

The background of the entire page is a photograph of an industrial construction site. In the foreground, two men in blue polo shirts and jeans are looking at a clipboard held by the man on the left. The man on the right has orange ear protection around his neck. In the background, there are large yellow industrial tanks, a crane, and a clear blue sky.

Betting big on Digital

5 key technology
areas that'll change
the game for E&C

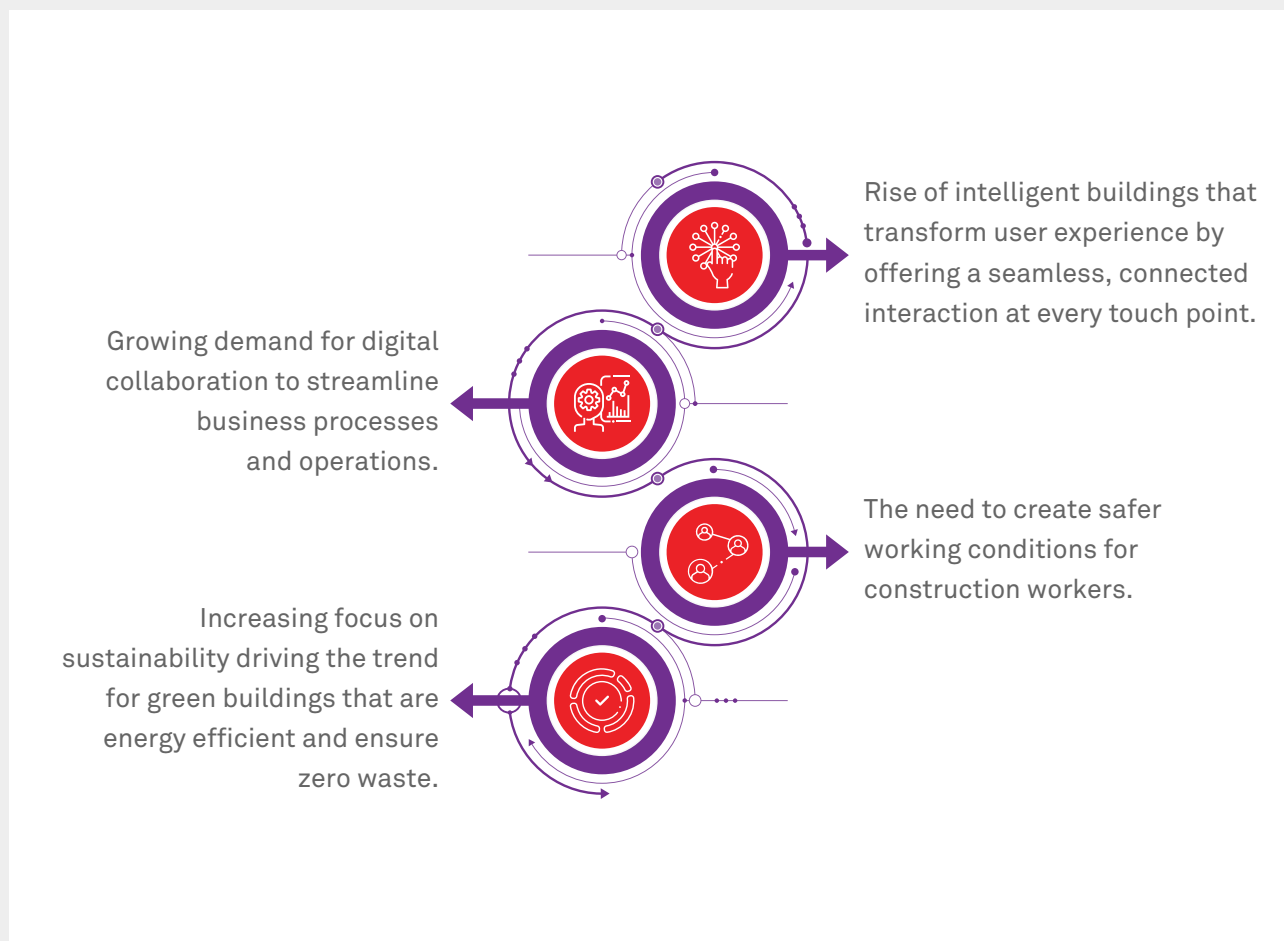
The Engineering and Construction (E&C) industry is a sector plagued by challenges. From productivity that has been stagnant for decades, to stiff competition, talent wars, and shrinking margins, to increasing project complexity and customer demands for more efficient, economical, and sustainable delivery – industry players are stretched thin. Moving up on the digitalization index, B2B clients of E&C companies are also demanding new-age infrastructure that can cater to the demands of the new digital user.

The realization that the way they do business must change drastically has hit hard. Industry leaders are asking with increasing urgency: “How digital technology platforms/services/models be used to enhance productivity of projects? How can advanced technologies transform end-user experience? How can digital technologies be used to enable workforce at scale?” The answers to these questions have thrown the E&C industry in to the throes of a fundamental transformation – one driven by digital technologies.

Engineering the future

Digital technology is bringing in a new era for the E&C sector, making it more intelligent, efficient, productive, transparent, and safe. The potential of digital to help create intelligent spaces and cities of the future is too lucrative to set aside. Adapting new technologies is also the only way for E&C companies to survive in the digital era – this is the path to operational efficiency that can reduce costs and improve margins! In fact, a recent KPMG survey found that the top digital investment priority for E&C companies is improving business process efficiency (82% vs. 54% for all industries)¹.

While slow on the uptake when it comes to digital technologies, the E&C industry is moving quickly to deliver on some of the emerging trends that we are witnessing:



Technology game-changers

In an increasingly data- and experience-driven environment, E&C companies must 'Be Digital' and 'Build Digital'. We see 5 key technology areas that can enable this across the lifecycle of design, pre-construction, construction, and operations and project management².



Augmented and virtual reality

Another finding from the KPMG survey of E&C companies is that this industry has invested in augmented/virtual reality much more than others (23% vs. 10% for all industries). AR/VR is increasingly being adopted to enable workforce training, collaboration, and service resolution, as well as to reduce design and construction errors and undertake virtual site tours. The convenience, flexibility, and depth of detail offered are making AR/VR an integral part of Building Information Modeling.



Building information modeling

Building information modeling (BIM) is a powerful, real-time modeling technique that gives a single window view of the entire project such as design, blueprints, project plan, manuals, and specifications. This collaborative cloud-based system is accessible on remote mobile devices, providing all stakeholders access to relevant information and real-time changes. More importantly, 5D BIM systems can help E&C companies identify how any change in plans will affect cost, effort, and time, and make informed decisions to drive operational efficiency. Energy efficiency and facility management are also coming in to the 6D BIM fold to enable comprehensive project lifecycle management.

BIM's potential to impact resource productivity, asset longevity, supply chain collaboration, smart data, document digitalization, and workforce safety is significant. Many of our

clients, such as a leading Canadian airport and a new generation real estate company in the UK, are already reaping the benefits of these construction management solutions integrated with core ERP systems.



Connected construction

Cloud and IoT advances are bringing sensors and connected devices into the fold to capture data, enable remote monitoring and assistance, minimize waste and energy consumption, and improve site safety with a 360-degree project view. IoT will make its presence felt in wearables, smart devices, and drones. AR-enabled Smart Helmets are already helping workers by monitoring health and safety, enabling real-time communication, data capture, and access to relevant information. We've also helped a Dutch global enterprise deploy drone-based solutions to deliver significant productivity improvements in video-based flare inspection of high-rise chimneys augmented by intelligent algorithms. By preventing manual inspection in high heat and volatility areas, the solution also improved worker safety.

As sensors evolve, and type and quantity of data collected improves, analytics tools and dashboards will become more accurate.



Data analytics and artificial intelligence

Data analytics continues to play a key role in helping E&C companies make informed decisions and fuels their ability to make smart investments, refine sourcing and operations, and meet business objectives. In the new era of Engineering and Construction, data sources are getting integrated into single systems where the analysis is available to the right people, at the right time. Further investments in this discipline are in the pipeline where E&C companies will continue to improve data collection and analytics capabilities.

This data will be invaluable for AI systems, such as Wipro HOLMES, that can help enterprises hyper-automate processes, redefine operations, and leverage historical data for insight-driven due diligence to acquire and deliver profitable projects.



Digital collaboration

A convergence of several technology areas will bring about much-needed digital collaboration in the E&C space. AI-driven operations, analytics-based asset/project/workforce management, 5D and 6D BIM-based design, construction and facility operations, IoT-enabled O&M/facility management, drones-based physical inspection/construction site monitoring, and mobility for field force productivity bring in much-needed agility in operations and can potentially improve business productivity by 8-10%. For instance, a large engineering services company in Australia reduced time spent on indirect work by 12% by leveraging a user-design-led field force mobility solution.

A word of caution

While connected construction has immense benefits, one must be conscious of the lurking threat of cyberattacks. Connected systems can have gaping holes that invite cybercriminals – the lure of holding critical infrastructure to ransom is too much to resist. One cybersecurity research organization estimates that the cost of ransomware damages alone in 2019 could exceed \$11 billion³! E&C companies must view the possibility of cyberattacks as a very real threat and build resilience into their systems from the beginning.

Blueprint for tomorrow

Investments in digital technologies will only accelerate as industry players make rapid advances to maintain their competitive edge. However, investments in technology for the sake of technology must be avoided. The right approach is to create a technology roadmap, identify gaps in the current systems, and invest in the right capabilities that can help achieve business goals and help E&C's philosophy of 'Be Digital' and 'Build Digital'.



About the author

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Sahadev Singh is the Global Head of Wipro's Engineering and Construction services business. With over 25 years of experience in helping customers unlock value from their IT investments and drive business transformation strategies, Sahadev is a highly respected advisor to Wipro's E&C industry customers and partners.

Under Sahadev's leadership, Wipro has built long-term strategic partnerships with leading global enterprises and established a proven track record for delivering predictable business value across a range of industry sectors. He has cultivated an extensive network within Wipro and its partners, and is able to leverage this network to meet clients' challenging needs.

1. <https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/09/harvey-nash-kpmg-cio-survey-2018-construction-engineering-industry-findings.pdf>
2. <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-new-age-of-engineering-and-construction-technology>
3. <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/critical-resilience-adapting-infrastructure-to-repel-cyberthreats>



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