Here's how technology enables the timely delivery of infrastructure projects

Digital technologies such as communication technology, project management software and cloud-based technologies, have proved to be a boon when it comes to the timely delivery of infrastructure projects. These technologies are proving their worth in almost every stage of project development.

ETCIO • November 02, 2022, 09:03 IST

By Prajjwal Misra

The significance of infrastructure for any modern economy cannot be overstated. Neither can it be summarized in words or articles. The importance of infrastructure can be understood by the fact that they not only generate financial value for the country but also help in raising the standard of living for the citizens and help conserve the environment. They have a dual effect on the economy and benefit it in the short as well as long run.

Infrastructure projects consume huge amounts of financial, environmental, and socio-economic resources. Due to their size and resources consumed, infrastructure projects hugely impact their surrounding areas. After completion and during the operation, the immediate impact is generally positive. However, during the construction phase, infrastructure projects create an enormous amount of social and ecological disturbance. This impact could be in form of the need for community relocation, loss of flora, pollution in local water bodies, traffic disturbance, etc. The longer a project stays in the construction phase, the longer these problems exist. Therefore, from the social and ecological point of view, timely completion of the infrastructure projects is a must.

Normally, infrastructure projects start generating economic and social value for the nation immediately after being commissioned. Delay in project delivery means higher sunk costs and delay in socio-economic value creation.

Why projects get delayed

Infrastructure projects are huge and complicated by nature. There are so many moving parts in one project that maintaining harmony is often a difficult task. During the planning phase, the developers have to find the most suitable site for the project, and then work with structural engineers and architects to prepare the most suitable design for the project. Engineers and designers have to work closely with various other stakeholders like water and electricity experts, environmental bodies, legal experts, and social activists to understand their requirements and prepare a perfect design. They also have to take into account future events like the rise in demand, the effects of climate change, and the need for modifications to suit the demand of the future. More often than not, coordination between all the aforementioned stakeholders is a time taking process and the design approval of the project is where the delay starts. A single-window approval system can really have a decisive impact on controlling project delays.

During the construction phase, inefficient supply chains lead to a shortage of construction materials. Sometimes the material is of unacceptable quality. Shortage of labor or other labor issues can also delay the delivery of projects.

Role of technology in faster delivery of projects

Digital technologies such as communication technology, project management software and cloud-based technologies, have proved to be a boon when it comes to the timely delivery of infrastructure projects. These technologies are proving their worth in almost every stage of project development.

Site Selection: Selecting the perfect site for an infrastructure project is one of the most critical and difficult task. These projects have huge socio-economic and environmental implications. Due to their sheer size, the projects are practically impossible to move from one place to another if the project site is deemed incorrect at later stages. Site selection could be the difference between the success and failure of a project. Therefore, correct site selection is paramount. Modern project developers use geospatial technologies like GPS, GIS, and remote sensing to determine the best possible site for a project. These technologies not only take into account the financial viability of the project but also its social impact and the effect on local ecology. By analyzing the historical data, these technologies prepare computer models to determine the effect of climate change on a project in a particular location. Geospatial technologies provide comprehensive information to the project developers and help them choose the most suitable location. All this, in a very short span of time.

Project Planning: Planning a project is often one of the most time-consuming tasks. Technologies like Computer-Aided Design (CAD) help planners build the basic design of the projects. Digital technologies like Connected Construction help various stakeholders of the project work simultaneously on the design and with inputs from each stakeholder, the project design gets automatically updated and everybody gets a notification. If anybody has any objections or feedback, the person can share it with everybody on a real-time basis. Building Information Modeling (BIM) enables planners and designers to incorporate multidisciplinary data in the project design and helps them anticipate the demands of the future and needs for repair or modifications.

Supply Chain Management: For a project to complete on time, the availability of the material at the right time is extremely important. Technologies like Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT) help project developers build efficient supply chains. These technologies keep a record of the material and anticipate the need in advance. They place orders automatically and track the supply. These technologies can also anticipate any sudden rise in the demand for the material or its price. AI and ML can also be used to set and examine the quality parameters of the material being used. By managing the supply chain better, digital technologies don't let the shortage of material delay any project.

Automation: Infrastructure projects are labor-intensive. Quite frequently, shortage of labour or other human-related issues leads to delays in projects. Automation can help developers reduce their dependence on manual labor. This not only saves cost in the long run; but also accelerates the work on the project site. Automation also helps in reducing wastage and human error. Even if there are issues with human resources, automation can help the developers carry on the work without much disruption.

Infrastructure projects are affected by and affect many different factors in life, business and the environment. Their timely delivery is one of the key criteria to measure their success. While not all factors, like the Covid-19 outbreak or extremes of weather, can be controlled by humans; digital technologies are enabling the project developers to address and resolve a lot of issues causing the delay in projects. Developers must be willing to invest in these technologies as the investment would be far less compared to the losses that they might incur in case of delayed project delivery.

The author is Director at RIPL.