

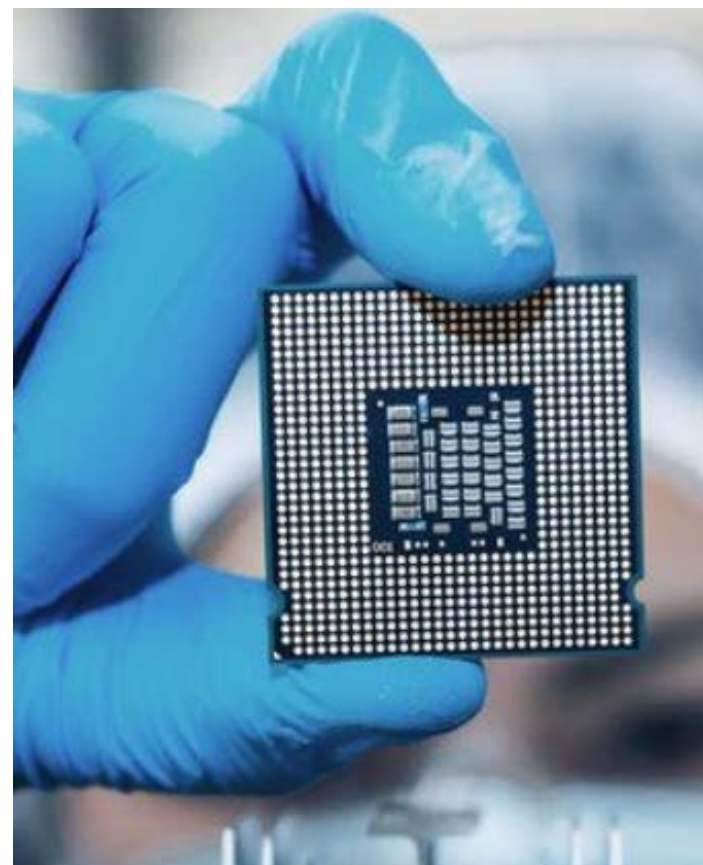
# SUPPLY CHAIN FUNDAMENTALS

## INTRODUCTION AND OVERVIEW

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Data presented in this file is subject of approval from multiple stakeholders



# Similarities Differences Disruptions Ons



Global  
Pandemic  
(2020)



**Chip shortage** - Toyota to cut global production by 40%  
<https://www.bbc.com/news/business-58266794>

**Floods in Thailand (2011)**



# Banana supply chain from a Chiquita plantation in Costa Rica to a Shaw's supermarket shelf in Boston, Massachusetts



## INPUT

Fertilizers,  
organic matter,  
pest control



## HARVESTING

Almost ripe, starts to  
green, it is harvested



## GRADING

Manually inspected  
sorted by size



## PACKING

load sorted & quality checked  
banana's - 40 pound stacked  
boxes - 48 boxes per pallet



## RETAIL STORE

When they reach  
desired color, sent to  
the retail stores



## RIPENING

DISTRIBUTION CENTER  
stack pallets in sealed ripening  
rooms, injected with ethylene gas  
that controls ripeness requested



40 ft Refrigerated containers  
with 20 pallets, load 100's  
of containers -> New Orleans



**DESTINATION PORT**  
unloaded, transported by  
rail or truck to refrigerated  
distribution Chiquita

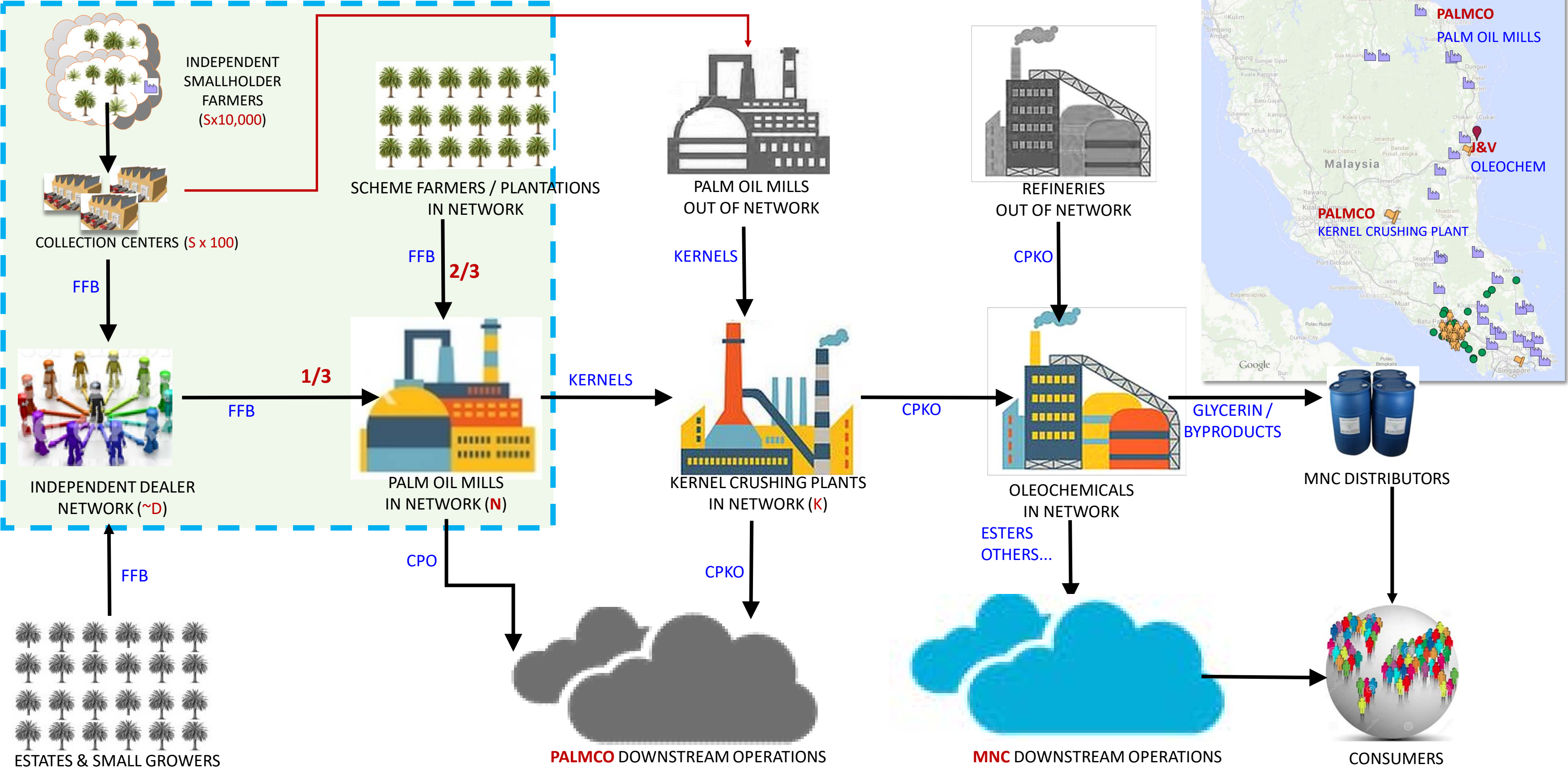


## TRANSPORT

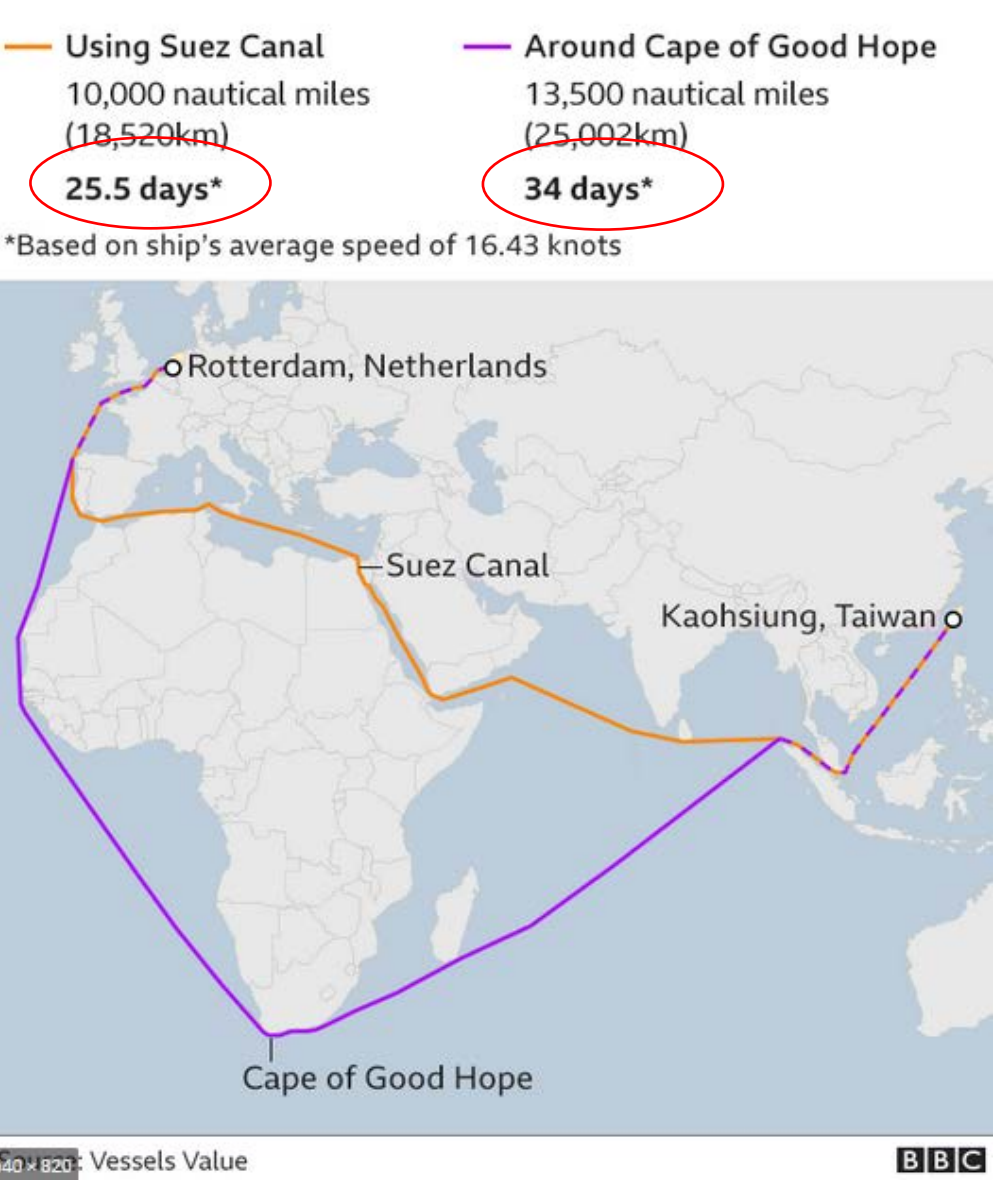
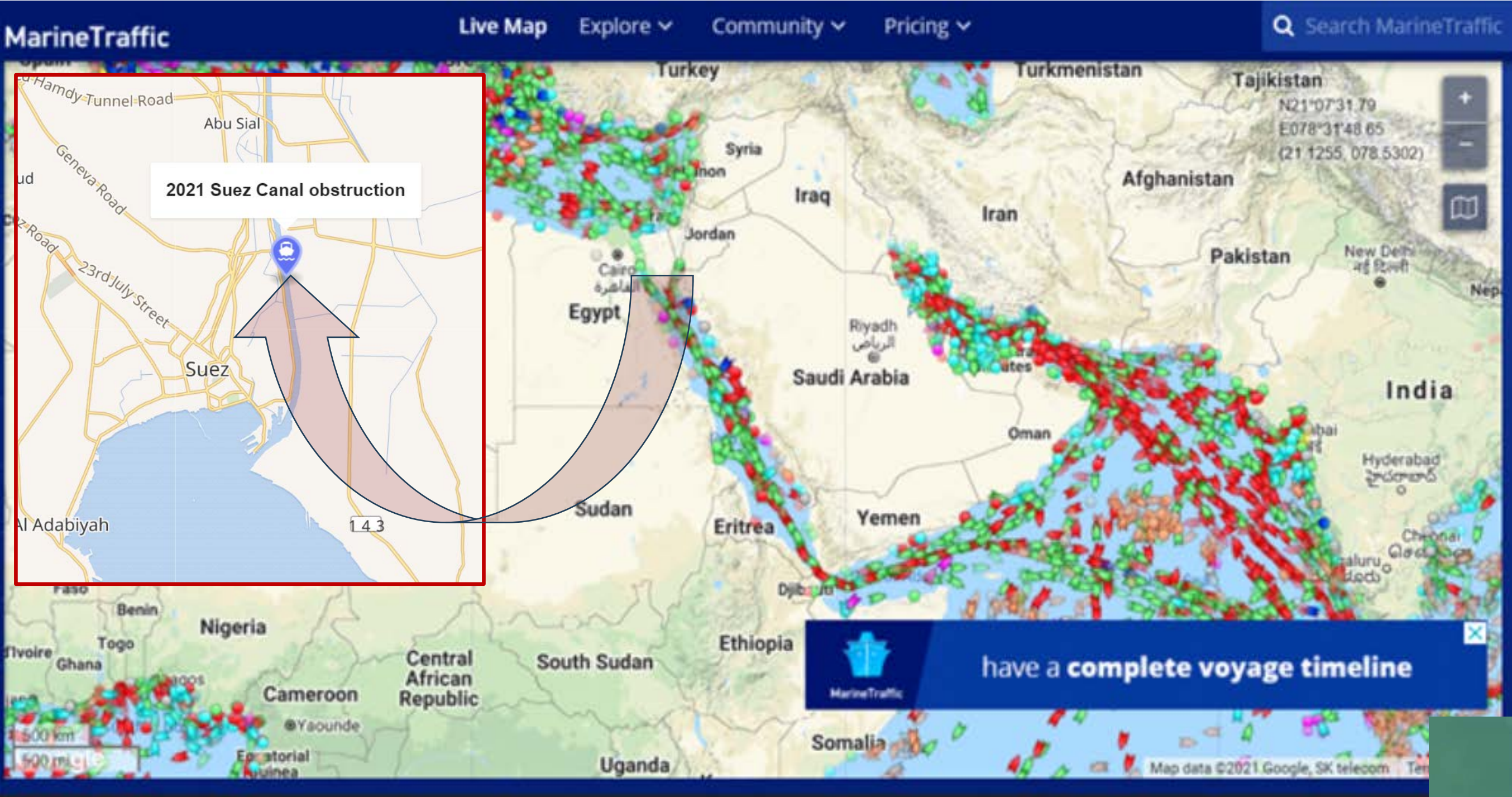
Farm -> Collection center  
1 ton pallets on trucks - east  
Costa Rican port of Puerto Moin,  
Limon, Caribbean Sea



# OIL PALM TO OLEOCHEM SUPPLY CHAIN







# THE SUEZ CANAL DISRUPTION

The importance of the Suez Canal to global trade could not have been more visible than in the 2021 blockage of the 105-nautical-mile (nm) waterway by the megaship *Ever Given*.

during the blockage the value of the goods delayed **each hour** at **US\$400 million**  
**US\$9 billion** worth Goods disrupted  
**450 Ships** queued on either end of the Canal

[MarineTraffic: Global Ship Tracking Intelligence](#) | [AIS Marine Traffic](#)

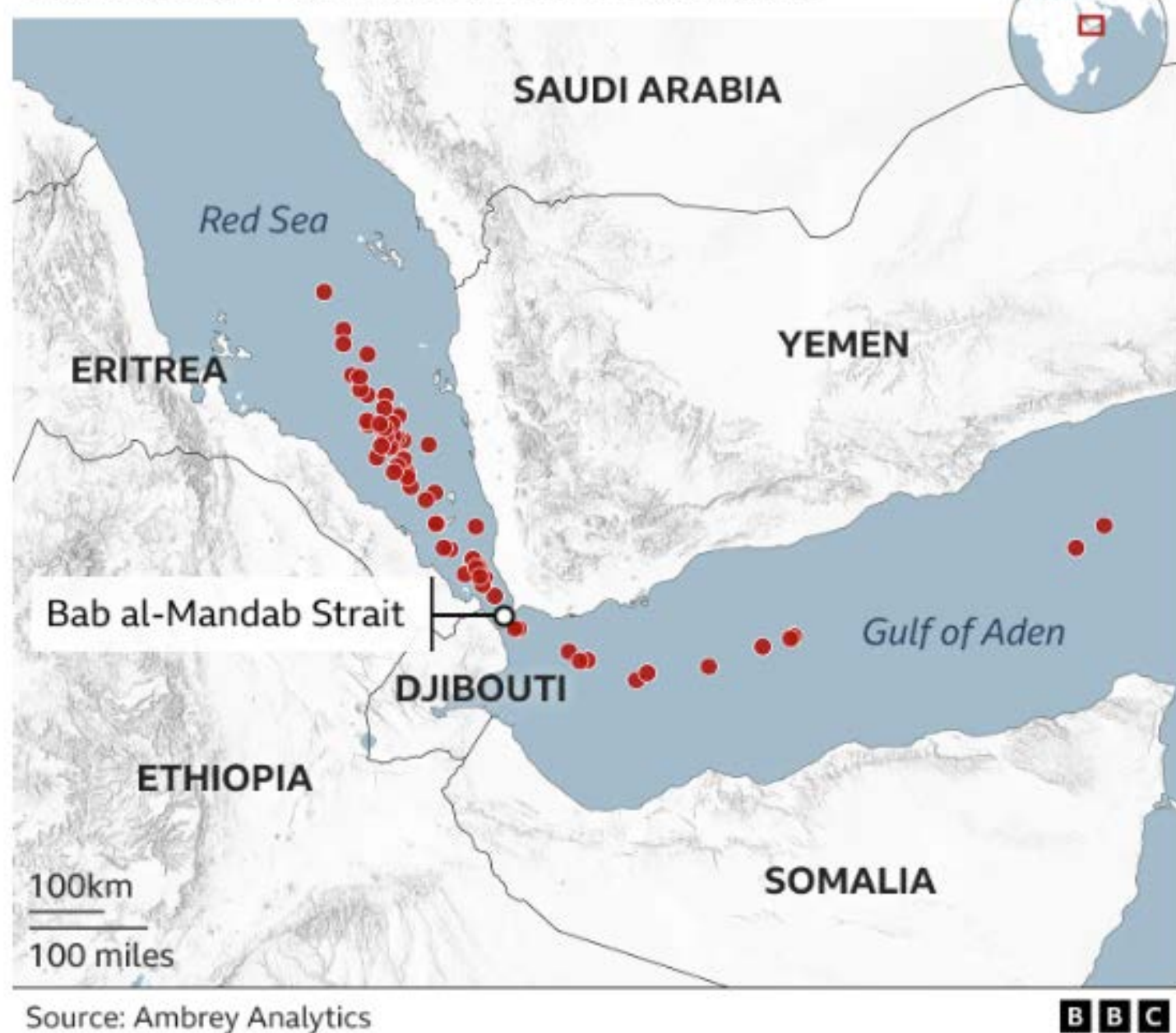
MAERSK AMAZON





# DISRUPTION AT RED SEA

## Incidents off the coast of Yemen



## Houthi attacks at Red sea

1. The Red Sea is one of the most important arteries in the global shipping system, with one-third of all container traffic flowing through it.
2. Any sustained disruption in trade there could send a **ripple effect of higher costs throughout the world economy.**
3. This is particularly true of **energy**: **12 percent of seaborne oil and 8 percent of liquified natural gas (LNG)** transit the Suez Canal.

Source: <https://www.cfr.org/in-brief/how-houthi-attacks-red-sea-threaten-global-shipping>

## Avoiding the Red Sea

1. Ships shunning the Red Sea will have to instead sail around the Horn of Africa, which can cost **\$1 million more round trip in additional fuel costs.**
2. More than **one hundred fifty commercial ships** have chosen the longer route since November 2023

3. **Insurance premiums** for ships using the Red Sea have **shot up nearly tenfold** since the attacks began.

4. France's CMA CGM, the world's second-largest shipper by market share, recently announced that it would double its rates for shipping from Asia to Europe.

Source: <https://www.reuters.com/markets/commodities/london-marine-insurers-widen-high-risk-zone-red-sea-attacks-surge-2023-12-18/>

LOGISTICS  
SUPPLY  
CHAIN  
MANAGEMENT

...

**Logistics or  
Supply Chain  
Management**

# The MODERN

## Logistics vs. Supply Chain Management

### MIT Center for Transportation & Logistics

Logistics involves managing the **flow of items, information, cash and ideas** through the coordination of supply chain processes and through the strategic addition of **place, period and pattern** values.

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### Stanford Supply Chain Forum

Supply Chain Management deals with the management of **materials, information, and financial flows** in a network consisting of **suppliers, manufacturers, distributors and customers**.

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### Fortune (1994)

Call it distribution or logistics or supply chain management, by whatever name it is the **sinuous, gritty, and cumbersome process** by which companies move **material, parts, and products** to customers.

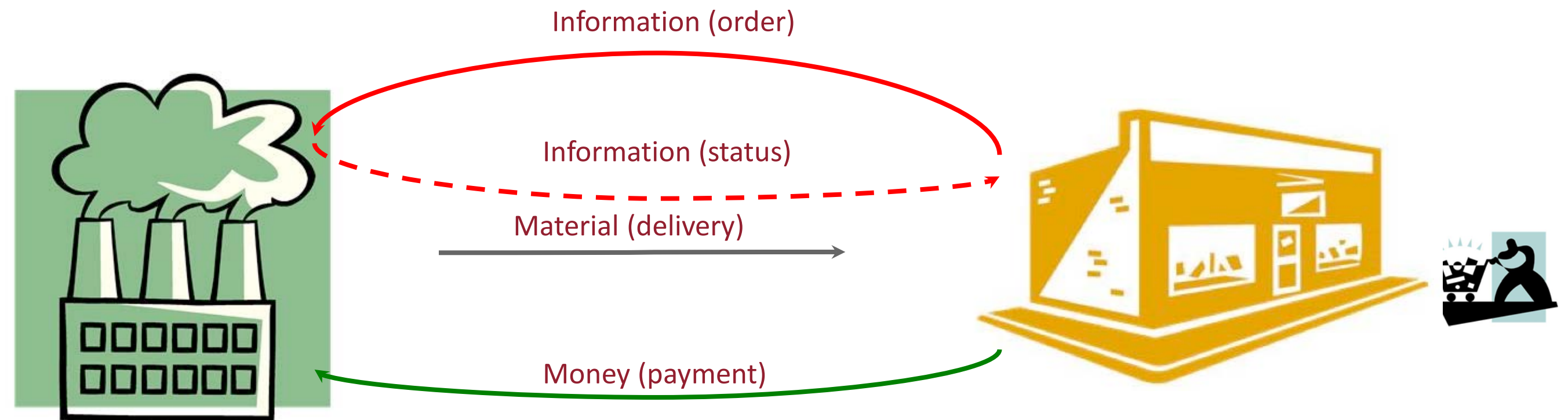


# What

Two or more parties linked by a flow of resources – typically material, information, and money – that ultimately fulfill a customer request.

# is A

# Supply Chain

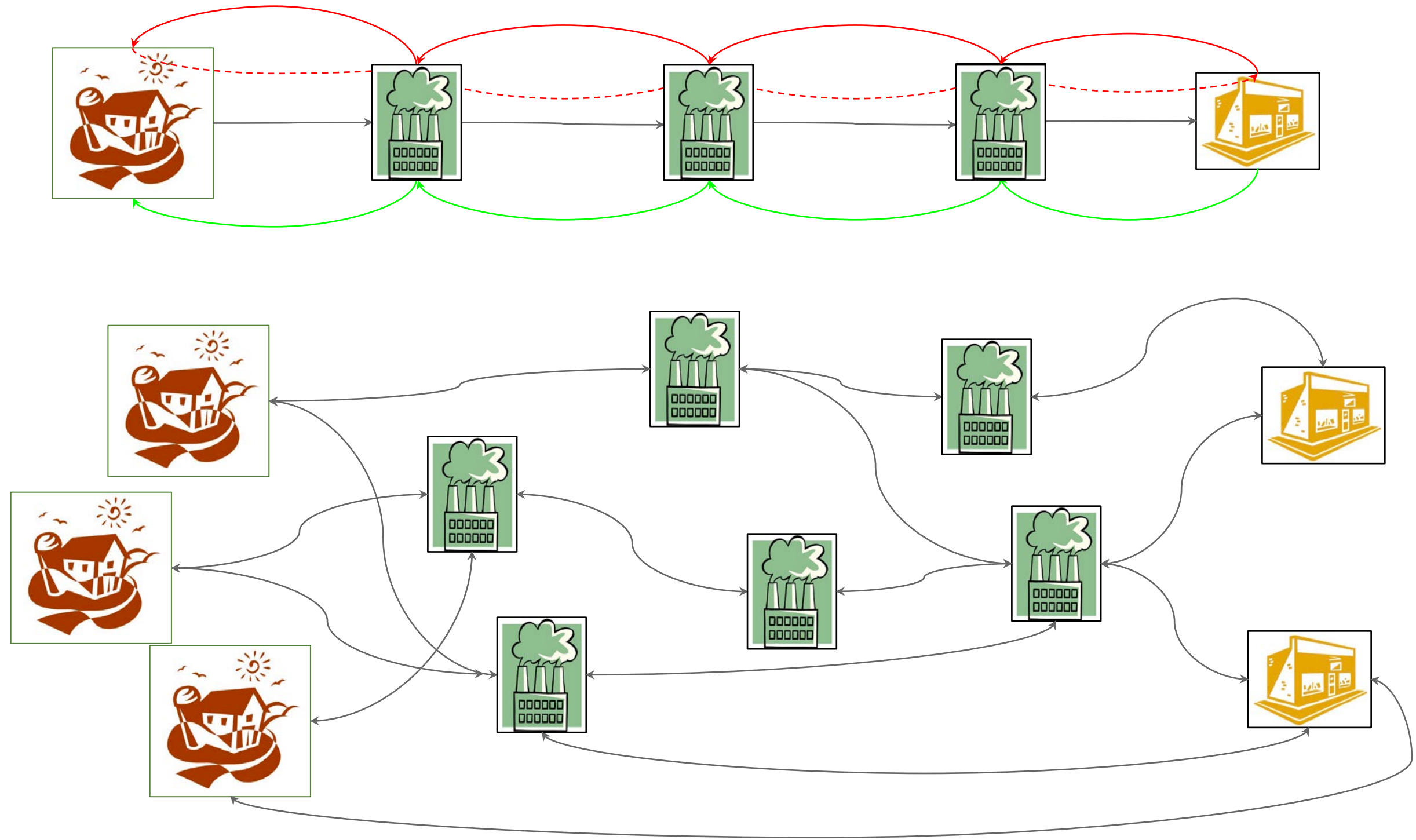




# What

# is A

# Supply Chain





# The SYSTEMS MANAGEMENT APPROACH

## Supply Chains of Tomorrow





# The SYSTEMS APPROACH

## Take an Engineering Systems Perspective

- What is a variable and what is a constraint?
- Continuous expansion of decision variables
- Increases potential for improvement but increases both complexity and coordination requirements



### Objective:

- Deliver at lowest transport cost

### Variables:

- Select carrier to tender each load to

### Constraints:

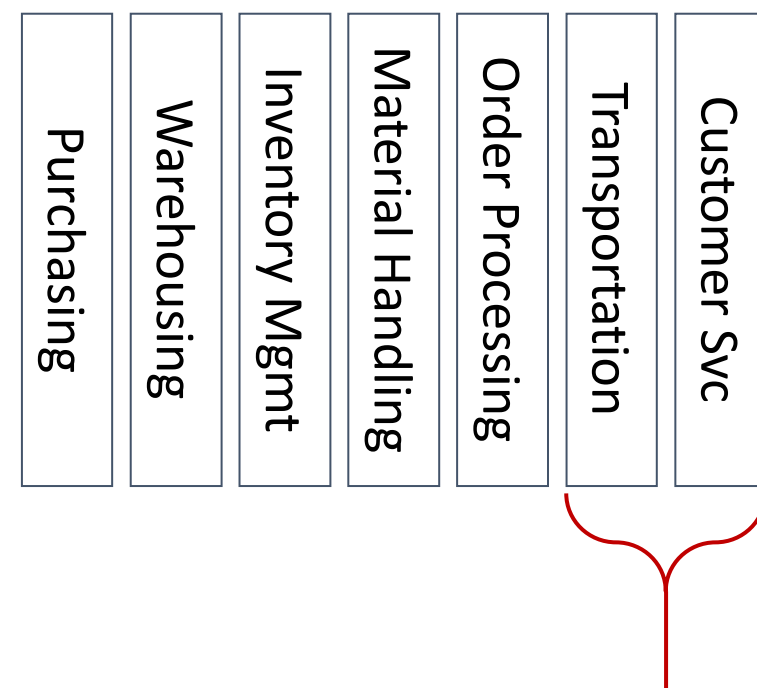
- Ship everything each day
- Must deliver within specified windows



# The SYSTEMS APPROACH

## Take an Engineering Systems Perspective

- What is a variable and what is a constraint?
- Continuous expansion of decision variables
- Increases potential for improvement but increases both complexity and coordination requirements



### Objective:

- Deliver at lowest transport cost

### Variables:

- Select carrier to tender each load to
- Select time windows to deliver

### Constraints:

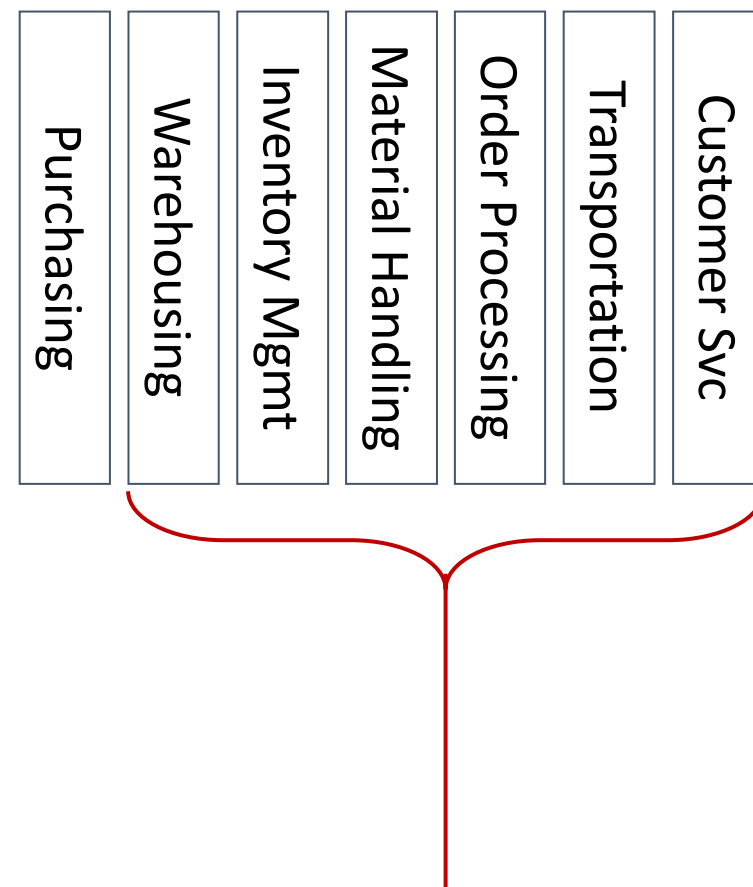
- Ship everything each day



# The SYSTEMS APPROACH

## Take an Engineering Systems Perspective

- What is a variable and what is a constraint?
- Continuous expansion of decision variables
- Increases potential for improvement but increases both complexity and coordination requirements



### Objective:

- Deliver at lowest total cost

### Variables:

- Select carrier to tender each load to
- Select time windows to deliver
- Select when to ship what from where

### Constraints:

- Ship everything each day



# The SYSTEMS APPROACH

## Take an Engineering Systems Perspective

- What is a variable and what is a constraint?
- Continuous expansion of decision variables
- Increases potential for improvement but increases both complexity and coordination requirements



### Objective:

- Design, build, and deliver at lowest total cost

### Variables:

- Select carrier to tender each load to
- Select time windows to deliver
- Select when to ship what from where
- Select where to stock which form of product

### Constraints:

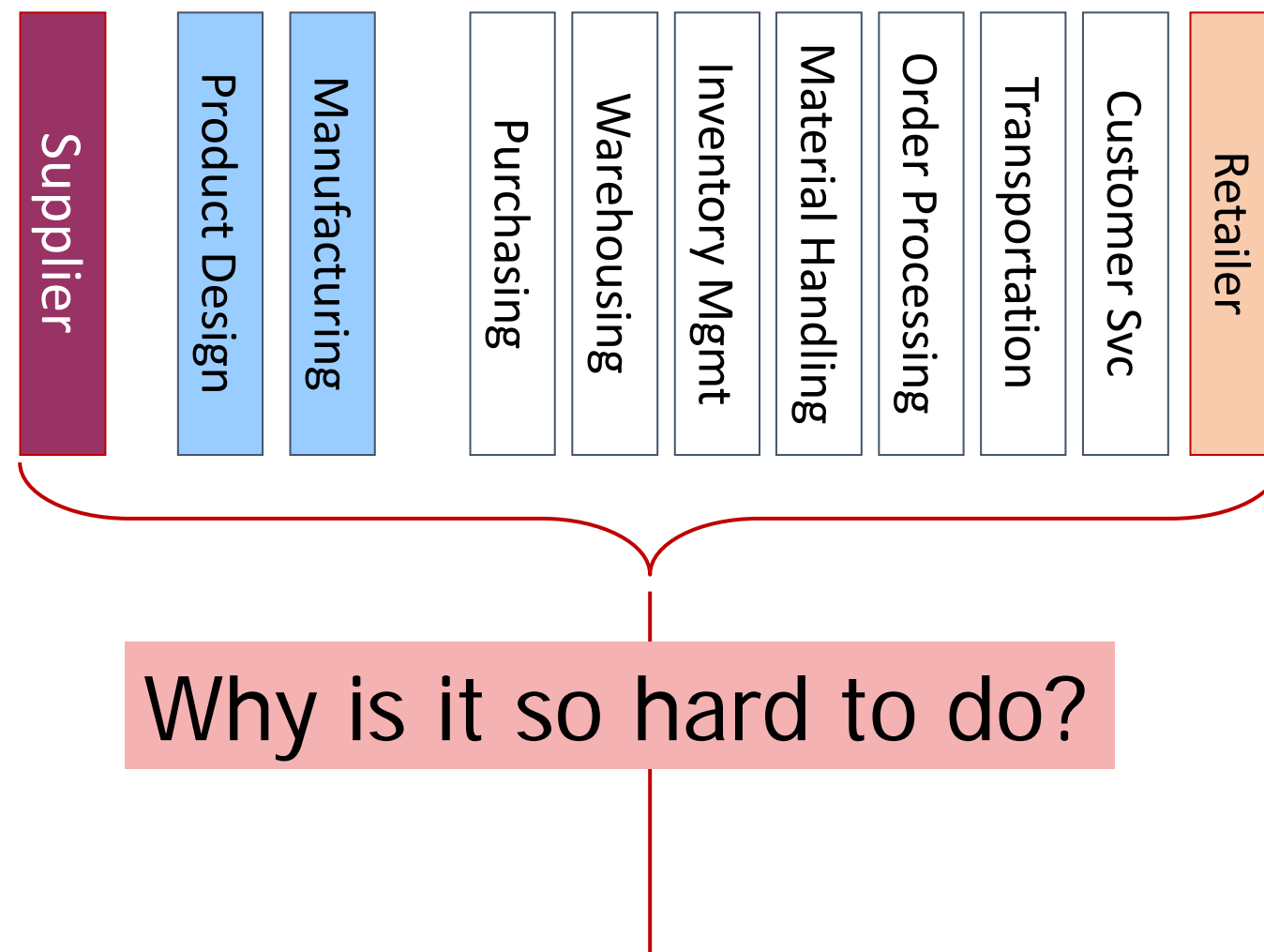
- Deliver within negotiated time frame



# The SYSTEMS APPROACH

Take an Engineering Systems Perspective

- What is a variable and what is a constraint?
- Continuous expansion of decision variables
- Increases potential for improvement but increases both complexity and coordination requirements



## Objective:

- Maximize on-shelf availability

## Variables:

- Select carrier to tender each load to
- Select time windows to deliver
- Select when to ship what from where
- Select where to stock which form of product
- Select contract relationships
- Select who should control replenishment
- Which channel member should perform which function

## Constraints:

- Total delivered cost to shelf



# Why Supply Chain Management Matters

- Supply Chains . . .
  - Span the globe and cannot be managed as an isolated function
  - Have become critical to any organization's operations
  - Connect functions, divisions, and business units within a firm as well as across firms
- Evolved into being both a Bridge and a Shock Absorber



Grow  
in  
Evolv  
in  
Discip  
line

Functional	Logistics	Supply Chain
Key Skills	Technically Narrow	COORDINATION
Influence	Local & Controllable	ACROSS ENTIRE SUPPLY CHAIN
Leadership	Hierarchical, Direct, 'Hard'	INFLUENTIAL, INDIRECT, 'SOFT'
Risk Management	Robust or Reactionary	PLANNED RESPONSE & FLEXIBILITY
Measurement	Single Focus	MULTI-FACETED
Technology Approach	Isolated Optimization	VISIBILITY & COORDINATION
Technology Platform	Self-Hosted, On-site	CLOUD OR SAAS
Scope / Reach	Regional / National	GLOBAL / MULTI-NATIONAL