



# Operation Vaccine

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01

# INTRODUCTION



# The Case + Challenges

Distribute **half a billion** vaccines in **12 months** globally (2 shots)

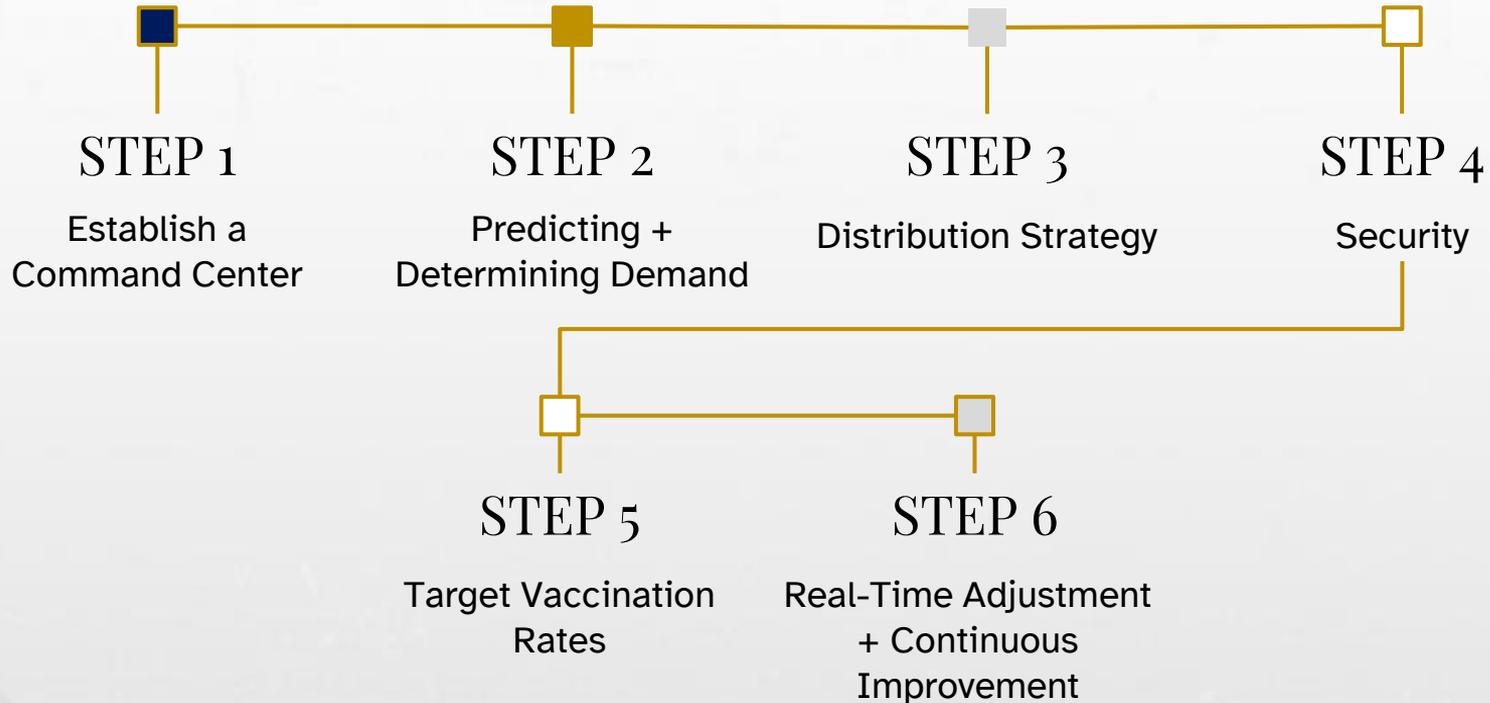
- Suppliers: Pfizer, Moderna, J&J, AstraZeneca
- Complex Operation
- Planning/Logistics/Supplier Management



02

# PLANNING

# PROCESS OVERVIEW



# AI IMPLEMENTATION

01

## Command Center

**AI:**

1. Natural Language Processing Model
2. Support Systems

**Example:**

1. Microsoft Teams
2. Slack

02

## Predicting Demand

**AI:**

1. Recurrent Neural Networks (RNNs)
2. Convolutional Neural Networks (CNNs)

**Example:**

1. Amazon Forecast
2. Google's TensorFlow

03

## Distribution Strategy

**AI:**

1. Simulation and Scenario Planning

**Example:**

1. IBM Watson Studio
2. SAS Visual Analytics

# AI IMPLEMENTATION

04

## Security

**AI:**

1. Anomaly Detection
2. Blockchain Tech

**Example:**

1. Splunk Enterprise Security
2. Ethereum

05

## Target Vax Rate

**AI:**

1. Machine Learning Models
2. Simulation Software

**Example:**

1. Microsoft Azure AI
2. Google Cloud AI Platform

06

## Adjustment and Improvement

**AI:**

1. Computer Vision Systems
2. Geospatial Analysis

**Example:**

1. Faster RCNN
2. Geographic Information Systems



03

# PROCURING

# Vaccine Manufacturers

01



- Market leadership & Brand recognition
- scaling potential

02



- Single dose vaccines → Easier vaccination process
- Can be refrigerated

03



- mRNA technology → rapid development
- Can be refrigerated

04



- Local manufacturing capabilities
- Strong established partners
- Regional supply chains

# How AI Can Aid This Step in the Process

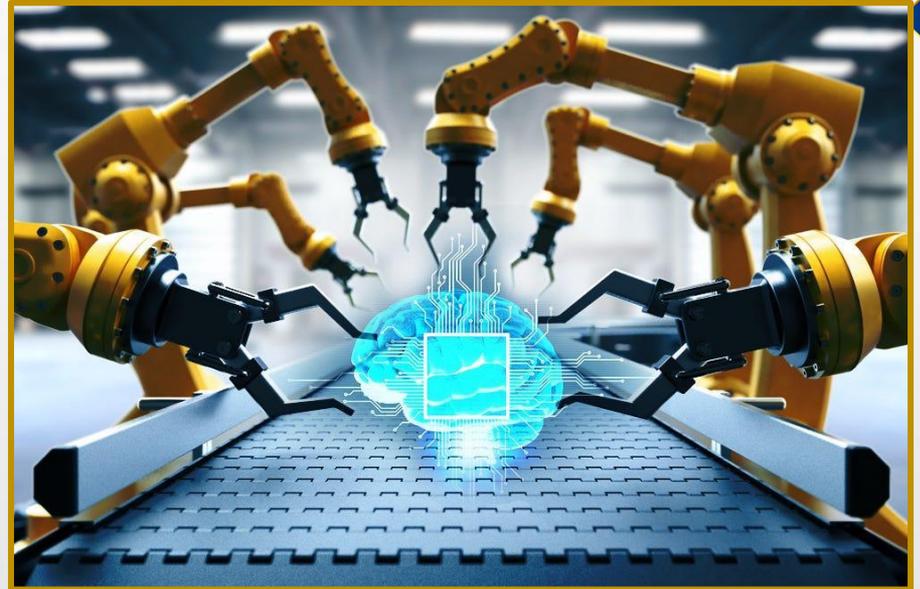
Generative AI can be used to compile and analyze data for the following purposes:

## **Procurement:**

- Automating processes
- Analyzing supplier capabilities
- Allocation optimization

## **Manufacturing:**

- Predictive maintenance
- Quality control





35%

Dominant manufacturer with mass production capabilities, prioritized in areas with cold storage supply chains



30%

Strong presence in vaccine market, prioritized in areas with cold storage access and smaller markets



20%

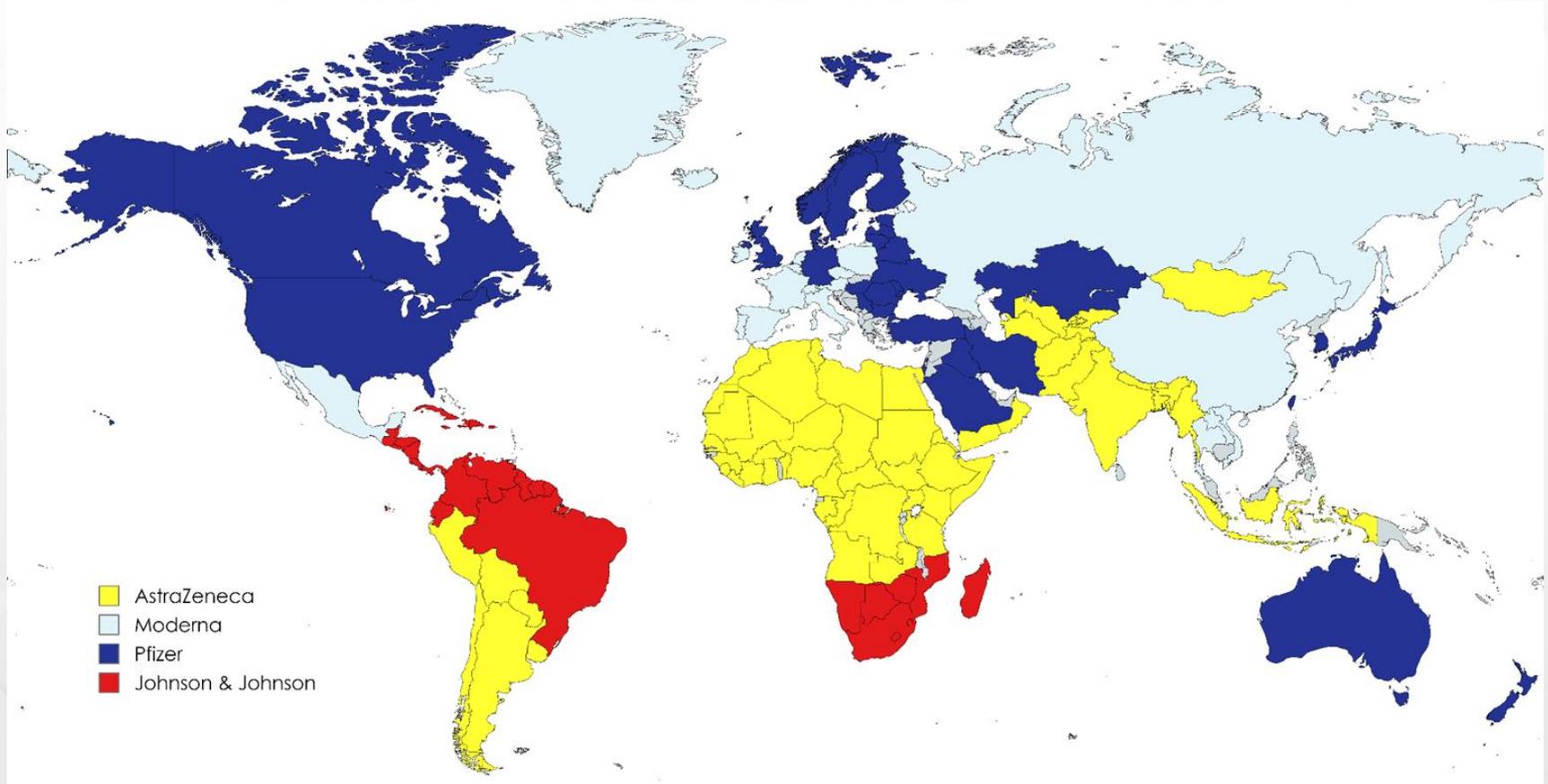
Strongest global presence, prioritize distribution in many lower/middle income nations with critical needs



15%

Strong US market presence, prioritize in the US and other regions where it would benefit single dose vaccines

# Geographical Representation





04

# TRANSPORTATION

# PROCESS OVERVIEW

## Transportation and Delivery

moving vaccines to local  
vaccination sites

## Supply Chain Management

advanced tracking systems  
(GPS, RFID, blockchain)

## Route Optimization

mapping optimal shipping  
lanes and planning efficient  
routes

## Security, Threats, and Challenges

mitigating transport related  
theft and risk

## Vaccine Fulfillment and Implementation

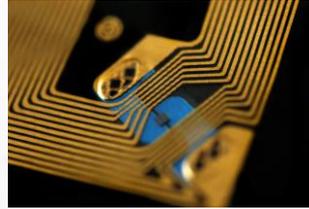
proactive VSC management  
and formation of task forces

# SUPPLY CHAIN MANAGEMENT



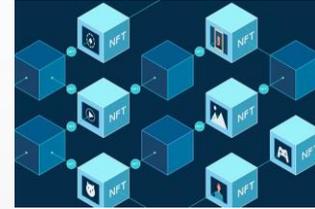
## GPS

- real-time tracking and route optimization
- analyze traffic patterns, weather conditions, and road work information



## RFID

- seamless tracking as they pass through various checkpoints
- analyze data from sensors to predict deviations temperature



## Blockchain

- boosts the security and efficiency of vaccine distribution
- simple task automation
- manage recalls and detect fraud

# ROUTE OPTIMIZATION

## AIR

addresses the urgent need for speed and reach

## SEA

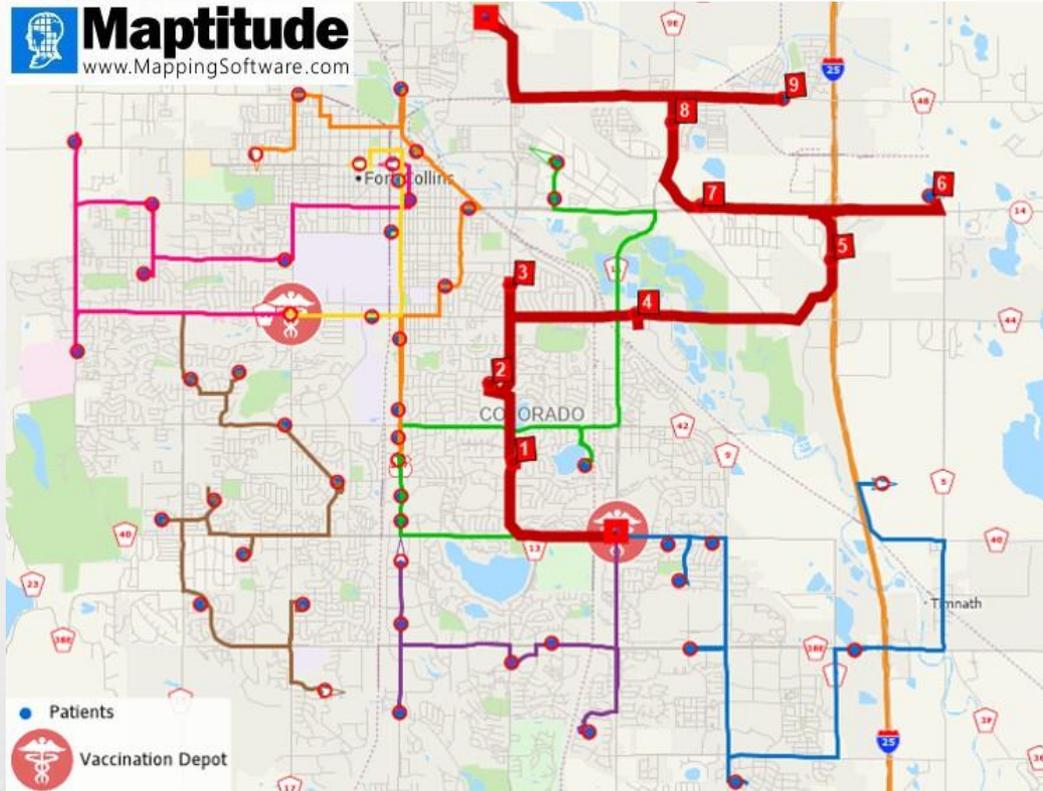
manage the bulk movements economically



## RAIL & GROUND

ensure continued cold chain integrity and local accessibility

# ROUTE OPTIMIZATION



# SECURITY, THREATS, AND CHALLENGES

## AIR

- WEATHER
- AIRSPACE RESTRICTIONS

## SEA

- PIRACY
- PORT DELAYS

## RAIL

- INFRASTRUCTURE ISSUES

## GROUND

- TRAFFIC
- ACCIDENTS
- THEFT

# VACCINE FULFILLMENT AND IMPLEMENTATION

## Operation Warp Speed

- expedite the development, manufacturing, and distribution of vaccines
- overlapped clinical trial phases and starting mass production concurrently, reducing bureaucratic delays and ensuring rapid deployment



## CoWIN Intelligence Network

- open platform for universal vaccination, and enables monitoring of vaccine utilization, coverage, and wastage throughout the system
- facilitates registration and booking of appointments for vaccination, regular reminders and communication, develop reports and monitor progress





05

RISK &  
SECURITY

# Monitoring and Evaluating

## Real-Time Data Analytics

- Implement AI-Driven real time data analytics to monitor KPIs
- Machine Learning

## Automated Reporting

- Implement AI-driven automated reporting systems to generate regular reports
- Automated Reporting Systems

## Feedback Mechanisms

- Establish feedback mechanisms to gather input from stakeholders, frontline workers, and the public.
- Reinforcement Learning

# Risk Management

## Training

- Inexperienced entities are a vulnerability
- Training & development
- 24/7 AI Chat bots

## Anti-Vax (Tracking)

- Adopt a proactive marketing approach
- AI powered sentiment analysis
  - discovers trends
  - & reduces misinformation

## Safety

- Prioritize safety as a core value
- Implement quality control measures and regulatory compliance
- AI-Powered monitoring systems



06

# CONCLUSION