



# ORCHESTRATING END-TO-END SUPPLY CHAIN PLANNING FOR DISCRETE MANUFACTURING

Unlocking greater value through integrated business planning





# DISCRETE MANUFACTURING SUPPLY CHAINS ARE COMPLEX

Planning supply chains in discrete manufacturing is no easy feat, owing to the complexity of all the operations that lead up to the creation of the finished product. Because discrete manufacturing products are made up of many different components, disruptions at any point of the supply chain can set off a chain reaction throughout the rest of the process, setting back the target delivery date or resulting in penalty fees for delays in many cases. At the same time, unpredictable demand also adds complexity to discrete manufacturing by limiting how much you can plan ahead.

With so many stakeholders involved and with different sets of requirements for each unique customer, it is a huge challenge to orchestrate a complex operation perfectly—but it is not impossible. Discrete manufacturers can overcome disruptions when equipped with solutions that enable their operations to be dynamic, versatile and agile in responding to unexpected issues. At the same time, building resilience to disruptions is possible with enhanced visibility of supply and demand as well as the status and completion expectations of activities within the value network.

This white paper examines the complexities of supply chain planning in discrete manufacturing, where you will learn about:

- ✓ **The ten key challenges faced by discrete manufacturers**
- ✓ **The importance of end-to-end supply chain visibility and synchronization**
- ✓ **An effective solution to increase the business value created by your supply chain**





## KEY CHALLENGES IN DISCRETE MANUFACTURING

### Strategic horizon



#### Lack of early visibility in demand planning

The first challenge begins in planning demand. Discrete manufacturers often do not have visibility of what customers ultimately need, until they are provided with the solution design or configuration details, making it difficult to create long-term plans—especially with products that are made-to-order or engineered-to-order.

Early preparation is however still possible with attach rate planning—analyzing historical data from past orders or projects to estimate a planning bill of materials (BOM). When discrete manufacturers have a clearer idea on what to expect in new orders, demand planning solutions allow them to plan production accordingly based on their capacity, inventory and other factors. This supports decision-making so discrete manufacturers can maximize their returns without accepting more orders than they can fulfil.



#### External supply chain capacity affects product delivery

An important factor discrete manufacturing companies need to remember when it comes to S&OP is that they need to look beyond their own production capacity. Manufacturers depend on multiple suppliers as well as outsourced production and assembly operations in the upstream of their supply chain, so it is important to take these capacities and constraints into account during the planning stage.

End-to-end visibility over the supply chain is vital, providing manufacturers with accurate and up-to-date information on supplier capacity, costs and lead times to ensure that manufacturers can meet their own deadlines.





### **Logistics of components can be costly and time consuming**

With global supply chains, the logistics of transporting components and products between facilities becomes an incredibly complex and often expensive matter. Companies want to choose the right locations for their production facilities and the ideal network for distribution centers in order to reduce the cost of logistics during production.

However, even during the production process, manufacturers can benefit greatly from end-to-end transparency throughout their supply chain, which will give them the insight to choose the most time- and cost-efficient options for the transportation of components or products between facilities across their network.



### **Sustainability requires smart planning to be effective**

Sustainability has become an important part of every manufacturing operation, but the adoption of environmentally friendly practices adds another layer of complexity to discrete manufacturing. Without adequate planning, sustainable practices executed inefficiently could add unwanted costs instead of saving money and resources—in addition to manufacturers being unable to meet their scientific targets and KPIs for reducing CO2 emissions.

What helps discrete manufacturers adopt sustainable practices efficiently is having insight on which course of action is the most effective in reducing environmental impact. This helps them to strike the right balance to be both environmentally and financially sustainable.



### **Competing operational and business goals**

In any business, manufacturers want to be able to deliver quality products in the shortest possible time to market while meeting sustainability targets, which may require a larger investment in resources. Without striking the right balance, this places these goals at odds with wanting to keep production costs low so that the company can reap larger profit margins.

Discrete manufacturers have an opportunity here to leverage a smart solution that can help them define and evaluate the trade-offs between multiple goals. By simulating multiple “what if” scenarios, manufacturers can identify the course of action that yields the best outcome every time.





## Tactical horizon



### Managing timing in delivery of components adds complexity

Timing in the delivery of components is another factor that should be taken into account in planning. Knowing when to expect the delivery of much needed components allows manufacturers to plan ahead and optimize production schedules in order to maximize throughput. This becomes even more crucial in the context of project-based engineer-to-order (ETO) manufacturing, where components may need to be assembled in a specific sequence.

What manufacturers need is a solution that provides the visibility and control to reduce operational waste in component delivery and achieve just-in-time (JIT) inventory. This helps them strike the right balance between make-to-stock, make-to-order and assemble-to-order production. Maximizing production efficiency this way helps manufacturers reduce costs and lead times significantly.



### Manufacturers must plan around bottlenecks and capacity

Unforeseen disruptions in supply and production happen all the time, creating bottlenecks such as a shortage of certain components due to overwhelming market demand. At the same time, failing to take capacity planning into consideration can either create a major bottleneck by accepting more orders than the workforce can fulfil or result in missed opportunities by failing to accept orders they had capacity for.

What discrete manufacturers need is visibility into which components are the most critical to production. Identifying key pains early helps manufacturers mitigate potential cost that could have resulted from prolonged delays in production.

At the same time, leveraging a solution for workforce management allows them to immediately know if their skilled workforce has enough capacity to deliver on all orders and projects according to deadlines, driving optimized efficiency on all sides.





## Operational horizon



### Changes to one project could affect other concurrent projects

We need to remember that managing challenges in the production of a single customer's order is not enough, since discrete manufacturers are normally managing multiple competing customer orders at the same time. Key decision-makers are aware that changes to production on one order or project could affect production on other orders, especially if the company is already operating close to full capacity.

Real-time constraint propagation is important here so that key decision-makers can make the most-informed decisions earlier, in order to best utilize their production capacity across multiple projects and prioritize the ones that maximize profitability.



### Complexity in producing efficiently while following tactical plans

Discrete manufacturers often produce various intermediate products at the lowest level. At this level, there is a long list of decisions to be made in order to be able to produce efficiently—from batching to sequencing and balancing resources—all while taking into account resource production shifts and maintenance intervals. At the same time, there needs to be an accurate estimate of the expected delivery time of these intermediate products so that it aligns with the higher-level assembly activity.

With so many factors to take into account, managing these activities manually could easily lead to human error. To maximize efficiency in intermediate-level production, discrete manufacturers should rely on an integrated master production scheduling system for greater control over production activities.



### Dynamic planning is necessary to overcome unforeseen issues

Early preparation helps discrete manufacturers deal with disruptions they can anticipate, but it is equally important to be flexible and agile in implementing changes to their supply chain in order to overcome unexpected disruptions. For example, manufacturers could be left in the lurch if their main supplier is suddenly unable to deliver critical components, or changes made to taxation laws in a supplier's country will unexpectedly reduce a manufacturer's profit margins. Unexpected machine breakdowns and last-minute changes in customer orders could also result in extended delays for manufacturers who are unable to resolve such issues quickly.

The capacity for dynamic planning is just as important as having end-to-end supply chain visibility. With the data gained through a control tower, key decision-makers can explore new options and are able to evaluate different scenarios by assessing the impact of each decision. Such capability helps discrete manufacturers adapt to ad-hoc circumstances and optimize with confidence.



## SUPPLY CHAIN VISIBILITY, SYNCHRONIZATION AND COLLABORATION IS KEY

Most of the challenges faced by discrete manufacturers stem from a common factor: a lack of visibility over what happens throughout their supply chains. End-to-end supply chain visibility through a single source of truth combined with advanced optimization and AI technology gives discrete manufacturers the insights they need to achieve synchronization across every part of their supply chain, helping them to better align their decision-making with their business KPIs.

Improved collaboration across the supply chain through a single integrated platform helps decision-makers to better understand their production capacity and make the right business decisions. No more lost business from rejecting projects that you could have delivered on, or dissatisfied customers from failing to deliver accepted projects that you had no capacity for.

Visibility also extends down to tactical operations as well as across the supply chain. Using IIoT capabilities, businesses can see the state of operations and inventory in real-time so that relevant data can flow to stakeholders to enable precision optimization and decision making.

As a dynamic and integrated manufacturing planning and optimization solution, DELMIA equips discrete manufacturers with the capability to model, plan and optimize their supply chains in alignment with business goals. To help discrete manufacturers achieve their full potential, DELMIA offers unique and powerful capabilities in project-based planning and configurable materials planning with BOM determination with which to unlock end-to-end supply chain visibility and synchronization through reliable, consistent and responsive planning capabilities.

-  **Improve business agility through responsive planning and scenario management**
-  **Increase productivity and profits through better demand-supply balancing and order promising**
-  **Improve customer satisfaction through shorter delivery times and more on-time deliveries**





# UNLOCKING GREATER BUSINESS VALUE WITH DELMIA PLANNING & OPTIMIZATION

DELMIA works as a single integrated platform supporting S&OP, Sales and Operations Execution (S&OE) as well as strategic network design and detailed scheduling. This gives manufacturers the capability to plan effectively at the strategic, tactical and operational time horizons. The integrated nature of our solution makes it easily configurable to be compatible with virtually any system that discrete manufacturers already use.

Leverage business-based KPI planning to calculate the consequences of any business decision to allow executives to make well-informed decisions and balance operational and corporate goals. Our best-in-class optimization technology combined with artificial intelligence (AI) and machine learning (ML) delivers accurate and consistent results. DELMIA also provides real-time scenario management, allowing executives to evaluate different options before making the best decisions.

	Challenges	Solutions
Strategic horizon	<ol style="list-style-type: none"> <li><b>Lack of early visibility in demand planning</b></li> <li><b>External supply chain capacity affects product delivery</b></li> <li><b>Costly and time-consuming logistics of components</b></li> <li><b>Sustainability requires careful planning</b></li> <li><b>Competing operational and business goals</b></li> </ol>	<ol style="list-style-type: none"> <li>Leverage attach rate planning with DELMIA to identify and source for components critical to most orders.</li> <li>DELMIA provides improved visibility over supplier capacity, costs and lead times so manufacturers can plan their own production accurately.</li> <li>DELMIA’s logistics planning capabilities helps manufacturers identify the fastest and most cost-efficient logistical arrangements.</li> <li>Simulating operations in various scenarios through DELMIA helps manufacturers identify the most effective sustainable practices for their business.</li> <li>DELMIA allows manufacturers to define and evaluate trade-offs between multiple goals (e.g. financial, operational and sustainable)</li> </ol>
Tactical horizon	<ol style="list-style-type: none"> <li><b>Managing timing in component delivery adds complexity</b></li> <li><b>Managing bottlenecks and capacity planning</b></li> </ol>	<ol style="list-style-type: none"> <li>DELMIA helps manufacturers optimize production schedules and reduce operational waste from component delivery and inventory.</li> <li>Increased operational visibility with DELMIA helps manufacturers identify and prevent bottlenecks early, as well as optimize production within capacity limits.</li> </ol>
Operational horizon	<ol style="list-style-type: none"> <li><b>Project changes affect other concurrent projects</b></li> <li><b>Producing efficiently while adhering to tactical plans</b></li> <li><b>Unforeseen issues require dynamic planning abilities</b></li> </ol>	<ol style="list-style-type: none"> <li>Real-time end-to-end visibility with DELMIA helps manufacturers identify how changes to a project could affect the rest of their operations.</li> <li>DELMIA features integrated master production scheduling capabilities, allowing manufacturers greater control over intermediate-level production.</li> <li>All of DELMIA’s capabilities are geared towards enabling manufacturers to be agile in responding to unexpected roadblocks.</li> </ol>



## Unlock end-to-end supply chain visibility and efficient planning



### Company-wide planning visibility

Having all information accessible through a control tower that serves as a single source of truth enables live reporting capabilities and improves teamwork, communication, as well as decision-making.



### Enhanced collaboration

As a single platform that supports integrated solutions, DELMIA is accessible to all internal stakeholders, enabling better collaboration and synchronization of operations.



### Decision-support technology

By being able to compare multiple scenarios through artificial intelligence and virtual simulation, DELMIA supports decision-making with data and keeps manufacturers focused on their real-time KPIs.



### Efficient planning

Legacy systems and tools are cumbersome, prone to human error and are an obstacle to agile operations. DELMIA eliminates manual work and reduces the amount of time spent on planning by allowing planners to focus on using their knowledge to make decisions.

Discrete manufacturers who use DELMIA have reaped many benefits for their businesses:

- 1 Shorter delivery lead time and increased delivery reliability**
  - leading to improved customer experience.
- 2 Increased business agility**
  - allowing manufacturers to gain actionable insights on how to overcome unforeseen disruptions.
- 3 Increased sales revenue**
  - as a result from improved demand forecasting, order promising, overall service reliability and additional sales potential through maximized resource utilization.
- 4 Improved cost efficiency**
  - by leveraging AI and world-class optimization to plan efficient operations, increase productivity and reduce working capital costs.
- 5 Better adherence and predictability**
  - by making realistic, executable plans that take all constraints into account.



# EXAMPLES OF CUSTOMER SUCCESS

GLOBAL MANUFACTURER OF ELEVATORS AND ESCALATORS	
<b>Business Challenges</b>	<ul style="list-style-type: none"> <li>• Managing a large workforce</li> <li>• Milestone-based financials</li> <li>• Project-based demand</li> <li>• Global value chain with many subcontractors, suppliers and factories</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Supply planners have greater trust in their project estimates</li> <li>• Increased customer satisfaction</li> <li>• Stable revenue forecast</li> <li>• Improved stakeholder relations</li> <li>• Enabled tracking and supporting of best practices</li> </ul>

MANUFACTURER OF AUTOMOTIVE COMPONENTS AND SYSTEMS	
<b>Business Challenges</b>	<ul style="list-style-type: none"> <li>• Dynamic, competitive and constantly changing market</li> <li>• Increasing market segmentation results in increase of stock keeping units (SKU)</li> <li>• Diverse range of products to manufacture</li> <li>• Increasingly complex workflows</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Improved visualization facilitates improved decision-making</li> <li>• Time saved on short-term scheduling through automated, single-loop computation, freeing up planners for medium-term planning</li> <li>• Able to level the workload and work with more anticipation, limiting the impact of emergencies or unplanned events</li> <li>• Group-wide customer service level increased to 98.5%</li> <li>• Improved plant productivity and reduced inventories</li> </ul>

PREMIUM CAR MANUFACTURER	
<b>Business Challenges</b>	<ul style="list-style-type: none"> <li>• Fast-moving industry when it comes to new technology</li> <li>• Increased consideration needed for supply of electric vehicle components</li> <li>• Complex value chain with many suppliers, intermediate parts and long lead times on transportation</li> <li>• Large dependency on external factors</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Enabled planning and steering of material flows, capacities, utilization and costs per network</li> <li>• Enabled demand allocation and dynamic sourcing to leverage potentials and synergies in the network to deliver resilience to disruptions</li> <li>• Enabled strategic and tactical planning for up to three years, including financial projection</li> </ul>



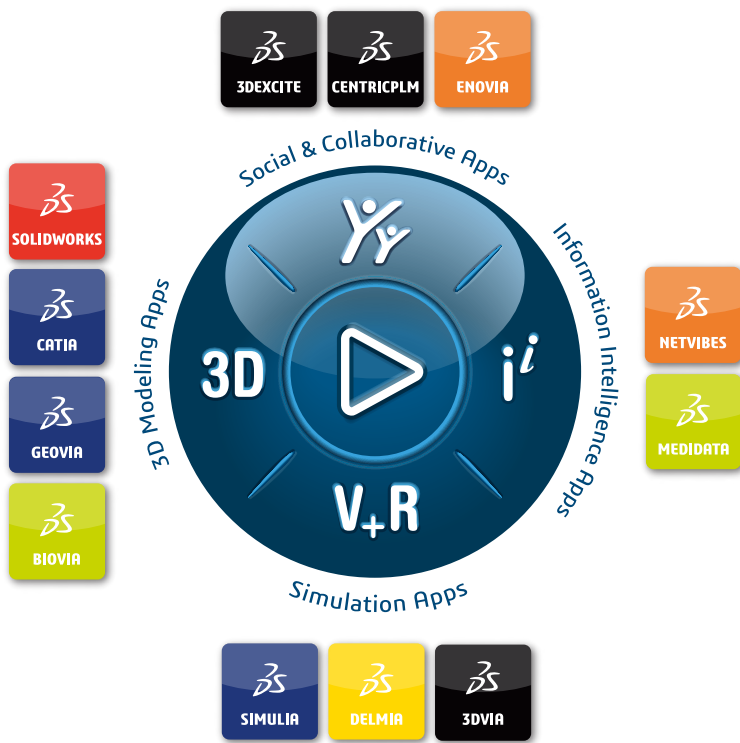
## AN INTEGRATED SOLUTION FOR DISCRETE MANUFACTURING EXCELLENCE

DELMIA's end-to-end planning capabilities empower discrete manufacturers to orchestrate complex value chains efficiently and with confidence. By integrating all data across value chains into a single source of truth, DELMIA provides the end-to-end visibility manufacturers need to optimize the scheduling of components, people and processes. This eliminates much of the complexity in planning and managing discrete manufacturing operations, allowing planners to focus on making decisions that best align with business KPIs.

Improve collaboration with distributed stakeholders across a global value network and leverage world-class optimization and AI technology to maximize productivity, reduce operating costs, shorten lead times, avoid common pitfalls and improve delivery quality. Powerful, responsive and flexible planning capabilities give manufacturers the business agility they need to make their value chains more resilient to unforeseen disruptions.

Take the first step towards realizing manufacturing excellence in your value chain today. Learn more about our solutions at [3ds.com](https://3ds.com).





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