Section 6 Lecture

Understanding Risk Using Location-Based Information

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Hello, and welcome back. I'm John Shramek. I work in Business Education here at Esri. I'm here to discuss how location can help you better understand and manage risk. In the next 10 minutes or so, I'd like to make the case that risk and geography are linked, and that you can better understand and manage risks to your business by analyzing geospatial information.

Organizations that know how to analyze the geographic components of risk benefit from a reduced exposure to it, as well as improved risk mitigation and management. Risk is the possibility of injury or loss. Businesses must contend with both natural and man-made risks. Natural risks include weather and climate, geophysical hazards, or biological risks. Man-made risks can be either unintentional or intentional.

Geography plays a significant role in natural risk. Physical location has a direct impact on the type and severity of the natural risk a geographic region may expect. There is a direct correlation between risk and proximity to water, fault zones, volcanoes, or certain climate zones, among others. Each of the natural risks listed here is more or less likely to occur depending on location.

Man-made risk can result from neglect, inexperience, misunderstanding, or intentional malicious acts. For example, if your organization were responsible for siting and building a nuclear power plant, the man-made risks you'd have to consider would include local political stability, economic and financial conditions, changing government regulations, or acts of terrorism. If you are a grower and heavily dependent on human laborers to

pick your crops, you'd be concerned with civil unrest, safety, and food regulatory compliance. Considering both natural and man-made risks can help you assess your organization's vulnerabilities at a given location. Knowing the distance to the shore line and local topography can help inform your

understanding of the risk of storm surge or flooding.

By analyzing both physical and human geography, you can start to understand risk. By understanding risk, you can analyze or measure the impact, as well as monitor or even possibly control the impact on your organization. Every business contends with both types of risk, regardless of its size or the products or services it sells.

Understanding the risks your business faces is crucial so you can determine how to best protect your business and your investment. Unmanaged risks can result in financial losses, loss of reputation, or lost opportunity.

Risk management is the identification, assessment, prioritization, and control of risk. The object is to avoid, transfer, or reduce the probability or impact of unfortunate events. Geography is relevant throughout the risk management process. Many industries deal with risk every day.

Let's briefly consider some of the geographic factors that contribute to risk in some of the industries that you're familiar with.

Financial services organizations look to manage exposure to portfolio risk, credit risk, and market risk. Other types of risk include foreign exchange, unemployment, and inflation. Geographic factors influence each of these risks. For example, credit risk is in part related to the economic characteristics of the places or regions that financial institutions serve. Unemployment is another example, as unemployment varies from state to state or region to region.

Remember the saying "location, location, location" in real estate? Risk management is a crucial part of the real estate sector, as well. Understanding the location, the market,

property values, depreciation, financing or credit risk, and competition are all important for managing risk in real estate.

Retailers face risk in the management of their business, property, assets, and customers. Managing risk means ensuring that the product is on the shelf or on the web at the right price at the right time. Retailers deal with issues of supply chain risk, real property risk, and financial risk, each of which is influenced by geography. Think about the network of stores a retailer may have. Any one of these stores could expect or experience a natural hazard on a given day, resulting in disruption or store closure. Every one of those store closures can result in damage to the store itself or lost revenue.

Finally, health and medical markets consider the health and risk indicators at the patient level. They also consider the threat of disease spread and prevention at global levels. An entire field of spatial epidemiology has come about to help health researchers and providers understand and predict the spread of disease. Also, location is a strong predictor in the prevalence of certain lifestyle-related ailments, such as diabetes and lung cancer, or environmental risks, like air pollution.

There are several methods or approaches to help visualize, understand, and respond to risk. These methods help businesses prepare for unforeseen events and recover as quickly as possible to minimize downtime, which equals lost revenue, market share, and customers.

Business continuity planning, or BCP, creates a structured response to an interruption in critical business functions. It helps an organization prioritize and continue their operations.

Disaster response planning, or DRP, is for continuing operations after a more major interruption, when infrastructure is also affected. DRP is part of BCP. For example, a bank may want to ensure that it is able to provide cash to its customers immediately following a natural disaster. The bank will have this defined as one of the risks in the BCP, along with possible impacts. Steps and procedures will also be documented, such as setting up temporary ATM banks in damaged areas or fixing broken units more quickly.

The DRP will also plan for back-up generators or even mobile data center sites to get operations back up and running.

Another method is common operating picture, or COP, which refers to a single display of information relevant to business operations shared by all groups or managers in an organization—a type of dashboard. This helps everyone be on the same page and see the same information. The term was traditionally used by governments and public agencies, and it is becoming now more widely accepted in the private sector, as well. A COP can help you understand the impact of an interruption on your network, including physical plant, suppliers, and distribution centers, as well as total interruption in sales, as depicted here. This information can be used to inform executives about operations or trigger the execution of your BCP. The COP is also used during the actual event to better understand and communicate in real time.

Decision support systems are another approach for understanding and responding to dynamic events. A decision support system, or DSS, combines human intelligence with information technologies such as databases, models, and user interfaces to help users better understand unstructured data. These systems are designed for use by middle- and upper-level management. What we mean by unstructured data would be aerial imagery, videos, or social media posts. When combined with location in a DSS, this data can help frame the event to help with decision making. Aerial imagery and social media were used, for example, during Hurricane Sandy in New York to understand better the actual impact and inundation areas or flooding before any data was published from official sources.

Finally, consider an industry based entirely on the management of risk: the insurance industry. Insurance is the equitable transfer of the risk of a loss from one entity to another, in exchange for payment. Re-insurers, the companies that insure the insurance companies, create stability by managing risks and covering losses. They protect investments and enable economic growth.

Imagine that you are in the business of growing grapes. What risks could you face? Are there some that you can transfer or offset by purchasing insurance? There are natural

risks to consider: your product is very sensitive to extreme heat, cold, flooding, drought. You could offset these risks by purchasing crop insurance. There are also man-made risks. What if there is a labor strike? If you can't get the grapes picked by hand, can it be done with machines? If so, what is the difference in product quality, or time to market? These risks might be offset by purchasing product liability insurance. And, if one of your workers is injured on the job, employer liability insurance can help offset that risk. Finally, you can get insurance for financial risk, such as decreasing prices from sagging demand, supply chain interruptions, or increasing costs. All of these risk factors and insurance options must be considered if you are in the grape-growing business.

In this brief lecture, I've tried to make the point that businesses of all kinds must deal with a wide variety of risks. Geography is a factor in every one. And, as we've argued throughout this course, businesses that know how to analyze geospatial information have the location advantage to drive better, more informed business decisions. Later in this section, you'll use Esri's location analysis platform in a realistic risk scenario. So good luck, and congratulations on getting the location advantage for yourself.