



Prescriptive AI Simulation

Tackling supply chain challenges with AI Simulation

COSMOTECH
Find Your Forward

Find Your Forward with simulation, planning new scenarios and developing robust, optimized action plans



Surmounting a supply chain crisis

The modern industrial world is constantly evolving, with economic trends and political decisions continually shaping and reshaping demand. For supply chain executives, this means not only confronting day-to-day challenges on a local scale, but also taking a long-term view of their global operations.

Recent global disruptions have highlighted ever more clearly the need for manufacturers to anticipate and prepare for business disruptions and fluctuations in demand. To weather this crisis and successfully restart operations, supply chain managers will need to quickly make and implement strategic decisions – about production, logistics, cost structure, hard savings, inventory and more – while generating free cash flow in a deeply uncertain environment.

To determine optimal action plans, manufacturers require both a complete understanding of inter- and intra-plant operational processes, and factual insight into changing business and social environments. Predicting how these various elements will interact is key to making quick and effective decisions, limiting costs in the short-term and defining a long-term recovery strategy.

Cosmo Tech's AI-Simulation technology creates a complete model of supply chain operations that accounts for ever-changing business environments. With Prescriptive Simulation Twins, manufacturing managers can simulate and optimize the effects of different operational strategies, identifying robust, resilient strategic plans and the actions required to implement them efficiently. Our technology identifies all possible points of optimization, providing manufacturers with short-term solutions for cost optimization and robust production planning, as well as long-term, resilient business recovery strategies.

While no one can determine the exact consequences of Covid-19, Cosmo Tech puts the power of prediction in our clients' hands. Our pre-packaged Simulation Twin solutions will play a key role in scenario planning, leading to optimized, robust and resilient value chains. For manufacturers worldwide, our advanced simulation tools provide factually-grounded, strategic plans that make a tangible impact on their business, steering them through uncertain times and towards successful outcomes.

A handwritten signature in black ink that reads "Hugues de Bantel". The signature is written in a cursive, flowing style.

Cosmo Tech Co-Founder and CEO.

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The technology designing the future of supply chain

Top 3

AI Simulation is in Top 3 technologies to enable CIOs and IT leaders deliver on the promise of digital

\$110.1 Bn

The global digital twin market is expected to be worth \$110.1 billion by 2028**

60%

60% of CSCOs are expected to make faster, more accurate and consistent decisions in real-time.***

*Source 2023 The Gartner Hype Cycle for Emerging technologies

**Source: Markets and markets, Digital Twin Market - Global Forecast to 2028

*** Maverick* Research, It Is Time to Move Beyond Traditional S&OP — Introducing Decision-Centric Planning

WHAT IS AI SIMULATION?

AI Simulation is the convergence of several types of AI, including complex system simulation, machine learning, statistics and optimization. It provides powerful techniques that can be used, alone or combined, in order to address decision-making problems in an increasingly complex and uncertain world.

How can an AI Simulation Twin be used for supply chains?

At its core is complex system simulation, which is the process of using computer models to imitate the operation of a real (or hypothetical) system or process. This digital replica is called a Simulation Twin and replicates the dynamic functioning of an organization's complete operational system. For supply chain managers, Simulation Twins offer the unique ability to replicate all activity and interactions throughout the production chain, regardless of the number and location of assets, manufacturing sites, suppliers, contractors and sub-contractors involved.

Using AI-Simulation technology, supply chain

managers can create unlimited predictive "what-if" simulations that demonstrate the impact of different decisions on operational efficiency and KPIs. Supply Chain managers can evaluate the strength of their action plans, testing their robustness in the face of unexpected events and gaining valuable insight into how to implement their plans across manufacturing sites.

Advanced Simulation Twins further provide prescriptive "how-to" optimizations that help manufacturing managers discover the course of action that best meets their needs. Users can choose among a range of KPIs (e.g. efficiency, cost, environmental needs), then use the Simulation Twin to discover the optimal action plan and implementation strategy for their business.

At a glance



Simulate the dynamic evolution of complete operational systems and sub-systems



Generate optimized and reliable plans for meeting KPIs using predictive and prescriptive functions



Provide step-by-step implementation instructions for short-, mid- and long-term action plans



Implement quickly and scale from a defined project to the complete industrial value chain

WHAT CAN YOU ACHIEVE WITH AI SIMULATION?

AI-Simulation puts the entirety of an organization's operating model at a supply chain manager's fingertips, helping them unlock hidden value throughout the value chain. With Cosmo Tech's Prescriptive AI Simulation, users gain the unique ability to achieve full operational efficiency through simulation and optimization.

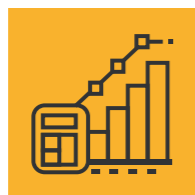
Virtually test strategic action plans with unlimited what-if simulations



Beyond providing a complete replica of an organization's operational model, the Cosmo Tech AI Simulation Platform offers unlimited what-if scenarios, allowing users to simulate how their decisions will impact each aspect of their business. These predictive scenarios are highly accurate and can be customized by the user, providing a clear picture of the strengths and weaknesses of their operational plans over the short- and long-term.



Customize and modify what-if scenarios for any time scale, system, set of constraints or available resources



Evaluate the future impacts of business decisions across your organization



Design optimal operational plans and gain step-by-step guidance for implementation



Use comprehensive, end-to-end understanding of your operational system to align and meet stakeholder expectations



Improve business outcomes with goal-seeking simulations

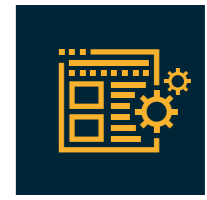
The Cosmo Tech AI-Simulation platform offers prescriptive how-to optimization, identifying conflicts or obstacles in an organization's system, and providing optimal solutions to operational challenges.



Gain an optimal, actionable plan calculated specifically for your chosen KPIs



Receive accurate predictions for any time scale, from the next 10 minutes to the next 10 years



Ensure the robustness and reliability of operational plans in the face of unexpected events

How does this create value for your business?

By mastering "cascading effects" – the chain of events that emerges naturally, or in response to user decisions – Simulation Twins reveal operational inefficiencies and opportunities across an organization.

What-if simulations or how-to optimizations allow managers to optimize their action plans by using fact-based predictions and reviewing all possible drivers of optimization to achieve predetermined objectives. Users in the automotive, aerospace or other manufacturing industries can unlock hidden value with an Enterprise Simulation Twin, quickly achieving full operational efficiency and seeing measurable benefits within one quarter.

IN PRACTICE

NAVIGATING RISK AND UNCERTAINTY

Over the last three years, we've seen things unexpectedly coming to us, and that was not just COVID. These disruptions have impacted availability of supplies, raw material or component shortages, availability of transportation capacity... The increasingly global and interconnectedness of the supply chain has also increased the complexity.

And we all know that we're just in front of the next disruption. The complexity of the supply chain makes it difficult to understand and prepare for the impact brought by the upheaval. Understanding where the top vulnerabilities in your supply chain are ahead of time, and how to anticipate - knowing where exactly to provide dual sourcing for example - will help companies minimize the risk to revenue and absolutely bring them a competitive edge.

Supply Chain transformation and the role of technologies for decision-making in the face of today's "superhuman complexity"

In the era of digital disruption, supply chain digital transformation has emerged as a strategic imperative for organizations aiming to thrive in a rapidly evolving business landscape. In order to navigate the complexities of the supply chain, organizations must adopt a holistic approach that encompasses planning, monitoring, sensing, increasing visibility, and responding in real-time. These points collectively drive successful supply chain digital transformations, improving efficiency, customer satisfaction, and competitive advantage.

• SENSE DISRUPTIONS

Create comprehensive and accurate plans by leveraging advanced technologies that consider uncertainty and unexpected events.

• IDENTIFY VULNERABILITIES

Uncover supply chain vulnerabilities: identify weaknesses and bottlenecks for enhanced resilience.

• VISUALIZE POSSIBLE FUTURES

Simulate unlimited scenarios to weigh the impact of uncertainty and proactively adapt supply chain operations for optimal performance.

• RESPOND PROACTIVELY

Utilize prescriptive simulations to guide actions like capacity review, inventory strategy and exploring new supply chain configurations.

Navigating risk with AI Simulation

Cosmo Tech's AI-Simulation technology is the navigation application for Enterprise. It uses simulation-guided, goal-seeking AI to discover all the paths to reach the business goals, no matter how complex they are, and then helps the users understand the best path to take. It is then possible to confidently optimize operations, improve profitability and navigate uncertainty, while also constantly adapting to unexpected events or changes in the execution of the plan.

Our approach

The models that underlie a Simulation Twin incorporate all the different types of risks and disruptions that a C-level executive must navigate. These include general business risks (disruptions of resources, operations, transport...) as well as financial, regulatory, environmental and safety risks.

With AI Simulation, executives can set the level of risk that they are comfortable with and constantly scan their vulnerabilities. The level of risk that a company is willing to tolerate is simply a constraint that can be configured and managed within the Simulation Twin.

They can then ensure business continuity through proactive risk monitoring and mitigation. By simulating the impact of their decisions they can ensure that the level of risk never surpasses their alert level or, if it does, be able to identify mitigation plans swiftly and minimize revenue at risk.

Key Results

+5%
Profit
increase

-60%
Logistics
costs

-30%
Stock
levels

HOW AI SIMULATION EMPOWERS SUPPLY CHAIN LEADERS TO TAKE CONTROL

Supply Chain leaders must be prepared for a range of eventualities, with managers needing ready answers to numerous what-if scenarios. What if obsolescent parts are unavailable? What if the supply chain is disrupted?

Taking a what-if approach is crucial for supply chain managers looking to handle complex production systems. To manage operations in a fast-evolving environment, manufacturers need to determine key contingency plans for shutdowns, maintenance and unexpected events, as well as for reinforcing production resilience.

The emerging and recurring issues raised by crises such as the Covid-19 pandemic are underscoring the critical need for contingency plans. To prepare for what-if scenarios, supply chain leaders must have the tools and technologies to create how-to management strategies.

Reviewing the past is not predicting the future

A key question for manufacturers is how to simulate the effects of potential changes on the future of their operations.

AI-only based technologies use past data to make predictions, determining the future state of a system by comparing its past and present states. Traditional digital twins rely exclusively on past data to make predictions, which do not account for ever-changing present and future scenarios. This leads to two problems:

1/ Traditional digital twins' cannot predict scenarios that have not already happened

2/ Predictions become less reliable the further a timeline is extended into the future

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In our ever-evolving and highly connected world, complexity is the new norm. We must have the ability to simulate this complexity, in order to anticipate what's coming and develop an optimal, actionable response in advance.”

Hugues de Bantel, Cosmo Tech Co-Founder and CEO.

Predicting the future with simulation solutions

With the modeling of complex systems at its core, Cosmo Tech's technological approach is fundamentally unique among digital twin providers. Our Simulation technology makes predictions and provides optimization scenarios based on a model of an industrial system's dynamic evolution. By identifying all of a system's critical variables, interactions and interdependent tasks, we can develop simulations for unlimited combinations of changes throughout a plant's operations.

Our AI-Simulation technology determines how each subsystem will affect others or be affected in any given scenario. By digitally testing a range of potential circumstances, the AI-Simulation technology can determine which disruptions to an operational system are most likely and most detrimental to production. Manufacturers can then optimize their responses, developing robust, effective action plans for numerous possible scenarios.

“
Working with past data alone restricts one's ability to predict scenarios that have not already occurred. Without simulation, supply chain leaders cannot identify all possible options for optimization, or determine which plans to enact to achieve their stated goals.”

Michel Morvan, Cosmo Tech Co-Founder and Chairman.

Why Cosmo Tech?

Cosmo Tech's solutions are based on a proprietary modeling language, the result of more than twenty years of academic research, as well as a unique methodology developed over more than a decade that identifies relevant variables and interactions. Our mastery of complex industrial systems allows us to use advanced simulation technology to predict the effects of changes with strong accuracy for the short-, medium- and long-term.

IN PRACTICE

OPTIMIZING OPERATIONAL AND SUPPLY CHAIN EFFICIENCY

The automotive market revolves around operational efficiency, a huge challenge for an industry dependent on complex supply chains. To maximize profitability and stay competitive, automotive players must master all stages of their value chains.

Your challenges

Our client, an international car manufacturer, needed to significantly boost production of one engine type to meet increased demand, without altering manufacturing capacity. To optimize production, the client required visibility on their end-to-end operations and the cascading effects of different decisions across the supply chain. Among the client's constraints were:

- Demand volatility
- Specific lead times
- Limited storage capacity
- Sharing resources between products with different cycle times
- Managing multiple resources manufacturing the same product

Our approach

Using a Cosmo Tech Supply Chain Simulation Twin, we developed a realistic and exhaustive Enterprise Digital Twin of the client's entire engine production system. The technology allowed our client to:

- Simulate a complete operational model, including multiple production sites and complex flows (e.g. factories, stocks, transports)
- Model real-world constraints (e.g. equipment capacity, labor shifts, lead-times)
- Include all necessary data (e.g. demand, contractors' agreements, production output, bill of materials, routings)
- Test what-if scenarios for pre-selected KPIs (e.g. productivity, efficiency)
- Run how-to optimizations and gain optimal action plans with step-by-step implementation guidance
- Perform sensitivity analyses to ensure an action plan's robustness
- Perform full cost calculations

Results

Our client first identified crucial points of operational efficiency – a bottleneck of two heat treatment machines running at maximum capacity – then determined and implemented the optimal action plan by negotiating with a specific contractor to increase production. By optimizing production line efficiency and output, our client was able to respond to market demand, maximizing production of specific engines without expending more resources.

+10%
Operational
efficiency

Adapt and achieve resilience in the face of an evolving crisis:

- Manage cash flow and develop ramp-up scenarios
- Define contingency plans and mitigate risks
- Optimize production for unusual and uncertain demand
- Plan for optimal reopening and build a resilient supply chain

6 MYTHS ABOUT AI SIMULATION

When faced with a transformative technology like AI Simulation many business owners and operational efficiency experts find themselves in uncertain territory. Questions surrounding the price, complexity, implementation, data requirements and ROI associated with digital twins abound – but what is the truth about this innovative technology?

MYTH 1

AI Simulation is costly in the long and short-term

AI Simulation can be highly cost-effective for businesses, generating next-quarter value and quick return on investment (ROI). Because Enterprise Simulation Twins build on companies' existing data, they are relatively uncomplicated and inexpensive to implement. Ready-to-deploy digital twins, created to tackle specific industrial challenges, can be quickly and easily adopted. Given this, AI Simulation has spread rapidly across industries and investment in this transformational technology is expected to explode in the next 5 years.

MYTH 2

AI Simulation is only for large, fully-developed businesses

A core advantage of Simulation Twins is the ability to replicate specific areas of operations, securing quick wins for users before being scaled up. As companies evolve, the Simulation Twins can integrate new assets, processes, systems, technologies, locations, subsidiaries and more, covering the full value chain. The common platform underlying Cosmo Tech's digital twins makes it simple to scale vertically and horizontally, an approach that has consistently demonstrated quick ROI, paying for itself within a quarter.



MYTH 3

Like other AI technologies, AI Simulation requires mountains of data

Because AI Simulation technology relies on models, the real challenge is not the quantity of data available, but the quality. Most companies are data rich, and AI Simulation experts are experienced in identifying exactly what data is pertinent and usable, and collecting it. Unlike strictly AI-based technologies, Cosmo Tech AI Simulation does not rely exclusively on historical data, instead using an in-depth understanding of an organization's underlying systems to develop accurate how-to simulations.

MYTH 4

Only data scientists can work with an AI-Simulation Twin

Prescriptive Simulation Twins do not require clients to invest in data expertise; there is no need to hire data scientists or rearrange internal teams. Cosmo Tech Simulation Twins are designed to be user-friendly, providing an easy-to-configure platform, readable dashboards and a host of intuitive functions. Our Simulation Twins feature customizable, easy-to-program scenarios, step-by-step implementation instructions and clear explanations that make the technology usable for specialists and non-specialists alike.



MYTH 5

Implementing an Enterprise Simulation Twin is time-consuming

Organizations can completely implement an Enterprise Simulation Twin within a few months of signing a contract. AI Simulation experts work with in-house experts, analyzing all systems, processes and operations, then developing conceptual models both specific to the organization and based on existing templates. Once this is accomplished, experts can format client data and enter it into the AI Simulation platform, which can then be deployed.

Moreover, clients can choose a scale-up approach, making the process of implementing an Enterprise Simulation Twin even faster. Cosmo Tech Prescriptive Simulation Twins are fully industrialized solutions, providing users customized software solutions that can be quickly implemented.

MYTH 6

Interpreting AI Simulation results is complicated

AI Simulation shows how and why a model has reached its conclusions, allowing the user to isolate variables and view cascading effects one-by-one. The Cosmo Tech AI Simulation Platform takes this a step further, offering clear optimization tactics that are transparent and explainable. Managers can identify the necessary steps to integrate operational changes, ensuring implementation across the organization. The complete transparency provided by an Simulation Twins makes it simple for users to justify strategic decisions to stakeholders.

IN PRACTICE

SECURING THE S&OP PROCESS FROM HIDDEN HAZARDS

As a global supply chain operations manager, you know that for each operation, there is a lot of uncertainty that can lead to a series of problems farther down the supply chain: stockouts, shutdowns, increased costs and more. Because so many things can go wrong, your supply chain needs to be flexible and resilient to risk.

The challenges

Our client, a leading agri-food manufacturer operating across more than 20 countries has faced challenges due to transport crises caused by extreme weather. This has led to a 50% increase in lead time for land transportation. By leveraging AI Simulation technology, the customer aimed to accurately model and simulate various scenarios, enabling him to proactively strategize and optimize supply chain operations amidst unpredictable conditions.

Among other client's challenges were:

- Complex supply chain network
- Multimodal transportation (cargo ships, trucks, airplanes)
- Lead-time constraints due to the perishable nature of the transported goods
- Balance inventory costs while maintaining acceptable service levels
- High demand variability and uncertainty
- High-level of constrained inventory (limited storage capacity)



Our approach

Cosmo Tech developed a realistic and exhaustive Simulation Twin of the entire supply chain, including all activity and interactions throughout the production chain.

- Simulate the complete operational model including multiple production sites and complex flows (factories, stocks, transports, suppliers...)
- Optimize Model real-world constraints (production and space capacity, stocks, transports...)
- Scan the Supply chain for vulnerabilities and gain full visibility on interdependencies, cascading effects and risks
- Identify top vulnerabilities/weaknesses in the supply chain such as critical transportation routes, production resources and logistic costs
- Simulate transport and stock policy
- Test several mitigation plans and new supply chain configurations

Results

The implementation of an optimal supply chain configuration, including a shift to land transportation and a local sourcing strategy, has resulted in significant revenue increase. By replacing the sourcing of raw materials from US suppliers with local sourcing from Brazil and Mexico, the company has maintained high service levels while minimizing unexpected input and transport costs. Additionally, this sustainable strategy has led to optimal inventory levels and

100%

Production resources, operations and costs modeled

WHO ARE WE?

Cosmo Tech is an AI-Simulation Software company and an expert in prescriptive AI Simulation and Enterprise Digital Twins. We support both enterprise decision-making and business optimization by helping our customers navigate complexity and uncertainty.

Supply Chain Vulnerability Scan for SAP IBP

Available on SAP Store, the Supply Chain Vulnerability Scan for SAP IBP is a go-to choice for supply chain leaders to profitably meet demand and accelerate their journey towards a more agile and resilient supply chain.

Similar to a computer anti-virus software, the Supply Chain Vulnerability Scan uses SAP IBP data to scan the entire supply chain for weaknesses. By detecting risks early, supply chain managers can mitigate the risks and

manage them before a big disruption can happen. They understand where and what are the weak spots that today are not a problem but may become a problem in the future.

It is not just about managing risks, it's about conquering them before they even arise. Our solution represents the insurance policy for protecting operations and cutting down costs.



2010

Cosmo Tech founded



70

Cosmo Tech employees

€32 million

Funding to date



Interested in learning more?
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