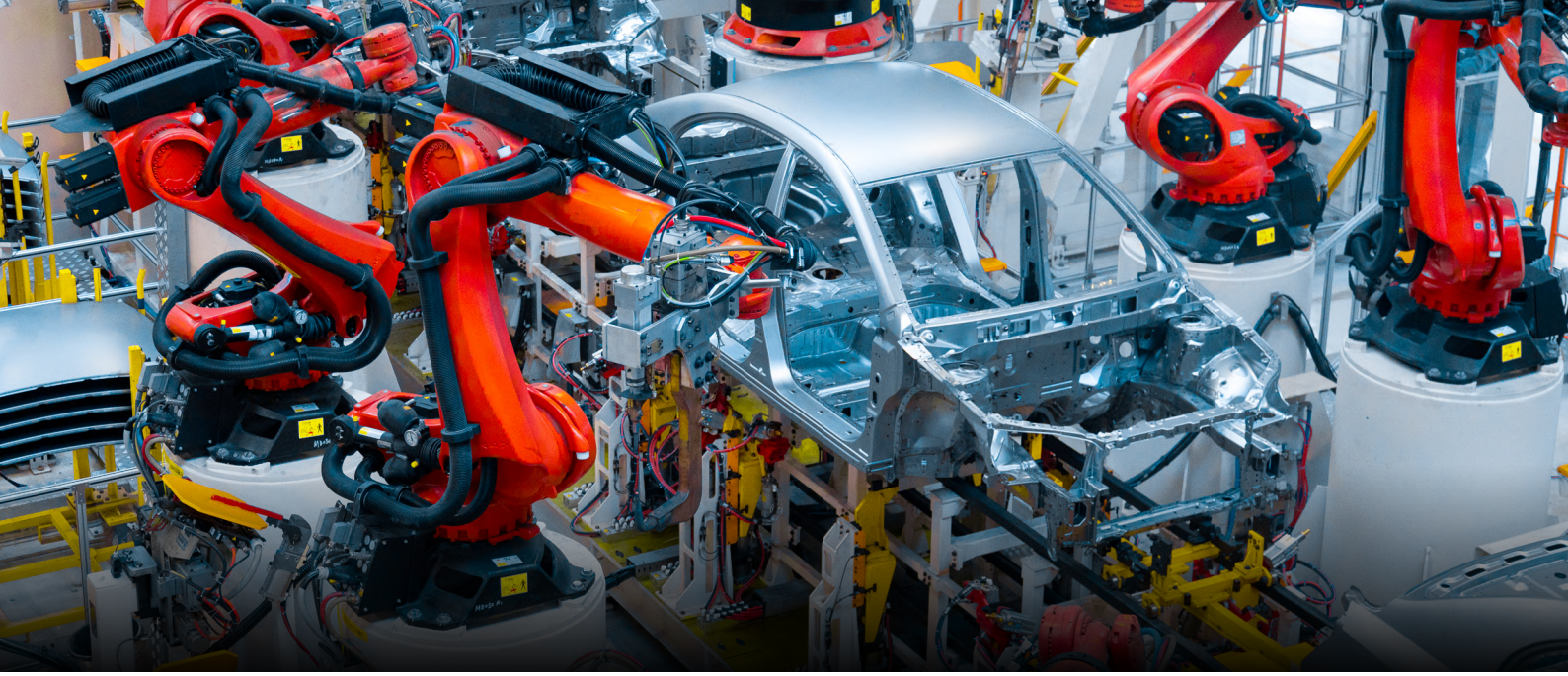
DELMIA

3DEXPERIENCE®

BUSINESS-BASED OPTIMIZATION TO ORCHESTRATE DISRUPTED SUPPLY CHAINS

Inceptra

DASSAULT SYSTEMES



THE CHALLENGES IN FOCUS

The concept of "supply chain management" has been known for decades, but the ability to effectively implement a strategy that meets business goals has been continually challenged. As the pandemic recedes, it has created lingering ill effects like worker shortages, inflation and supply constraints. The war in Ukraine also triggered particularly severe disruptions to global markets for essential raw materials. The unprecedented disruption has shone a spotlight on critical weaknesses that need to be addressed.

SUPPLY CHAIN RESILIENCE:

Even mature organizations were caught off guard. Shortages of material, people and demand led to a complete breakdown of the supply chain in many cases.

RELIANCE ON EXTENDED NETWORKS:

With very few truly vertically integrated supply chains, global organizations found that overseas supply and manufacturing were suddenly cut off leaving them starved of critical components and assemblies.

DISRUPTION AS A CONSTANT:

Although minor disruption is perpetual, potential "compounding" disruption was not anticipated. The pandemic impact was historic but adding events like the blockage in the Suez Canal and Brexit is exaggerating the challenges, and others will follow.

LACK OF VISIBILITY:

Knowing where you are and what is happening across the supply chain in real time is needed to know how to try and course correct. Very few companies had visibility to the overall operational status in order to effectively develop a contingency plan with any confidence.

DELMIA has always been at the forefront of addressing these business challenges and supporting integrated business planning. By enabling customers to model the intricacies of their supply chains and consider the trade-offs between operational and business goals using advanced optimization, we provide unique ways for organizations to weather the storm of disruption and variability and emerge as leaders in their industries.

The path each organization can take in reimagining the supply chain of tomorrow depends on their industry, maturity and goals but it is possible to see some key trends emerge and the changes in thinking and process being considered and adopted.

KEY CAPABILITIES NEEDED IN THE TRANSPORTATION & MOBILITY INDUSTRY

The Transportation & Mobility industry must be able to respond to continuing supply chain disruptions including the ongoing chip shortage, ever increasing product innovations driven by electrification and the growth in autonomous vehicles, and rapidly changing supply and demand in order to thrive and progress in today's business environment. There are several key capabilities that are required in order to address these challenges:

REAL-TIME COLLABORATION:

Leverage real-time data and visibility across value networks for better collaboration, speed and more accurate decision-making. Ensuring deliveries are made on time and in full are critical in the transport & mobility industry, especially with the accelerated rate of change driven by electrification and autonomous vehicles. These two key industry drivers have lead to an increased number of new suppliers and customers, as well as ever-evolving demands of the value network. Real-time collaboration is more critical than ever to address these challenges.

INTEGRATED BUSINESS PLANNING (IBP):

Financial Demand Planning—also called Integrated Business Planning—ties financial goals to the strategic planning process and is key to long-term strategic planning effectiveness.

WORKFORCE DIGITALIZATION:

Ensure better worker engagement with a real-time work-shift scheduling system, simplified digital procedures, and optimized workforce planning.

BIG DATA AND AI-DRIVEN PREDICTIONS:

Achieve accurate predictions powered by artificial intelligence (AI) and big data to mitigate challenges effectively, avert costly consequences and maintain best practices.

ROBOTIC PROCESSES AND AUTOMATION:

Apply robotics processes and intelligent automation to routine manual work for higher efficiency, lower costs and a safer working environment.

VIRTUAL TWIN:

Create a virtual twin of your supply chain network and simulate what-if scenarios to identify areas for improvement and growth. Optimize production and operations to find cost-saving opportunities and deliver excellent customer experience at speed and scale.

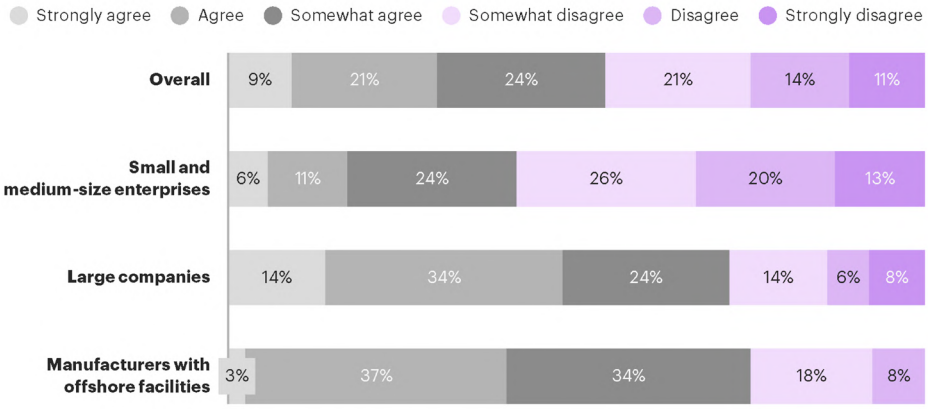
By digitalizing value networks from end to end, Transportation & Mobility companies can gain full visibility into their operations, acquire the ability to integrate and synchronize their activities to deliver faster, manage more efficiently, improve throughput, mitigate risks effectively and run nimble business practices.

IMPORTANT SUPPLY CHAIN TRENDS

Responding to the new normal has seen companies undoing previous operational strategies as well as adopting new innovation and technology. Although potentially beneficial, each trend offers challenges to overcome.

Considerations	Supply Chain Trends	Challenges
What is the value of re-integrating the supply chain?	Larger OEMs have certainly felt the need to nearshore or re-shore supply chain operations, with some even considering the extra step of bringing manufacturing and other operations back "in-house" to (re)create a vertically integrated supply chain. The belief behind this is bringing operations closer, meaning better control and management.	Companies still suffer from disparate systems and organization silos.
How do "control towers" add value?	Having a snapshot view of the overall supply chain status is key to being able to formulate decisions and plans. Realizing this "control tower" capability is quickly becoming a top priority for many organizations.	There are still challenges in obtaining and centralizing information to realize the "control tower" capability.

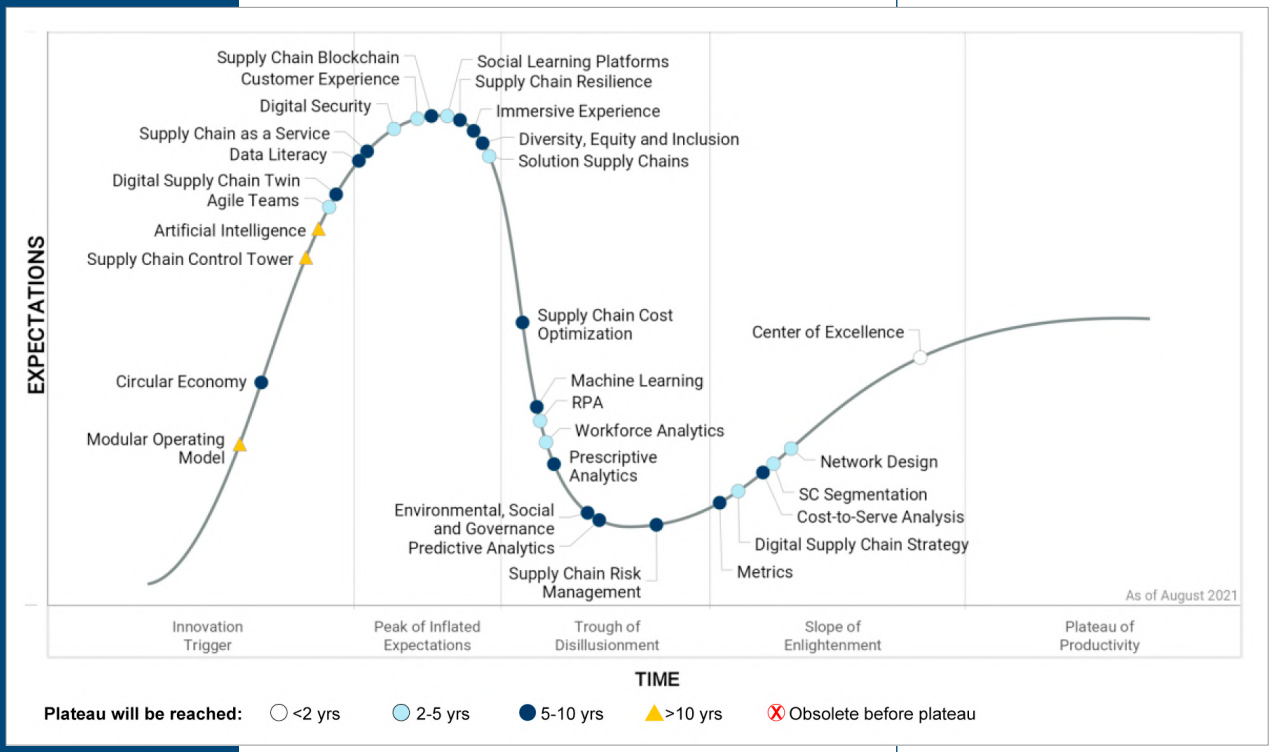
Figure 6
In a recent Kearney survey on reshoring, many executives perceive nearshoring to Mexico or Canada as more advantageous than reshoring manufacturing to the United States



(100% = 120 respondents; 70 small and medium-size enterprises and 50 large companies)

(Source: Kearney 2020 Reshoring Index)

How can optimization help?	Optimization and artificial intelligence (AI) are areas that organizations are investigating as a method of automating analysis in complex supply chains so that decision-making can be expedited both rapidly and confidently.	Optimization is a complex discipline and organizations are struggling to determine what the real-world benefits would be compared to the marketing hype.
How to leverage the virtual world?	Digital twins of products and facilities are already a valuable tool, and the same value can be applied to the supply chain. By having a connected model of the end-to-end operations from supplier to customer, organizations can have a unique ability to analyze and experiment with new strategies across the supply chain.	The full realization of this is not a trivial task and organizations are attempting to understand the first steps along the path to this virtual experience.
How to combine product innovation with the supply chain?	As above, digital twins of the product already exist. Decisions in the product digital twin affect the supply chain digital twin and vice-versa. Therefore, connecting the two provide a unique advantage to enable truly holistic supply chain and product planning.	Having a consolidated vision and technology platform to support this is possible but requires a strategic commitment across the organization.



(Example of Key Supply Chain Market Trends.
Source: Gartner 2021 Supply Chain Planning Hype Cycle)

All these major trends, along with many other initiatives are supporting two overarching goals:

1 **enable agility**

2 **resiliency across all supply chain operations**

THE ESSENCE OF SUPPLY CHAIN INNOVATION

Organizations must not only survive disruption—they must also thrive and innovate. Agility and resiliency are two fundamental competencies that all future supply chains need to achieve.

Agility applies to production processes, workforce and equipment utilization, supply of materials to production, and the decision-making process. It depends upon an understanding of what is happening and evaluating possible plans to determine the best course of action moving forward.

Resiliency adds an ability to endure disruption and then recover quickly. It also requires understanding and the knowledge to create longer term strategies so that viable options are available when challenges occur.

HOW DO ORGANIZATIONS BECOME AGILE AND RESILIENT?

These competencies need to be developed through effective application and implementation of people, process and technology. When all three are considered together, organizations can not only provide a foundation for the new normal but also unlock new levels of innovation and develop a truly sustainable business environment.

UNDERSTANDING SUPPLY CHAIN PROBLEMS

Every organization would be supply chain "masters" if the problems were easy to solve, but thanks to the ever-increasing complexity of operations the problems are both numerous and convoluted.

HOW DO YOU MANAGE A DISTRIBUTED VALUE NETWORK OF FACILITIES, SUPPLIERS AND CUSTOMERS?

To effectively manage this type of supply chain, it is first necessary to be able to fundamentally represent it logically so that information and process can be applied to all elements that impact operations.

CAN TRADITIONAL TOOLS DEAL WITH TODAY'S PLANNING COMPLEXITIES?

The ever-increasing product mix and launches, combined with complexity of manufacturing and suppliers, means that existing planning systems and manual spreadsheets are no longer effective. The ability to develop a single plan (let alone multiple scenarios or re-planning on demand) can be a monumental task.

WHAT DATA IS NEEDED?

Supply chain plans need to be informed with real-time data from inventory, manufacturing and logistics in order to analyze multiple scenarios and develop feasible action plans that can be executed with confidence. This requires connectivity and data input at multiple levels and locations across supply chain operations.

HOW DO YOU COLLABORATE AND INCLUDE THE RIGHT STAKEHOLDERS?

Developing effective supply chain plans means including sales, operations, finance, procurement as well as the executive team. There needs to be an expedient and standardized process whereby the stakeholders can collaborate effectively and inclusively so that all viewpoints and priorities are considered.

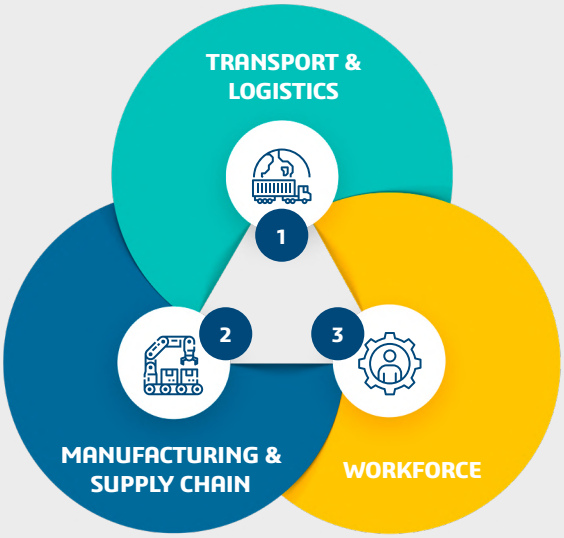
WHAT IF THERE ARE COMPETING COMPANY GOALS?

Traditional supply chain planning has considered typical constraints such as material and capacity, but sustainable business in the new normal means organizations must include operational goals with financial and corporate goals as part of the holistic plan.

There are many other tactical problems that should also be considered and each industry will have unique variations and distinctions. These add to the challenge of finding solutions that can be effectively applied to enable benefit and value.

CRITICAL CAPABILITIES

DELMIA offers robust supply chain solutions that can help organizations in different industries to address the challenges and problems to operate with greater agility, efficiency and operational excellence. DELMIA provides planning, scheduling and optimization for complex integrated business planning processes within supply chain, logistics and workforce operations across all planning horizons.



1. Optimize your logistics and transportation network; gain full control over the fleet, align transport with production plans and collaborate more closely with customers across the supply chain.

2. Model and optimize your supply chain network performance from inbound supply to manufacturing and distribution. Gain control, visibility and lasting resiliency across your value network.

3. Improve staff utilization and employee productivity by striking the right balance between operational efficiency, regulations, and employee and customer satisfaction.

The DELMIA supply chain solution delivers innovation and value with key differentiation:

END-TO-END SUPPLY CHAIN MODELING

DELMIA Planning & Optimization provides optimized planning for operations execution across your entire value network. Taking a holistic but modular approach, DELMIA enables intelligent supply chain planning and optimization for every stage of your supply chain journey and time horizon—whether it is operational, tactical or strategic. Inaccurate or ineffective strategic plans and tactical supply chain issues can cause major business goals to be missed. It's important to model all aspects of the supply chain to achieve sustainable operational efficiency across your manufacturing, workforce and logistics operations.

Important challenges & trends addressed:

- Control tower visibility across extended networks
- Evaluating options for reconfiguration of the supply chain

BUSINESS-BASED OUTCOMES

Efficiency is more than throughput and can be quite complex. It's about being able to model and optimize the right mix in your operations and supply chain network to maximize efficiency based on different business metrics and ever-changing constraints. As business metrics, such as sustainability, become higher priorities, the integrated business planning process must include these as a part of supply chain planning.

Important challenges & trends addressed:

- Managing sustainability and customer fulfillment
- Balancing profitability and efficiency

WORLD-CLASS OPTIMIZATION AND ANALYTICS

Recognized as a leading company in optimization technology, DELMIA provides world record-breaking optimization to drive the best course of action in your operations on a continuous basis, which directly translates to increased efficiency, asset utilization and ROI. DELMIA offers a broad set of industry standard and proprietary optimization technologies and experience to optimize your world and provide the right level of automation.

Important challenges & trends addressed:

- Providing agility despite disruption
- Enabling autonomous decision-making

These capabilities are provided using a collaborative environment that allows all stakeholders to be included in the decision and analysis process to arrive at optimized consensus plans.

VALUE & BENEFIT

Leveraging these critical DELMIA capabilities provides significant benefits for organizations:

- **Balance and optimize financial objectives with operational and sustainability goals**
- **Reduce planning cycle times with effective collaboration**
- **Decrease lost sales and better serve high-margin demand**
- **Improve capacity utilization and productivity across the supply chain**
- **Gain global supply chain control and visibility**

Together, these benefits allow for new levels of agility and resilience to realize real-world value:

> "The **3D**EXPERIENCE platform is the backbone for our future success. It helps us to avoid failures even in advance and makes our processes more transparent and efficient."
>
> Klaus Roos, Vice President Industry 4.0, Brose Group

brose
Technik für Automobile

> "Quintiq offers us a flexible and scalable planning software platform. Supported by the Quintiq team's expertise, we are confident of achieving continued future growth while maintaining our goals of minimizing environmental impact and maximizing added value for the customer to ultimately offer the best transport solutions between Paris, Brussels, Amsterdam and Dortmund."
>
> Hélène Lesaffre-Valenzuela, COO, Thalys

THALYS

> "We were pleased with the Quintiq team's knowledge of the transport sector and very impressed with the agility and flexibility of the software. The transport sector is one that's highly susceptible to disruptions. With Quintiq, we'll be able to simulate and analyze different scenarios quickly to make the best decisions to overcome these challenges."
>
> Thomas du Crest, Manager of Transport Operations, Studies and Methods, Tisséo

tisséo
VOYAGEURS

The customer service level is 98.5% group-wide:

> "We have plants that weren't at 100% before the tool was installed, which is a real bonus. Regarding the supplier service level, it is more than 90%. We issue much more reliable delivery schedules and lead times with fewer changes, which lets us level out our demand at suppliers and consequently reduce inventory levels both at suppliers and in our plants."
>
> Frédéric Marcotte, Supply Chain Director, Novares

NOVARES

CONNECTING SUPPLY CHAIN PLANNING TO OPERATIONAL SUCCESS

As previously mentioned, digital twins developed for product and operational design are already in use (as seen with the Dassault Systèmes Virtual Twin Experience in the link below). The planning and decision-making in the supply chain essentially follows the same practice of using virtual models to make better real-world decisions.

Not only are the two processes similar, but they are also actually entwined. New product designs drive new suppliers and manufacturing operations that need to be planned. Changes in the supply chain drive potential facility and resource planning. The peak of sustainable agility and resilience is achieved when both virtual twins are connected.

The 3DEXPERIENCE platform

Dassault Systèmes provides a broad scope of solutions that help companies innovate from product ideation through planning and manufacturing. Using the **3D**EXPERIENCE platform, organizations can unify the critical parts of their business using digital tools and models. This platform is where supply chain and production virtual twins can work together to help organizations achieve their goals.

For more information on the Virtual Twin Experience for operational excellence, read the eBook here.

CONCLUSION & NEXT STEPS

Imagine if you could...

- **Have an accurate model of all the critical participants and constraints in your value network**
- **Evaluate unlimited long-term supply chain strategies to meet long-term goals**
- **Develop optimized consensus supply chain plans with all stakeholders seamlessly**
- **Replan and adjust supply chain operations rapidly to adapt to changing demand and supply**
- **Include product development and strategy as a part of the supply chain planning process**

The path to supply chain innovation and integrated business planning is available now for organizations that are seeking new answers and solutions to today's challenges and disruptions. With DELMIA, it is possible to start taking steps to building foundational process and infrastructure within critical areas of business, from high-level supply chain strategy to manufacturing, logistics and for workforce planning.

At DELMIA, we are proud to be helping organizations with their major supply chain initiatives:

- **Enabling sustainable business operations by optimizing critical resources, people and energy**
- **Building resilient supply chains by empowering companies to confidently plan for the future and react instantly to disruptions**
- **Achieving business-based outcomes by enabling integrated business planning that optimizes financial and corporate goals**

Contact us for more information.

Inceptra supports engineering and manufacturing organizations with best-in-class solutions to digitally design, simulate, produce, and manage their products and processes, enabling enhanced innovation and productivity.

As the largest Platinum partner in North America, Inceptra is dedicated to Dassault Systèmes' product development software portfolio, complementary solutions, and related services, including training, implementation, integration, support, consulting, and automation services. For more information, please visit Inceptra.com.

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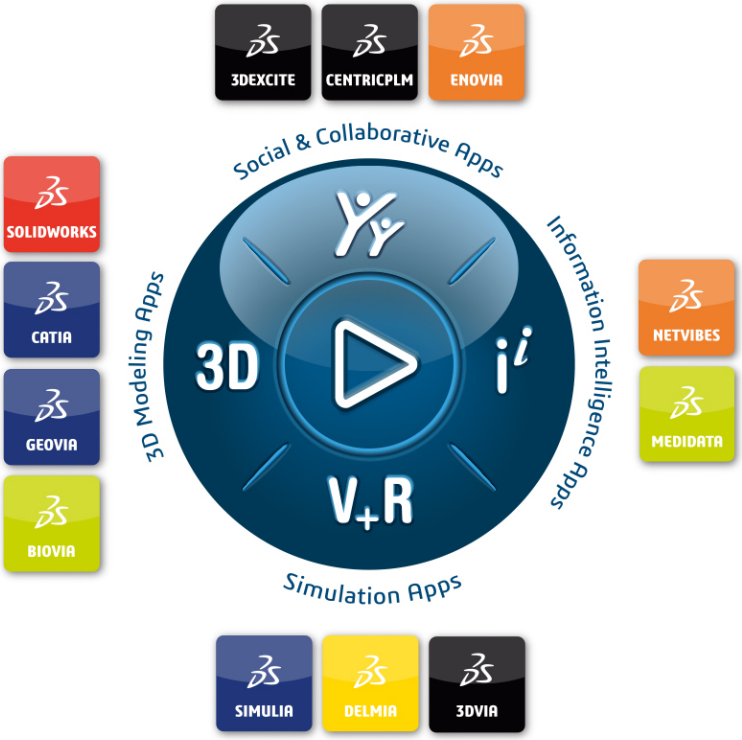

Our **3D**EXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3D**EXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit **3ds.com**.

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