

SKILLING THE ADOPTION OF DIGITAL TECHNOLOGIES

BIM views, advice and experience:
a collection of essays curated
by KnowledgePoint





The world we live in is under threat.

Population growth is driving increased urbanisation, burdening already stretched infrastructure and resources. Across the region and the world, we're experiencing the devastating effects of climate change – rising temperatures and sea levels, floods and fires. Conflict continues to create chaos, affecting lives and livelihoods on a daily basis.

Across the Middle East and North Africa (MENA), countries are adjusting to a new future – diversifying economies and reducing reliance on fossil fuels. Governments and policymakers across the region are striving to ensure a good today and a better tomorrow.

Whilst it can't promise to solve all the world's challenges, the Architecture, Engineering and Construction (AEC) industry has a crucial role to play in both building and strengthening the modern world. It can utilise the latest technologies to create a positive impact.

The adoption of Building Information Modelling (BIM) represents an opportunity in the region's journey towards sustainable and efficient construction practices. It can help the region's AEC sector take a step forward.

However, the successful integration of BIM into construction practices across MENA hinges not only on technological investments but also on the development of a skilled workforce capable of harnessing its full potential.

This series of essays explores the interplay between technology, human capital and economic development. They shed light on the need to invest in skills for successful BIM implementation to realise efficiency gains. They emphasise the vital role of education and training programmes play in equipping the AEC workforce with the knowledge and expertise needed for its effective adoption.

Our expert authors provide practical advice for governments, policymakers, educators, owners and organisations playing their part across the AEC value chain.

They aim to inspire discussion, inform decisions and, ultimately, a more sustainable and efficient future for the region and the world.

Explore essays from digital transformation and training experts

1. Steps to increase adoption of BIM – build awareness, educate, practice, certify and mandate

Hana Elleuch
Prodesign Training

2. What's in a name? Should we stop talking about BIM to secure its success?

Paul Woddy
White Frog and Focus HQ

3. Investing time and effort in embedding BIM will reap rewards

Tharakesh Anantha Krishnan
Omnix International

4. Training from the inside out – views from industry

Juan Tena Florez
KEO International Consultants

5. Training for specificity, efficiency and effectiveness

Tomas Karlsson
KnowledgePoint



Steps to increase adoption of BIM – build awareness, educate, practice, certify and mandate



HANA ELLEUCH
BIM expert & Founder of
Prodesign Training, Tunisia

Organisations and governments around the globe are increasingly recognising the efficiencies that can be gained from adopting Building Information Management (BIM).

Many across the AEC ecosystem believe BIM is as key to increasing innovation and directly responsible for improvements in productivity. However, its use is not yet systematic or widespread.

Increasing BIM adoption requires coordinated efforts involving government, educational institutions, industry associations and professionals across the AEC ecosystem.

But this change is not just about technology adoption. It is also about changing mentality and creating an ecosystem that supports BIM implementation throughout the construction and building management lifecycle.

Hana Elleuch is a BIM expert from Prodesign Training in Tunisia. She shares her thoughts on steps to increase adoption BIM, drawing upon experiences in Tunisia and beyond.

1. Government support: Government support and policies play a crucial role in promoting BIM adoption. The government can provide incentives and increase BIM usage through regulations, tax benefits, by offering funds or preferential treatment in project bidding, to organisations and professionals who adopt and excel in BIM.

Government can also build awareness and offer education, training and BIM-related research funds to encourage the sector to learn, certify and practice BIM in real projects. Tunisia's government can continue its efforts to encourage BIM adoption in public projects then mandate it gradually.

2. BIM license donation: Access to reduced-price or free licenses for BIM software would help remove some of the financial barriers for AEC operators/stockholders. They would be able to develop capability and capacity, and focus on the BIM development and implementation process.

3. Invest in education and training: Providing comprehensive BIM training programmes is crucial to increasing adoption. This should start at university level, where students on architecture and engineering programmes should be exposed to BIM concepts and tools.

Government can encourage university researchers and developments in BIM-related technologies to foster innovation and competitiveness. This could include offering certifying training sessions for ongoing professional development for current practitioners.

4. Spread public awareness: Increasing awareness about the benefits of BIM among industry professionals is essential. This could include the organisation of workshops, webinars, seminars, and conferences to showcase successful BIM projects and share best practice.

5. Focus on certification and standards: Establishing BIM standards and certification processes can help ensure consistency and quality in BIM implementation. Aligning with international standards such as ISO can facilitate interoperability and collaboration with global partners.

Certification programmes offered by vendors such as Autodesk recognise and validate BIM proficiency, further encouraging professionals to invest in learning and implementing BIM. Training programs and workshops can be used upskill existing professionals. This would include both basic and advanced training to cater to individuals at different skill levels.

6. Explore collaboration and partnerships: Encouraging collaboration between different stakeholders, including architects, engineers, contractors, and facility managers, is essential. This fosters a culture of teamwork and information sharing.

Similarly, explore collaborations and partnerships with relevant industry associations, which can actively support BIM adoption. They can offer resources, organise seminars and workshops, and advocate for the benefit of BIM. Use such opportunities to discuss digital transformation of the sector and the role BIM can play in improving practices and increasing efficiencies.

7. Prepare an efficient technology infrastructure: Adequate technology infrastructure, including reliable high-speed internet and access to necessary software, is fundamental for successful BIM adoption.

Government ministries and authorities will need to play a part to ensure that these resources are readily available.

8. Showcase BIM success stories: Sharing case studies of successful BIM projects can inspire others and demonstrate the practical benefits of BIM in real-world applications. Those projects would serve as practical examples of how BIM can streamline construction processes, reduce errors and enhance project outcomes.

In Tunisia, adoption of BIM is still in its early stages but I believe we're making progress against some of these steps. If we're to achieve a culture of BIM implementation in Tunisia, we need to make further efforts before we see widespread acceptance and integration of BIM practices throughout the construction and building management industry.

Ultimately, we can transform Tunisia's construction and building management landscape into one that not only embraces BIM as a standard practice but also reaps the numerous benefits it offers in terms of cost-effectiveness, sustainability, and competitiveness.

Hana Elleuch is a BIM expert & Founder of Prodesign Training, Tunisia. With a PhD in architectural design, Hana also teaches at the School of Architecture and Urbanism of Tunis and Université Centrale (Honoris Group). She is an Autodesk Certified Instructor and Autodesk Certified Professional, with extensive experience of the incorporating BIM into practice.

What's in a name? Should we stop talking about BIM to secure its success?



PAUL WODDY
White Frog and Focus HQ, UK

Technology has been shown to address fragmentation and improve integration of the AEC sector, a sector which has faced a productivity challenge for many years. Architects, construction firms, surveyors, engineers and project managers alike are looking for ways to aid communication and ease project management. They need solutions which help in the planning and the ongoing management of buildings and infrastructure projects, reducing costs and reducing complexity.

But the sector is known to be a laggard, traditionally slow to embrace technology. In recent years, the adoption of technology and digital construction solutions has increased – in part, as a result of the global pandemic.

To further boost adoption, experts argue cultural change is needed. New approaches are required, terminology needs to shift and conversations need to happen.

Paul Woddy from White Frog and Focus HQ has advised many organisations on the strategic implementation of Information Management. He shares his views on effective digital data management, and whether changing our lexicon will drive transformation across the sector.

The term Building Information Management, or BIM for short, has grown from being an academic concept to being a catch-all for a whole digital sub-sector of the AECO industry. Arguably it has outgrown the name.

After its academic appearance, BIM was then embraced by architects and engineers. It then became the software industry's "must-have" buzzword to describe anything current.

Old products rebranded as BIM tools, CAD Managers recast as BIM Managers; and old techniques and services reborn as BIM offerings. Much of this was driven by a lack of understanding. BIM is a methodology and not a software solution. If firms don't change the fundamental way that they operate, then new software alone is not going to deliver much improvement.

Poorly implemented BIM in early deployments has led to a reluctance amongst other professionals to get involved – BIM is seen as an unnecessary overhead, with added effort for no return. But some of the blame for a lack of adoption beyond design professions can arguably be attributed to the name itself.

Building Information Modelling

We are trying to engage the whole AECO sector in this revolution, including infrastructure and not just building projects. We need to embrace every project that involves construction – bridges, roads, rail lines, seaports, power networks and more. We are also attempting to broaden the timeframe from focusing on capital construction to encompass the whole lifecycle from inception through to demolition and recycling. Arguably, the word "Building" is holding us back.

Building Information Modelling

The word "Modelling" implies a 3D graphical representation of the data. Futuristic, glowing 3D graphics, and renderings of proposed developments, mean some discount the underlying principles of BIM. They do not see the relevance of "fancy 3D models" to what they do and how they do it.

In truth, much of the data we collate, analyse and communicate in the process of BIM delivery is non-graphical text, including manufacturer's references, tables of figures and performance data. This information is often associated with an element which is geographically located in relation to other elements, but this can as easily be done with a codification system as with a 3D digital model.

Building Information Modelling

So, we are left with **Information**. Not a very exciting way to enthuse an industry to adopt new ways of working. We need to be more specific.

We want Digital Information Management, but what does that mean?

For a start, we don't want just any information, nor can we handle a dump of all information. Distinction should be made between Electronic Data and Digital Data – if I send you a pdf document by email or scan a product manual and pass it to you on USB stick, this is an exchange of electronic data, but it is not digital. Digital data is transferred in a way that the recipient can upload from a source application, into a different platform which can manipulate and interrogate that information to derive new data or to influence decisions. Digital data can be stored in such a way that it can be applied to use-cases which may not have been conceived by the authors of the data.

We have a lot of inconsistency across the sub-sectors of the industry about digital use-cases. In most cases, the operational side, where clients and Facilities Managers reside, has still not joined the conversation. This means that we are often creating and transferring digital information from the design and construction teams to a recipient that will either ignore the data, or ultimately find that it is not acceptable because they did not know or learned too late what to ask for.

The route to adoption isn't consistent around the world. I have seen some regions move early, whilst others hold back. I have seen some take a prescriptive approach, whilst some allow flexibility. I have seen governments lead the way, and others to build on that early drive to jump ahead. Through all this experience, I see common trends and barriers to adoption, which include financial and technological hurdles. But, more often than not, they revolve around the need for cultural change.

With the launch of the ISO 19650 standards, we now have an internationally consistent approach to what good digital data management looks like. There are case-studies from around the world which can guide an organisation in understanding what form that could take for their circumstances. We no longer need to accept a one-size-fits-all approach to BIM deployment.

Education around BIM is so much more than teaching someone how to use software, like Revit. It is a change in mindset, both in terms of how we do what we do, but also in the way we interact with others. We can no longer work in silos, issuing information in such a way that it satisfies our basic obligations. We must talk to one another! We must understand the perspectives of those around us, and of those that will receive and use our data further around the lifecycle of the asset from where we sit.

Paul Woddy from White Frog and Focus HQ, has defined internationally recognised protocols and advised hundreds of companies on the strategic implementation of Information Management. An original member of the Revit Inc team, Paul has spent over twenty years as a trainer of trainers, directly or indirectly responsible for upskilling hundreds of thousands of BIM / IM professionals. He builds training courseware on IM software and workflows as well as teaching and speaking globally. He also provides a templated and auditable approach to delivering standardised frameworks such as ISO 19650 and others.

Investing time and effort in embedding BIM will reap rewards



THARAKESH ANANTHA KRISHNAN
Omnix International

After more than 20 years working in the AEC sector, I've learnt that implementing BIM isn't an overnight process. It takes time, care and a real sense of purpose to establish repeatable BIM workflows. It requires collaboration and engagement from all stakeholders in projects. Rushing the adoption process can lead to costly mistakes and missed opportunities. All parties need to be engaged, demonstrating capacity and competence.

When care is taken, BIM is proven to be a transformative technology that enhances project efficiency, collaboration and sustainability. Such benefits of BIM are well known across the AEC ecosystem. A plethora of examples exist around the world which reinforce the benefits of BIM, and are available used for benchmarking purposes.

However, we must remind ourselves of these benefits on an ongoing basis. We must keep learning. These benefits of BIM are not one offs or short-term, they are sustaining and evolving.

Tharakesh Anantha Krishnan is from Omnix International, a key provider of engineering solutions for the construction sector in the Middle East. He shares his perspectives on the need to take time and establish the right conditions for implementing BIM across the construction sector.

In my experience, the benefits of BIM are well understood by governments and owners across the region. As such, BIM competence is increasingly one of the main eligibility criteria for contractors and consultants to bid on projects. As such, these consultants and contractors need to demonstrate their BIM capacity and capability. If not, they will not be eligible to bid for, let alone win contracts.

This drive towards BIM acceptance, supports the need for all stakeholders participating in projects to embed BIM tools and processes within their respective organisations. The exchange of information and asset information requirement documents from owners, on a per project basis, clearly indicates how consultant and contractors should follow BIM process and workflows from the concept stage to the as-built and handover stages.

Investment in the necessary technology and software infrastructure is vital. Adequate financial resources and a commitment to long-term adoption are crucial for sustained success. Organisations should consider upgrading hardware to ensure it can support BIM tools to run smoothly and faster.

Training on BIM tools and processes is key. Stakeholders, from architects to contractors, must invest time in understanding BIM software and workflows to harness its full potential. Clear communication and collaboration are vital. Stakeholders must establish common goals and protocols to ensure seamless integration.

Training should be tailored by role, whilst also making sure each stakeholder understands dependencies and relationships within workflows and projects. Such tailored training can be provided by Authorized Autodesk learning partners, who have proven track records of preparing and supporting stakeholders across the AEC ecosystem.

Continuing education is important. Organisations should keep their team updated on all latest features of the BIM tools that evolve every year. This could be learning new technologies, software or updating teams on new versions those are released every year.

Once training is complete, it is important to establish BIM standards within organisations. This involves setting up workflows and create all necessary BIM documentation and templates such as the pre and post appointment BEP templates, MIDP, TIDP, COBie sheets etc.

Organisations may also want to enlist the support of BIM implementation specialists to guide them and hand-hold them during their first project. It is important to remember that the first project can act as an awesome template for the next project. It is very important to create 'lessons learned' register for each project.

I believe it is important to constantly evolve your BIM processes. In addition, as technology develops increases and new versions of software are released, you won't be able to stand-still. You'll need to continue to invest in developing your skills and embedding BIM practices.

Remember that BIM is scalable – you build on fundamental knowledge with each successive project, and so over time the benefits of your investment pay off significantly.

Tharakesh Anantha Krishnan from Omnix International is a project management professional and civil engineer with more than 24 years of experience. He draws upon 10 years of experience in digital project delivery using BIM, Open BIM, VDC & CDE. He is a certified ISO 19650 BIM Project Information Practitioner and ISO 19650 BIM Asset Information Practitioner. Tharakesh also holds a Master's in Global BIM management. He's experienced in cloud project management solutions for construction, remote management and augmenting frontline workforce solutions. He's involved in the upskilling of digital and BIM knowledge for stakeholders at all levels.

Training from the inside out – views from industry



JUAN TENA FLOREZ
KEO International Consultants

Around the world, the AEC sector requires a skilled workforce to meet ambitious construction projects and achieve the productivity and efficiency benefits associated with digital technologies.

For the AEC ecosystem across the Middle East, this is a significant challenge. There is already a digital skills mismatch. And, with many young people leaving education without the digital skills needed by the AECO sector, there are risks this mismatch could get worse.

The AEC sector is continuously evolving, with new technologies, design methodologies, and sustainability practices. It can be difficult to find professionals with the necessary expertise in these areas. It is crucial for AEC companies to keep up with the industry's changing landscape and ensure they have the right skill sets within their teams to deliver successful projects.

Intervention is needed to increase interaction across the sector, between employers, governments, and educational institutions, to ensure collaboration to meet the skills requirements for the modern workplace.

Juan Tena Florez is from KEO International Consultants, a major player in the AEC sector in the Middle East. He shares his perspectives on addressing the skills challenges facing the sector.

As an organisation, we are committed to tackling skills challenges head on. Training plays a vital role by educating professionals, bridging the knowledge gap, promoting standardisation, improving collaboration, and encouraging innovation. We like to develop our own talent as much as we can. We invest in continuous training and development programs for our employees – we have a true learning culture. But we have also had to look outside our business to skills gaps in our workforce, recruiting talent from overseas markets where specific skills are more readily available.

Training is crucial to our business because it ensures employees are equipped with the necessary skills and it helps to foster a culture of continuous learning and improvement. It helps us maintain a competitive edge, and promotes growth and development. Our training programme incorporates technical skills training and industry certification – the latter is important as it helps to reinforce professional credibility and expertise. We also promote knowledge sharing and collaboration through various channels such as training sessions, workshops, webinars, and conferences.

More broadly, training programmes have a multifaceted role in increasing the adoption of Building Information Modelling (BIM) in the Middle East. Besides imparting technical skills, training can address cultural barriers, promote the benefits of BIM, foster a BIM culture, and develop local expertise. Such comprehensive training initiatives can have a significant impact on the widespread adoption and successful implementation of BIM across the sector.

The rapid advancements in technology require continuous learning and upskilling of professionals to adapt to the digital transformation. One example is a collaboration between industry leaders, educational institutions, and professional associations. KEO's BIM Academy and our Digital Advisory Services are working together to define industry standards, develop curriculum and training programmes that incorporate the latest digital tools and techniques. By aligning the needs of the industry with the educational programmes, graduates will possess the necessary skills needed by the workforce.

For us to see widespread adoption of BIM and digital transformation across the region, several conditions need to be met. Beyond investment in training, these include government support through initiatives and regulations, industry collaboration, increased awareness and understanding of BIM's benefits, adequate technological infrastructure, and the establishment of knowledge-sharing platforms.

Successful digital adoption and associated training require a combination of technical readiness, effective training programmes, ongoing support, clear communication, and a positive organizational culture that supports and encourages digital transformation. This, in turn, allows users to fully leverage the potential of digital tools, leading to improved productivity, efficiency, and innovation.

By addressing these factors, the region will benefit. Across the AEC ecosystem, we will see improved project outcomes, standardised approaches, and increased competitiveness.

Juan Tena Florez is Digital Services Director at KEO. He has more than 18 years of professional experience, including nine years in the Middle East, where he has gained extensive experience in BIM implementation, strategic planning, and standardization of processes in line with ISO 19650 standards. He is a BSI Certified BIM Project Information Professional and BIM Project Information Practitioner and a Smart Cities Academy Practitioner. He is a regular speaker at key GCC and International BIM conferences and events. He was winner of the BIM Champion of the Year 2022 at the Construction Technology Festival awards in the Middle East and winner of the Visionary of the Year 2023 at the ME Digital Construction Awards.

Training for specificity, efficiency and effectiveness



TOMAS KARLSSON
KnowledgePoint

The AEC (Architecture, Engineering, and Construction) industry has long-relied on manual processes and paper-based documentation. The sector is now embracing its own digital revolution. The integration of technology is revolutionising the way projects are planned, designed, constructed and managed.

This digital construction revolution demands a range of different roles and skills. Skills of a digital nature are now expected in the toolbox of professionals across the AEC sector. Whether new recruits or seasoned professionals, the expectation is that they need digital skills in order to contribute effectively to projects. Investment in education and training is critical to the sector's ongoing digital transformation.

As Building Information Modelling (BIM) is increasingly being adopted (and, indeed, mandated) on projects across the Middle East and North Africa, organisations and institutions need to consider how they address talent and skills needs.

Tomas Karlsson is from KnowledgePoint, an Autodesk Authorized Learning Partner Distributor and specialist provider of services to the learning sector. He shares his perspectives on tailoring training needs to different players in the AEC ecosystem.

BIM is a collaborative process that allows stakeholders in the AEC ecosystem to work together more efficiently throughout a project's lifecycle. BIM skills are particularly vital in the AEC industry due to their potential to drive efficiency, reduce errors and enhance communication.

Tailoring training to specific roles is critical to ensuring projects can be delivered effectively and efficiently. Similarly, universities can prepare students for specific roles in the AEC sector by embedding digital construction principles and BIM workflows into their curriculum. Any training should incorporate hands-on exercises and simulations to provide students and professionals with understanding of how these skills will be used in real-world projects.

- 1. Architects and designers:** Architects and designers need training in BIM software that focuses on creating and visualising 3D models. They must also learn how to use BIM for design coordination and clash detection to identify and resolve conflicts early in the design phase.
- 2. Structural engineers:** Structural engineers require training in BIM tools that emphasize structural analysis and design. They must learn how to use BIM for load calculations, structural simulations, and the creation of detailed structural models. They will focus on interoperability with structural analysis software, as well as coordination with architectural and MEP (Mechanical, Electrical, and Plumbing) teams.
- 3. Civil engineers:** For civil engineers, BIM training needs to contextualise and focus software proficiency alongside core engineering principles. This ensures engineers can optimise designs and manage projects effectively.
- 4. BIM managers:** Acting as the point person between the client's team, design team, contractor team and supply chain, BIM managers need to develop comprehensive understanding of BIM workflows and processes. They need to be skilled in the production of project information models which contain 3D visualisations that bring together data, drawings and schedules associated with the design and construction phase of a project.
- 5. Construction managers:** With responsibility for overseeing the execution of projects on-site, construction managers will need to use BIM tools for sequencing, logistics planning and project scheduling. This includes understanding how to use BIM to create construction schedules and track progress. They also need to understand how BIM can facilitate communication with subcontractors and other stakeholders.

6. Facility managers: With responsibility for the ongoing operation, maintenance and management of buildings, facility managers require training on how to use BIM for space allocation, asset management and energy performance monitoring. This involves using BIM data to optimise building performance, plan maintenance activities and manage facility assets effectively.

7. Project managers: Project managers play a central role in coordinating the efforts of various teams and ensuring that projects are delivered on time and within budget. Their training should include project-specific BIM workflows, cost-management, collaboration tools and effective communication strategies. They also need to understand how to extract valuable project insights from BIM for informed decision-making.

I've worked for several years with a network of organisations developing and delivering BIM training across MENA and beyond. They and their learners report benefits from role-specific BIM training:

- ▶ **Effective use of time and resources:** Professionals can focus on learning the BIM skills and tools directly relevant to their roles, avoiding unnecessary training in areas that may not apply to their day-to-day responsibilities.
- ▶ **Enhanced proficiency:** Individuals develop a deeper understanding of BIM tools and workflows that are directly applicable to their job functions. This enhanced proficiency leads to improved job performance and efficiency.
- ▶ **Better collaboration:** They gain insights into how their specific tasks and responsibilities fit into the broader project workflow. This knowledge fosters better collaboration and communication among team members, leading to more successful projects.
- ▶ **Defined careers and learning paths:** BIM training programs can align with career goals and development plans. This flexibility empowers professionals to tailor their training to their specific needs and aspirations.

Investing in digital skills and specifically BIM training is key to driving forward the digital transformation of the AEC sector. By tailoring training and educational initiatives to the unique responsibilities of professionals in different roles, the industry can harness the full potential of BIM, improve collaboration, and ultimately deliver more successful and efficient projects.

Tomas Karlsson leads channel services at KnowledgePoint. An economist by training, he has worked for more than 15 years in the education sector. At KnowledgePoint he oversees the management of outsourced extended enterprise learning programmes, recruiting and supporting global network of training providers on behalf of clients such as Autodesk.

AEC career paths



Educational background



Complementary skills & prof dev training



Career opportunities



2+ YEARS

Vocational/
career technical
apprenticeship



4+ YEARS

Bachelor or Master's
degree in engineering
or construction

Skills

- ▶ Drafting
- ▶ 3D modelling and visualization
- ▶ Construction management
- ▶ Project management

Soft skills

- ▶ Collaboration and people skills
- ▶ Problem solving and leadership skills

Software

- ▶ Autodesk Revit
- ▶ AutoCAD
- ▶ Civil 3D
- ▶ 3ds Max
- ▶ Autodesk Forma

CAD Drafter
Design Architect
BIM Coordinator

Architect
BIM Manager
Structural engineer
Civil engineer

Work in construction
office, engineering
or architectural firm,
or for a building
manufacturer

Through this collection of essays, we have journeyed through the evolving AEC landscape of the Middle East and North Africa (MENA) region, exploring the transformative power of BIM and the importance of investment in digital skills.

From the architects reshaping skylines to the engineers redefining efficiency, these essays highlight how the region needs to embrace innovation and invest in education.

We're reminded that BIM is not just a technological tool; it's a catalyst for progress, sustainability and excellence. The thoughts shared here should inspire action so the region can achieve a sustainable and transformed future.

AEC players across the region can get ahead of the game, supporting the adoption of new working practices and investing time in developing BIM skills today. Governments, academia, industry, practitioners and training providers all have a part to play.

For further information about KnowledgePoint and our role as the Autodesk Learning Partner Distributor for the EMEAR territory, or to find out how you can play a part in driving change in practice across the region, visit:

knowledgepoint.com/autodesk



