructure, among others. Technologies such as drones, sensors and IOTs are being deployed on the project.

overcome the challenges of adoption and implementation.

Awareness/Uptake

The South African-wide BIM survey revealed increased awareness, with responses spread across its nine provinces. About 65% of the respondents indicated a level of awareness ranging from average to very high. However, 53% indicated they had not participated in at least one project where BIM was adopted. The results are not surprising, as shown in follow-up questions, which revealed that 37% had no BIM training, including seminars, workshops and webinars. In comparison, 52% of the respondents also indicated they self-funded BIM training acquired with no support/incentives from the government or employers. Regarding BIM implementation stages within organisations, 44% of the respondents revealed they were at the non-usage stage.

Findings also revealed low use of collaboration platforms, issues on BIM standards acceptable to all stakeholders, and data exchange still primarily through PDFs with minimal use of Authoring & Analysis tools and CDE. Governments and industry stakeholders are currently being engaged on a roadmap to

SWEDEN

Education/Training

In 2023, changes within the education system and industry took place that may have impacted different education programs and levels. For example, the Swedish government changed the main subjects and learning objectives for upper secondary education. Before the changes, upper secondary schools offered CAD-related practical learning goals in their curriculum. However, no comprehensive mapping of BIM or CAD-related education within the built environment has been carried out since 2021. It will be necessary to initiate a more detailed study to map out the changes.

From previous mapping (2021) we learnt that universities in Sweden offered:

- 8 Master programs (300 HP) with BIM education.
- 21 Bachelor programs (180 HP) with BIM education.
- 11 2-year university programs (120 HP) with BIM education.

Two new Masters programs (300 HP) were developed at Jönköpings tekniska högskola and Linnéuniversitetet and started in autumn 2025.

Swedish higher vocational education schools (Yrkeshögskolor) offer 26 programs within the built environment. Most programs have courses focused on BIM applications and digital technology. The number of programs offered changes on a yearly basis due to industry demand.

A new mapping of BIM courses at Swedish universities and higher vocational education needs to be conducted for tracking changes compared to the last report. For example, AI and programming courses have been introduced in several programs and existing BIM courses are constantly being developed and updated.

Initiatives/Organisations

The BIM Alliance Sweden is a sector-driven non-profit organisation that works for development within the built environment with the help of BIM. The BIM Academy is a working group within the BIM Alliance that brings colleges, universities, and training companies together on BIM related education and progress.

In 2023, the BIM Alliance established new working groups and initiatives were taken to coordinate workshops between the separate groups. The format will mostly be as digital breakfast meetings or workshops. Meetings and topics for the BIM Academy 2023 and 2024 were common national guidelines within BIM (Nationella Riktlinjer), AI, and practical examples of BIM uses within education. The active members are Linköping University, Luleå University of Technology, Chalmers University of Technology, Royal Institute of Technology, Technical University of Jönköping, Dalarna University, Nackademin, City of Gothenburg YRGO, Yrkesakademien and STI.

InRoad, a collaboration between Aalborg University, Jönköping University, NTNU and the University of Oulu, and funded by EU Erasmus and the program for strategic partnerships for higher education has ended. The outcome of the project shows satisfactory results in choosing intensive workshops as a delivery method for teaching road design software. It enables the students to gain knowledge in the respective engineering topics, advanced digital tools, and concurrent engineering, all in the same workshop. According to Erasmus, “the project idea is very innovative and very relevant - based on a detailed needs analysis”. For more information, see: <https://www.en.build.aau.dk/web/inroad>.

Awareness/Uptake

One thing that may have a great impact on the development of BIM use in Sweden is the Swedish government commissioned Boverket (Swedish National Board of Housing, Building and Planning) to promote the digitisation of construction processes by developing support for public actors regarding BIM. Four proposals were made in the report from Boverket:

- That Boverket will be commissioned to produce proposed legislation on the regulation of BIM in collaboration with the Swedish Public Procurement Authority. These legislative proposals should be formulated in a way that enables a progressive introduction of the application.
- That the Swedish Public Procurement Authority, or another authority that the government deems appropriate, be given a coordinating assignment to develop basic requirements for deliveries, based on ISO 19650, for use in public procurement for new construction or renovation of buildings.

- That Sweden should work to ensure that the European Commission mandates the European Committee for Standardization (CEN) to develop and manage a common classification system for the built environment.
- That the Board will be responsible for the task of investigating the set of requirements for the processing of building permits. Such an assignment should be organised with a possible coordination responsibility regarding requirements for IFC.

SWITZERLAND

Education/Training

The BIM training landscape in Switzerland is multi-faceted, covering all levels of qualification from the fundamentals to specialist CPD.

Technical universities such as the Swiss Federal Institutes of Technology in Zurich (ETH) and Lausanne (EPFL) offer structured programmes (CAS, DAS, MAS - Certificate/Diploma/Master of Advanced Studies) that teach both technical and management-oriented skills.

These are supplemented by the universities of applied sciences, which provide practical bachelor's and master's degree courses along with specialized CAS programmes, e.g. VDC (virtual design and construction), IPD (integrated project delivery), facility management, digital construction and digital timberwork methods. BIM topics are featuring ever more prominently in basic training and increasingly entering the standard curricula. Students thus receive a thorough grounding in the traditional training content in conjunction with additional digital components. Digital construction can generally be seen as a common focus of CPD in Switzerland.

Training centres run by professional and trade associations, private schools and companies offer practice-oriented courses and certificates that are geared, in particular, to non-academics and career changers. Here, the buildingSMART certification programme is a recognized standard for openBIM skills. However, the demand for this has declined in recent quarters given the need to acquire the Foundation certificate only once and the resulting market saturation.

Initiatives/Organisations

Initiatives such as buildingSMART Switzerland and "Bauen digital Schweiz" (Swiss Digital Construction) at the private level and the KBOB (Coordination of the Federal Construction and Properties Services) at the public level are key drivers for the popularization and standardization of BIM in Switzerland. buildingSMART Switzerland is particularly committed to open standards (openBIM) and, through the buildingSMART Professional Certification Program, provides an internationally comparable specialist qualification.

This certification scheme has now achieved a strong market penetration; the future challenge lies in continuously adapting the content to technological and regulatory developments so as to safeguard its relevance.

As an umbrella organization for the biggest public-sector clients, the KBOB provides practice-oriented tools, guidelines and recommendations that address the various requirements and roles in the construction process. It thus makes a decisive contribution to durably enshrining BIM standards in public-sector projects while fostering an understanding of digital working methods in administrations.

Privately organized major events, e.g. the *Conférence BIM Lausanne* and *BIM Day Geneva*, additionally encourage CPD initiatives and networking within the specialist community. These conferences offer a platform for the exchange of best practices, discussion of current challenges and presentation of the latest trends. The widespread use of support documents and active participation in such events are promoting a more professional approach and an innovative mindset among all players along the value chain.

Awareness/Uptake

While the awareness and actual use of BIM in Switzerland's construction and real estate industry have noticeably increased in recent years, the overall picture remains somewhat patchy.

The application of BIM is now firmly established for major infrastructure projects, e.g. by SBB (Swiss Federal Railways) and FEDRO (Swiss Federal Roads Office), on the back of clear-cut client specifications and the growing pressure to boost efficiency and sustainability.

Penetration across the broader market, however, remains moderate: while digital skills and BIM methodology are considered standard among leading companies and public-sector clients, acceptance among SMEs (small and medium-sized enterprises) and tradespersons offers scope for improvement.

This is due to a variety of factors: alongside the barriers posed by investment and qualification, a certain scepticism vis-à-vis new working methods also prevails. At the same time, there is a growing awareness of the benefits of digital methods, e.g. regarding error avoidance, cost control, sustainability and attractiveness for qualified staff.

The aforementioned conferences - the *Conférence BIM Lausanne* and *BIM Day Geneva* - primarily in French-speaking Switzerland have established themselves as key platforms for knowledge transfer and best practice sharing, and are helping to further increase acceptance.

Yet, the latest analyses reveal that, although Switzerland has caught up on an international level, it must still be regarded as a "late adopter" without, as yet, any across-the-board market penetration for BIM.

The demand for specific CPD and certification programmes remains high. Here, the momentum is being accelerated by regulatory developments, technological innovation (e.g. AI, digital twins) and tighter requirements regarding sustainability and the circular economy.

TAIWAN

Education/Training

Architecture, Civil Engineering, and Construction-related university or college departments used to teach CAD and visualization/animation tools, e.g., AutoCAD, SketchUp, 3D Studio Max, and Blender, as part of their required curriculum.

Since around 2010, BIM-related courses have been increasingly introduced into these departments. Taking the Civil Engineering Department at the National Taiwan University as an example, it begins by offering an elective course, Technology and Application of BIM (3 credits), and subsequently offers more advanced BIM-related courses in its curriculum. To facilitate access to BIM education for college students and professional engineers, the department also provides online courses, such as BIM Fundamentals for Engineers and BIM Applications for Engineers, on Coursera, a popular global massive open online courses (MOOCs) platform, and NTU's OpenCourseWare (OCW).

These courses, including both physical and online ones, were originally taught in Chinese, but, in recent years, English-taught ones have been offered and the online ones have attracted more than 167,000 enrolments. Besides, the BIM Summer Program has been offered at NTU since 2014 for students from abroad. The program aims to help students understand the fundamental concepts of BIM and acquire essential skills to use BIM tools such as Autodesk Revit for BIM-enabled digital and green transformation.

The WorkSkills Competition (established by WorldSkills International in 1950, in Spain) adopted BIM as one of its new competition subjects in 2020, and the first competition was eventually held in 2022 due to the COVID-19 pandemic. Taiwan has been actively participating in international skills competitions. Preparations for BIM-related competitions began in 2021, with the first national team selection and training process taking place that year.

For the BIM subject, the contestants must be under 25 years old, and the content of the competition is to reflect the WorldSkills Occupational Standards (WSOS), which includes work organization and management, software and hardware, interpretation of the client brief, modeling, coordination of models, corrective modeling, data extraction, and visualization. In the 2022 WorldSkills

Competition in Lyon, France, Taiwan won a silver medal in Skill #58, "Digital Construction-BI." In the 2024 competition, Taiwan received an Outstanding Achievement Award.

In addition to educational programs offered by universities and colleges, architecture-related programs in several occupational senior high schools have introduced BIM into their curricula. Several senior high schools have offered elective BIM courses to their students, each worth 2 to 3 credits. Furthermore, several research institutes in Taiwan have offered a variety of education and training courses. For example, the Taiwan Architecture and Building Center (TABC) has been offering a series of courses on the Application of BIM in architectural design, MEP practice, interior design, facility component modeling, quantity takeoff, design integration, construction supervision, etc., plus the integrated application of BIM and GIS.

The Architecture and Building Research Institute (ABRI) of the Ministry of the Interior, recognizing the gap between BIM education and industry practice, has been actively promoting cross-agency talent bridging initiatives since August 2024. These efforts include developing a "Digital Construction BIM Manual" and creating supporting video-based learning materials. Starting from technical and vocational schools, ABRI has launched seed instructor training programs, provided teaching materials, and implemented campus pilot teaching and dissemination plans. Since late 2025, it has also sought to align these efforts with the Ministry of Labor's vocational training system to advance digital construction-related occupations.

As a next step, ABRI hopes to collaborate with universities to broaden the talent pipeline in AI-integrated BIM, either through expanded admissions mechanisms or dedicated academic programs. The goal is to attract both industry professionals and university talent, and to cultivate a workforce capable not only of practical design and BIM operations but also of extending the value and effectiveness of AI applications. In doing so, ABRI aims to help build the talent base that Taiwan's construction industry will need over the next few decades.

The British Standards Institution Taiwan (BSI Taiwan) and the Taiwan Construction Research Institute (TCRI) have collaborated to deliver a 3-day BIM training course on ISO

19650: Project Management and Information Exchange. Also, BSI Taiwan offers a 6-day BIM training course on ISO 19650: Project/Asset Information Management. From 2018 to 2024, around 750 students have completed the two courses.

Initiatives/Organisations

In 2009, the BIM Research Center at the National Taiwan University (NTU BIM Center) was established to provide a platform for industry-academia-government collaboration on BIM adoption and applications in Taiwan. This marked the beginning of academia's active involvement in supporting the industry and government in BIM adoption. Since then, some universities and companies in Taiwan have begun establishing their own BIM centers.

In 2011, the Chinese Institute of Civil and Hydraulic Engineering launched the biennial Taiwan BIM Awards competition for construction projects, and the first awards were presented to 5 BIM application projects. It was clear that the scope of BIM applications has been expanded from mainly the design and construction phases in the early days to the whole life cycle, including building permit application review and facility management.

In 2015, the Taiwan BIM Alliance was established by the NTU BIM Center with support from Taiwan's Ministry of Science and Technology to use BIM as a driver to upgrade Taiwan's construction industry. The Alliance accepts only group members and currently has 50 industrial, 6 governmental, and 21 academic members.

The Taiwan BIM Task Group was formed in 2018. Its initiated members are BSI Taiwan, NTU BIM Center, Taiwan BIM Alliance, TCRI, Taiwan Architecture & Building Center (TABC), and Taiwan Institute of Built Environment Lifecycle Management. The goal of the task group is to help Taiwan's construction industry adopt BIM as a stepping stone toward digital transformation and ultimately achieve sustainable, smart living.

Awareness/Uptake

In 2014, Taiwan's central government began promoting BIM Applications. After a few years of test runs on BIM applications in some public construction projects, almost all major national projects now require BIM applications. Several local governments, especially New Taipei City,

Taoyuan City, and Taipei City, require BIM applications for their public construction projects, helping to push the industry toward BIM readiness.

One government effort to mention is the New Taipei City government's implementation of a BIM-based building permit application review platform that requires the submission of BIM models for automated review of design regulations for building permit applications.

Also, design-build projects are mostly encouraged for BIM applications in Taiwan. However, Taiwan has not yet established national BIM standards. Only some local governments or national agencies have developed their own guidelines for BIM applications.

From the 2013 Taiwan BIM Awards, the increase in BIM adoption in the industry is clearly evident from the early 2010s onward, with more BIM applications by construction companies and owners. BIM applications by engineering consulting firms were more mature and extended to assist construction partners during the construction stage.

One of the largest construction companies in Taiwan demonstrated how it applied BIM to construction management and ensured that the BIM model was the sole up-to-date source of consistent construction drawings. A new BIM service company spun out from the construction company that built the National Kaohsiung Center for the Arts project. It began providing BIM-based construction management tools as services to other construction companies.

Most major design firms in Taiwan have a high level of BIM capability to handle BIM-based design projects and continue to deepen BIM applications in their design processes. Recently, they have started using BIM as a driver to transform their design process, achieving design automation and smart design. They also provide BIM services for the owners and construction firms. For example, one engineering consulting company has developed facility management tools to help owners manage the maintenance and operations of public infrastructure.

At a leading local consulting firm in Taiwan, BIM techniques are used not only during the design stage to facilitate collaboration but also during the construction stage, particularly for health and safety issues. For example, one firm developed a photogrammetry-based

procedure to build VR scenes integrated with BIM models. Site engineers can realistically experience different situations through VR helmets before construction starts. This greatly helps personnel training by preventing dangerous actions and saving lives.

For most major construction companies in Taiwan, although they have different focuses and degrees of BIM applications in their construction management, they are all aware of what BIM applications can help them in the pre-construction examination on design integration and constructability, construction management coordination, quantity take-off, quality assurance, risk elimination, construction safety, etc. Several companies have already integrated, or are integrating, BIM applications into their project management systems, including developing APPs on handheld devices for construction quality inspection and issue management. One construction company has also developed a BIM-based facility management system for a public construction project.

After so many years of BIM promotion and adoption in Taiwan, major designers and contractors in the construction industry have all been equipped with strong BIM capabilities, and more and more owners, including governments, are now requiring BIM for facility management.

With the availability of BIM-related ISO standards, several design firms and construction companies in Taiwan have completed certification under the ISO 19650 series. One of them even qualified for the ISO 19650 Parts 1, 2, and 5 BIM Level 2 Kitemark Certification, the first construction company in the APEC area to complete this certification. Up until 2023, 10 companies have already completed the ISO 19650 series certification.

In 2021, three experts from the same construction company were awarded the international BIM Qualification: BSI BIM Project Information Certified Professional. As the first pilots globally, they were the first BIM managers in Taiwan to be awarded the recognized personal certificate for formally demonstrating BIM competency. This indicates the determination and maturity of construction companies in BIM applications. It can also show that some construction companies in Taiwan have been well aware of the necessity of implementing BIM standards into their business process.

UNITED KINGDOM

Education/Training

The BIM Academic Forum (BAF – discussed later) published *Embedding building information modelling (BIM) within taught curriculum* in 2013 and *Current position and associated challenges of BIM education in UK higher education* in 2015. The latter report indicated that BIM is now becoming widespread across the various levels of higher education, albeit ad hoc and without consistency. In the main, this tends to be driven by individual academics or schools/departments that have a particular interest in the area of BIM and recognise its importance in the education of professionals.

Over the last few years, a number of BIM specific programs at master's level have emerged. A number of BIM specific BTEC level programs have also now begun to emerge. Apart from architecture and construction related disciplines, there are overall low levels of interest in BIM incorporation in teaching across built environment related disciplines. At the cutting edge where BIM is fully embedded into programs/modules, architecture maintains a significant edge over all other built environment disciplines.

BAF held its first international conference at Glasgow Caledonian University, 13th-15th September 2016. This brought together delegates from both industry and academia to discuss aspects around Education & Training, Process & Standards, Strategy & Implementation, Knowledge Management & Decision Support, BIM Maturity & Assessment, Asset Handover & Operational Management, Technology. The program also included a workshop to explore establishing a European BIM Academic Network to bring together the European national BIM academic forums. BAF are currently focusing on taking the first report of embedding BIM within the taught curriculum forward by drilling down to disciplinary perspectives at the undergraduate level. BAF are also aligning their activities in support of the UK BIM Alliance, and the Upskilling work stream, in particular.

Within the UK, Secondary, Further (FE) and Higher Education (HE) are devolved matters and in Scotland these fall within the Scottish Government's remit. According to sources published in 2018, Scotland has 26 FE and 18 HE Institutions. Although the Scottish

Government acts as the funding agency for HE built environment programs, accreditation is normally undertaken by professional bodies (PBs). During 2019, the focus for several built environment PBs was supporting the transition from the PAS 1192 to the ISO 19650 suite of BIM standards.

The Scottish Qualifications Authority (SQA) is the executive non-departmental public body of the Scottish Government responsible for accrediting educational awards at secondary and FE levels. The SQA acts as a single awarding body to devise, develop and validate qualifications and quality-assure education and training establishments which offer SQA awards. The SQA also publishes the Scottish Credit and Qualifications (SCQF) framework which offers a structured and incremental pathway (Levels 1-12) for education and training which spans between secondary and tertiary level qualifications and maps equivalences between FE/HE provision and workplace-based learning programs.

Within FE provision, the current suite of built environment awards is being refreshed. The SQA's Architectural Technology review team are in the process of constructing revised HNC and HND programs. On a very positive note, it appears that within named awards, interdisciplinary activities will have a raised profile. It is likely that the BIM Professional Development Award (PDA) will be offered as an optional 30 credit Unit. The BCTG Construct funded research project hosted by Glasgow College has now published a blended learning resource to help Scotland's construction sector close technical skills gaps by offering site supervisors access to online learning resources including an introductory module in BIM.

A number of HE centres including Napier, Heriot Watt, Strathclyde, Glasgow Caledonian, the University of Edinburgh and the University of West of Scotland continue to engage with BIM, either through the provision of named awards and/or by embedding BIM/digital in undergraduate/postgraduate teaching and research. Pockets of expertise have developed. These include Glasgow School of Art Simulation and Visualisation facility which explores interfaces between science, technology using advanced 3D digital visualisation and interaction technologies. The University of Edinburgh's *Scan-vs-BIM* concept has investigated the comparison of reality capture 3D point clouds with BIM models to

offer opportunities for enhancement of construction project delivery, for example with quality control across design and construction processes.

The Robert Gordon University's Scott Sutherland School of Architecture and Built Environment continues to participate in cross-discipline built environment projects through European ERASMUS links and the International Congress for Architectural Technology (ICAT) networks. Collaboration is developed through partnerships with centres in Spain, Netherlands, Germany and Denmark. Typically, undergraduate projects develop simulated BIM projects in team-working environments framed by real-world protocols such as ISO 19650. These projects use digital media to facilitate developing an analytical approach to deep learning in areas fundamental to built environment education; site appraisal, brief development and environmental analysis.

Construction Scotland Innovation Centre (CSIC) is one of eight industry led and demand driven Innovation Centres supported by Scottish Funding Council, Scottish Enterprise, Highlands & Islands Enterprise and 14 Scottish University partners. CSIC's remit is to support businesses in delivering transformational change in construction. CSIC's BIM in Practice program was developed to support businesses from their initial awareness of BIM practices to the continuous development of their BIM journey, offering support at all the following stages:

- Awareness: For businesses unfamiliar with BIM, introductory workshops offered an overview of the benefits of working with BIM can bring to an organisation and the practices and processes involved. These workshops were hosted at the CSIC Innovation Factory near Glasgow, by outreach at various sites across Scotland and as an e-Learning module.
- Understanding: Acknowledging that BIM requires significant investment and commitment of resources to any organisation considering adoption, the CSIC BIM For Business Leaders e-Learning Module was designed to enable greater understanding of BIM by CEOs, finance directors and other senior leaders involved in strategic decision making.
- Implementation: Covering the areas involved in implementing BIM such as People, Processes, Systems and Practices, these workshops supported this stage in an

organisation's BIM journey. Eight business focussed events were held throughout Scotland. In addition, four workshops focused on particular industry groups such as architecture and design. These workshops provided greater detail on the specifics of implementing BIM for businesses.

Since 2015, the *BIM Regions* have been actively seeking partnerships with local Higher Education Institutions. The London and SE BIM Region formed a partnership with the University of Westminster and ran a series of free BIM Events aligned to its master's program. *thinkBIM* is run by the Centre for Knowledge Exchange at Leeds Beckett University in partnership with the Yorkshire and Humber BIM Region. The South West BIM Region is run in partnership with University of West England. The *BIM Academy* is partnered with Northumbria University.

Design, Engineer and Construct (DEC), run by Class of Your Own, is an accredited learning program for secondary-school age students and has been expertly developed to create and inspire the next generation of Built Environment professionals. Class of Your Own are leading the *BIM4Education* initiative. This initiative has recently been awarded *CITB* funding to get teachers and students excited about BIM and construction. One published report has shown how the DEC program has worked well in Manchester as a partnership between the University of Salford and St Ambrose Barlow RC High School.

There are now many providers of BIM training within the UK. As identified above, the BIM Regions have partnered with local universities to provide free events. Other providers of paid for content include:

- Professional Institutions:
 - . Royal Institution of Chartered Surveyors (RICS).
 - . Chartered Institute of Architectural Technologists (CIAT).
 - . Chartered Institute of Building (CIOB).
 - . Institution of Civil Engineers (ICE).
 - . Building Services Research and Information Association (BSRIA).
 - . Building Research Establishment (BRE).
 - . Construction Industry Training Board (CITB).
 - . National Federation of Builders (NFB).
 - . British Standards Institute (BSI).

- The *BIM Campus* provides a six-week intensive course.
- The B1M is an online video resource which includes a *BIM for Beginners* program.

Many of the AEC companies have run their own in-house training programs which are compulsory to attend and require a certain level of attainment.

There is significant body of research being undertaken into BIM. Each Higher Education Institution has its own research program and there are also numerous Knowledge Transfer Partnerships (KTPs) being undertaken. *KT4BIM* involves BIM4SME acting as a client to a virtual project with numerous KTPs; the objective is to achieve a Level 2 compliant project.

Initiatives/Organisations

The UK Government influenced a significant movement within the UK AEC industry by requiring the use of BIM on public sector projects in its *2011 Government Construction Strategy*. The primary objective of the strategy was to sustainably reduce the construction costs incurred by the public sector. BIM was identified as one of the principal initiatives to achieve the objective and was supported by the creation of the *BIM Task Group*. *Training and Education* was one of the Task Group's four work-streams and a key output was the *BIM Learning Outcomes Framework*. As a consequence, there has been a significant increase in the provision of formal academic qualifications, training, accreditation and research.

The subsequent *Government Construction Strategy 2016-2020* maintained the emphasis on developing digital and data capability in construction, although the BIM Task Group was no longer funded to support the wider adoption of BIM. The formation of the *UK BIM Alliance* has taken on the mantle from the BIM Task Group and there is a work-stream dedicated to upskilling the industry. The Alliance was formed in late-2016.

The BIM Task Group instigated a community of special interest groups with the aim of "raising awareness of BIM and promoting a shared understanding of the value proposition and issues affecting the implementation of BIM", as stated in the *BIM4 Community Charter*. Each group determines their own approach and certain groups are seen to be

significantly more active e.g. *BIM4SME* and the *BIM Regions*.

The BAF is the BIM4 Community special interest group representing Higher Education. Formed in 2011, BAF consists of a group of representatives from a large number of UK universities, with the aim of creating a dynamic collaborative group to enhance and promote teaching and learning together with the research aspects of BIM, therefore serving as a conduit between industry demands and BIM education in higher education institutions.

Scottish Government aspires to be at the forefront of the digital economy and is resolute that digital technologies will form an integral part of the country's transition to a low carbon economy. The use of BIM Level 2 was introduced by the Scottish Government in April 2017 with a view to encouraging its adoption across public sector contracts. The overall objectives were to increase efficiencies, reduce costs and promote collaboration within the Scottish construction industry. A wider ranging challenge facing built environment educators is how best to equip undergraduates with skills necessary to support industry across a range of digital-centric themes which research has identified as being key to forward travel for construction including:

- Higher definition surveying and geolocation, rapid digital mapping and estimating.
- Next generation 5D building information modelling.
- Digital collaboration and mobility, moving towards paperless projects from the office to the workforce.
- The Internet of Things and advanced analytics – intelligent management of built assets.
- Future-proof design and construction – designing with methods and materials of the future.

These imperatives are likely to assume greater urgency in a post COVID-19 world as construction regroups, recalibrates and develops robust strategies to ensure survival as a viable industry.

As digitisation pushes the boundaries of BIM and what it means to a range of built environment stakeholders, there may be growing demand for built environment education to support wide ranging digital processes which underpin the development of environmentally sensitive and necessarily

resilient solutions for future buildings/infrastructure. In that context, contemporary reference standards such as ISO 19650 will fit within a bigger picture framed primarily by construction's response to the climate emergency.

Scottish Futures Trust (SFT) is Scottish Government's agency tasked with improving publicly funded infrastructure investment. SFT liaises with the public and private sectors to deliver value-for-money on all public sector infrastructure investment across the country. The SFT's BIM Portal offers a range of online tools. These tools are designed to facilitate decision making to support BIM implementation involving the procurement of public sector building and infrastructure projects. These online resources include the SFT Grading Tool which predicts the level of BIM maturity which could be appropriately applied to a project, a return on investment calculator, whole life appraisal and BIM viewing tools.

Awareness/Uptake

The government's BIM requirements and the subsequent activity of the BIM Task Group and the wider BIM community has significantly influenced the awareness and take up on BIM within the UK. This is evidenced above by the broad range of support and resources available to via the UK BIM Task Group Website, the BIM Regions and BIM4 groups such as BIM4M2 and BIM4SME. This is supported by a frequent program of conferences run by amongst others the professional institutions.

In addition, institutions and industry related journals have sections on their websites specifically focused on BIM, which together with the plethora of BIM-specific resources such as *BIM Plus*, support the growing awareness of BIM within the UK.

The proposed program of the UK BIM Alliance includes a work-stream focused on Awareness and being the champion for BIM Level 2. The *Government Construction Strategy 2016-2020* indicated that progress had been made in "developing digital capability in design and construction, with all departments on target to procure assets using Building Information Modelling (BIM) Level 2 by 2016". The strategic objective within this strategy is "increasing BIM Level 2 maturity across government will enable departments to

gradually move to BIM Level 3, which would support a fully integrated and collaborative process” (point 25).

The Government in conjunction with industry will develop the next generation of digital standards to enable BIM Level 3 adoption under the remit of the *Digital Built Britain Strategy*.

In common with the rest of the UK, construction in Scotland faces many well-rehearsed challenges. A relatively small core of major Tier 1 contractors is supported by long supply chains of sub-contractors and suppliers. COVID-19 has now interrupted many projects, causing significant delays not least because supply chains have been severally disrupted.

Some of the largest construction firms active in Scotland, are UK-based, others are controlled from abroad. Low levels of investment in training and cash flow challenges are among factors which mitigate against movement away from established business models. Construction has a complex and organic structure, is risk averse, slow to react to change and does not respond well to force feeding.

Feedback suggests that the Level 2 BIM methodologies promoted by the UK Government from 2011-2016 have not had significant impact on many construction firms. Despite Scottish Government’s aspiration to develop a digitally enabled world-class construction industry, engagement with BIM is perceived to involve significant risk for many of the SME and micro-organisations which comprise 90% of Scotland’s construction sector by numbers.

Feedback from one university actively involved in partnering with large contractors suggests three levels of contemporary activity. At the first (highest) level contracting organisations may regard BIM as a sub-set of initiatives to digitise all business processes with a view to eliminating waste, adding value and incorporating automation where possible. That is a trajectory which moves towards the Industry 4.0 model which originated in Germany.

At the second level, contractors may be using BIM models, but often with gaps in workflows

for many reasons including engagement and operational challenges within supply chains. The third level is *business-as-usual* which suggests little or no engagement with BIM processes. It is thought that many/most housebuilders in Scotland would fit the third category. Around 1,800 firms are directly engaged in house building activity in Scotland. 8 of the country’s top 150 companies are residential house builders. That profile suggests a significant gap when a key player in the Scottish construction sector does not appear inclined to engage with BIM processes.

Although various strategies and interventions continue to support the development of BIM education across FE and HE, clearly Scottish Government’s support for publicly funded projects to be BIM enabled has not transformed the construction sector. Post COVID-19, sustainable development goals are likely to feature more significantly in construction education/practice for the foreseeable future. Embedding strategies for resilience into business plans may be key to the survival of many construction related businesses.

In November 2017, the UK Government launched a centre of excellence in Cambridge to champion the “digital revolution” in the built environment. The Centre for Digital Built Britain’s primary function is to assist with delivery of a smart digital economy for construction and infrastructure. Central to that initiative is the concept of digital twins. The aim is to develop digital protocols which will underpin transformation of the UK construction industry’s approach to planning, constructing, use and maintenance of buildings/infrastructure. In that context, the UK Government set out a clear vision and powerful agenda for harnessing the power of digital technology, data capture, and analytics. The extent to which the initiative will harmonise with or overtake ISO 19650 BIM imperatives and impact on education/training for Scotland’s construction sector remains to be seen.

UNITED STATES

Education/Training

There are 118 universities, both private and public, that are accredited by the National Architectural Accreditation Board (NCARB) to provide undergraduate, graduate and doctoral programs in Architecture. The coursework, focused on BIM in particular, range from direct *Autodesk Revit* coursework at the Georgia Institute of Technology to *BIM in Construction* at Montana State University, just to identify a few.

A number of universities also provide master's degrees in BIM Management as listed at the University of Miami, in Miami Florida, and Computer Graphics Technology at Purdue University. Stanford University and California State University also offer coursework in the Technology of Digital Graphics, among others. There are also community-based colleges too numerous to name that provide coursework in BIM with Revit. However, this coursework does not lead to an accredited degree in Architecture which is required in the US for licensure.

A good number of universities provide research programs for advanced degree candidates focusing on a range of topics including *Design Technology* at the Georgia Tech School of Architecture and the Texas A&M University *BIMSIM Lab* which focuses on Building Information Modelling and Simulation. The University of Hawaii at Manoa also offers a Doctor in Architecture. A good number of universities now offer online bachelor's degree programs.

The following universities and colleges provide Specialised BIM coursework either as integral to the B Arch program or as an alternative course plan: University of Arkansas, Georgia Inst. of Tech., Stanford University, John Brown University, University of Washington, University of Southern California, Pennsylvania State University, Purdue University, Philadelphia University, Montana State University, California State University, Milwaukee School of Engineering, Clemson University, Wentworth Institute of Technology, Arizona State University, NYU School of Professional Studies.

Community Colleges also provide coursework, as at the Seminole State College of Florida, offering a 3-credit course for 3D modelling

including Revit instruction as a standard summer course, though there are many others providing similar education.

The American Institute of Architects (AIA) has for years supported the American Institute of Architecture Students organisation (AIAS) which is an independent, non-profit organisation and completely run by students from across the country. The organisation aims to promote the advancement of architectural education in the US. The AIAS Learning, Design, and Technology Task Force provide an online tool that provides an extensive listing of software packages that graduating students may encounter in the design field. These packages are grouped into the following categories: Drafting (CAD), Animation, Illustrative Drawing, Digital Modelling, Rendering, BIM, Diagramming and Video. Each category provides links to tutorials and instruction for the different platforms.

The Association of General Contractors (AGC) continues to sponsor and provide a structured program for those interested in a path in Construction Management obtaining certifications in the areas of Construction Management-BIM. The coursework aims to “enhance career development opportunities for individuals and improve the performance of construction companies and the industry”.

The first module titled Building Information Modelling includes 32 hours of intense study. According to their website, “two national credentials for Building Information Modelling and Lean Construction. Those that complete the entire BIM Education Program or Lean Construction Education Program are eligible to sit for an exam to earn a Certificate of Management-Building Information Modelling (CM-BIM) or Certificate of Management-Lean Construction (CM-Lean)”.

Initiatives/Organisations

The United States General Services Administration has produced, back in 2003, The National 2D-3D BIM Program, which has had a strong influence on the rate of adoption by the design/construction community by mandating its use on all GSA projects. The recently published GSA BIM Guidelines for Revit include guidelines for data submittals, roles and responsibilities, and technical standards and are now required as part of the BIM Execution Plan for all GSA projects.

Many states, including Wisconsin and Connecticut have adopted a similar mandate with other states like Massachusetts, Utah, Georgia, Virginia, Washington and Connecticut also looking to do so. This activity at the state level has put an onus on universities to apply more emphasis on BIM education and facility standards to include BIM technology. Indiana University and Penn State University have both issued BIM standards on all campus projects of 5 million or more in construction cost.

items like the Room data sheets and drawing deliverable requirements.

Other organisations like the National BIM Standard-United States® (NBIMS-US™) by the National Institute of Building Sciences, 2015 (NBIMS-US) provides consensus-based standards through referencing existing standards, documenting information exchanges and delivering best business practices for the entire built environment. The buildingSMART alliance is among the list of the technology programs. Other organisations leading the way towards national BIM adoption include:

- *The CAD BIM Technology Center:* According to the center's website, the center sets standards, promotes system integrations and provide assistance for the installation, training, operation and maintenance of BIM based systems.
- *The Naval Facilities Engineering Command Building Information Management and Modelling:* The NAVY claims to be the first Federal Government Agency to leverage BIM with the goal of digital management of facilities. Their focus has been on standardised delivery of digitised facility data, 2D drawings and 3D parametric models.
- *The Air Force Building Information Modelling for MILCon Transformation:* The agency under the *USACE ECB 2018-7 Advanced Modelling Requirements on USACE Projects -- Category: Directive and Policy* sets the requirements for the advanced modelling requirements on all USACE projects. The policy states as one criterion: All Army and Air Force Civil Engineer Center (AFCEC) (ref d) design and/or construction projects, regardless of funding source or acquisition method, must utilise advanced modelling to generate design, construction, record, and space utilisation drawings deliverables.
- *Department of Veterans Affairs:* The agency provides BIM standards covering all aspects of project submission including

CONCLUSION

It is clear that BIM is now firmly established as a global driver of digital transformation in the built environment, but that its educational and industry maturity remains highly uneven across jurisdictions. In some countries, BIM has moved well beyond introductory modelling and software training to become embedded in multidisciplinary curricula, national competency frameworks, procurement requirements, and lifecycle information management practices. In others, however, BIM education is still largely dependent on isolated university initiatives, vendor-led training, or the efforts of a small number of industry champions. The overall picture is therefore one of strong momentum, but with markedly different starting points, capacities, and pathways of development.

A recurring finding across the 24 countries and regions covered in this report is that progress in BIM education depends less on technology availability alone and more on the strength of the surrounding ecosystem. Where governments, universities, vocational institutions, industry associations and private firms work in alignment, BIM capability develops more quickly and with greater consistency. Clear procurement expectations, national standards, implementation roadmaps, pilot projects and support for upskilling all help create the demand signals and institutional confidence needed to move BIM from optional practice to common capability. Conversely, where these enablers are absent, BIM education and use tends to remain fragmented and project-specific.

The report also highlights a set of common barriers that continue to constrain adoption across many regions. These include shortages of educators and experienced practitioners, limited curriculum space, high software and implementation costs, inconsistent standards, lack of client demand, and weak alignment between academic learning and workplace needs. In many regions, the challenge is no longer simply to raise awareness of BIM, but to improve the quality, relevance and accessibility of education and training. This requires a shift from software-centric instruction towards broader capability in information management, collaboration, interoperability, open standards, digital delivery and asset lifecycle thinking.

As reported in previous years, many countries/regions are reporting that the content of courses being offered have expanded to include more sophisticated elements of BIM, such as BIM for FM(Facility Management), costing, openBIM information exchange and BIM management. This change in course content is consistent with increasing public and private demand as organisations realise the benefits of BIM beyond design modelling, but also for procurement, construction management, operation, and maintenance of assets. In particular, there has been an increased interest in integrating artificial intelligence with BIM, and on improving sustainability outcomes of building and infrastructure projects using BIM.

BIM competitions, promoting practical and collaborative use of BIM among higher education students continue to be run by education institutions. The level of interest in these competitions also appear to be increasing significantly.

Some countries/regions have developed or are developing BIM standards and guidelines. Notably, the importance of standardisation and alignment of terminology and processes across the industry for efficient information delivery has been recognised. Many countries/regions are adopting or incorporating the ISO 19650 series, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM)* in their guidelines.

Looking ahead, the future of BIM education will be shaped by how effectively it connects with other developing concepts already reshaping the sector, including digital twins, artificial intelligence, industrialised construction, sustainability, circular economy principles and data-driven asset management. The regions with a more mature BIM education provision are already moving in this direction, positioning BIM not as an isolated methodology but as the foundation of a broader digital built environment capability. For countries with a less mature BIM education offering, the opportunity is to accelerate progress by learning from more mature markets, adapting global standards to local conditions, and investing in practical, collaborative and standards-based training models.

CONTRIBUTORS

NATSPEC and I.C.I.S. would like to thank contributors, past and present, who have provided input to this report for their respective countries/regions. Note: Where more than one individual from any particular organisation has provided input, the name of the organisation has simply been listed.

Current contributors

- Amer Hijazi – c4SMC, Western Sydney University (Australia & Jordan)
- Mathieu Robitaille – Groupe BIM du Quebec (Canada)
- Mauricio Loyola Vergara – Universidad de Chile (Chile)
- Tianlun Yang – NingboTech University (China)
- Rong Wang, Huahui Lai – China BIM Union (China)
- Mao Wang – Pinming Technology Co., Ltd (China)
- Daniel Kliment – URS (Czech Republic)
- Mikko Raikaa – Metropolia Ammattikorkeakoulu (Finland)
- Guersendre Nagy – buildingSMART (France)
- Kacy Chong – Construction Industry Council (Hong Kong)
- Mark Fairbairn – CIL Masterspec (New Zealand)
- Eilif Hjelseth – Norwegian University of Science and Technology (Norway)
- Ingolf Sundfør – Fagskolen Oslo (Norway)
- Pablo C. Herrera Polo – Universidad Peruana de Ciencias Aplicadas (Peru)
- Vanessa Tang – buildingSMART Singapore (bSS) (Singapore)
- Irene Schuler Stäger – CRB (Switzerland)
- Prof. Dr. Adrian Wildenauer – HWZ Zurich University of Applied Sciences (Switzerland)
- Shang-Hsien (Patrick) Hsieh – National Taiwan University (Taiwan)

Past contributors

- Vaughan Harris – BIM Institute South Africa (Africa and South Africa)
- Mario Mauer – BIM Forum Argentina (Argentina)
- Belinda Hodgkinson – Magnae Pty Ltd (Australia)
- Julie Jupp – University of Technology Sydney (Australia)
- Kim Ki – University of South Australia (Australia)
- Deakin University (Australia)
- Rosemarie Rusch – Bond University (Australia)
- Shannon Thomas – Beca (Australia)
- Jennifer Macdonald – buildingSMART Australia (Australia)
- Ronald Webber – Central Queensland University (Australia)
- Saeed Banihashemi – University of Canberra (Australia)
- Canada BIM Council (Canada)
- David Watson – Digicon Information Inc. (Canada)
- buildingSMART Canada (Canada)
- Erik Poirier – Ecole de technologie superieure – ETS Montreal (Canada)
- Simon Brodeur – Cegep du Vieux Montreal (Canada)
- Carolina Soto Ogueta – Planbim (Chile)
- Rodrigo Herrera – BIMForum Chile (Chile)
- Ximena Finschi – Corporacion de Desarrollo Tecnologico (CDT) (Chile)
- Shenzhen Municipal Design & Research Institute Co. Ltd. (China)
- University of Nottingham Ningbo (China)
- Li Sheng – Pinming Technology Co. Ltd (China)

- Zhejiang Huiyuan Engineering Data Technology Co. Ltd (China)
- Daniel Cihelka – URS (Czech Republic)
- Petr Vokoun – BIM Project (Czech Republic)
- Rakennustieto (Finland)
- buildingSMART Finland (Finland)
- Metropolia University of Applied Sciences (Finland)
- Tarja Mäkeläinen – VTT Technical Research Centre of Finland (Finland)
- Timo Lehtoviita – LAB University of Applied Sciences (Finland)
- buildingSMART France (France)
- Emmanuel Natchitz – ESITC (France)
- Benjamin Mombree - Planen-Bauen 4.0 (Germany)
- Institute of International Harmonization for Building and Housing – iibh (Japan)
- Masaki Muto – Building Research Institute (Japan)
- Martijn Carlier – BIM Loket (Netherlands)
- Radboud Baayen – Stabu (Netherlands)
- buildingSMART Norway (Norway)
- Harald Selvaer – Fagskolen Oslo (Norway)
- Geir Johansen – Norconsult (Norway)
- BCA Academy – Building and Construction Authority – BCA (Singapore)
- BIMcommUNITY.Africa (South Africa)
- Chris Allen – Nelson Mandela University (South Africa)
- Innocent Musonda – University of Johannesburg (South Africa)
- Jean-Pierre Basson – Nelson Mandela University (South Africa)
- Mark Grant – Construction Communication Network (Pty) Limited (South Africa)
- Gustav Jansson – Luleå University of Technology (Sweden)
- Niclas Andersson – Malmö University (Sweden)
- Nina Andersson – Jönköping University (Sweden)
- Johannes Herold – Schweizerische Zentralstelle für Baurationalisierung – CRB (Switzerland)
- Kai Halbach – CRB (Switzerland)
- BIM Academic Forum (United Kingdom)
- Frederic Bosche – University of Edinburgh (United Kingdom)
- Graham Paterson – Letsbuildigital (United Kingdom)
- Jason Underwood – University of Salford (United Kingdom)
- John Gelder – NBS (United Kingdom)
- Rob Garvey – University of Westminster (United Kingdom)
- Christopher Bushnell – Arcom (United States)
- Gilles Letourneau – Deltek (United States)
- James Robertson – Robertson Sherwood (United States)