jda.
Plan to deliver™

SanDisk®

CASE STUDY

The Flexible Supply Chain

SanDisk improves safety-stock inventory and on-time delivery metrics by more than 10 percent and increases its supply chain flexibility using JDA solutions

OBJECTIVE

Maintain its market leadership by embarking on a long-term journey to increase its supply chain flexibility and responsiveness to customer demand.

SOLUTIONS

- JDA® Demand Manager
- JDA® Enterprise Architecture
- JDA® Inventory Optimization
- JDA® Supply Chain Planner
- JDA® Factory Planner

SERVICES

- JDA Consulting Services

ALLIANCE MEMBER

- Spinnaker Management Group

REAL RESULTS

- Improved safety-stock inventory and on-time delivery performance metrics by more than 10 percent
- Consistently delivered above 95 percent performance to the original promise date
- Earned top supplier awards from commercial and retail partners
- Enhanced decision making as a result of improved plan quality and alignment
- Shortened its frozen production plan period from weeks to days

Consumer demand can change quickly, and no one understands this better than SanDisk Corporation, a global leader in flash memory storage solutions. Today, SanDisk's state-of-the-art solutions can be found in many of the world's largest data centers, embedded in advanced smart phones, tablets and PCs, and at hundreds of thousands of retail stores worldwide.

As SanDisk's business grew, the company needed to migrate from homegrown, spreadsheet-based planning tools to robust, scalable solutions that would support its expanding original equipment manufacturer (OEM) channels and retail presence. SanDisk sought an integrated advanced planning solution that would help the company maintain profitable growth and maximize its margins while continuing to meet customer demand and increase customer satisfaction.

After an extensive analysis of solution vendors, SanDisk selected JDA Software's Manufacturing Planning solutions to enhance its planning processes. "We felt that JDA had the best solutions, and that those solutions would enable us to grow on a much larger scale than where we were 10 years ago when we started this initiative," said Kehat Shahar, vice president, supply and demand planning, SanDisk.

Increasing visibility with a single, integrated plan

Prior to the implementation, SanDisk's manually intensive spreadsheet-based planning process involved four-week planning cycles with simpler planning assumptions. Leveraging JDA solutions, along with a series of process improvements, SanDisk now produces a daily integrated supply chain plan that includes demand, material supply and capacity constraints and utilization, allocation, and execution objectives.

> "SanDisk's end-to-end vertical integration and commitment to supply chain excellence have played a major role in establishing the company as a trusted leader in flash storage solutions for nearly three decades."
>
> **Manish Bhatia**
> Sr. Vice President, Worldwide Operations
> SanDisk

The end-to-end supply chain plan is seamlessly integrated and funnels supply plan information from the long-range materials and capacity plan to the daily production plan. This is incorporated with the demand plan, which includes a single version of the forecast that aligns with business unit, sales and finance goals. This single forecast — which is formulated based on both market and silicon constraints and also considers bottom-up forecasting from the field sales team, as well as medium- to long-term business forecasts — is incorporated into the weekly and monthly planning cycles.

With the integrated business plan, SanDisk now has visibility into demand and supply across the entire organization, including the number of units in each segment, promotional plans, how inventory is structured in specific channels as well as how it's planned back to supply and onto the shop floor.

"One of the best parts of our supply chain journey is that it got everybody engaged actively and collectively working on one plan," said Sudhakar Adivikolanu, director of IT, SanDisk. "At the same time, they can influence their own activities whether they're in demand planning, supply planning, execution or sales operations."

Supporting informed decision making

SanDisk leverages the advanced planning systems to manage demand, compute statistical forecasts and translate sell-through forecast data and actuals to sell. This allows them to effectively identify optimal inventory levels and stages, and manage silicon allocation. The system is also used to manage complex demand prioritizations, optimize supply and demand responses based on material, capacity, cost and service levels, and support re-planning multiple times a day based on demand signals and what-if scenarios. "The main competitive advantage of using JDA solutions is the faster response. We can be very quick to give an answer and change direction," said Ronnie McAdams, vice president of sales operations, SanDisk.

"Leveraging simulation, optimization and statistical tool kits, the supply chain analytics set up policy guidelines in the advanced planning systems, which in turn generate a feasible supply plan that drives the integrated business planning process," said Shiva Esturi, director, supply chain strategy and optimization, SanDisk.

Some of the policy guidelines that SanDisk employs include demand prioritization, minimum capacity utilization percentage, build-ahead limits, and in-sourcing versus outsourcing percentage. The company also uses daily and weekly planning cycles to incrementally adapt the plan to changing demand and supply, ensuring that the right amount of product is built and delivered to customers on time. "The daily supply chain planning run is the one that typically captures all of the immediate changes — whether they are supply changes or factory capacity changes — and we can respond quickly and adapt the plan," said McAdams.

> "It's important to optimize and maximize the efficiency of our inventory. Using supply chain segmentation with the JDA solutions, and customizing a different supply chain for each of these channels to optimize the inventory, is really the key."
>
> **Shiva Esturi**
> Director, Supply Chain Strategy and Optimization
> SanDisk

Balancing supply and demand with postponement

For the past five years, SanDisk has been profitably balancing supply to meet demand through the deployment of its carefully planned manufacturing and inventory postponement strategy. The postponement strategy includes effectively staging inventory across the supply chain based on product flexibility, supply chain constraints and the required response to demand. Through increased supply chain visibility and a reduced frozen fence, the company has improved its response to demand changes. It also has the ability to stop replenishment and hold the supply upstream once targeted inventory levels are achieved.

SanDisk has shortened its frozen production plan period from weeks to days, as well as scaled its vertically integrated supply chain to ship nearly two million units per day. The postponement strategy has also played a critical role in improving the company's inventory turns which have increased significantly. "Because we're able to postpone things back into the factory, we don't have to balance shipments between regions, which took one to two weeks," said McAdams. "Now we can ship next day from the factory."

By utilizing this demand-pull model, SanDisk has the flexibility to respond with a segmented approach, redirecting work-in-process items and products to other regions and customers as demand changes — while still maintaining a high customer commit rate and optimal inventory levels. "What changed is not the forecast itself, but what the supply chain did with the forecast," said Bhatia.

As a result, SanDisk's inventory turns and service level have increased steadily, enabling the company to keep its customers top of mind and satisfied while achieving an optimal balance between inventory and service. "When we initially implemented the postponement strategy, we did a 'one size supply chain design fits all customers and products' approach. We soon learned that different customers had different product needs, and we segmented the supply chain to meet their unique requirements," said Esturi.

Embracing supply chain segmentation

SanDisk serves a wide array of customers and industries, each one with its own unique requirements of service level, cost and replenishment lead times. "We carefully segmented the supply chain based on our understanding of our customers' product needs when it comes to service level, cost and lead times. We were able to accomplish this by working closely with our sales, business unit, customer collaboration and product development teams," said Esturi. "It's important to optimize and maximize the efficiency of our inventory. Using supply chain segmentation with the JDA solutions, and customizing a different supply chain for each of these channels to optimize the inventory, is really the key."

As part of its segmented supply chain approach, SanDisk adapts the supply chain based on different customer needs, adjusting for differentiations between customers and products. To determine how much product/item inventory to hold and where in the supply chain to hold it, the company conducts in-depth analyses of factors such as sales history, demand volatility, lead time by replenishment, and product margins across all of its stock-keeping units.

The company then uses that information to design different replenishment strategies, and has started using JDA's inventory optimization solution to position the inventory at different levels of the supply chain. Since employing JDA solutions, SanDisk has consistently delivered above 95 percent performance to the original promise date to customers.

"We've been really good at listening to our customers, especially in the last few years. We've developed the capability to really customize the supply chain to meet our customers' needs. We already have the capability to manage up to seven or eight different supply chain strategies within our supply chain," said Shahar. "Our customers view us as a supplier that can really give them what they need, when they need it, in a reliable way. Recently, using different supply chain methodologies, we were able to reduce our lead time by half in one of our major product lines to be more competitive compared to other suppliers."

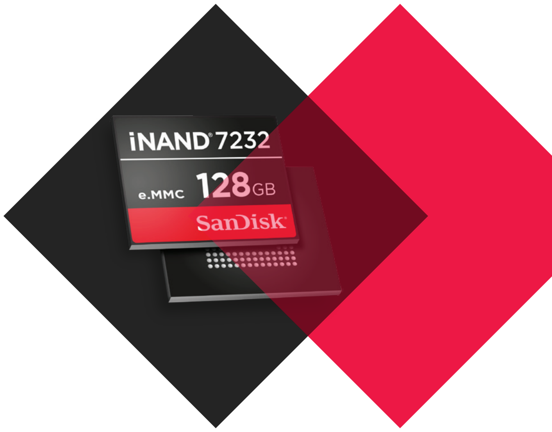
Supporting future growth

Over the course of SanDisk's decade-long partnership with JDA, SanDisk has grown from $1.8 billion to $6.17 billion and has adapted JDA solutions to support a larger customer base, an expanded product portfolio and a more complex supply chain. SanDisk has also earned multiple top supplier awards from leading retailers and OEM partners.

"SanDisk's end-to-end vertical integration and commitment to supply chain excellence have played a major role in establishing the company as a trusted leader in flash storage solutions for nearly three decades," said Manish Bhatia, senior vice president, worldwide operations, SanDisk. "SanDisk's supply chain capabilities are built on a combination of fundamental operations research modeling, advanced optimization planning systems and strong manufacturing execution. These capabilities together allow SanDisk to ship nearly two million products each day while delivering world-class service to both our commercial and retail customers."

Backed by the scalability and flexibility of its supply chain, SanDisk's commitment to innovation and continuous improvement is evident in its journey to create an optimal experience for its partners and customers. "We extensively adopt supply chain concepts such as theory of constraints, Little's law for cycle time, demand and supply variability, risk pooling, postponement strategy, and delayed product differentiation. These concepts are very well integrated in our planning process and advanced planning systems," said Esturi.

"As our unit volume grows year over year, along with the broad portfolio of products and customers, keeping the supply chain flexible and adaptive is very critical. We chose JDA as our partner because of its deep domain knowledge and willingness to apply that knowledge to our business problems," added Adivikolanu. "During our partnership with JDA, our mix of OEM and retail customers has changed substantially, requiring us to be flexible. The postponement strategy is a great example of how we have adapted our business processes using JDA solutions to support our company's growth."



jda. Plan to deliver™