How Digital Twins Take the Guesswork Out of Running a Business

Using virtual models of physical things, organizations can make smarter moves in the real world.

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What if you could see the results of business decisions before you made them? Test a new process idea? Start with the outcomes you want and work backwards to trace the steps needed to achieve them? All of that is possible today—even if you don't have a crystal ball. What you do need is a digital twin.

Digital twins are virtual models of real-world equipment or processes. Manufacturing, aerospace and automotive companies use them to streamline production lines, test designs and predict maintenance needs.

Now, with business data everywhere, digital twins are coming off the factory floor. They're moving into life sciences, retail, energy, agriculture, city management and more. They're ready to disrupt business decision-making by creating virtual mirrors of everything from contact centers to sustainability projects. And better decisions through digital twins are showing real impact on corporate bottom lines.

With the power of digital twins coming to the fore, it's essential for businesses to understand what these systems are, where they should be deployed, where they're already driving results and practical considerations for using them.

A digital twin brings all those strands together into a unified thread, revealing where they can form a tapestry—and where they might tangle.

60%
annual growth rate over the next five years.

Source: Marketsandmarkets.com

A Digital Crystal Ball

A digital twin is a virtual, working replica of a real-world object, system or process. These systems can model a component, like a Rolls-Royce jet engine, or the relationships among systems in a business—or an entire country, in Singapore's case.

Regardless of scope, digital twins work in real time, feeding on live data. The more data the system has, the more accurate its model. And with business increasingly done digitally, data is everywhere. Think heat sensors on a cell tower, customer sentiment analytics, and

patterns identified by artificial intelligence and machine learning (AI/ML) models. A digital twin brings all those strands together into a unified thread, revealing where they can form a tapestry—and where they might tangle.

Digital twins take questions. They can simulate results, model outcomes and predict potential futures. Beyond equipment and products, they can also do this for entire ecosystems. Every person, process, system and asset in an organization could be part of a digital twin.

A single twin can model customer personas, retail stores, online sales, contact centers and supply chains. It could simulate the outcomes of different actions *before* an organization commits to any of them. With digital twins mirroring how their businesses run, companies can base their decisions on data. Doing so eliminates gut calls and guesswork and expensive trials full of errors.

It's no wonder the digital twin market is predicted to grow at an annual rate of more than 60% over the next five years.

Today's Use Cases for Digital Twins

Digital twins aren't just for the factory floor. These systems can reflect people, processes and objects—any entity that generates or can be represented by digital data. This capability opens the door to using digital twins for a wide range of business processes and functions. Here are just a few:

Optimize contact centers and other operations. A digital twin can model interactions among processes, customers and human and digital customer service agents to more accurately identify staffing requirements.

Improve customer experiences. Twins are expected to reshape how companies deliver customer experiences. Digital twins of a consumer can help companies simulate, analyze and optimize individual customer journeys.

Go to market faster and smarter. Digital twins can help companies continually finetune their products and services with new features and functions. Insights from these systems could also reveal the potential impact of a new product or feature on maintenance and customer service parameters. These insights might also suggest ways a company might monetize additional investments in those areas, such as monitoring device health.

Build a sustainable supply chain. Organizations could link their supply chain twins to those of their production lines, finished goods or raw inventory, or even to twins developed by their suppliers. By changing variables, an organization can see the projected effects on delivery times and provide more accurate information to customers about product or raw material availability.

Enhance ESG compliance processes. Digital twins will be an enormous help in modeling and monitoring emissions as companies take inventory of their greenhouse gas emissions—both internally and throughout their supply chains.

Our team used a digital twin to help a leading health insurer make intelligent decisions about improving its member experiences without driving up its contact center costs.

3%

of businesses lose profits annually to poor "every day operational decisions."

Source: Gartner

De-risk Decisions with Twins

Gartner estimates that businesses lose 3% of their profits annually to poor "every day operational decisions," from how long to run a piece of equipment to which vendor to choose. Digital twins help minimize the risk of making unwise decisions by demonstrating the likely results of their different options.

For example, our team used a digital twin to help a leading health insurer make intelligent decisions about improving its member experiences without driving up its contact center costs. That meant making the right choices the first time about whether to add staff, which digital tools to offer and which members to target with new measures.

The system is an accurate reflection of the client's real-world contact center. It consumes live data about agent performance, call deflection, call times, reasons for calls and types of members calling. That meant the virtual tests we did in the twin—changing workflows, adding human agents, incorporating chatbots—showed results based on real-time data.

As the contact center changes, so does the digital twin. The system can even share insights with the real-world contact center, such as how to route queries for optimal resolution at a specific time of day. The twin creates insights into a complex system for which our client previously had murky visibility at best.

Dispatching hundreds of workers to log and monitor such changes isn't practical; however, using a digital twin of the network and its surroundings, the carrier can see into the network's future.

Twins Take on Time and Space

Digital twins can help companies tackle decision-making without being limited by real-world constraints such as time, resources, terrain and safety, among others. They enable businesses to accelerate time, such as exploring how volume growth over months and years will affect the performance of processes or equipment. These insights can inform decisions about when to upgrade systems or schedule maintenance.

Take a large cellular carrier we worked with that wanted to future-proof its mobile network against the performance degradation that often leads customers to switch carriers. Environmental changes ranging from extreme weather to new construction to growing trees and shrubbery can all degrade network performance.

Dispatching hundreds of workers to log and monitor such changes isn't practical; however, using a digital twin of the network and its surroundings, the carrier can see into the network's future. The twin can model factors like tree growth over time, and forecast the impact of rising or falling temperatures on cell tower equipment. These insights enable the carrier to plan well in advance for the steps needed to optimize network performance.

Practical considerations about digital twins

Using digital twins successfully requires organizations to understand the following key points about why they work and how to maintain them.

The more data, the better. Just as human twins share intuitive connections, digital twins and their real-world counterparts should be connected via a continuous flow of data. The more data an organization incorporates into a digital twin, the more valuable the system will be. Its simulations will be more detailed, and its insights more accurate. That's not to say, however, that a company should wait to develop a digital twin for a key process until it has deployed every sensor and built every application programming interface (API). Data may be layered into a digital twin as additional telemetry emerges.
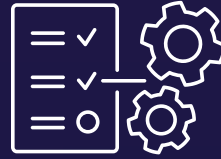
Define a realistic goal. By clarifying the business goal, businesses can better identify the data required to model different scenarios. A single process may incorporate hundreds of data points, and some may not be immediately relevant. Start with the obviously data and add to it as new use cases and business questions emerge.

Let data stay in its databases. There's no need to create either a central data lake or make business decisions with insufficient data and computing power at network edges. Data meshes and fabrics are nimble, cost-effective ways to get required data to digital twins.
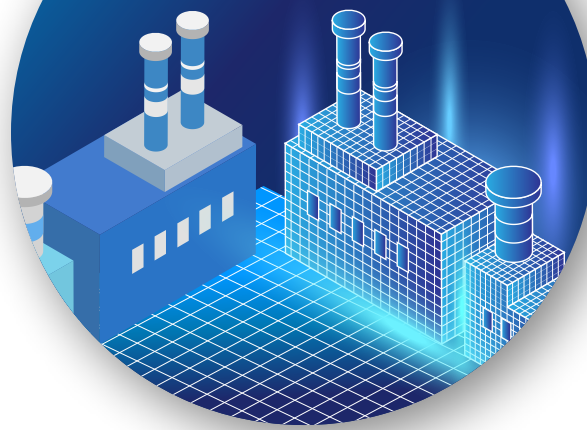
Identify ecosystem complexities. Many older, proprietary systems were not designed to share data. Through APIs, digital twins can help stitch these systems into an ecosystem. However, a digital twin should not become an excuse for increasing the technical debt of maintaining legacy systems. New systems should be open and designed for data exchange.

Consider a twin's lifecycle management. Businesses today must continuously change to keep up with new demands and developments. Digital twins must quickly flex to mirror these shifts. It's important to ensure digital twins incorporate modern data standards and iterative development methods such as Agile.

Prepare to act. A digital twin will certainly reveal where and how internal and external customer- and supplier-facing processes can be improved. It's up to the organization to act on these insights.

A quick service restaurant chain took its first steps toward the metaverse when we used a digital twin to help ensure its "farm to fork" philosophy was sustainable.

Twins, Meet the Metaverse

Because digital twins represent all the data created by a process, person or system, they're natural companions for AI models and ML algorithms. Going further, digital twins have been called the foundation of the enterprise metaverse. Businesses can connect their digital twins, gradually forming a virtual portrait of the company, its customers, its employees, its supply chains, and its campus or physical plant. Using AI and ML tools, it can analyze and act on the data in its own metaverse to solve challenges and make optimal decisions virtually, then implement them.

A quick service restaurant chain took its first steps toward the metaverse when we used a digital twin to help ensure its "farm to fork" philosophy was sustainable. The system encompassed warehouses, transportation options and locations of the chain's physical restaurants, which enabled it to model the consequences of various suppliers being unable to ship produce, poultry, meats and other supplies. The company then used these insights to select suppliers.

Eventually, the restaurant chain's metaverse could encompass farms, weather data, labor forecasts and more to create a data-based model of the company's entire operating environment.

Companies that work with these systems today will literally see into the future and be poised to make better decisions, run smarter and identify opportunities before competitors do.

The Time for Twins Is Now

As businesses gain the insights, cost savings and other outcomes that can be generated by digital twins, they'll likely realize additional use cases. These can be bolted onto a company's initial efforts, like interlocking blocks. We'll look at more of these use cases by industry in future articles.

Digital twins will soon be essential tools. Companies that work with these systems today will literally see into the future and be poised to make better decisions, run smarter and identify opportunities before competitors do. Start turning data into a digital twin today, and take your business into a larger virtual world.

About the author

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I'm a problem solver and evangelist, focused on applying the right mix of business and technical competency to solve large business problems. I thrive on fuzziness and am passionate about defining the blueprint for digital transformation, with clear outcomes and elevated experiences for my customers. I have the ability to inspire teams to work toward common goals and accomplish desired results. I have over 22 years of diversified technical experience in architecting, solutioning, innovation and product development.

In my current role, I lead the innovation and establish the engineering mindset within Brillio. I have a Computer Science Engineering degree from The Bangalore University and am a member of the Forbes Technology Council.

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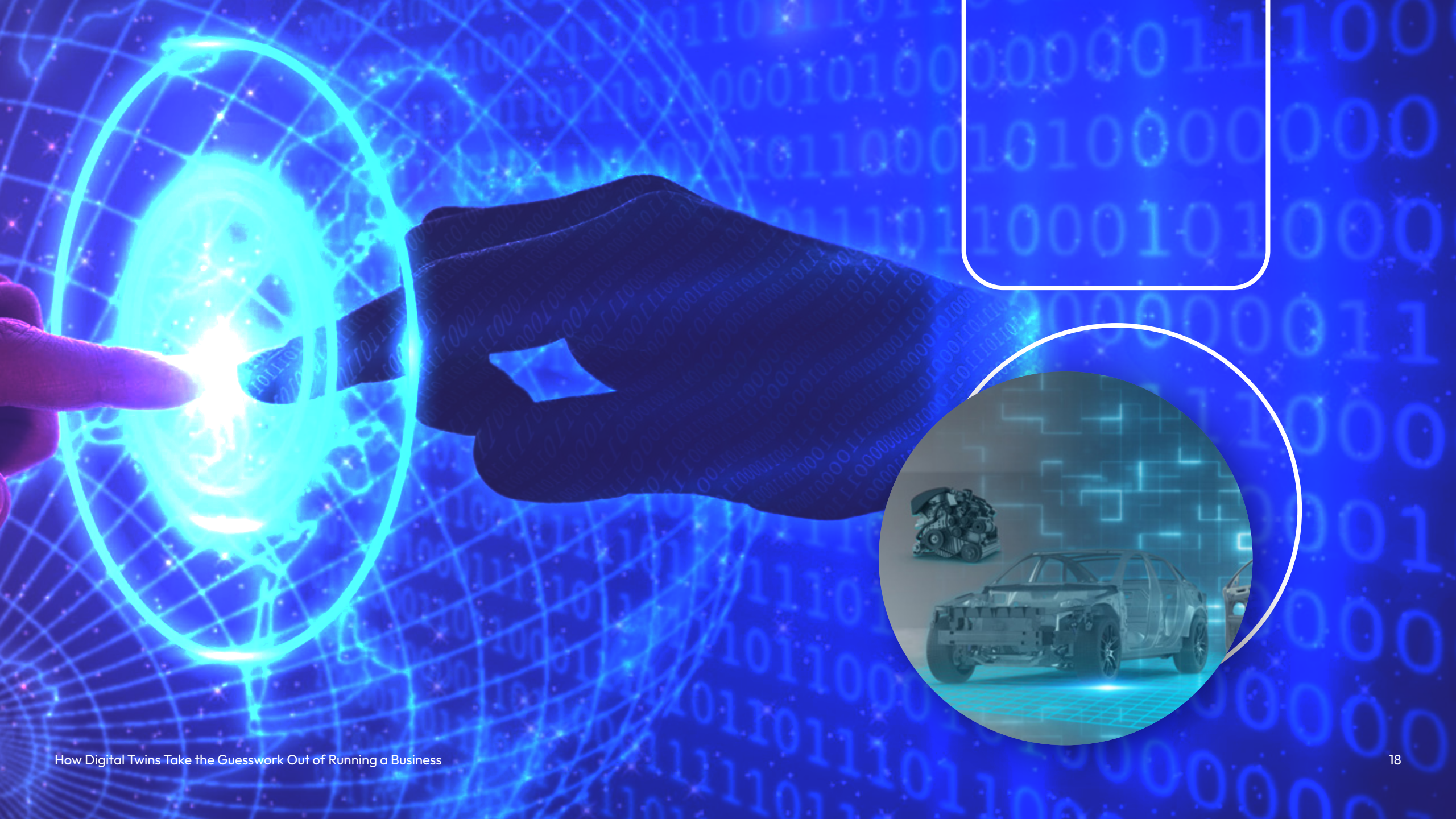
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