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Optimizing the USAID Global Health Supply Chain Network:

A Journey of Supply Chain Transformation

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Agenda

- GHSC-PSM background
- Network design optimization process
- Reflections on the journey





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GHSC-PSM inherited 5 regional distribution centers (RDCs) providing commodities to 50+ countries



Source: USAID Current Operations within Latin America/Caribbean, Africa, and Asia as posted at USAID.GOV

*RDC Placement based on 2013 USAID SCMS Locations



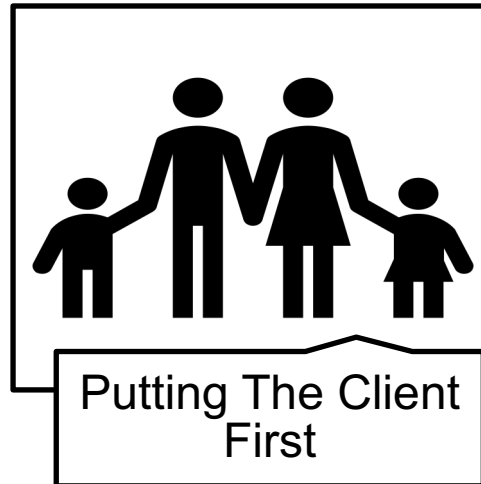
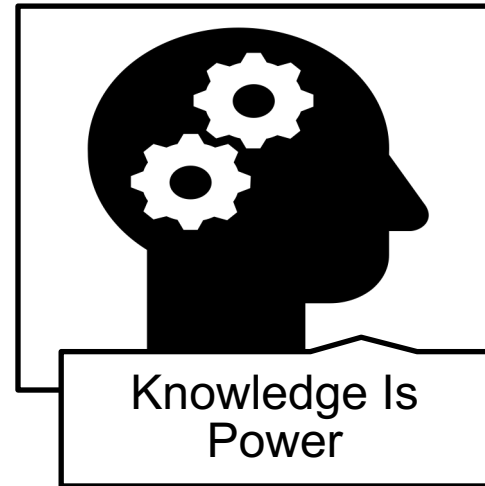
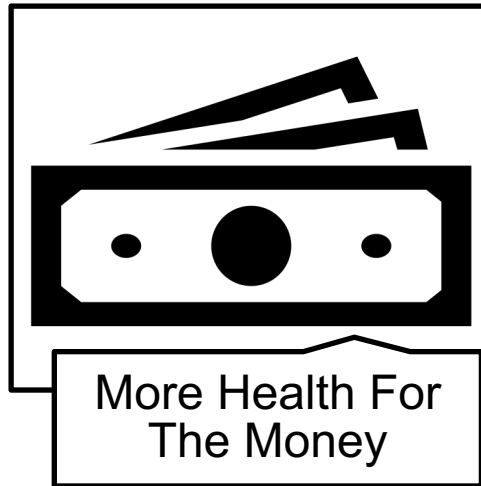
RDC roles

- ✓ Buffer zone between supply and demand
- ✓ Pre-position products for faster response
- ✓ Economy of scale for storage needs
- ✓ Logistics consolidation and holding point
- ✓ Better access to logistic resources



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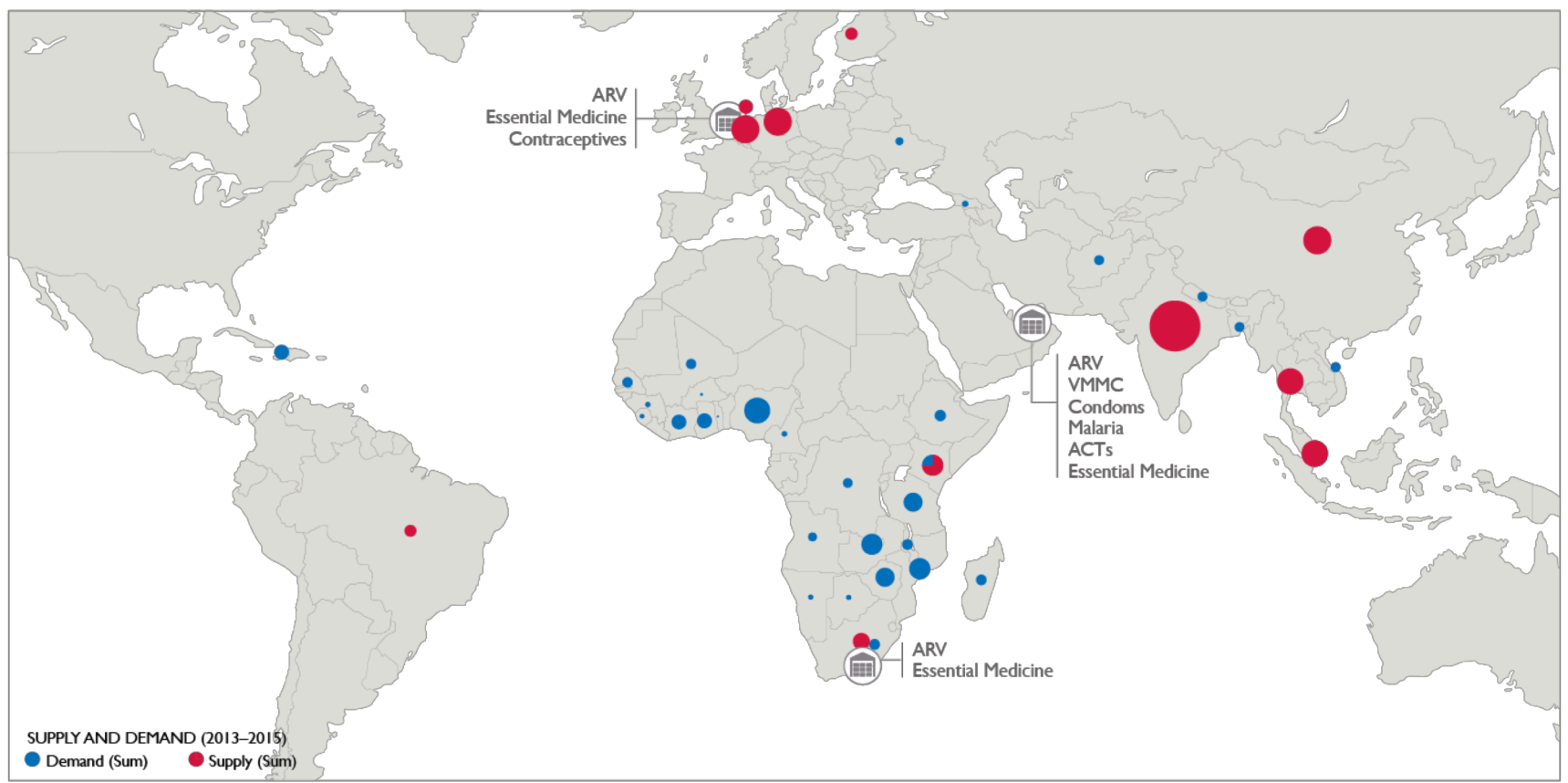
GHSC-PSM commitment and strategy





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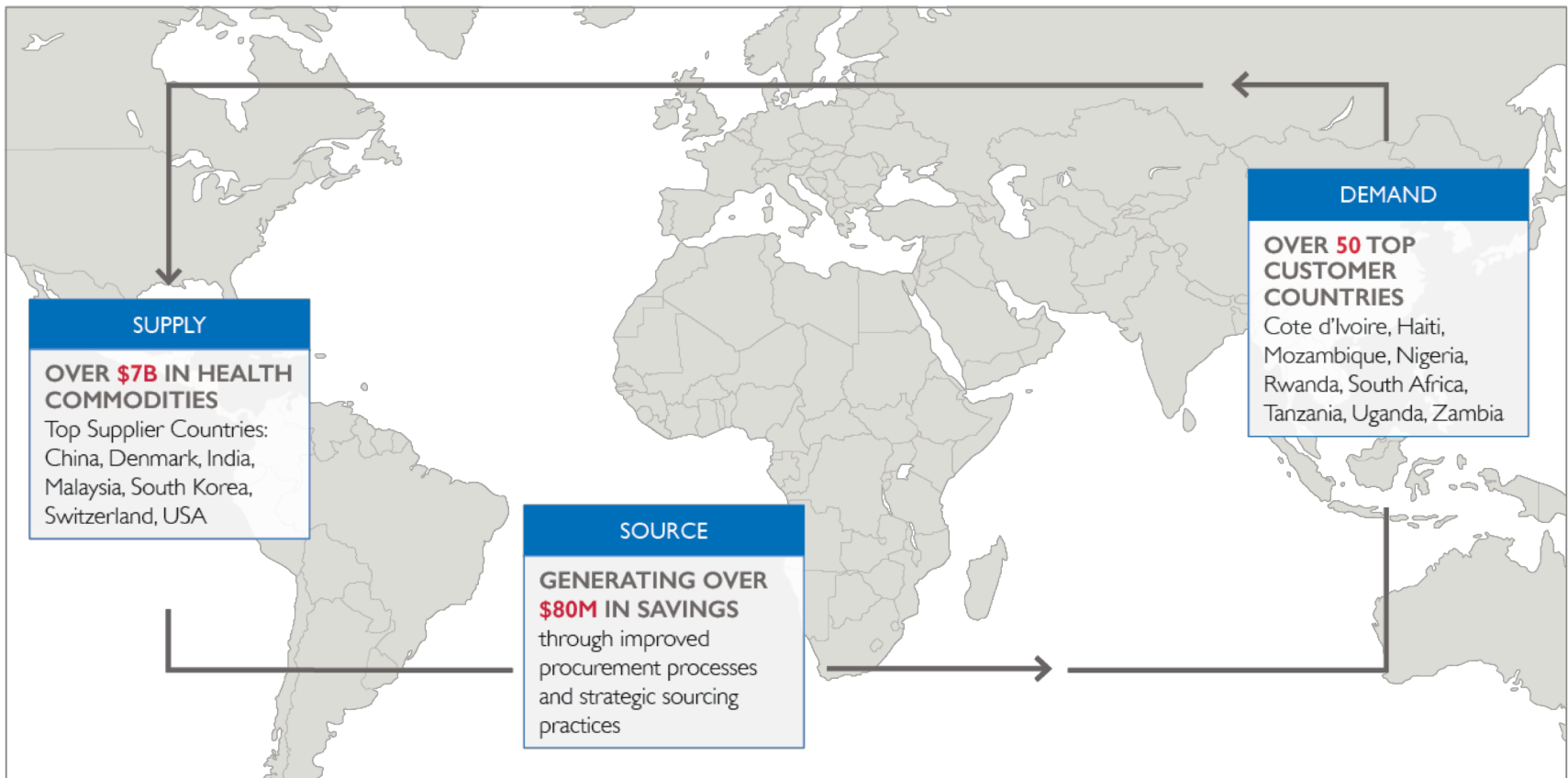
The optimized RDC network: three RDCs providing commodities to 50+ countries



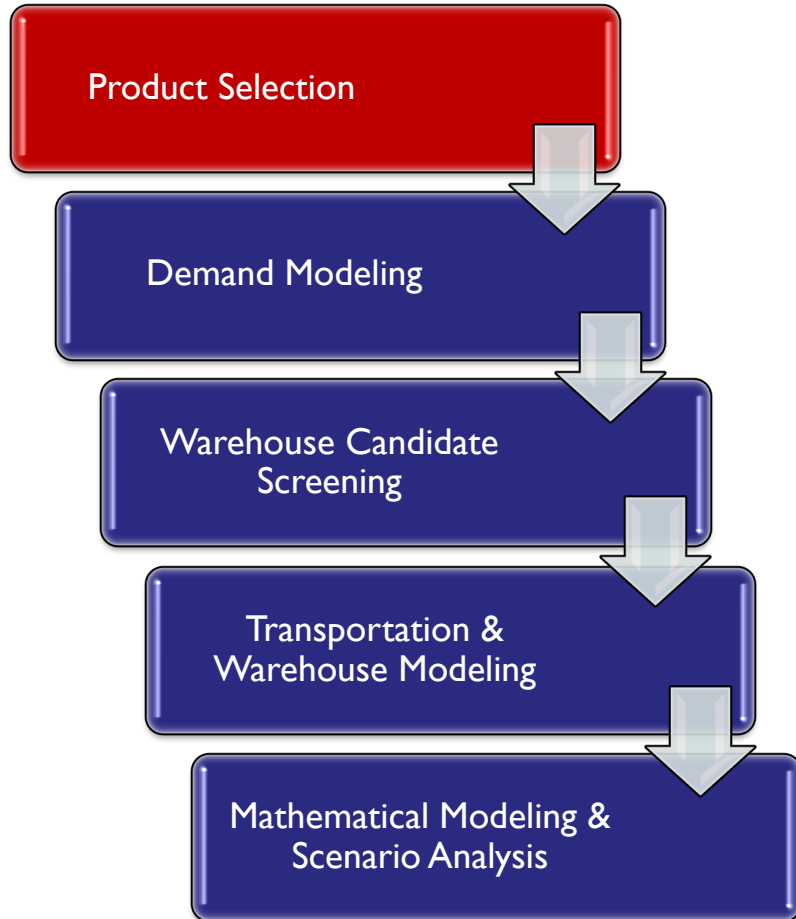


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The optimized RDC network

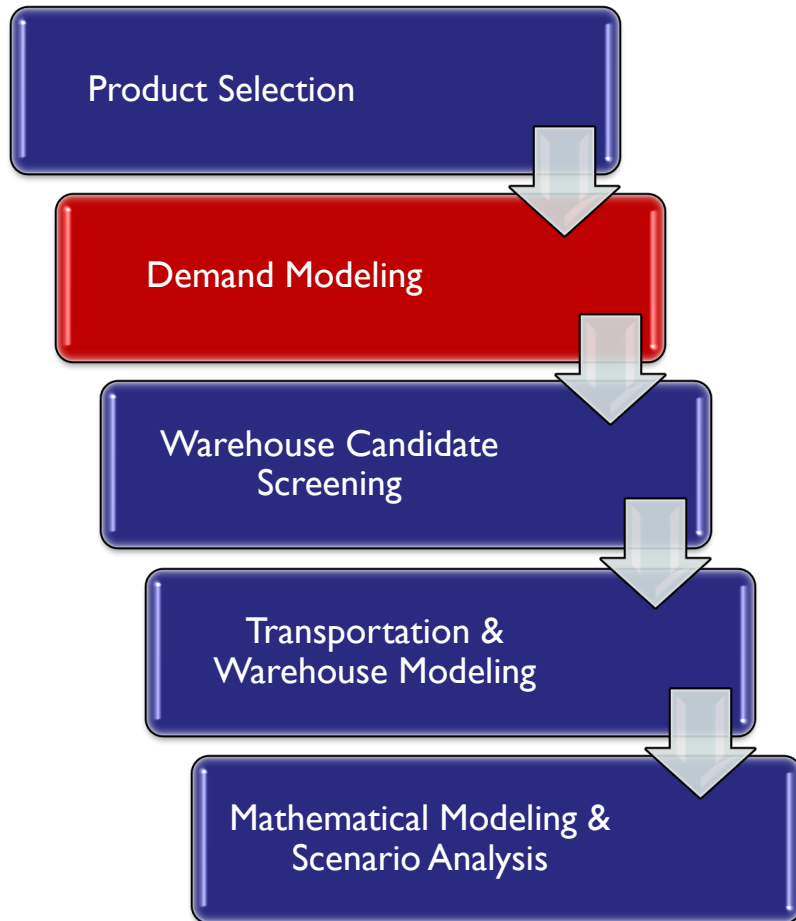


Network design optimization process



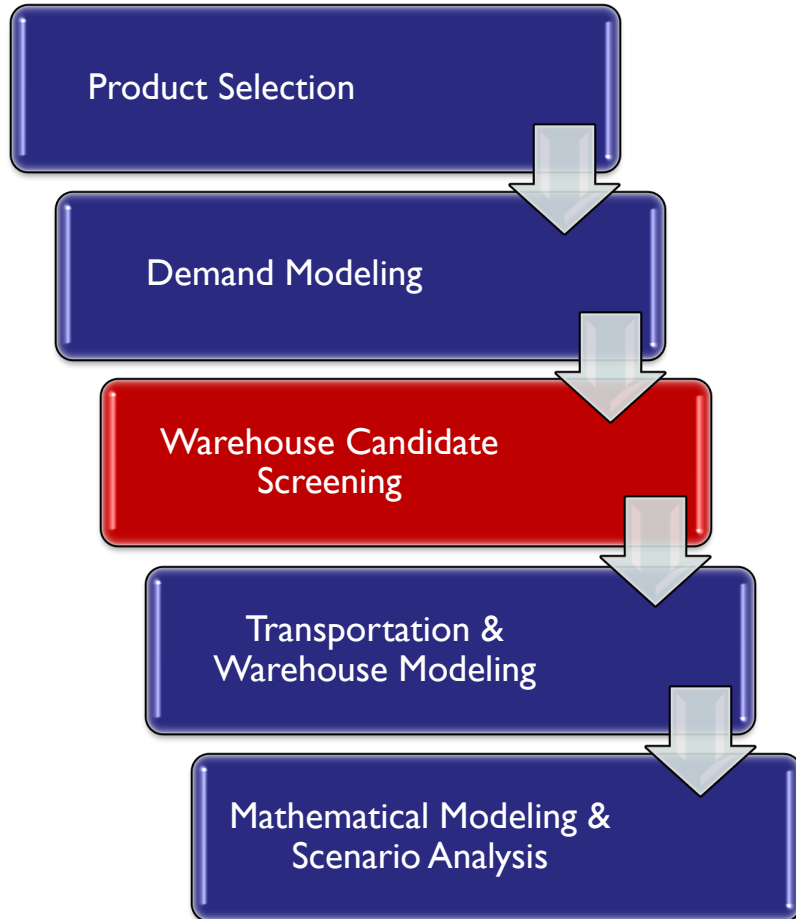
- Identified 46 products that represent 19 product groups eligible for the RDC network
 - High demand/high value
 - Long production lead time
- Collected product information on the size, weight, supply bases, production lead time, etc.
 - Calculated the production lead time and variations for HIV products using historical order information

Network design optimization process



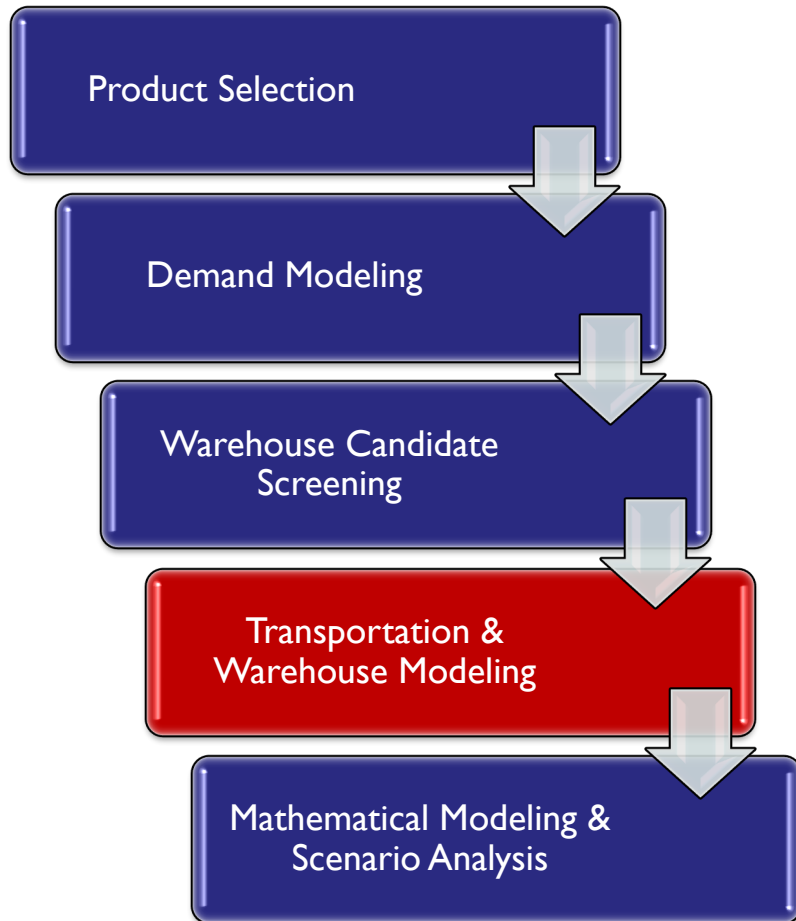
- Created the demand scenarios for 2016 to 2020 by product group and destination country
 - Demand scenarios are used later to assess the stability of the model results
- Used clustering analysis on the historical order lead times by country and product to derive more accurate demand profiles

Network design optimization process



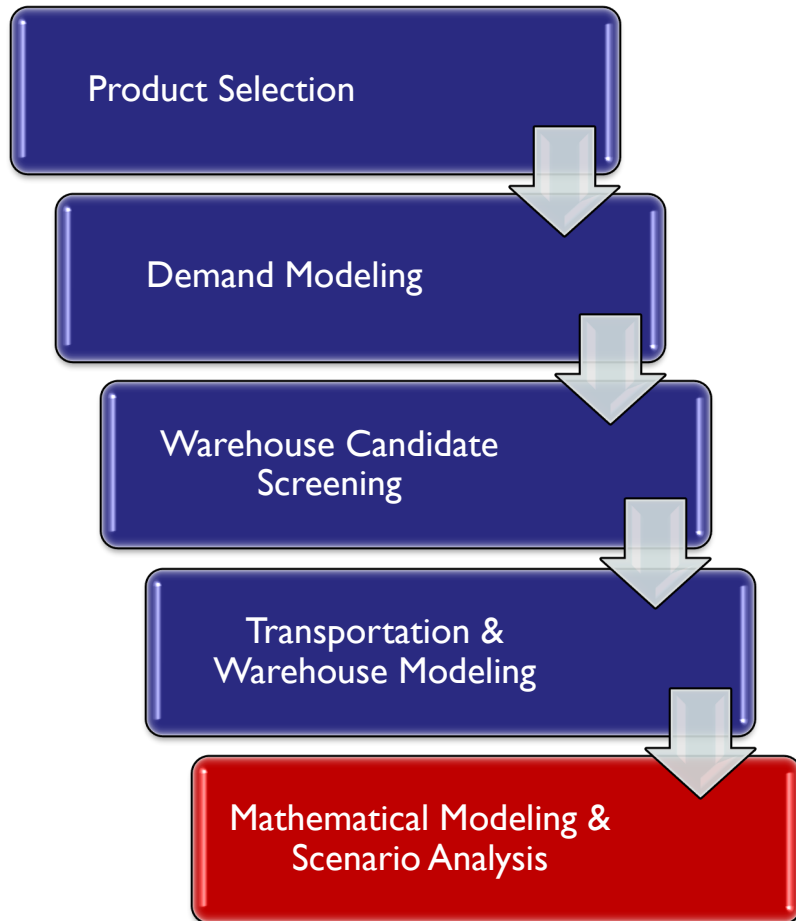
- Used gravity analysis to create a candidate pool
 - Gravity analysis uses mathematical optimization to identify the center(s) linking sources and destinations based on location and volume
 - Ran variants to identify the alternative candidates
- Applied limiting factors:
 - Political and security situation
 - Infrastructure availability
 - Access to transportation
- Considered origin and destination warehouse candidates

Network design optimization process



- Gathered cost rates and transit time for direct lanes, RDC fulfillment and replenishment lanes for the candidate locations based on the gravity analysis
- Apply the warehouse rates based on the market and incumbent data
 - Order Processing Cost
 - Handling Cost
 - Storage Cost
 - Minimum Warehouse Spend
- GHSC-PSM's freight forwarding and warehouse RFQs refined the rates used in the model

Network design optimization process



- Identified all replenishment options and all possible fulfillment options for each order
- Calculated the probability of on-time fulfillment based on the expectation and variation of:
 - Production lead time
 - Waiver processing time
 - Transit time
 - Port to client time
- Developed a network design model to optimization the network configurations, order fulfillments and replenishments simultaneously
 - Conducted scenarios and sensitivity analysis based on demand variations



Mathematical model decision hierarchy (Key drivers)

Achieve 95% OTIF by volume and shipments at the overall system, product, and country levels

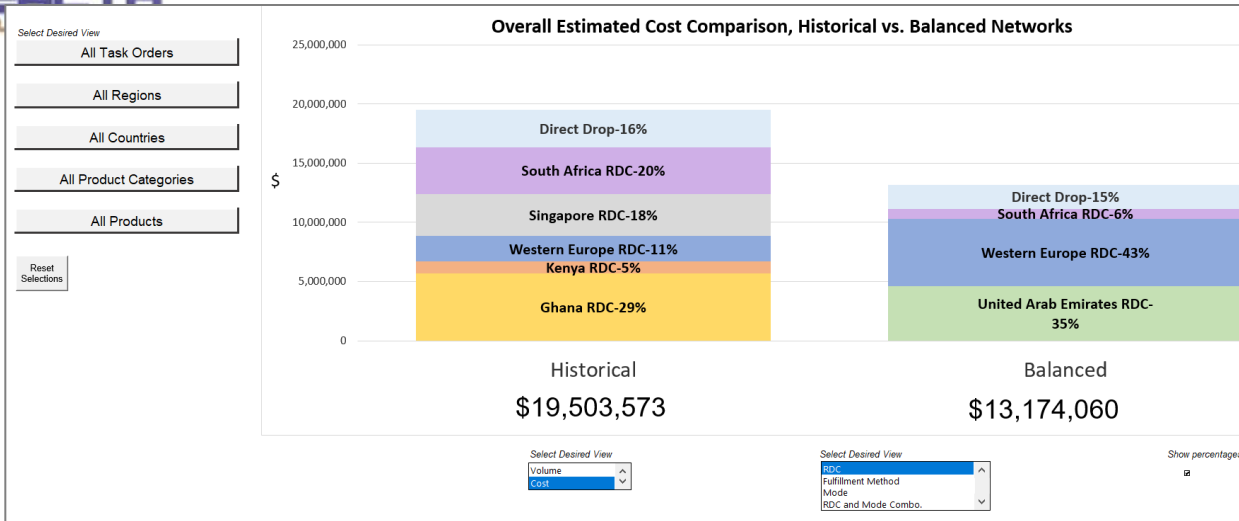
Minimize the total logistics cost (transportation & warehouse)

Minimize delays and maximize performance if possible within a small increase in logistics cost



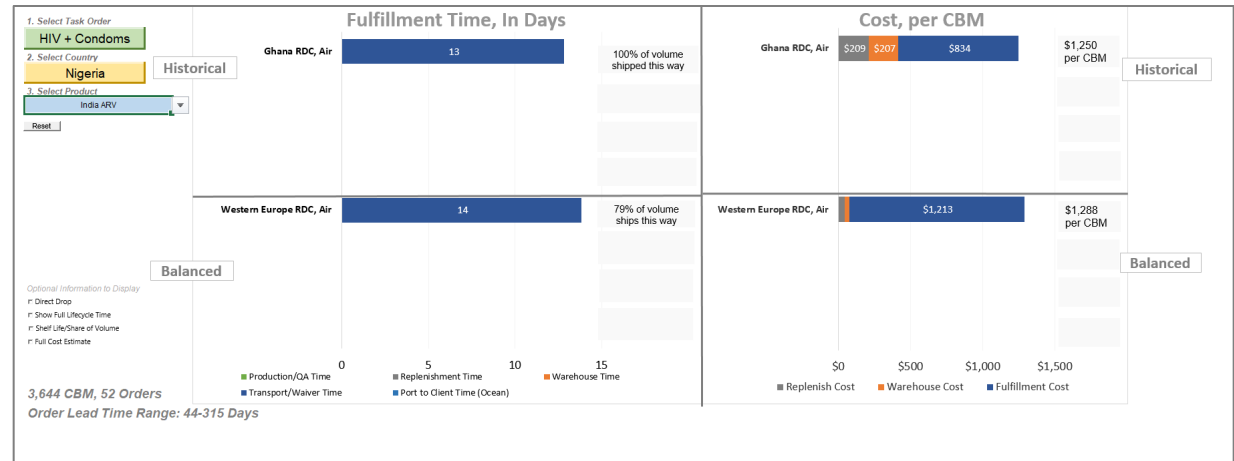
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Network Design Optimization Dashboard

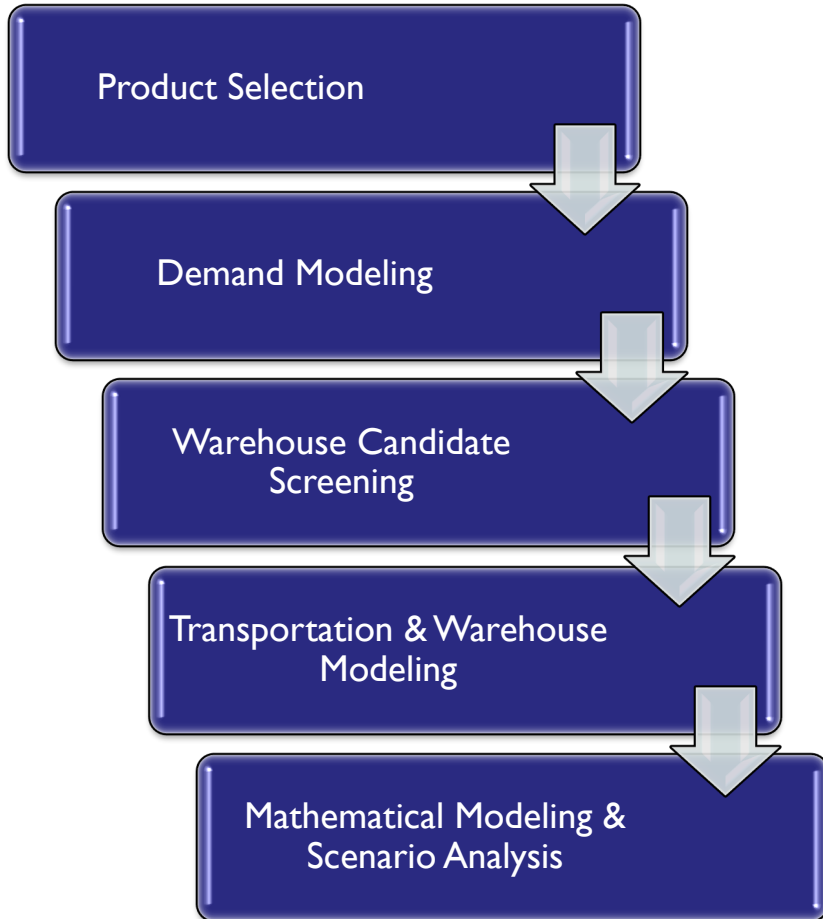


Developed dashboard so client could assess impact of network shift

Dashboard shows cost and service impact for specific country and product combinations

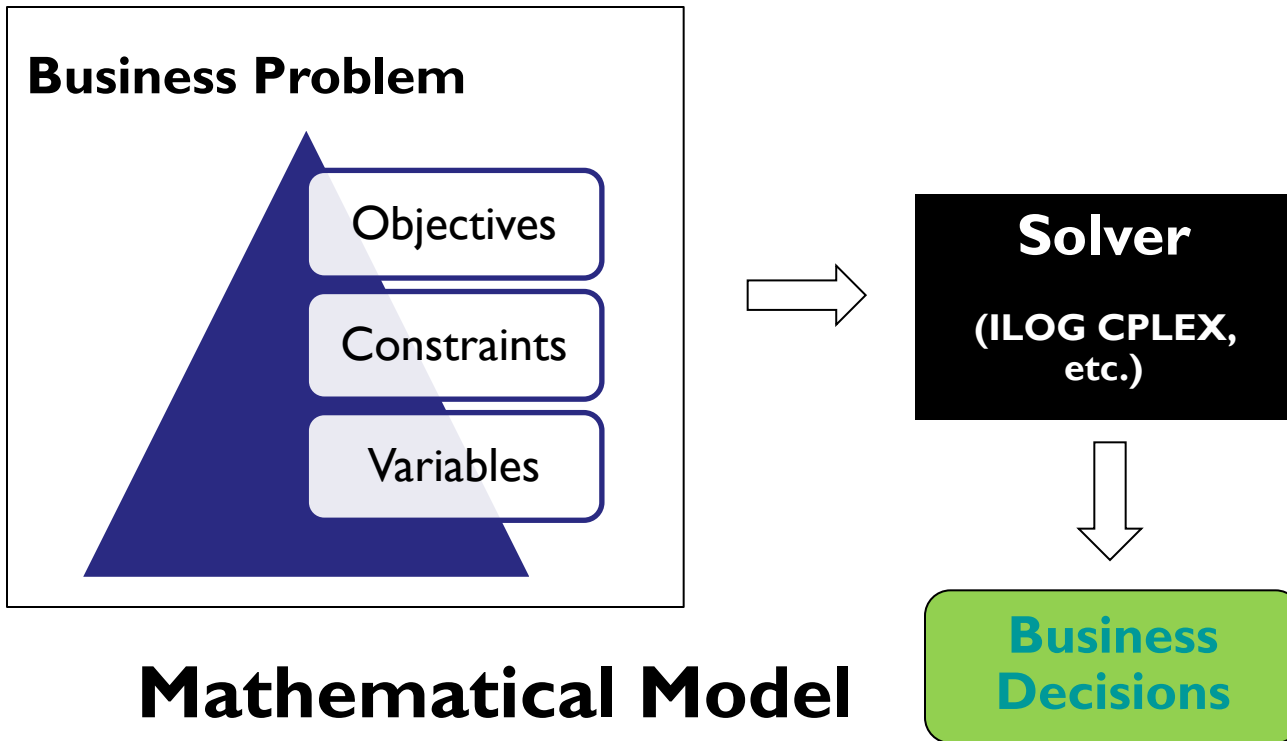


Network design optimization process and benefits



- Reduce RDC network operational complexity for planning, sourcing and logistics
 - 5 existing RDCs consolidated to 3 RDCs
- Reduced cost through competitive 3PL and warehouse RFQs
- Established a network capable of achieving high fulfillment performance and substantial cost savings over the current network
 - Annual estimated cost savings: \$6.3M

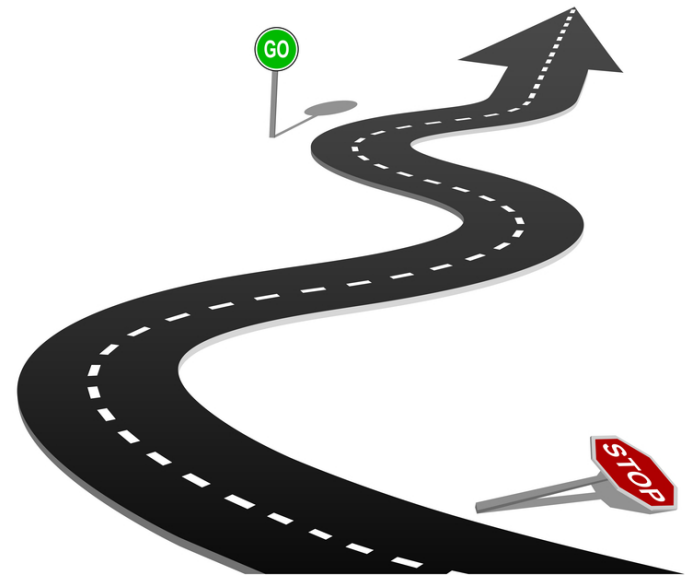
Mathematical optimization in a nutshell – Prescriptive analytics



Countries where we have successfully applied mathematical optimization so far:
Côte d'Ivoire, Ethiopia, Ghana, Lesotho

Reflections on the journey

- Challenges:
 - High stakes
 - Limited historical data
 - Complex modeling choices
- Success factors:
 - ✓ Right vision
 - ✓ Close collaboration
 - ✓ Stakeholder communication
 - ✓ Transparency and empowerment
- We are on track to exceed the original cost saving estimates!



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The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project is funded under USAID Contract No. AID-OAA-I-15-0004. GHSC-PSM connects technical solutions and proven commercial processes to promote efficient and cost-effective health supply chains worldwide. Our goal is to ensure uninterrupted supplies of health commodities to save lives and create a healthier future for all. The project purchases and delivers health commodities, offers comprehensive technical assistance to strengthen national supply chain systems, and provides global supply chain leadership. For more information, visit ghsupplychain.org.

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