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So says Prajwal Misra, director, REPL



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Despite being one of the largest and fastest growing infrastructure sectors in the world, India's infrastructure sector is still a few years behind the global standards in terms of technology and efficiency. Improper planning, wastage of resources, cost overruns, delays in delivery, poor design, unsustainable practices, and several other issues keep the sector from performing to its full potential. However, thanks to digital technologies, things need not be the same for much longer. Digital technologies coupled with geospatial technologies are rapidly bridging the technological gaps that have marred the Indian infrastructure sector. BIM and digital twin are two such technologies that are rapidly revolutionizing the AEC sector.

Building Information Modelling (BIM) is a process that uses digital technologies to create a 3D model of a building or infrastructure project. This model can be used to plan, design, construct and operate the project throughout its lifecycle. BIM allows all stakeholders to collaboratively work on the same model. This reduces error, design clashes and improves construction efficiency.

BIM is used to plan and design projects more efficiently, and there are potential cost savings across the construction lifecycle. It helps in identifying potential risks and hazards during the planning stage, and hence construction sites can be made safer for workers. BIM helps in streamlining construction processes and improves coordination between different teams working on a project. As a result, construction projects can be delivered more quickly and with reduced disruptions. It is also an important tool to assess the environmental impacts of proposed construction projects. We can help deliver more sustainable buildings that have less of an impact on the environment. Software such as ArchiCAD is providing a build-in tools to design, visualize, document, and deliver all size of projects. Such software platform also helps the designers in shaping complex projects with ease and innovative features. It is notable that it was way back in 1987 itself that the BIM software was introduced by ArchiCAD in Europe. However in India, the BIM has started getting acceptability only after 2010. So Industry as whole, we have a time lag to catch up.

A digital twin is a digital replica of a real-world object or system. It can be used to simulate the behavior of a real-world object or system and to optimize its performance. Digital twins are often used in the manufacturing and healthcare industries, but they have potential applications in any industry where data can be collected about a physical object or system. Digital twins provide the virtual representation of the physical assets, resources, and processes. It can integrate the data from BIM on a real-time basis and help the teams working on a project understand how the latest update would fit into the project and how other parts might react to the new update. In case it is unable to gel with the project design, the developers would know it at the digital level and make necessary adjustments to make it work.

Use of BIM with Internet of Things (IoT) applications offer a variety of fresh perspectives and decision-making abilities across the built environment's life cycle. The concept of the Digital Twin of the Built Environment has just come into existence due to the capability of real-time connectivity to online sensors installed in an area. It provides seamlessly oversees and manages the life cycle operations of construction, facilities management, environmental monitoring, and other processes by fusing the real world with a virtual environment.

BIM and digital twins are two of the most transformational technologies to have emerged for the AEC sector in recent years. When used together, they can provide a number of powerful benefits for organizations involved in designing, building, and operating facilities.

Some of the key benefits of using BIM and Digital twin include:

***Greater accuracy and precision:** By using BIM to create a detailed 3D model of a facility before it is built, the project planners can be sure that everything fits together perfectly and that there are no surprises when construction begins. Digital twins further improve accuracy by providing real-time data on how a facility is performing after it has been built, allowing for corrections to be made if necessary.

***Increased efficiency and productivity:** BIM and digital twins can help the developer to save time and money by preventing errors and reducing rework. For instance, the use of BIM to design a pipe system for a new building can ensure that the pipes will fit correctly the first time around — saving you time and money on site.

***Better decision-making:** With access to accurate information about a facility at all stages of its lifecycle, from design through to operation, you can make informed decisions about changes or modifications that could improve performance or address problems.

***Improved communication and collaboration:** BIM provide a common platform for all project stakeholders to share information and work progress.

The application of digital twins in the AEC industry will allow for more efficient and effective construction processes by providing a comprehensive view of the project lifecycle. Additionally, this strategy will help to improve communication and coordination between different teams and stakeholders involved in a project. Ultimately, the use of digital twins can help save time and money while also reducing errors and improving safety.

BIM and digital twin have the power to uplift the performance of the AEC sector to the next level. They can boost the productivity of sector by 25 to 30 percent. However, India's AEC sector is not very proactive in the adoption of new technology. If India is to achieve the target of a 5 trillion-dollar economy by 2025, the AEC sector must act as the driving force. The corporate sector is doing its bit in adopting BIM and Digital twins in project development, however, the progress is not happening at desirable pace. It is time for the government to formulate a policy and make it mandatory for the infrastructure sector to adopt BIM and Digital twins in all forthcoming projects. Several developed countries already have such policies in place and are reaping rich benefits from them. Not only BIM and digital twin policy optimize the resources for now but also will prepare it for the needs of the future.