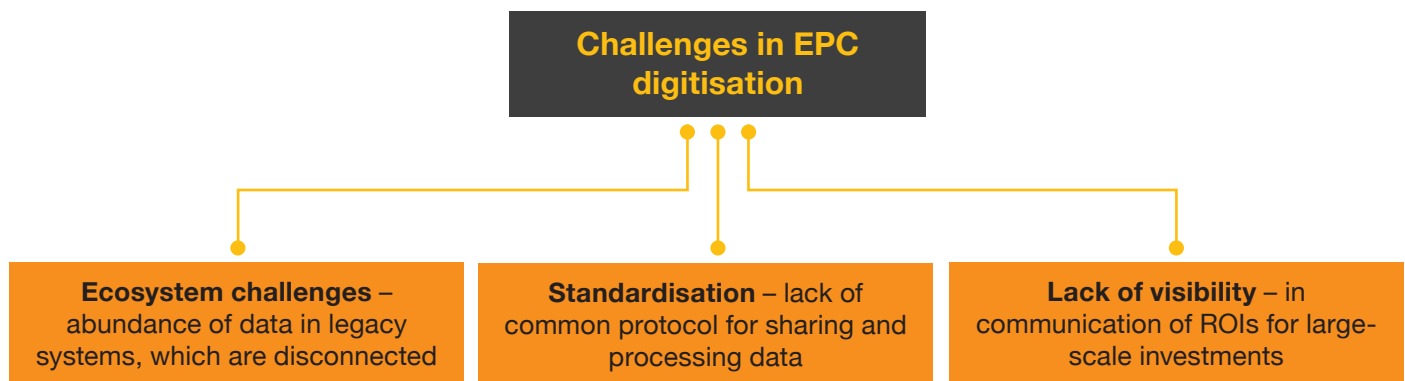


Lack of visibility

The EPC industry is capital heavy, with each project requiring large-scale investments. This results in any level of digitisation requiring significant initial investment in terms of new equipment, software and training. Unfortunately, the returns on investment (ROIs) across the EPC value chain are rarely evident in the short term. Lack of visibility on the ROI and probable disruption in production processes make it difficult for investors to be on board with the digitisation agenda.

How 5G can help

5G technology, with its enhanced mobile broadband, ultra-low latency and massive machine connectivity, is helping the EPC industry discover a host of enterprise use cases. Acting as an enabling tool for a plethora of other technologies, 5G could aid the digitisation, process optimisation and higher levels of automation in the EPC industry.



Advantages of using 5G in EPC

IoT-enabled machine connectivity for monitoring

Through its massive machine connectivity, 5G could facilitate IoT-enabled devices to tackle the ecosystem challenges in the EPC industry. Presently, the data influx from various data points into the legacy system used by most of the EPC players is disconnected. However, IoT could be used to collate this data and process it by setting up an internal IT environment that integrates data from multiple touchpoints. The ask from the EPC industry is also evolving with customer requirements going beyond the construction and installation of equipment. Machine-to-machine (M2M) data collected through multiple IoT sensors and aided by low latency of 5G can provide proactive quality maintenance. This could be a critical after-sales success facilitator. The continuous monitoring of heavy machinery in the EPC industry would enable predictive maintenance that will aid in strategising the workforce, avoid system breakdowns or malfunctions, and improve workers' safety. The information gathered from these connected IoT devices can relay actionable insights such as idle-time data, danger-zone proximity and machine wear and tear. These insights can be used to optimise manpower, enhance worker safety, enable proactive machine maintenance and optimise asset allocation and utilisation of power/cost, thereby enhancing and improving the entire operation.

Augmented and virtual reality (AR/VR) for communication, safety and training

AR/VR connected via 5G could enable EPC companies to improve their construction outcomes. VR can be used for training purposes in a risk-free environment by creating structured walk-throughs. Moreover, it can help in engaging multiple stakeholders from remote locations for collaboration. AR can perform a real-time comparison of the modelled and constructed layouts by superimposing construction blueprints over the elements constructed, thereby reducing errors during construction. 5G aids AR and VR technologies with its high bandwidth and low-latency connections.

Health, safety, security and environment (HSSE) data for smarter designs

Generating virtual 3D models of the infrastructure to be developed through building information modelling (BIM) and big data integration could help the EPC industry to enhance and improve design and construction planning.

These virtual models could enable site engineers and workers to pull up images of the site with exact dimensions through mobile or web apps. Earlier, it was a challenge to enable such technology owing to the lack of bandwidth. Now, the bandwidth requirements can be effectively addressed by 5G. Moreover, taking measurements of risky infrastructure can be facilitated via drones with a 5G connection for seamless transition of data, providing a safe environment for the workers. These drones can also be used to collect HSSE data for validating compliance at construction sites.

Intelligent automation through artificial intelligence (AI)

AI and 5G play a pivotal role in enabling innovation and automation in the EPC industry. 5G-integrated AI systems, with their state-of-the-art analytical capabilities, enable real-time decision-making and improve production efficiencies. For example, design solutions are considering a plethora of design parameters and are benchmarking with the industry's leading designs from various databases on the web. This would require the seamless processing of huge volumes of data from multiple sources, which can be enabled by using 5G connectivity. Post that, the system will perform multiple iterations suggested by AI tools to optimise the design. Collaboration with industry experts for faster deployment and quicker delivery time will also be possible due to the faster connectivity of 5G networks.

Benefits



Improved worker safety and working conditions



One remote operator for multiple machinery



Innovative use of technologies with 3D printing, drones, robotics



Collaboration between site and remote workers



Deployment in days instead of months



Modular construction and shorter delivery times





5G use cases in the EPC industry

A leading EPC firm in Australia conducted 5G trials to visualise a construction infrastructure. It used mixed reality smart glasses requiring high bandwidth, which were developed by a leading American multinational technology corporation.³ This enabled the employees and customers to visualise a virtual model of the building and its elements such as electrical schematics and structural steel framing. The trial facilitated the visualisation of real-time architecture and drawing changes on tablets owing to the low latency, high speed and high upload rates of the 5G connection.

A Japanese telecom operator conducted 5G trials to check remote control of construction machinery such as excavation and transport vehicles. Videos from 4K HD cameras mounted on construction machinery were transmitted to a remote controller through a 5G network. The operator in the remote control room operated the equipment while watching the high-resolution videos on monitors in real time, enabling worker safety and improving working conditions.⁴

An Indian construction conglomerate conducted 5G trials on a Government-allocated spectrum in collaboration with a British telecom major in India. This trial focused on visualising and analysing smart city applications.⁵ The construction company's proprietary platform was tested with 5G connectivity to address the use cases related to safety and security, smart solutions to citizens, and the challenges faced because of rapid urbanisation. High speeds of approximately 1.5 Gbps were achieved with very low latency on the millimetre wave spectrum band.

The combination of 5G and other emerging technologies offers huge potential to all EPC players. Companies are working on several use cases using 5G for remotely controlling machinery and visualising and monitoring construction through high-definition camera feeds, asset tracking and maintenance through IoT-enabled sensors and 3D printing construction robots. EPC players need to collaborate with technology providers to evaluate the efficacies in order to gauge the advantages of these 5G-enabled systems.

How we can help you

PwC has a robust structure in place to help you understand the impact of 5G technology on various business areas. Through our Technology Tinkering Lab, you can find out more about how we leverage our in-depth industry experience to help you understand this technology and chalk out your organisation's 5G roadmap.

³ <https://www.computerweekly.com/news/252491002/Taylor-Construction-successfully-trials-5G-for-high-tech-applications>

⁴ https://www.nec.com/en/press/201901/global_20190128_01.html

⁵ https://www.business-standard.com/article/companies/vodafone-idea-teams-up-with-l-t-for-trials-of-5g-based-smart-city-solutions-121101800552_1.html

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Contact us

Ashootosh Chand

Partner, Digital and Emerging technologies

PwC India

ashootosh.chand@pwc.com

Mohammed Ali Kizer

Associate Director, Digital and Emerging technologies

PwC India

ali.kizer@pwc.com

Contributors

Vignesh Venkataraman

Avneesh Narang

Tanvi Vakil

pwc.in

Data Classification: DC0 (Public)

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KS/June 2022-M&C20157