DIGITAL TWIN – THE JOURNEY TO RESILIENT ASSETS

A human-and data-centric approach to asset management helps extract and protect asset value.

One of the main goals of asset management is to ensure that assets are more resilient. Whether it is a highway, a building, a railroad, or an entire city, all of these assets are subject to different types of deterioration due to disrupting climatic changes. As these assets age, significant investments are made to maintain basic performance levels.

In addition, the risk of natural disasters can mean that an organization not only loses its assets, but it is extremely difficult to identify the loss. This is why the digitizing assets and related information (asset functional and location hierarchy, asset attributes, asset condition, operational status, etc.), is so important.

“…when we started to remove stops and switches (transformers, fuses, resistors, motors) it would be very helpful had we had a device list on hand…”


The good news is there is a whole new world (in motion) where asset information can be captured in real-time and used to understand/realize the maximum potential of the asset. This ability to integrate physical assets with information technology brings huge benefits for asset stakeholders.

To make informed decisions, we can analyze data obtained through BIM (Building Information Modelling) and real-time data obtained through GIS (Geographic Information System), AI (Artificial Intelligence), ML (Machine Learning), and other IoT (Internet of Things) sensory devices.

Digital Twin (DT) is a popular technology currently used worldwide in various sectors. The DT can be viewed as a combination of digitized asset (IoT, connected infrastructure) and the ability to analyze the data produced through technology. Without the operational technology, data itself is not enough.

Digital Twin Consortium defines Digital Twin\(^1\) as

“A digital twin is a virtual representation of real-world entities and processes, synchronized at a specified frequency and fidelity.”

Infrastructure managers use this concept to make informed decisions in many ways.

\(^1\) Digital Twin
Some key examples include:

- Predictive maintenance - Improve current and future decision-making based on historical information;
- System lifecycle mirroring - Predict long-term performances/behavior, simulation of IoT devices, etc.;
- Remote control of systems;
- Real-time scenario testing; and
- Simulation of future designs.

With digital twinning capabilities, an organization can predict asset risks such as faults/failures, support asset operations, ensure maintenance, and do strategic capital planning. This improves asset management practices by extracting the maximum value from the asset while enabling better decisions in the future, through the use of technology.

Due to its enormous capability across the full lifecycle management of assets, various public and private sector organizations and asset owners are using DT and promoting its use around the world:

Sources: Centre for Digital Built Britain, ESRI, The Construction Index, Global Infrastructure Hub, Federal Transit Administration

Organizations that fully understand the capability of their assets can better understand asset management risks to address vulnerabilities and improve resilience.

At WSP, we understand that asset management goes beyond asset maintenance. That is why we help our clients think more broadly, not only about how to extract the value from their assets but also how to protect their assets against value erosion by making them more resilient through digital best practices.
“In recent times, we are seeing significant challenges impacting assets around the globe, across all sectors, due to natural and manmade disasters. This requires a paradigm shift in the way assets are managed through their lifecycle to increase their resilience and prevent value erosion. At WSP, we believe that a holistic approach to asset management is required, underpinned by the exploitation of data through technology such as Digital Twin. Organizations that adapt to the new reality and adopt new strategies will reap tangible value through the application of Digital Twin technology by developing a human- and asset data-centric approach!” - Nilmino Robert

Author
Nilmino Roberts
Principal Consultant
Asset Management
WSP in the USA
Nilmino.Roberts@wsp.com

About WSP
WSP is one of the world’s leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. We design lasting solutions in the Transportation & Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. Our talented people around the globe engineer projects that will help societies grow for lifetimes to come. wsp.com