

APPLICATIONS OF FREIGHT FLUIDITY

FREIGHT FLUIDITY BACKGROUND PAPER #1

**Task Force on Development of Freight Fluidity
Performance Measures**

**National Academy of Sciences and Federal
Highway Administration**

This paper is tasked to address the questions:

- Who would use a fluidity measurement system, and how would they use it?**
- In what ways could a fluidity performance system support transportation, the economy or other sectors?**
- Who would be the beneficiaries?**
- What are the potential policy impacts?**

The first question is what are freight fluidity performance measures?

- For the purposes of this paper, "freight fluidity" refers to the performance of transportation supply chains and freight networks.
- "Freight fluidity" can be a measure of the performance of a supply chain using a single mode or multiple modes of freight transportation.
- "Freight fluidity" can also be a measure of the performance of a freight network or freight corridor serving many supply chains.
- Perhaps a short-hand term to reflect the meaning of Freight Fluidity in more current U.S. parlance might be **Supply Chain Performance Measures; SCPM.**

STARTING QUESTIONS:WHAT IS THE GOAL?

A BROADER GOAL SERVED BY SUPPLY CHAINS

The goal for transportation is to reduce the effects of distance as an inhibiting force in our society's ability to realize its economic and social aspirations

TRANSPORTATION IS ALL ABOUT OVERCOMING THE TYRANNY OF DISTANCE

STARTING QUESTIONS:WHAT IS THE GOAL?

- **#1** What is our **value added** here? What do we add to the discussion?
- **#2** Are not the very real and direct interests in adequate supply chains on the part of the private or public sector actors **sufficient to serve national interest purposes**?
- **#3** Does the sum of their individual interests equal the national interest? **If not; why not?**
- **#4** Is there a **market failure** here of some kind? Is this a case of **“The Tragedy of the Commons”**?
- **#5** Are there new, **unrecognized opportunities** perhaps?

Varying Perspectives

Perspective	Components	Measures	What does it tell us ?	Why do we care?
Transportation View	Shipper to consignee through intermediate points; region-to-region flows over the network	Network use and performance: commodity flows, fluidity, and user costs	How well is the system working and what commodities does network performance affect	Identify and correct critical bottlenecks; identify potential improved options; improve other areas of system performance; respond to disruptions
Business Logistics View	Supplier to business to market; business-to-business flows over the network	Adding fluidity into market sheds (accessibility measures) and shipper costs: geographic consequences and regional economic development	How system performance affects users (businesses) in the region	Identify opportunities for attracting and keeping businesses; expand markets; respond to disruptions
Economic View	Raw material to basic manufacturing to assembly to wholesale to retail; industry-to-industry flows	Adding transport costs into I-O tables: national economic consequences	How system performance and geographic and business consequences affect the national economy	Monitor trends in transportation logistics costs; Inform national transportation and trade policies to improve economic health

KEY CONCERNS

1. NATIONAL SECURITY
2. INTERNATIONAL COMPETITIVENESS
3. GENERAL ECONOMIC EFFICIENCY
4. GENERAL HEALTH, WELFARE, SAFETY AND ENVIRONMENTAL SUPPORT

THE CHALLENGE:

IT IS NOT ENOUGH TO IDENTIFY SYSTEM BOTTLENECKS !
WE MUST IDENTIFY THOSE COMMODITIES WHICH ARE CRITICAL, PERHAPS STRATEGIC, TO THE NATION, STATES, OR LOCAL AREAS

APPROACHES

- DEVELOP A TYPOLOGY OF SUPPLY CHAIN TYPES
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- FOCUS ON KEY PERFORMANCE FACTORS
 - Reliability
 - Speed
 - Cost
- NATIONAL ACCOUNTS AS A DRIVER
- MONITOR TRENDS IN TRANSPORTATION COSTS IN THE OUTPUT OF INDUSTRIES

Key Performance Factors

□ **RELIABILITY**

- **Continuous Flow**
- **Just in time**
- **Safety and Risk**

□ **SPEED**

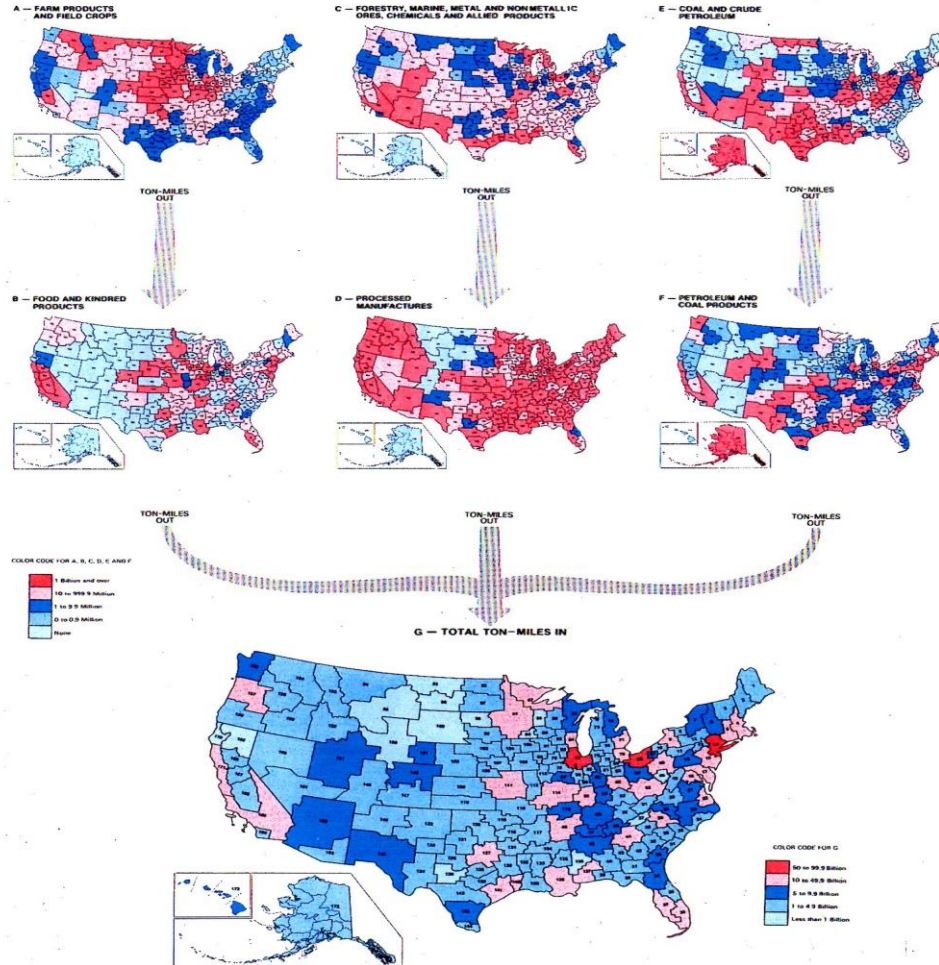
- **Perishability**
- **Inventory Costs**

□ **COST**

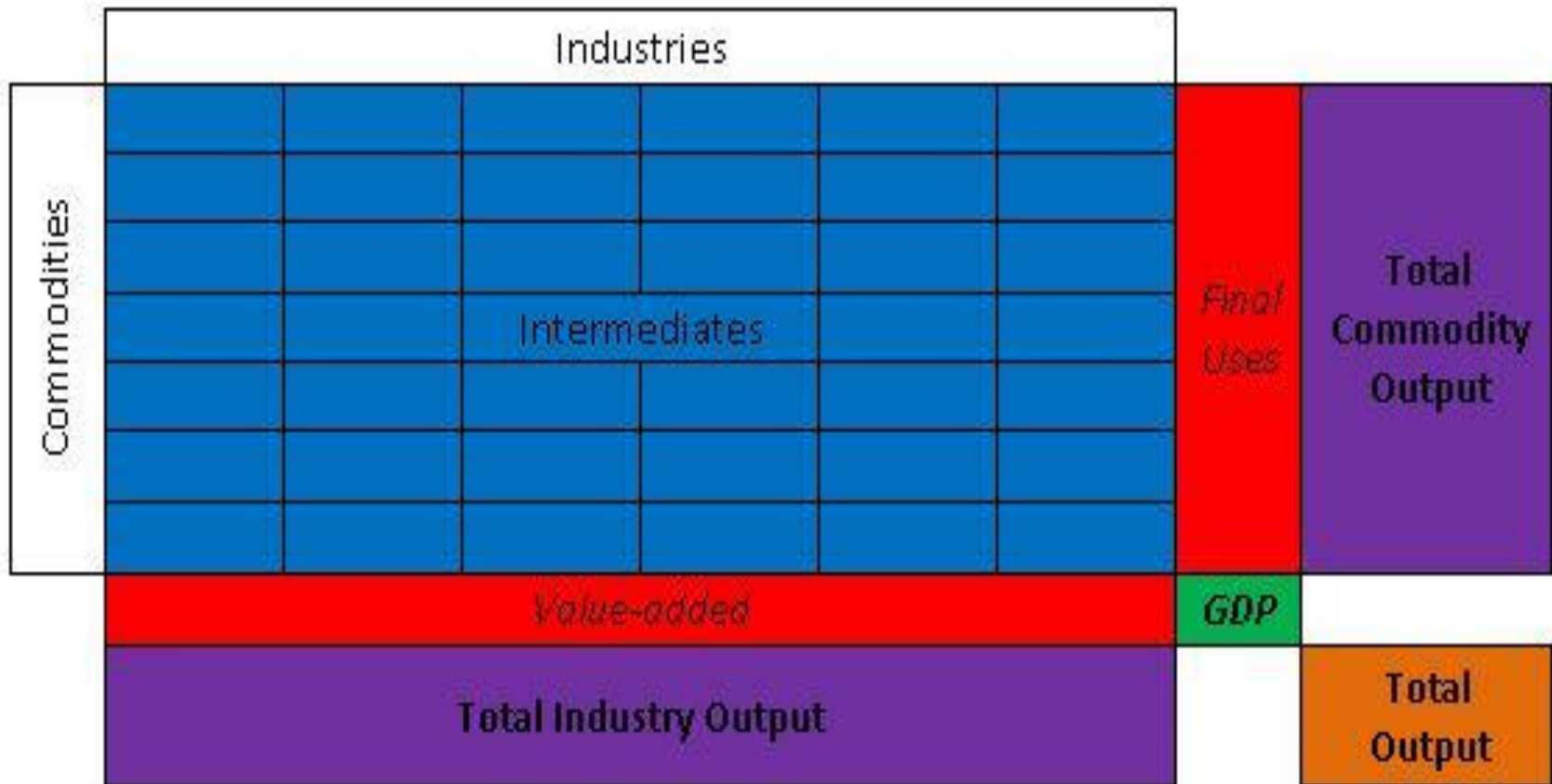
- **Tolerance to Transportation Costs**
- **Low Value Goods**
- **High Value Goods**
- **Cost Trends**

COUNTY LEVEL COMMODITY FLOWS

National Transportation: Trends and Choices



National Accounts as a Driver



SYSTEM INTERACTIONS

	LEGACY SYSTEMS	FUTURE SYSTEM OPTIONS
THREATS	<p>Where does ambient congestion impede critical commodities generating reliability or cost effects?</p>	<p>Where/how do general increases in system efficiency generate competitiveness gains for targeted commodities?</p> <p>What about passenger Interactions?</p>
OPPORTUNITIES	<p>Where are target opportunities for competitiveness gains?</p>	<p>Identifying alternative opportunities?</p>

SOME CONCLUSIONS

SUBSTANTIAL ROLES FOR THE PUBLIC SECTOR

MAKING THE CASE

- Make the case for greater focus on supply chains as a critical national, state and local concern.
- Bring that case to legislators and policy officials
- Demonstrate the importance of supply chains for national, state and local strategic interests

DEVELOPING THE TOOLS

- Develop the data and analytical capabilities to support cooperative private and public decision-making at all levels
- Establish the criteria to assure supply chains are specifically embedded in public investment analyses
- Improve our ability at all levels to assess passenger and freight tradeoffs.
- Embed analytical capability in the US National Accounts.

SOME CONCLUSIONS

SUBSTANTIAL ROLES FOR THE PUBLIC SECTOR

- **Real measurement of supply chains** cannot happen until it addresses flows at the commodity or product level.
- **Where does ambient congestion impede** exports, critical commodities or strategic industries generating reliability and cost effects or lost opportunities?
- **Recognize the opportunities** provided by existing and new facilities and services in terms of national productivity benefits, the equity of those benefits in all areas of the nation, and to all segments of society
- **Knowing the trends** in the transportation share of product costs will be crucial for exports and overall general economic efficiency.
- **A challenge;** when are increased transportation expenditures the result of inefficiencies in the system; or rather, the result of conscious decisions about trade-offs, such as the rolling warehouse notion of just-in-time.

THANK YOU

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