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THE EFFECTS OF TRANSPORTATION ON COMPETITIVENESS OF U.S. AGRICULTURE

IMPORTANCE OF INTERMODAL CONNECTIVITY AND BOTTLENECK ELIMINATION

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Importance of Intermodal Connectivity and Bottleneck Elimination

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Intermodal Supply Chain Networks

Intermodal transport refers to the shipment of goods that involves two, or more, modes of transport in a single journey.

- Ideally, each mode of transport is used for the length of haul that minimizes the line haul cost for the maximum distance moved.
- The best attributes of each model of transport are combined in a system that yields the lowest cost of transportation for the supply chain.

Rationale for Intermodal Transport

- Trade-off between time and cost: a railbarge intermodal system should be lower cost than all rail, but will be slower
- Accessibility: trucks are usually needed for pick-up and delivery, but don't do well on ocean crossings

Intermodal Freight Bottlenecks

• Definition

- Any impediment that slows or halts the flow of traffic.
- Symptoms
 - Congestion slowdowns, queue formation, shipping delays
- Causes

- physical, economic, political and environmental

Bottleneck Elimination

- Cascading Bottlenecks
 - The impact of any bottleneck can accentuate other bottlenecks, and create new ones
- "Bottleneck Removal Futility"
 - Clearing up a single bottleneck only causes another bottleneck to appear – Manheim, 1979

Importance of Eliminating Bottlenecks from Intermodal Transport

- The effectiveness of a supply chain network is a like the strength of materials. The fewer the cracks, the stronger the material.
- As bottlenecks are reduced or removed, the average velocity of the traffic increases. As a result, costs fall and the supply chain network becomes more competitive.



Typical bulk supply chain for single point product supply

Economic Model of Supply Chain Network Costs



Competing Supply Chain Intermodal Networks





Any infrastructure bottleneck can be relieved, at least temporarily, if enough money and time is invested





Dysfunctional Supply Chain Bottlenecks

> Labour Work Rules

Competing Corporate Agendas

Information

The Basic Canadian Bulk Grain Handling and Transportation System





Terminal Elevators

Terminal to Vessel

The Proposed Canadian Containerized Grain Handling and Transportation System



Container Loading

Train

Truck to Inland Terminal

Ag. Container Yard



Rail to Vessel

Scheduled Sailing

Competing Intermodal Systems for Grain Transportation

- Bulk Handling
 - Economies of size
 - Zero Tare Weight
 - Specialized material handling systems
 - Large pipeline inventories
 - Bottlenecks?

- ISO Container Handling
 - Economies of scope
 - Identity preservation
 - Minimal product handling
 - Just-in-time delivery capability
 - Bottlenecks?

Sources of Intermodal Grain	Advantage Advantage
Transportation Bottlenecks	Containers Bulk
Infrastructure: Chronic - Climate Barrie Physical Res Under Investe Temporary - Weather Disr Market Pertu Accidents, Co	ers \bigstar \bigstar trictions \bigstar ment \bigstar uptions \bigstar \bigstar \bigstar rbations \bigstar onstruction, etc. \bigstar
Regulations: Direct - Cabotage Re Pricing Polici Competition I Indirect - Safety/Quality Security	strictions es Policy y Inspections $ \begin{array}{c} \bigstar \\ \bigstar \\ \bigstar \\ \bigstar \end{array} $
Supply Chain Dysfunction: Labour Work	Rules 🛧 🛧
Corporate Age	endas 🛧
Information In	compatibility 六

Bottleneck Scorecard

	Chronic and Temporary Infrastructure Bottlenecks	Direct and Indirect Regulatory Bottlenecks	Dysfunctional Supply Chain's Bottlenecks
Bulk Handling	Advantage Chronic	Advantage Indirect Effects	
ISO Containers	Advantage Temporary	Advantage Direct Effects	Advantage Corporate Policy & Information

Who's afraid of genetically modified foods?

Courtesy of Frankenfoods Inc.

Grain Supply Chains Containers versus Bulk



Pending Bottleneck: Harvest Transportation

- Consolidation Trends:
 - Fewer, larger farms
 - Fewer, larger grain elevators
 - Fewer, larger combines
- Longer hauling distances from fields to storage could increase harvest equipment idle-time
 - More trucks
 - More portable temporary storage

Conclusions

- Removal of any bottleneck is likely to improve the efficiency of an intermodal supply chain.
- Just because a bottleneck exists, its removal may not be justified economically.
- Some parties may benefit from bottlenecks.
- Bottlenecks are a symptom of a problem, and should not be treated as the problem.