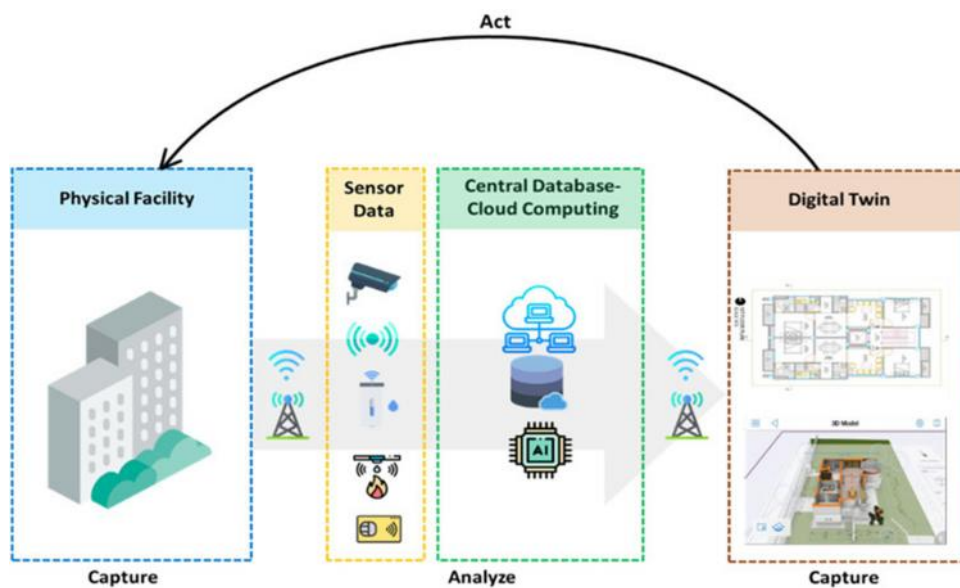


## The digital twin in construction field

The Digital Twin, is a technology that makes it possible to create a virtual replica of an object, a system or a real process. This is a model that incorporates real-time data, IA and data analysis to simulate the behavior of its physical counterpart.

An example of the Digital Twin application is the management of a road tunnel. By installing sensors in the tunnel, parameters such as wind speed, temperature, traffic density, etc. can be measured. This data is then integrated into a digital model of the tunnel which faithfully reproduces its structure and characteristics. The tunnel's Digital Twin thus becomes an analysis and decision-making tool which makes it possible to test hypothetical scenarios (for example, the impact of a partial closure or a change in signaling) and to carry out predictions (for example, traffic evolution or maintenance needs).



[Framework for the implementation of Digital Twin in construction | Download Scientific Diagram \(researchgate.net\)](#)

The Digital Twin is not a static model, but a dynamic representation of reality that adapts to changes in its real twin and can receive information from its environment. It interacts with other digital models or human users, creating a network of data and knowledge. From an initial model, the Digital Twin can be enriched with additional data or linked to other models to create a more complex and complete system. For example, if it is possible to create the Digital Twin of a building, we can also create, step by step, the DT of the district and even of the city, which integrates the technical, environmental and social aspects. The Digital Twin is therefore a key technology for the construction sector, which offers new possibilities for innovation and optimization.

In the module of WP3: “The digital Twin in the field of construction”, we are therefore going to deviate from the industry to make the state of the art of this technology in the urban environment. As in industry, the Digital twin can be used to optimize the design, manufacture, operation and maintenance of construction works. It can also be used to improve the energy performance, safety, comfort and sustainability of buildings.

However, the digitization of the construction sector is not an easy task. It requires substantial investments, both in terms of equipment and skills. It also presupposes an adaptation of working methods, processes and relationships between the different actors in the value chain. Finally, it involves a strategic vision and a desire for change.

The digitization of the construction sector is neither uniform nor homogeneous. It takes place at different rates and levels depending on the company, segment and market. Large groups often have a technological lead and a capacity for innovation greater than that of small and medium-sized enterprises. They can therefore take advantage of the most advanced digital tools, such as BIM, drones, sensors, artificial intelligence or even augmented reality.

The construction field must therefore take up the challenge of digitalization, taking into account its diversity, complexity and usefulness. It must support companies in their digital transition, by providing them with the necessary resources, training and incentives. It must also promote cooperation and sharing of good practices between players in the field of activity, in order to create a common digital culture.

The notion of digital sobriety is also important at this stage. Indeed, the use of digital technologies has an impact on the environment. It consumes energy, generates greenhouse gas emissions and produces electronic waste. It is therefore a question of choosing the most suitable and effective digital solutions to meet urban challenges, without compromising the well-being of people or the preservation of the planet. This is a major challenge for this sector, which must reconcile technological innovation with ecological transition.

If you want to know more about the Digital Twin and its applications in the field of construction, I invite you to follow the dedicated module on the e-learning platform of the Digital Twin Academy. You will discover the principles, methods and tools as well as some of the solutions currently being developed in this field.