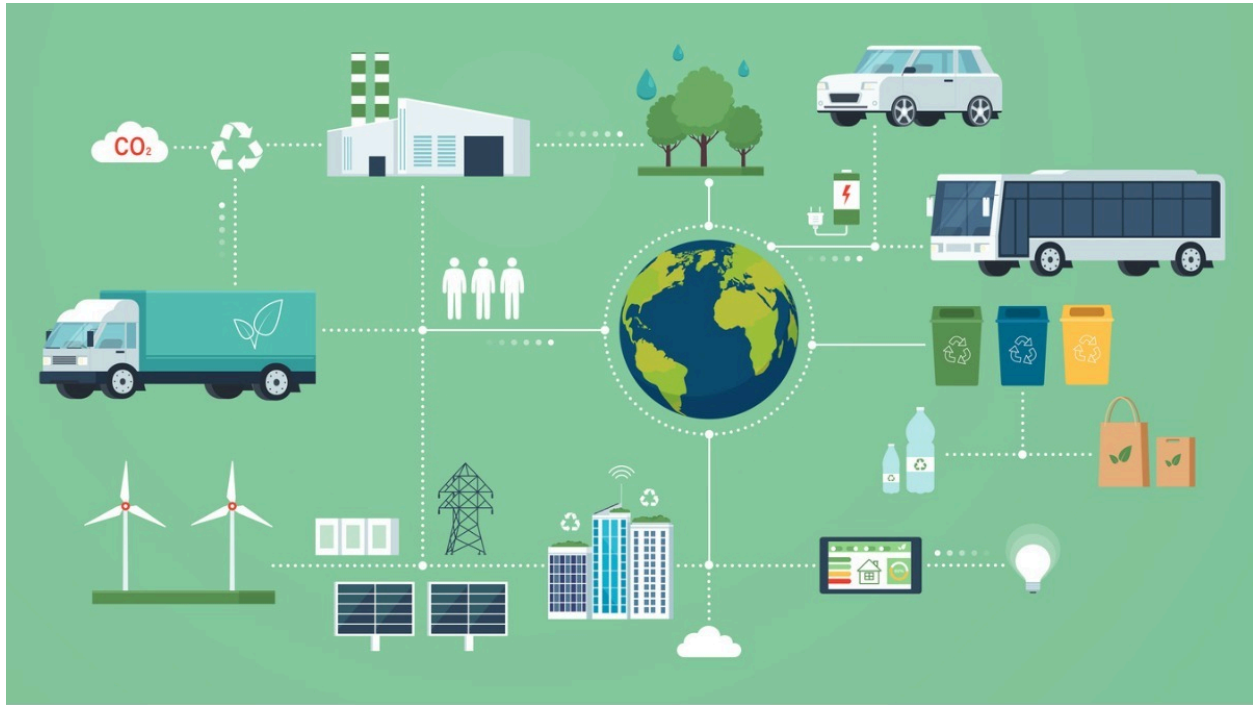


SUSTAINABILITY SUPPLY CHAIN

Sustainable Supply Chain for Health Commodities in Global Logistics



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OBJECTIVE

This project aims to analyze and optimize the supply chain for health commodities, with a focus on sustainability. The objective is to minimize the environmental impact of logistics operations, reduce operational costs, and enhance the overall efficiency of the distribution network for critical health products, such as Antiretroviral (ARV) drugs and HIV lab supplies.

BACKGROUND

- This analysis focuses on the logistics and pricing of HIV/AIDS health commodity shipments, particularly antiretroviral (ARV) and HIV lab supplies. The dataset offers detailed information on pricing, supply chain expenses, and shipping logistics, helping stakeholders understand global trends, pricing variations, and transportation costs. It is used by major procurers like the U.S. government, PEPFAR, and the Global Fund to track spending patterns and optimize logistics strategies.
- Additionally, the dataset includes sustainability metrics such as carbon emissions, energy usage, and recyclable packaging, allowing for the assessment of the environmental impact of logistics operations. By analyzing this data, stakeholders can make more informed decisions about global health commodity shipments, improve cost-efficiency, and reduce the ecological footprint of transportation processes.

PROBLEM STATEMENT

The logistics network faces challenges in optimizing the balance between cost, efficiency, and sustainability. Freight costs, especially air transport, often drive high expenses in moving HIV/AIDS-related commodities. With the goal of reducing carbon emissions, improving cost-efficiency, and enhancing the sustainability of shipments, this analysis will focus on optimizing transport modes and supply chain processes, while also accounting for contextual factors that can influence pricing and delivery lead times.

SCOPE OF WORK

1. **Shipping Mode and Cost Optimization:** Analyzing the logistics data to explore cost-efficient and sustainable transport modes (air, sea, land) for HIV/AIDS commodities.
2. **Freight and Sustainability Analysis:** Evaluating freight costs alongside sustainability metrics, such as carbon emissions and energy usage, to develop more environmentally responsible logistics strategies.
3. **Pricing and Vendor Analysis:** Investigating trends in product pricing and vendor logistics to identify opportunities for cost reduction and improved supply chain collaboration.
4. **Warehouse and Logistics Optimization:** Understanding the logistics constraints, including freight modes and vendor INCO terms, to optimize order fulfillment and reduce delays.
5. **Sustainability Reporting:** Creating sustainability metrics for shipments, including waste generation, recyclable packaging, and carbon footprints, to help stakeholders make informed, environmentally conscious decisions.

DATA SOURCES AND DESCRIPTION

TABLE NAME	DESCRIPTION
Projects	Contains details about specific health commodity projects, including product group, fulfillment methods, and project classifications.
Orders	Tracks order details such as shipment modes, scheduled delivery dates, and actual delivery dates, as well as associated vendors and shipping terms.
Products	Includes product IDs, descriptions, quantities ordered, weight, and pack prices for HIV-related commodities such as test kits and ARVs.
Vendor	Contains information about vendors or manufacturers, including the manufacturing site and product details.

Logistics	Tracks shipment logistics, such as freight costs, shipment modes, and delivery recorded dates for specific orders.
Sustainability Metrics	Measures the environmental impact of each shipment, including carbon emissions, energy usage, waste generation, and recyclable packaging.

KEY QUESTIONS

1. How can we optimize the selection of shipment modes (air, sea, land) to reduce overall freight costs and carbon emissions for HIV/AIDS commodities?
2. What are the cost-saving opportunities when considering alternative transport methods, factoring in freight rates and sustainability metrics?
3. How do vendor and shipping terms impact the overall cost of transporting HIV health commodities, and can we identify ways to negotiate better terms?
4. How can sustainability metrics (carbon emissions, waste, energy usage) be reduced in the context of global health commodity logistics?
5. What trends in pricing and order volumes can we identify to improve the predictability and efficiency of future shipments?

METHODOLOGY

- **Data Cleaning and Integration:** Ensuring the data is accurate and complete, integrating data from various tables such as Orders, Products, and Logistics.
- **Descriptive and Exploratory Analysis:** Summarizing the logistics network, shipping costs, and sustainability metrics across different transportation modes.
- **Optimization Modeling:** Using optimization techniques such as Linear Programming (LP) to identify the most cost-effective and sustainable shipment routes based on carbon emissions, energy usage, and freight costs.
- **Sustainability Analysis:** Developing models to assess the environmental footprint of each shipment, including carbon emissions and waste generated by different shipping modes and routes.
- **Vendor and Pricing Trend Analysis:** Analyzing vendor pricing and supply chain performance to identify patterns and opportunities for cost savings.

EXPECTED OUTCOMES

- Optimization of shipping modes and routes to reduce carbon emissions and improve cost-efficiency.
- A set of recommendations for reducing freight costs and improving vendor agreements based on historical shipping and pricing trends.
- Development of sustainability benchmarks for logistics operations, including reduced carbon footprint and waste generation.
- A deeper understanding of the pricing structure for HIV/AIDS commodities, aiding stakeholders in more informed procurement and distribution decisions.

DELIVERABLES

- **Final Report:** A comprehensive report summarizing findings, optimization strategies, and sustainability recommendations.
- **Data Models:** A detailed data model mapping the relationships among different tables and attributes.
- **Visualizations:** Graphical representations of logistics efficiency, sustainability metrics, and pricing trends.
- **Optimization Model Documentation:** Clear documentation of the methods and assumptions used in the optimization process.
- **Sustainability Dashboard:** An interactive dashboard to track logistics performance and sustainability metrics over time, enabling stakeholders to monitor progress.