USC Marshall
School of Business

BridgePort Group LLC Global Solutions

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USC Academic Case Competition
Sponsored by BridgePort Group and ESRI
Problem Statement

Innovating the Site Selection Process for Future Expansion (B2B & B2C & B2B2C)

Executive Summary

BridgePort Group, LLC (BPG) is an American global supply chain, warehousing and inventory management company based in Cleveland, Ohio. For nearly 20 years, BridgePort has been a leader in providing technology-based engineered solutions for the global movement, inventory management and distribution of industrial parts.

As part of our effort to remain a leader in the supply chain industry, BPG continuously evaluates the market trends for the logistical and warehousing market. We identified a sharp increase in the demand for cold storage in the medical industry which led BPG to expand our vendor managed inventory services to include cold storage. The primary drivers for our decision to add a cold storage solution is the expected rise in e-commerce's share of total U.S. medication sales of approximately 19% during the period 2020-2026. This growth will drive demand within the entire cold storage industry, particularly within the medical distribution segment.

Another factor is the reduction of pharmacies in the urban core and the change in population and demographics in large cities. These pharmacy deserts and population shifts have generated more demand in states like Ohio, Florida, Arizona, and Texas, resulting in the need for more cold storage capacity to store and distribute pharmaceuticals, medical devices, and other healthcare related items. The rise in chronic illnesses in these same populations has driven the need for laboratory medical research and the examination of health disparities similar to those being conducted at the University of Wisconsin and other major research institutions.

The growth in cold storage demand is inclusive of critical lifesaving medication, medical devices, sterilant and disinfectants requiring refrigeration, and a growth of biological samples needed for ongoing medical research and development. The increase in demand for effective logistical management concerning strict temperature requirements for medications and vaccinations is in response to the growth in highly transmissible diseases and chronic illnesses. To address the growing demand and strict adherence to temperature zones, packaging, shipping, receiving, storage, and inventory requirements, the BPG team must identify optimal geographical locations, nationally and globally, for additional warehouses leveraging a sustainable last mile delivery.

Geographic Information Systems (GIS) is a technology the team believes will innovate and revolutionize the way they understand and analyze locations for future temperature-controlled warehouses. The team will utilize these tools to collaborate and share data via maps, apps, dashboards, and reports to make sound business decisions and meet the demands of business partners, commercial customers, and individual consumers.

Business Opportunities

Next Generation of Temperature Warehouse Design

BPG's innovative warehouse concept has several unique features all focused on building a world class multi-temperature zone storage facility with physical and virtual Research Lab, Testing Lab, and Teaching Lab. The planning includes integration of cutting-edge technology and the efficient installation of high-tech equipment keeping the safety protocols and required regulations as its highest priority. The motivation behind the conception of such a facility in the heart of the medical hub of Cleveland is to provide high-class medical and pharmaceutical support throughout the entire North-East Ohio area. Finally, the facility also aims to become an environmentally, socially, and economically sustainable facility.

The Cleveland pilot facility has a unique value proposition for the area because it is equipped with six multifaceted cold temperature zones. Currently, warehouses that align with BridgePort's design and business concept are located on the east and west coasts of the United States. Opening in Cleveland will fill the gap and meet the rising Midwest market warehouse demand.

Warehouse Zone Overview

- Zone 1 – Cooler Space temperatures are between 8°C and 15°C (46°F to 59°F). A product that requires cool storage, unless otherwise specified by the individual USP monograph - (a document that reflects the quality attributes of medicines approved by the U.S. Food and Drug Administration - US FDA). This zone may also include temperature ranges for Freezer Storage which requires temperatures to be maintained thermostatically between -20°C and -10°C (-4°F to 14°F).

  Focus area: Pharmaceutical Storage (cooler space – target)

- Zone 2 – Ultra Cold storage (ULT) as defined by the World Health Organization as 60 °C to -80 °C (-76°F to -112°F); also, there at specific temperature and storage time requirements around the thawing of the product.

  Focus area: Medical Samples and vaccines (ultra cold space – target)

- Zone 3 – Controlled Humidity ambient storage area temperature is maintained thermostatically to meet the usual and customary working environment of 20°C to 25°C (68°F to 77°F) that allows for relative humidity: 60-65%RH. Products like capsules, tablets and electronics do best when shipped at an ambient-controlled temperature, so the external temperature doesn't melt or otherwise compromise the product.

  Focus area: Medical Device Storage (ambient space – target), Research & Development (Laboratory Clean Rooms large metro areas with large educational universities)

- Zone 4 – Lab Research temperature per the Food and Drug Administration's regulatory guidelines outline an optimal temperature for labs as being between 20 °C and 25 °C (68 °F and 77 °F) with humidity levels somewhere between 30% and 50%. BPG is seeking a pharmaceutical level ISO 5, low particles clean-room classification. An ISO 5 clean room must have less than 3,520 particles >0.5 micron per cubic meter and 250-300 HEPA filtered air changes per hour. The equivalent FDA standard is class 100 or 100 particles per cubic foot. Common applications are semiconductor manufacturing and pharmaceutical filling rooms.

  Focus area: Research & Development (Laboratory Clean Rooms large metro areas with big educational universities)

- Zone 5 – Cryogenic Temperature range is defined as temperatures from -150 °C to - 274 °C (−238 °F to −460 °F which is absolute zero), the point where molecular motion is as close to theoretically possible to stop completely. Temperatures above -150 °C can, therefore, not be considered cryogenic. Any treatments applied at such temperatures won't qualify as cryogenic treatment.

  Focus area: Manufacturing (Metal Hardening, hydrogen, dry ice, and aerospace and automotive)

- Zone 6 – Ambient Temperature for cold chain logistics means maintaining a temperature between 15°C to 25°C (59°F to 77°F). These temperatures fall in the range of comfortable room temperature instead of being on one extreme of temperature ranges. These temperatures are typical ambient warehouse storage conditions.

  Focus area: Innovation Hub (certification training, industry training, incubator, general office leasing)

Why Cleveland, Ohio?

The first temperature-controlled warehouse facility will be established in Cleveland, Ohio, serving as the pilot project. This warehouse will store the inventory of sensitive bio-medical products and manage the final delivery of these products to various recipients, including medical providers (e.g., hospitals and clinics - B2B), retail facilities (e.g., pharmacies and stores - B2B2C), and direct prescription deliveries to patients (B2C). The choice to pilot the warehouse in Cleveland is reinforced by the local market's proximity to suppliers and customers, along with favorable environmental factors.

Other considerations:

- Centrally located between Pittsburgh and Detroit's university research centers and is near major highways and transportation routes with four major hospital systems within the region.
- The site's location is in the inner city and satisfies the company's requirements to be located within a Federally identified Opportunity Zone serving historically underserved residents.
- Opens opportunities to serve an urban environment that lacks pharmacies and accessibility to healthcare services for underprivileged and underserved patients with critical illnesses.
- Accessibility of the location and reach to a determined percentage of the population and targeted clients (i.e., hospitals, clinics, consumers). For example, the average warehouse in America can reach 73% of any location for a delivery within the US via ground shipping in two days. That number jumps to 90% when shipped from the Washington DC area.
- Insights into the city's economic development plans and available capital earmarked for sustainable development supports BPG's committed to making a positive impact on the surrounding communities and environment.
- Just in Time (JIT) delivery of the product will be performed using electric delivery vehicles with Connected and Automated Vehicles (CAVs) to reduce the company's carbon footprint.
- Seasonal weather conditions will have limited impact on the facility's equipment and functions. Note: The temperature-controlled warehouse contains several levels of refrigeration which are needed to store the client's products safely. External environmental factors, including temperature and humidity, can affect sensitive interior storage conditions within the warehouse as well as the refrigeration energy costs.
- BPG's two industry-recognized certification programs, the Supply Chain Logistics Technology and Warehousing (SCLT&W) and Supply Chain Logistics Information Systems (SCLIS) will support staffing needs by training residents to become frontline workers, technicians, administrators, and delivery drivers.

PROBLEM STATEMENT

BPG's growth plan involves expanding its temperature-controlled warehousing and distribution network with an additional three to five warehouses across the United States. The primary objective of this expansion includes:

1. Supporting the cold-chain logistical and warehousing requirements of both current and potential customers in different markets.
2. Ensuring the quick and cost-efficient delivery of temperature-sensitive goods to our customers.
3. Enhancing warehousing activities as an integral part of our customers' distribution management systems, particularly in hospitals and clinics.
4. Offering customers the advantages of a comprehensive process for overseeing the movement of temperature-sensitive goods, from their suppliers or manufacturers to a technology-enabled warehouse, and ultimately to the point of sale through efficient delivery solutions for national customers.

Given the continuously changing and competitive nature of the warehousing industry, BridgePort must engage in strategic planning to identify the most advantageous locations for expanding its temperature-controlled warehouse network. The company needs to establish a scalable and repeatable assessment process for site selection that incorporates the criteria used for identifying the Cleveland, Ohio pilot project location. The approach for selecting the pilot included the following factors:

Key Factors:

a. Customer Locations
b. Labor Availability
c. Local Infrastructure
d. Local Laws and Regulations
e. Taxation Rates and Financial Incentives
f. Environmental Risks
g. Model for Scalability and Future Expansion

There are other site selection criteria and important considerations that also influence BPG's revenue streams and profitability. Additionally, focus on the type and amount of product that generates revenues and high profits should be based on market sizes, price points, storage costs and operating expenses.

The Challenge

The aim of this case competition is to use GIS generated maps and other resources to identify and prioritize suitable locations for BPG's expansion and establishment of a nationwide network of temperature-controlled warehouses. This network will serve BPG's target markets, encompassing customers in the Eastern, Western, and Central regions of the United States.

For this case competition the teams will:

- Determine if the provided selection criteria are the right factors to use for considering location. Provide an assessment of the criteria and recommendations on additional considerations.
- Determine how to best use the Esri provided maps to evaluate optimal locations across the United States for temperature-controlled warehouse expansion in urban environments.
- Determine 3 to 5 ideal locations for placement of the temperature-controlled warehouses. Specifically, identify the single best location BridgePort should commit to investing in immediately. Then, identify and prioritize the other locations that the company may want to consider sometime in the next 2-to-5-year period.
- Recommend some data analytic tools or frameworks that can be used to track population shifts, market demands, and healthcare related trends that will support making business decisions for existing and future warehouses.
- Discuss how the geographic location of a temperature-controlled warehouse equipped to house sensitive medications and biologics can positively impact public healthcare and address healthcare disparities within a community.
- Recommend some innovative strategies for improving warehouse site selection that considers urban

environments and all the factors that may influence business outcomes.

Solution deliverables:

- List of 3 to 5 optimal site locations with rationale explaining the selection process and resources used for making the determination.
- Rank the recommended locations in order of business priority and to include factors listed below. Add other factors if necessary.
    - Available Power Supply
    - Internet Network Connectivity
    - Real Estate Cost and Availability
    - Skilled Labor
    - Local Taxes and Incentives
    - Climate
    - Political and Economic Stability
- Recommendations for innovating the location selection process.
- Highlight the locations access to multimodal and intermodal transport include local roadways, freeways, rail, airports, and waterways.

Please keep in mind for this competition teams will need to use the Esri maps and other independently sourced tools and resources to address the case.

APPENDIX: Additional Information

Space Requirements (15 - 20 acres)

- 250,000 + sqft. warehouse with 35 ft. ceilings
- External space with a great access via multi-model transportation system and road connectivity, seamless spacing for the loading of various sized trucks, along with ample space for up to 10 EV charging stations, and employee/visitor parking and other major space requirements
- Based on our revenue model, sections of the warehouse will be leased to outside firms. The rental rate of a warehouse in the US is normally based on square feet (SF) per year or month depending on the owner. See the table below for examples of warehouse lease cost in various markets.

Low Cost Markets	Avg. Price Per Sq Ft Per Year	High Cost Markets	Avg. Price Per Sq Ft Per Year
Memphis, TN	$2.56	San Francisco, CA	$16.50
Dallas-Ft. Worth, TX	$4.27	Long Island, NY	$9.60
Atlanta, GA	$3.96	San Diego, CA	$10.60
Nashville, TN	$4.72	Orange County, CA	$10.14
Jacksonville, MI	$4.08	Honolulu, HI	$14.60
Savannah, GA	$4.52	Miami, FL	$11.61

Environmental Requirements

- Available land, 15-20 acres with no, or very little, remediation and cleanup needed.
- Energy and Environmental regulations, laws, and incentives in potential markets
- The municipality's building code regulations on storage/production of certain chemical/bio-chemical elements and proper handling of bio- waste.
- Availability and location of public charging stations. (Maps of Alternative Fueling Corridors).
- Other local environmental factors that should also be considered include proximity to neighbors (warehouses can be noisy – avoid disputes), traffic congestion, and peak traffic hours. Consider how these variables could affect regular operations.
- Local environmental factors such as weather conditions and risk of exposure to natural disasters should also be considered.
- **Resource**: https://www.plugshare.com/

Target Population Demographic Requirements

- Location of six identified competitors - most of the competitor storage facilities are based in coastal areas as compared to the mid-west. Since Cleveland is situated in the heart of several medical facilities and bio-tech companies it seems to be a good demographic.
- Socio-economic demographics and ethnicity make-up.
- Population density and percentage of people suffering from chronic illnesses requiring temperature-controlled meds.
- Healthcare disparities in urban areas around the east, central, and west regions.
- Using economic, social, and racial data inclusive of poverty, age, living conditions, and education levels to identify areas/populations/patterns impacted by limited access to medication.
- Using census data to help locate a warehouse to best service existing gaps in medication availability and healthcare access.
- **Resources:** https://www.census.gov/data.html , Neighborhood Atlas - Mapping (wisc.edu)

Workforce Availability, Labor Skills, and Wage Requirements

- Skilled workforce availability and labor costs are directly associated with local demographics. Not every geographical location offers a workforce with the right skills at the right price.
- Consider when choosing a warehouse location, understand the demographics and focus on educational attainment, population characteristics, income levels and educational institutions.

Traffic Flow Requirements

- Transportation costs are affected by some or all of these variables and can impact the competitiveness or the attractiveness of our facility to customers. Consider the following points:
  - Accessibility to highways and exit ramps.
  - Highway inter-connectivity.
  - Public transportation penetration (availability for labor).
  - Average traffic speed.
  - Average traffic volume.
  - Traffic peak hours Road safety & conditions.
  - Interconnected roads, signs, and signals (signals to create ease of access for vehicles).

Proximity to Airport, Railway Stations, and Ports Requirements

- In a temperature-controlled warehouse, the main mode(s) of transportation used to receive or ship goods to and from the warehouse must be prioritized.
- For inbound cargo, the largest percentage is imported via ship, combined with some rail and truck.
- Outbound shipments are primarily moved by truck with last mile delivery by small vans, about 6% are transported by air.

Market Requirements

- A temperature-controlled warehouse location should consider the distance to major suppliers, producers, and/or customers.
- Reducing the distance will help reduce lead times, decrease transportation costs, and enhance responsiveness.
- Number of hospitals, clinics, urgent care facilities, pharmacies, and nursing homes.
- Number of similar temperature-controlled warehouses identified as competition.
- Regional and local economic trends in employment, education, average income, and spend in healthcare services.

List of Competitors

- **Precision Stability Storage** – Locations in NC, FL, MA, CA
  - https://precisionstabilitystorage.com/
- **Core Cryolab** – Locations in Toronto, ON, Canada, and Mississauga, ON, Canada
  - https://corecryolab.com/
- **GenVault** – Location in NJ
  - https://genvault.com/
- **Masy Bioservices** – Locations in MA, PA, NC, NJ, CA
  - https://www.masy.com/
- **CRYOPOINT** – Locations in IN
  - https://cryopointllc.com/
- **Biolife** Solutions – Locations in WA ○ Data Resources:
  - https://www.biolifesolutions.com/