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Role of IT in infrastructure

By **The Property Times News Bureau** - April 15, 2021 36 0

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Introduction

The 21st Century is the century of Information Technology (IT). It has touched and influenced every aspect of the modern life. The advent of IT has changed the way people communicate, study, travel, build, plan and everything else. Infrastructure, like every other facet of modern life, is also hugely dependent on IT. Whether its planning, development or operation of any project; IT plays an important role in every phase. Modern economies are largely dependent on infrastructure for their smooth operation, sustainability & growth and in today's world it is almost impossible to imagine any infrastructure without the IT. Not only the new, but decades, even centuries, old infrastructure is now equipped with modern IT infrastructure for their maintenance and operation. It won't be an overstatement to say that IT plays the role of backbone in any modern infrastructure.

The role IT is vital in every phase of infrastructure project; right from planning to project execution to the operation of the infrastructure. IT has significant application in standalone infrastructure like a highway as well as in matrix of infrastructure like a smart city.

Planning

Planning is the most important chapter of any project and so is the role of Information Technology. Computer modeling and historical data analysis helps the developers understand the need and demand of infrastructure project at a particular site. Othertools like GPS help understanding the location and landscape of the project site. IT tools like Auto Computer Assisted Design (AutoCAD)and BIM help in designing the projects and create 3 dimensional models on computer much before the first stone is laid. Such modeling helps in identifying any design flaws or additional requirements much before the start of the project. Besides saving time and effort, these tools helps create flawless designs. IT tools also help analyze historical data and predict future demands, upgrade & maintenance requirements, ecological impact, expected influence of climate change on the infrastructure etc. These tools enable various stakeholders of the project work simultaneously on the design and provide their inputs & feedbacks. Information Technology coupled with communication technology also helps in community participation in the design phase. It helps developers understand and address the concerns of the local community & ecology.

Construction phase

After proper planning, comes the stage of construction. This stage islabor intensive and involves heavy machinery. However even at this stage IT plays a significant role. Most of the machinery is controlled by specialized computers. This is done to maintain accuracy and precision. Computer models help in resource optimization and mobilization. Managers keep track of their inventory and staff with help of IT tools. These tools provide them timely alerts regarding the upcoming requirements of men, machinery and raw material. Specialized IT tools are used for project management. These tools help monitor the progress of the project, maintain timeline, manage demands and generate timely reports for all the stakeholders. Remote sensing and GIS enable developers to keep close eye on the developments and alterations happening at the project site and surrounding areas.

Role during operation and management

Once the project is complete and operational, the perennial role of IT infrastructure starts. In todays infrastructures almost everything is controlled and managed through IT. This includes HVAC, lighting, safety, security, inventory management, personnel management and much more. IT tools are also used to monitor the overall health of the project and keep the managers alert regarding any contingencies. In projects like parking spaces, highways etc special software help in fee collection, demand forecast and traffic regulation. Thus, helping the managers maximize revenue and plan for peaks & troughs of demand and supply.

Smart cities are smart due to the application of Information Technology in their infrastructure. Smart cities are able to optimize their resources due to the information gathering, processing and sharing, all done by the virtue of IT systems installed throughout their infrastructure. A smart city is as smart as its IT infrastructure.

Conclusion

Information Technology serves as the backbone of any modern infrastructure project.Either its planning, construction or operation, the role of IT cannot be overstated. Whether it's a stand-alone project or a combination of projects like a smart city, IT is imperative for conception as well as smooth operation. Several applications of IT and related systems have been mentioned in this article however the list is not exhaustive. With every passing day, new applications of IT are being introduced in the infrastructure sector. IT helps projects save cost, curtail errors, minimize environmental impact and maximize revenue. However, the success of any project depends on the selection of right tools and correct application by the managers.

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