

A man in a light blue button-down shirt is looking down at a laptop. The background is a blurred industrial or warehouse setting with blue lighting. The image is partially obscured by a dark blue vertical bar on the left side of the page.

DIGITAL TWINS: THE FUTURE OF RETAIL

Industry 4.0 is predicated on the knowledge that digital transformation will benefit businesses in a variety of industries. Adoption of new technologies like edge computing, AI, automation, and IoT is already starting to assist businesses in making better use of their data to optimise processes and discover new ways to generate value.

The discussion of Industry 4.0 has inevitably focused heavily on 5G as the next level of connectivity. It has the advantage of being able to compare these to its forerunner, 4G, and promises a vast array of capabilities that can enable a variety of new use cases in many industries: It is quicker, safer, and more dependable.

There is a clear place in the Industry 4.0 market for digital twins, as a technology that can facilitate adoption and deployment of other technologies and enable enterprises and developers to predict and understand how to use their existing infrastructure in the most efficient way and how to integrate other technologies to create additional value.

One of the most intriguing industry 4.0 technologies is arguably digital twin technology. According to a recent Gartner research report, The digital twin market will cross the chasm in 2026 to reach \$183 billion in revenue by 2031.

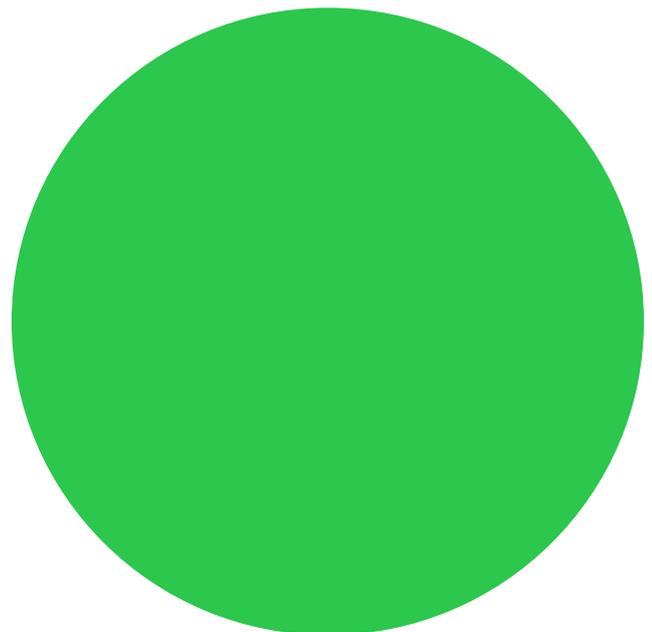
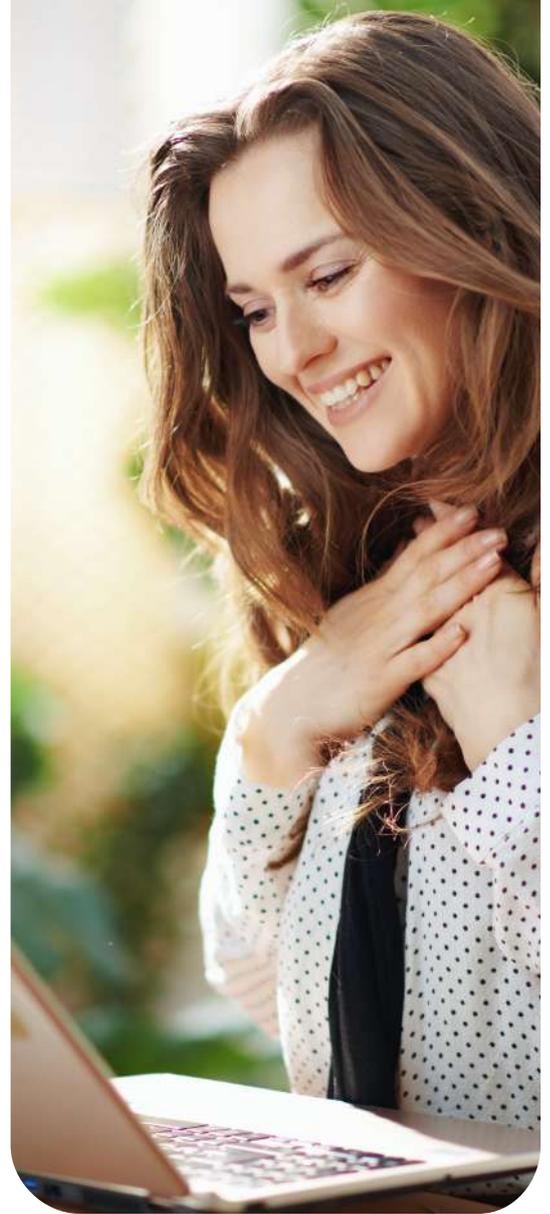
Businesses can use it to digitally recreate practically any physical object, including people, processes, and sensors, devices, and systems. Teams can use virtual representations of almost anything to make data-driven decisions based on the outcomes of the digital replica.

Although this technology is primarily linked to the manufacturing and industrial sectors, it is now making inroads into the retail sector. Every facet of retail, from product placement to every phase of the customer journey, is inherently complex. But with floor plans and numerous emails, it's much harder to picture any of this. Alternately, leaders can build a precise digital clone of a physical store and use real-time data to make it come to life and allow users to interact with it before implementing changes in a live setting.

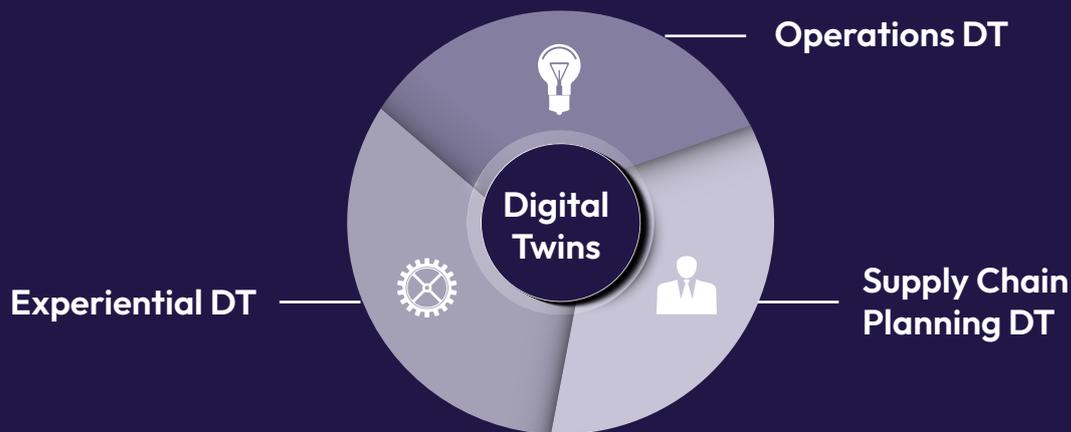
Retailers may think even broader than the customer experience by converting the physical environment into data points and fusing it with 3D technology. When managing inventory, product selection, and POS displays across numerous stores, there may be more opportunities in the less glamorous aspects of retail. For instance, it will be significantly simpler to create a consistent brand experience across numerous places worldwide with the aid of a digital blueprint.

Additionally, digital twins have the potential to enhance client experiences in a number of ways. Customers might use them to connect the dots between home repair projects, the materials needed, and the costs of those products. By arranging the order shopping lists to correspond with a path through the store, they might also aid in enhancing the physical client journeys within the establishments.

The original purpose of digital twins was to use engineering simulation to enhance product design. The Omniverse makes a far wider range of use cases for digital twin technologies and approaches possible.



How is Digital Twin Helpful in the Retail Industry?



1. Operations DT

Predictive maintenance in manufacturing

Businesses can analyse the data from the digital twin to proactively identify any mistakes or problems that will occur during the product's manufacture. Developers can learn more about the virtual environment with the use of IoT sensors and scanners integrated into the real system. This makes it possible for companies to plan out predictive maintenance precisely, which lowers maintenance costs and boosts the effectiveness of production lines

Continuous Operational Efficiency

With the help of digital twins, manufacturers can perform a "root cause analysis." To determine the cause of an anomaly, facility managers might investigate all probable catalysts. They develop a theory and make corrections after using the facts to support it. This serves as the basis for ongoing workplace changes and increased operational effectiveness.

Data as the defining factor for workplaces

Digital twins represent a plethora of accessible data. Facility managers have greater opportunity to comprehend the physical workplace as buildings become smarter and more technologies produce digital insights about it. They can regulate it more effectively the more they comprehend it. The results include increased workplace productivity, cost reduction, enhanced cost management, and even improved business culture. The digital twin, which serves as a source of truth for data-backed decision-making, is at the centre of all of it.

2. Supply Chain Planning DT

Real-time monitoring

Obtaining a thorough, real-time image of a complex physical system is nearly impossible. A digital twin will be useful in achieving this. Since digital twins are accessible everywhere, consumers are encouraged to interact with and understand the system

Product Lifecycle Management

Each product variant is represented by a single digital model in a traditional PLM system. In contrast, a digital twin can have a single model for every single product that is continuously updated utilising information gathered over the course of the product's life cycle.

The potential benefits of digital twins for users and product-based businesses are numerous. They can speed up an organization's responsiveness to new client needs, help with design optimization, and cut costs and time to market. In addition, digital twins can be a key enabler of new revenue streams including "as a service" business models and remote maintenance and support services.

Supply Chain Optimization

Supply chains, fulfilment, and distribution processes, as well as worker performance on an individual level, can all be optimised with the aid of digital twins. Retailers may model their supply chains as interconnected environments thanks to digital twin technologies. Retailers can model their assets, storage facilities, logistics and material flows, inventory positions, personnel, and operational procedures. The model is updated with real-time sensor and equipment data as well as data from ERP and other business systems to provide a live execution environment.

3. Experiential DT

Interactive Online Shopping experiences

Retailers can use digital twins as the foundation for 3D virtual walk-throughs for customers, as well as improved store management, planning, and inventory thanks to a plethora of data. Large businesses can effectively and remotely manage thousands of store locations thanks to digital twins.

Improving Customer Experience

Using inexpensive IoT sensors, the digital representation of a store may be fed real-time operational activity at many touchpoints. It is feasible to add and keep track of data from consumer activity, allowing distribution to be tailored to the preferences of their customers. Managers and staff will be able to explore and test out the ideal visitor interactions and layouts with the use of visualisation tools, and schedules may be rebuilt based on data-driven insights.

Sales and operations planning

The digital twin can enhance sales and operations planning by simulating the implementation of a given plan, emphasising risks and possibilities, and feeding the insights back into the planning process. This enables the retailer to lessen losses brought on by system limitations, hidden bottlenecks, and plan misalignment. The company may also better align maintenance and inventory builds to market demand with the help of the information

Future of Digital Twins in Retail

Due to Digital Twin's rising popularity, some businesses are already beginning to place a strong emphasis on its creation, implementation, and compatibility.

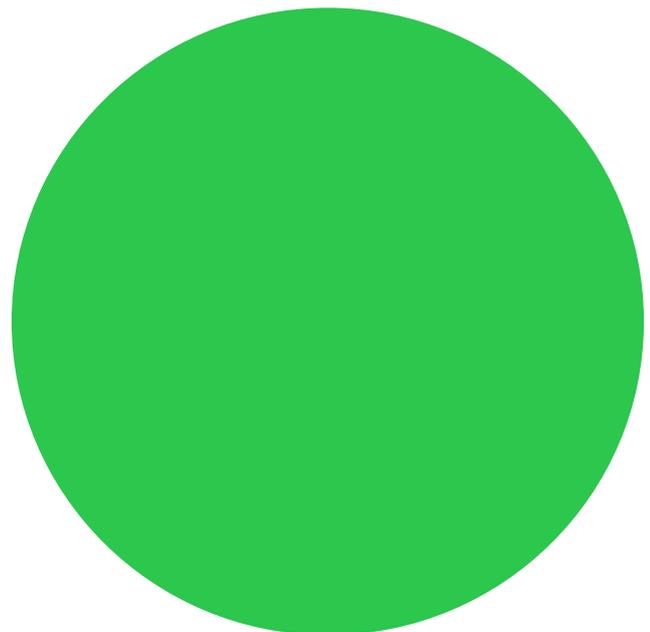
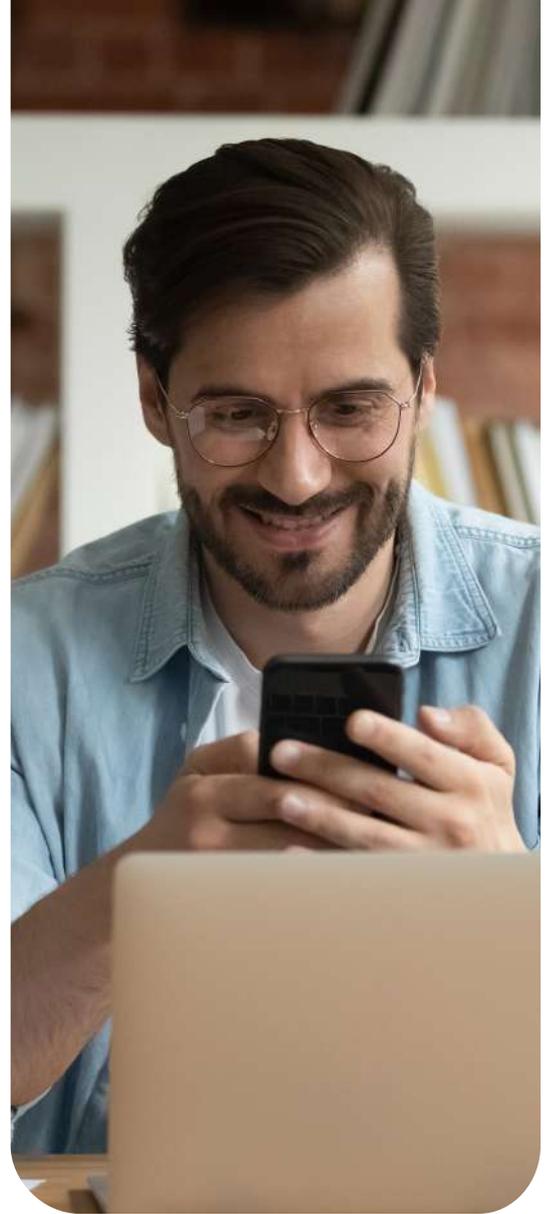
The majority of items purchased online are made through e-commerce, and Amazon has been utilising the idea of a digital twin to offer its users a customised, customised experience through marketing. Users begin interacting with the website's features by visiting it. Every single item they have browsed, bought, or put in their virtual shopping cart aids Amazon's Digital Twin algorithm in developing a digital representation of the customer. Due to the frequent re-marketing Ads that the end customer is exposed to every day while online, the obtained data helps them get them back on their website. The market leader uses Digital Twin technology in this way to get a lot of momentum.

To ensure brand consistency across all of its locations and to create immersive, virtual experiences for its staff, outside customers, and wholesale partners, GUESS, a leading worldwide fashion brand and retailer, has implemented digital twins. Since 2017, GUESS has employed digital twins, or photorealistic digital duplicates of stores, to enhance productivity by 200 percent, reduce travel expenses by 30 percent, and cut departmental paper and ink costs by 95 percent.

There is still a lot of unexplored potential for digital twins that businesses and merchants may explore. By optimising energy management, in-store planning, and security implementation, digital twins can significantly enhance the customer experience. By creating a virtual representation of clients, digital twins can significantly improve customer service. For a business to succeed in retail, a sizable customer base must be grown and maintained. Through the creation of a distinctive customer experience, such as offering clients the perfect fashion apparel products based on their digital twin model, digital twins can deliver this.

Retailers can utilise the digital twin to replicate the performance of a supply chain and pinpoint areas that can be optimised. Retailers can implement innovative non-linear supply chain fulfilment models like curb side pick-up or micro-fulfilment thanks to the real-time insight afforded by digital twins. The supply chain can access crucial information thanks to the digital twin's creation of a canopy over segregated data. According to Boston Consulting Group, early retail adopters of digital twins saw CAPEX reductions of up to 10%, sustained inventory reductions of up to 5%, and EBITDA improvements of one to three percentage points.

For companies looking to upgrade their supply chain with the newest technologies, Brillio's Track and Trace supply chain solution powered by digital twins offers a number of advantages, including Traceability through a shared platform to trace complete history with Chain of Identity and Chain of Custody, Alerts on tampering evidence, Enhanced visibility and Control, Data Security, and Real-time tracking via notifications.



ABOUT BRILLIO

At Brillio, our customers are at the heart of everything we do. We were founded on the philosophy that to be great at something, you need to be unreasonably focused. That's why we are relentless about delivering the technology-enabled solutions our customers need to thrive in today's digital economy. Simply put, we help our customers accelerate what matters to their business by leveraging our expertise in agile engineering to bring human-centric products to market at warp speed. Born in the digital age, we embrace the four superpowers of technology, enabling our customers to not only improve their current performance but to rethink their business in entirely new ways. Headquartered in Silicon Valley, Brillio has exceptional employees worldwide and is trusted by hundreds of Fortune 2000 organizations across the globe.



<https://www.brillio.com/>

Contact Us: info@brillio.com