Digital twinning in real estate
Humanizing buildings with Industry 4.0

As technology gets more pervasive, and smart buildings and precincts develop, real estate companies will (and some already do) use their smarts to anticipate both customer and technological needs. A good way to do this, and to cut time and costs, is to create a digital twin of the physical assets.
Centrally running and managing the building is just the beginning of the benefits of digital twinning. Getting real-time data on how tenants are using the building gives you the capability to provide really useful and value-adding services for the tenants. With the data on maintenance requirements sourced from smart sensors located throughout the building, downtime is reduced, as are its costs. In addition, the tenant experience is enhanced.

Digital twinning optimizes operations, improves the customer experience, delivers benefits across the full lifecycle of a building, and simulates complex scenarios. It is industry 4.0, and it is strategic. It is, in fact, the next innovation stage in today’s technology-laden smart building real estate industry.

Buildings are more than assets
As complex, high-value assets, with equally complex lifecycles, buildings present an ideal opportunity to realize the benefits of digital twinning. Moreover, buildings are so much more than just physical assets, as they nurture an environment where people live and work, facilitate social interactions, foster communities, and offer opportunities to improve individual outcomes.

From a corporate perspective, they drive loyalty and build brand. And on a win-win basis they help to create healthier, happier and more productive people.

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Considering how the digital twin empowers humans, it is critical in optimizing occupant experiences, not just physical infrastructure.
Approaching a building as an ecosystem lets you create a digital twin to optimize far more than just energy use. You can completely reimagine things, like air quality, temperature control, furnishings and facilities that respond to human sensitivity and are personalized through a series of personas.

**Breaking down the digital twin**

Creating a complete digital twin that can do this is a complex journey. It is important to break it down into smaller, modular digital twins, which can eventually integrate together over time. This allows faster development of the twin, and to prioritize use cases in order to build momentum and realize short-term value.

This approach is the most efficient method to create the roadmap for a complete digital twin of the entire building across its entire lifecycle. It also starts the process of digitally twinning the entire property portfolio.

The digital thread enables the integration of multiple digital twins into one single evolving view of a building.
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Choosing to optimize the Heating, Ventilation, Air Conditioning (HVAC) and lighting may not be the use case that redefines the industry, but strategically it makes sense. In the average commercial office building, around 10-15 percent of operating costs are due to electricity costs (of which almost 70 percent is associated with HVAC and lighting). These are substantial costs largely driven by tenant use of a building.

Digital twins will enable better visibility of how tenants use a building, and in time, the ability to simulate and hence forecast how tenants will move and interact. This will allow for more efficient HVAC and lighting management, and enable more optimal cleaning rostering while maintaining tenant experience.

In this way, it is a use case that will drive immediate and sustained cost savings, which in turn, helps build confidence in the digital twin, and paves the way for more complex use cases.

A digital twin enabled future

The digital twin expands as it incorporates each new simulation and use case, slowly building up a complete view of the entire building across its lifecycle, and integrating any disparate systems to create a centralized repository for all data and decision-making. This is often referred to as the digital thread. With a digital thread and digital twin in place, the real industry shift can begin.

Entirely new ways of designing buildings will start to emerge, as designers have access to complex simulations of entire buildings that provide a sandbox environment in which to test new designs. The entire construction process can be planned, visualized, and optimized before ground is even broken. Construction sites can therefore be managed more effectively, now able to predict exactly what impacts mean delays and which decisions to make to affect the overall construction process. The ability to monitor safety and compliance in real-time saves lives by predicting emergencies before they occur.

Self-maintaining buildings will become more commonplace. The digital twin can predict when something will fail, book a contractor, guide them to the asset, provide specifications and historical information, and then invoice them once the job is complete.

Through simulations, workplaces will be able to redefine the way spaces are structured and dynamically reorganized. There will be a shift to bespoke spaces and multimodal workstations that can be adapted in near to real-time to respond to the unique needs of different teams. Retail will take advantage of simulations to test new store layouts and design spaces that engage consumers in a more meaningful way. The health sector will take advantage of staff and patient simulations to minimize friction and bottlenecks, allocate medical supplies more efficiently, and optimize staff rostering to meet current needs and to predict future ones.

The next industry-wide distribution

Real estate assets have been getting progressively ‘smarter’ across industries, but the digital twin represents the next major driver of change because of these powerful predictive capabilities. Given the complexities involved with creating a complete digital twin, the industry is currently focused on delivering value for smaller, more specific digital twin use cases.

These aren’t big enough to completely disrupt the industry yet, but as these use cases are slowly combined into a complete digital twin, companies will be able to optimize entire buildings, precincts and portfolios in every stage of the lifecycle. As a result, new business models and market offerings will emerge and the way spaces are designed and built will be redefined.

Buildings will become more human, able to understand human sensitivity better and have the capability to nurture the rich ecosystems they contain. It will no longer be sufficient to design, build and lease a space.

The space will need to think for itself and react to the world around it. These large-scale changes, enabled by the predictive capabilities of a digital twin, will drive a dramatic disruption of the real estate industry.

Digital Twinning is one of our real estate predictions this year. Further information is available at [https://deloi.tt/2OrPiRK](https://deloi.tt/2OrPiRK)

Another key use case is optimizing how people are distributed throughout a space, to both improve utilization and to adapt to meet teams’ evolving ways of working.