



## Section 5 Lecture

# Location and Supply Chain Management

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Hi, I'm Robin Jones. I lead Esri's Business Development team. We work with tech sector partners, and I'd like to talk to you about how location impacts supply chain management.

So whether you've studied in business school or you're employed in business, you know that supply chain is a very important sequence of processes involved in producing and distributing your product. So in the next 10 minutes or so, I'll illustrate for you how geography is highly relevant to supply chain management, and that location advantage can give you and your company a competitive advantage.

Getting your products into the hands of consumers when they need them is imperative for many businesses. Interruptions like severe weather, or political or civil unrest, or even an economic crisis can affect the supply chain, resulting in significant costs. So, how do you harness the location advantage to mitigate interruptions and reduce loss and costs in your business and your supply chain? Well, let's spend a few minutes talking about that today.

By analyzing your supply chain and visualizing the associated impacts or threats, you can minimize your risks by better understanding your supply chain, the distribution network, your inventory, and your logistics. Location analytics can help you identify optimal locations, detect and quantify patterns in your business, and make predictions about how changes and events can impact your supply chain performance. Effective management of the supply chain from suppliers to manufacturers to customers helps a business gain competitive advantage and increase your customer satisfaction.



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As you can see, supply chain management can be a very long and complex system. Location affects many parts of the supply chain process, not just the movement of goods. For example, the cost of goods sold and your net margin can be impacted by the supply chain costs. Those are directly affected by geographic factors like distance.

Geography also impacts your cost of fuel, your raw materials, and labor costs, which are significant contributors to the total price in a product. Location analytic techniques can be applied to optimize your supply chain network and minimize your cost.

Product life cycle management is the process of guiding the entire arc of a product's inception, design, engineering, manufacture, service, and eventual disposal. Think about how location impacts the decisions that you make along the product life cycle in terms of the product, the place, the price, and your promotion. Your supply chain might increase the complexity as you move through the various stages of your product life cycle, and the complexity of managing that supply chain will increase, as well.

Spatial analysis is defined as a set of statistical techniques that turn location data into useful information. Use of spatial analysis can help mitigate some of the increased complexity in your supply chain.

There are several phases of the product life cycle, each of which represents opportunities to gain the location advantage. In your introductory phase, your sales may be low, and you might only have one distribution center. But as you experience product growth, sales increase, and the distribution of your product becomes much more intensive and broad. And in the maturity phase, you need to become efficient in your distribution, with the goal of reducing the overall cost, as competitive pressures are most fierce right now. It's at this stage where you might need to consider new distribution channels or incentives. There is tremendous opportunity to use location to help you manage your resources more effectively, reduce your costs, ensure environmental and safety compliance, and increase revenue as you manage your product life cycle and your supply chain.



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Protecting the supply chain from risk is of utmost importance to the overall success of your business. Supply chain risk management strategies help you reduce your vulnerability and ensure your business continuity. So let's consider an example. Many of you might have experienced a major snowstorm that's made it difficult to move around, or a hurricane or a tropical storm that's inflicted damage to your home or your business. So let's think about that in terms of a global business. An example to consider is the 2011 floods in Thailand. These floods were massive; they impacted not only the people of Thailand, but the entire global economy. The World Bank, in fact, rated this as the fourth costliest disaster in history. It resulted in an estimated 45.7 billion U.S. dollars in economic damage and loss. The manufacturing industry sustained most of this damage: seven major industrial complexes were inundated by as much three meters of water during the floods. And major companies were forced to entirely halt production, including leading automobile manufacturers and electronics manufacturers, including some of the world's largest producers of hard drives.

This event highlighted the impact that location and supply chain can have on businesses around the world. Now that we're in a truly global economy, the impact of an event like this has worldwide ramifications. Think about how many products include a hard drive, for example, or similar electronic components. The business interruption didn't just impact the computer sector—it interrupted many industries, resulting in added cost and lost revenue. In fact, according to a study done by insurer AON Benfield, more than 7,500 industrial and manufacturing plants were damaged by floods in 40 separate provinces. And beyond the devastation in Thailand, the subsequent impact on other businesses both up and down the supply chain was massive. AON reported that nine separate motor companies in Japan were forced to halt production at the height of the flooding, and the production loss was approximately 6,000 vehicles per day.

Finally, consider the losses and the payments that the insurance industry faced. According to the Office of Insurance Commission, the insured losses from the 2011 floods were estimated to exceed 10.8 billion U.S. dollars. As you can see, the geography of your suppliers, as well as your business, is very highly relevant.



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Now, let's look at the impact of logistics on the supply chain. The term logistics refers to the management of the flow of goods between the point of origin and the point of consumption or purchase. The resources employed in logistics might be many, including raw materials, people, machinery, time, transportation, and more. Location analytics can help you better understand this complex set of interweaved processes and steps so that you can minimize the use of resources and drive your costs down.

There's many types of logistics, as you can see here. For the purposes of this discussion, we'll focus on distribution logistics; that's the delivery of finished goods out to the consumer. So considering the logistics of distribution, it's important to take into effect all the nodes of the distribution network, be those factories, warehouses, retail storefronts, or other stops along the way. Analyzing the locations and connections between these nodes can help you better understand how to optimize that network to better reach your customers and reduce your costs.

Using location in your business analysis, you can realize tangible savings in operational expenses by reducing your mileage, your overtime, and the time it takes to create those optimized routes in the first place. Mileage savings translates into fuel use savings and a smaller carbon footprint for your business. Location analytics is similar to spatial analysis, but it's newer and it's more specific to business. It entails looking at a customer or logistics data that's housed in another enterprise business system or a data warehouse. These days, it's often in a large big data platform running Hadoop or MongoDB. You can use location analytics alongside your business analytics to help enhance your deep-dive business intelligence, predictive analytics, CRM, supply chain management, and so on.

Location analysis helps us to understand and model logistics scenarios based on multiple factors, such as your delivery type, the freight being hauled; the driver, the vehicle, route considerations; and your customer demand. By leveraging location analytics with technologies such as GPS or mobile, businesses can understand the real-time location impacts on your network and adjust accordingly.



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Later in this section, take a look at the video we've provided about a leading transportation and logistic services company that uses the location advantage to provide real-time analysis of their drivers, the routes, the freight, and their customers. It has resulted in improved customer efficiency and asset management.

Now, earlier in this course, we argued that location can help inform your decisions on market planning, your site evaluation, and customer preferences. I hope that you've seen from today's discussion that location can also impact much more, including your product marketing and life cycle; logistics, planning, and distribution; and supply chain and risk management. In this week's case study exercise, you'll see how location is used to help better manage a large international supply chain (in this case, it's for a company that makes potato chips). Have a good time, and let us know what you think!