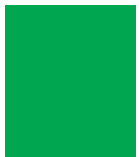


QUESTIONS AND ANSWERS



Photos courtesy of Nissan



A Nissan spokesperson responds to questions about the company's supply chain issues

Cliff Welborn, MTSU assistant professor of management and marketing, conducted this interview via e-mail with a Nissan spokesperson.

What do you perceive as the primary logistics advantages to your Tennessee location?

Fifty percent of the U.S. population is within 500 miles of Smyrna and 72 percent within 800 miles. Because of this location, coupled with the interstate highway network that serves middle Tennessee (I-24, I-65, and I-40) and railroad service provided by CSX that connects Nissan's Smyrna vehicle assembly plant directly to all rail ramps east of the Mississippi, Nissan has a natural competitive advantage when it comes to delivering cars and trucks to its customers.



NISSAN CASE STUDY

Which supply chain work is done in-house and which outsourced?

Nissan considers the following activities to be key supply chain functions:

- strategic planning,
- procurement,
- bills of material establishment and maintenance,
- production scheduling,
- vehicle order processing,
- parts ordering,
- inventory management,
- logistics network planning,
- transportation,

- warehousing,
- material handling, and
- export operations.

Generally, Nissan employees perform activities involving supply chain process planning and management, and logistics service providers handle more routine, repetitive functions primarily associated with those plans' execution. The mix of employee-provided and purchased services continually changes depending on current business needs, available technology, and outside service provider capabilities.

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Nissan's Smyrna assembly plant covers 5.4 million square feet and produces five Nissan vehicles including the Maxima sedan, Altima sedan, Frontier pickup truck, Xterra SUV, and Pathfinder SUV.



Nissan's parts redistribution center in Smyrna ships service parts to Nissan's mega and speed centers.

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How many Nissan employees are directly involved with logistics or distribution?

Today, Nissan employees support production parts logistics and vehicle distribution through the planning and management of these activities—for not only the production of vehicles and engines at the Smyrna and Decherd facilities in middle Tennessee but also vehicle production at Nissan's plant in Canton, Mississippi, and production parts exports that support Nissan production in Japan, Mexico, Brazil, Spain, and Thailand.

How much of a vehicle is produced in-house and how much procured through the supply chain?

The major components produced in Smyrna by Nissan employees are stampings for the body assembly and the plastic bumper fascias. Engine assemblies are produced at Nissan's power train plant in Decherd. The remaining parts are purchased from 450 suppliers (125 in Tennessee).

Several of these Tennessee suppliers who manufacture major components such as truck frames, cockpit and front end modules, and brake and fuel tube assemblies have operations located on-site at Nissan's Smyrna facility. This allows just-in-time manufacturing and delivery of these components not possible from off-site locations. Nissan's strategy includes on-site supplier operations, resulting in a supply chain more efficient and cost competitive than other auto manufacturers'.

Who is your largest logistics/distribution vendor, and what does this vendor do for you?

Currently, Nissan's largest logistics service provider in North America is Wallenius Wilhelmsen Logistics Vehicle Services Americas, or WWL VSA.

WWL VSA is responsible for operating all of Nissan's Vehicle Processing Centers (VPCs) located in Canada, the U.S., and Mexico. This involves managing vehicle inventories at all of Nissan's vehicle manufacturing plants and ports of entry. WWL VSA is responsible for accessory installation and loading railcars and truck haul-away carriers for the delivery of the vehicles to Nissan and Infiniti dealers located throughout North America.

WWL VSA is also responsible for developing the distribution logistics network used to deliver the vehicles produced in North America or imported into North America to Nissan and Infiniti dealers, and the company negotiates the

transportation services used to provide short sea, rail, and truck services required for those deliveries. Additionally, WWL VSA arranges for transportation to the ports for vehicles produced by Nissan in North America that are exported to countries in other regions of the world.

Who is your largest Tennessee-based logistics supplier, and what does this supplier do for you?

Presently, Venture Express, a trucking company headquartered in La Vergne, is Nissan's largest Tennessee-based logistics service provider. Based on Venture's ability to meet Nissan's supplier selection criteria of quality, cost, delivery, development, and management (QCDDM), Venture Express has grown over the years to become Nissan's leading core carrier for the transportation of production parts used at Nissan's manufacturing facilities located in Smyrna and Decherd as well as Canton, Mississippi.

How many inbound trucks/containers do you receive each day?

The daily volume of inbound trucks and marine containers required to support production capacity at Smyrna and Decherd is approximately 450 trucks and 50 marine containers.

How many outbound trucks/containers do you ship each day?

At capacity production volume, the number of railcars and trucks shipped daily from Nissan's vehicle assembly plant in Smyrna is approximately 75 to 100 railcars and 100 trucks. The average number of cars and trucks shipped per railcar is 12, and the average number of cars and trucks shipped per truck is nine. The actual number varies based on the size of the vehicle being shipped (primarily height) and the mix of cars and trucks being shipped on the same railcar or truck.

What are your current primary supply chain issues?

Several challenges are common to all North American automotive manufacturers, including Nissan:

- The financial stability of the U.S. automotive supply base is being affected by the current financial difficulties facing General Motors, Ford, and DaimlerChrysler. This financial strain can harm some suppliers' ability to meet their supply obligations to their customers.
- The rise in global competition between the traditional North American automotive supply base and automotive suppliers in countries such as Mexico, China, Korea,

Factors supporting the relocation decision included the potential to improve operational efficiencies among its North American functions due to Tennessee's lower costs of doing business, favorable business and taxation climate, and central location.

India, and other emerging countries worldwide has literally stretched Nissan's supply chain around the globe. This presents new challenges that must be managed in order to maintain an uninterrupted parts supply to Nissan's manufacturing facilities.

- Currently, transportation infrastructure issues within the U.S. affect Nissan's supply chain. Capacity constraints include port facility capacities; railroad capacity and railroad investment in capital equipment required for shipping automobiles and trucks; truck driver shortages, which limit the national trucking capacity and the growth of trucking companies; and obviously the rising cost of fuel, which adversely affects the cost of transportation of both parts and finished vehicles.
- Supply chain management organizations must manage the availability of resources and time required to adopt advanced information technology required to keep pace with advances in supply chain management.

What major developments do you foresee for your supply chain in the near future?

The biggest development will be the continued expansion of global vehicle assembly operations and automotive supplier bases. The supply chain for both finished vehicles and production parts supply will continue to expand on a global basis to support these activities and provide new opportunities for companies that learn how to compete globally—particularly logistics service providers.

What factors influenced Nissan's decision to relocate its corporate headquarters to Tennessee?

The relocation of Nissan's corporate headquarters to Tennessee is providing strategic, long-term operational benefits and supports the company's ongoing efforts to create synergies and improve performance. Prior to the relocation, corporate functions such as sales, marketing, product planning, corporate planning, communications, and training were managed from Nissan's corporate facility in Gardena, California. The relocation allowed those functional groups to have closer collaboration and higher levels of cross-functional involvement with the manufacturing, purchasing, product quality, and supply chain management functions based in Smyrna. Other factors supporting the relocation decision included the potential to improve operational efficiencies among its North American functions due to Tennessee's lower costs of doing business, favorable business and taxation climate, and central location.

With the corporate relocation, will there be any significant changes in the way this plant's supply chain operates?

Prior to the relocation of the headquarters to Nashville, Nissan's supply chain management group was looking into opportunities that could be gained by combining the production parts and service parts logistics networks. Opportunities included combining suppliers' production parts shipments to Smyrna with service parts shipments and negotiating common transportation service provider contracts. The relocation of the headquarters operation to Nashville facilitates the working relationship between the groups responsible for product and service parts, allowing Nissan to accelerate these collaborative efforts. ■



Logistics centers attached to Nissan assembly plants are used to receive, sort, and sequence inbound production parts for delivery to Nissan's vehicle assembly lines.



Multiple model production at Nissan assembly plants maximizes haul-away trailer load efficiency.