

Factoring technology into connectivity

Impact of digital disruptions on transportation infrastructure has to be considered so that it does not turn obsolete even before it is put to use



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Digital technologies are disruptive — a reality changing the challenges of transportation infrastructure. A powerful source of innovation and renewal, its impact is felt most in the way that priorities are set and met. While they help asset owners by automating key tasks in the value chain, they are also responsible for altering the usage patterns in ways that often massively reshape assumptions made at the asset planning stage. The problem is that whilst governments and planners are usually able to identify the right kind of infrastructure that should be developed, the impact of technology on future infrastructure requirements is often left out of the planning exercise. This presents a host of new possibilities across the value chain, and in turn influences how businesses and individuals use infrastructure.

More often than not, the specific impacts of these digital trends may not be immediately apparent, although it is entirely likely that future infrastructure requirements will be dramatically different from what they are today.

Asset owners can make the most of digital innovations across the life cycle of an asset keeping in mind three imperatives:

■ **Accounting for the impact of megatrends in asset planning:** Asset owners

must keep an eye out for digital disruptions capable of altering usage patterns and turn them into competitive opportunities. Drawing parallels to when the onset of automobiles drastically reduced the share of railways in most economies, the onset of autonomous vehicles (AV) is set to profoundly alter transit mechanisms by 2020. The deployment of connected technology and AVs will fundamentally change the way transport infrastructure such as bridges, railways, roadway capacity and parking systems are designed, built and reconfigured. Innovations such as self-parking and lane-keeping technology, coupled with easy sharing and last mile connectivity, will capture market share from rails as well as public transportation.

Globally, leading industry players like Google and Tesla have made tremendous progress in AVs. Smaller players like nuTonomy in Singapore have piloted a fleet of autonomous shared vehicles that optimise capacity utilisation and reduce energy consumption.

■ **Driving efficiencies in construction and maintenance through Building Information Modelling:** Building Information Modelling (BIM) is increasingly being identified as a key emerging technology with almost endless applications to assist with asset management. BIMs or virtual design and construction or digital engineering empowers owners to clarify the scope of projects sooner and with more clarity. In the delivery phase, construction managers are armed with precise digital representations of the facility and are able to leverage that information in a lean construction process that emphasises continuous improvement. Coupled with emerging technologies, BIMs are boosting productivity, reducing complexity,

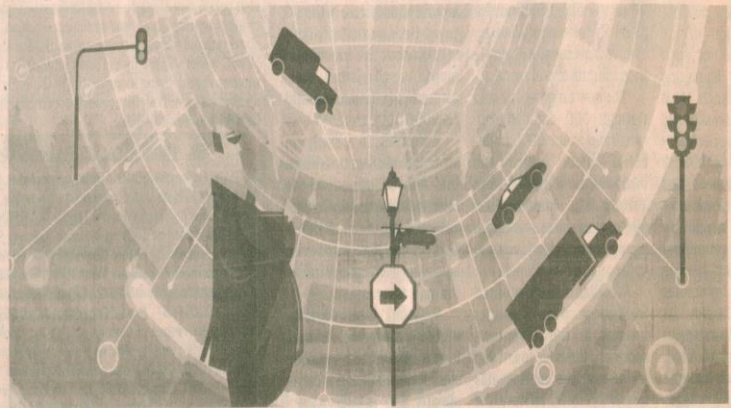


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optimising costs and improving quality and safety of assets. Transport infrastructure asset owners should build digital competencies to leapfrog. The construction of the New Karolinska Hospital is considered the world's largest public-private partnership for a hospital involving an investment of \$3billion. The contract mandated the use of advanced BIM across the entire life cycle from design engineering to construction, with close to one billion data items accessible to managers, auditors, project owners and staff through a simple SharePoint interface on smartphones and tablets. The integrated model not only allows coordinated construction and inspection of building plans and construction tasks to identify potential issues but is also linked to an environment library with relevant information of materials used to ease environmental certification.

■ **Optimising existing capacities of infrastructure assets:** Leveraging digi-

tal interventions to our infrastructure assets offers the potential to use assets more intelligently, finding efficiencies and optimising existing capacities. Transport infrastructure is ripe for disruptive innovations and the world over innovations are transforming experiences both for consumers, businesses and regulatory authorities. The use of sensor technology along with big data analytics has aided traffic optimisation and fleet management across various modes of transport. An integrated port community system, for instance, is a digital platform that connects multiple systems and enables standardised communication within and across various logistical modes connected to the port. Hamburg port is implementing a port community data platform for improving movement of vessels and goods across road, sea and rail transport. The traffic centre receives sensor-based geo-maps for short-term road traffic forecasts, wagon and freight-related information from rail stakeholders as well as real-time elec-

tronic charts of incoming sea vessels. The central coordination minimises waiting time ensuring smooth traffic flow.

■ **Digital innovations separate leaders from the laggard**

Unless asset owners carefully consider the impact that digital disruptions will have on businesses, society and in turn transportation infrastructure, they run the risk of planning and building infrastructure that will become obsolete even before it is operational. The thought process behind future infrastructure requirements needs to be reset from "the volume of new infrastructure that needs to be built" to "how can technology improve, influence or impact the existing infrastructure we have". The need of the hour is for owners to set up dedicated teams to devise methods on how to make the most of digital innovations across the asset life cycle.

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