BENORI

Digital Twin:

Global Influence and Saudi Arabia's Accelerated Adoption

October 2023

Digital Twin

A digital twin serves as a virtual replica of an object, system, or process throughout its complete lifecycle, reshaping the way we approach the design, monitoring, and optimization of the physical world. These digital twins stay up-to-date with real-time data, harnessing simulation, machine learning, and reasoning to enhance decision-making in the business domain.

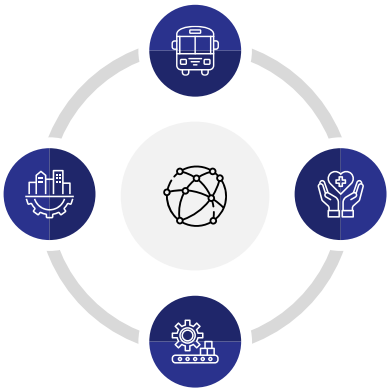
While the digital twin concept has had a presence for some time, it has evolved from a niche application to gaining widespread acceptance and adoption. As per industry estimates, the digital twin market is expected to be more than USD 150 billion by the year 2030. This surge in adoption spans various sectors and is driven by advancements in AI, IoT, AR, VR, and related technologies. Additionally, the integration of advanced Building Information Modeling (BIM) and simulation software with digital twin capabilities is expected to further boost market expansion.

Global Adoption of Digital Twin Technology by Government Organizations Across Various Sectors

Digital twin technology accelerates time-to-market through swift iterations and enhances sustainability by minimizing waste. This transformative capability is reshaping the landscape of informed decision-making. It has attracted considerable attention and is experiencing rapid expansion, finding relevance in prominent projects across diverse sectors, including:

Transportation – Dubai's Road Transport Authority has partnered with Du, a local telecom provider, to establish a digital twin solution leveraging IoT, extended reality technologies and innovative telecommunication solutions of Du. Digital twin helps in the detection of faults and maintenance of physical structures. The initial phase of this partnership focuses on Dubai Metro.

Infrastructure – The Indian government, under its GeoSmart Infrastructure 2023 initiative, announced the adoption of digital twin technology to boost infrastructure development. Digital technology offers real-time monitoring and effective maintenance that allows decision-makers to adopt sustainable practices and optimize the performance of the infrastructure.



Healthcare – Japan's National Centre for Neurology and Psychiatry has partnered with NTT, a local telecom provider, to develop a brain bio-digital twin technology that helps detect and prevent mental illness.

Manufacturing – Digital Manufacturing Ireland is an industry-led national organization that enables Irish-based manufacturers to access, adopt, and accelerate new digital technologies. In line with the government's Industry 4.0 strategy, it promotes adopting digital twin technology to fully represent the digital and physical production line.

The recent advancements above underscore the global recognition of digital twin technology's significance as governments embrace its potential worldwide.

Adoption of Digital Twin in Saudi Arabia

In alignment with Saudi Arabia's Vision 2030, which aims to create technologically advanced, sustainable urban environments, the country is actively harnessing cutting-edge technologies such as Digital Twins. NEOM, a futuristic city envisioned by the government of Saudi Arabia, embodies these principles, potentially becoming a template for innovative, sustainable, and diverse urban development. A subsidiary of NEOM, Tonomus, specializing in digital technology, has introduced "XVRS," a 3D cognitive metaverse platform. This platform enables real-time teleportation using robotic avatars or holograms across various metaverse locations. At its core, XVRS leverages digital twin technology to create these avatars. Tonomus has made a significant investment of USD 1 billion in AI-driven products, including digital twin technology.

Additionally, Saudi Arabia's government hosted the BIM & Digital Twins Saudi Arabia 2023 Conference and Expo to discuss the roadmap to Industry 4.0 and development in the latest technologies such as Building Information Modelling (BIM), digital twin system, geographic information system, digital design, digital construction, digital transformation, 3D printing, and related technologies. The government is also actively establishing strategic alliances and partnerships to integrate digital twin technology:

1. **Tonomus** has partnered with **Nvidia** and **Oracle** to enhance the adoption of AI within NEOM. As a result of these collaborations, Tonomus' clients will be able to utilize Nvidia's digital twin technology and access the Oracle Cloud region situated in NEOM city.

2. **Genesys International**, an India-based company that specializes in advanced mapping, surveying, and geospatial services, has secured a contract valued at USD 8 million to provide advanced mapping services for the Kingdom. The company will contribute to NEOM's ambitious digital twin program by creating elevation models, digital output forms, updating building data, enhancing the transport and hydrographic networks, improving the land cover database, and aligning with the national geospatial platform. Genesys also concluded the indoor mapping of around 24 airports in Saudi Arabia using digital twin technology.

3. **Naver Labs**, a South Korea-based IT R&D company, and **Naver Cloud**, a cloud solution provider, signed an agreement with the Ministry of Municipal and Rural Affairs and Housing (MoMRAH) and the Ministry of Investment of Saudi Arabia (MISA) to support Saudi Arabia in building digital twins at city scale. The projects are expected to utilize Naver's robotics and AI-enabled digital twin solution for Saudi Arabia's city-scale simulations and city monitoring. This agreement enhances their prospects of involvement in the NEOM project.

The Way Ahead

The journey of digital twin technology, evolving from a niche concept to its current global adoption, clearly demonstrates its pioneering nature. Government agencies worldwide acknowledge the importance of digital twin in bolstering sustainability and improving decision-making in sectors such as transportation, healthcare, infrastructure, and manufacturing. This evolution is marked by innovation, collaboration, and a shared vision for a more efficient and responsible world. It paves the way for smarter, interconnected, and sustainable urban development.

Benori is a trusted partner for knowledge solutions across the globe, serving clients from a wide range of industries including Professional Services, Financial Services, Consumer & Retail, Technology & Internet, Industrials & Manufacturing, and more. Our customized solutions strengthen the insights value chain of our clients, empowering them with key insights needed to drive intelligent decision-making and accelerate growth.

Headquartered in India, Benori is uniquely positioned to deliver multilingual research needs of global clients, powered by its digital agility, deep research capabilities and a highly experienced leadership team. Adopting a 360-degree approach, our team employs a combination of diverse methodologies including primary research, secondary research and data modeling, and offers detailed foresight on market trends, competitive shifts, regulatory changes and technological advancements.

Powering Growth Through Knowledge


info@benoriknowledge.com


www.benori.com

BENORI