

REGIONAL PORTS AS DRIVERS OF ECONOMIC DEVELOPMENT AND INNOVATION

Upper Mississippi River Regional Multi-Modal Port & Logistics Center Annual Meeting
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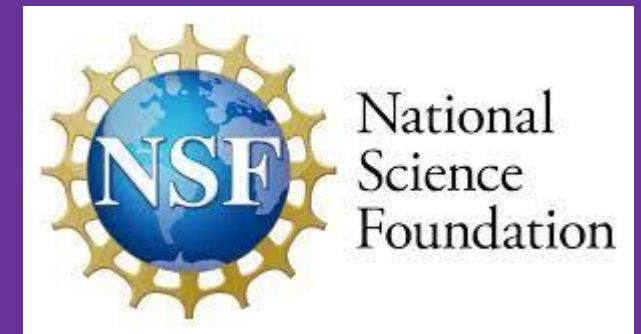
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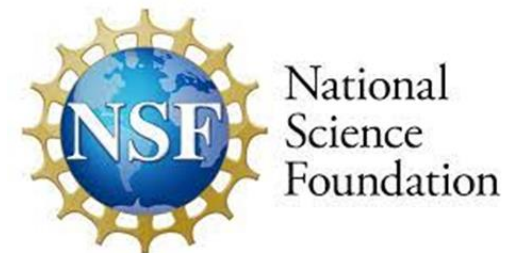
Introduction

• Purpose

- Summarize NSF-funded research on “smart logistics”
- Emphasis on waterborne commerce, regional ports, and business clusters
 - **How does regional collaboration occur to increase port competitiveness?**
 - **How can regional port stakeholders spark supply chain innovation?**
- Present Survey Results

• Outline

1. Research Overview
2. Research Methodology
3. Survey Results
4. Conclusions & Discussion



1. Research Overview

- **Purpose of NSF Program**

- \$1,000,000 2-Year Planning Grant
- Boost regional innovation capacity
- Advancing Smart Logistics / Industry 4.0 Technologies
 - Is Illinois Keeping Up?
 - Focus on **smart logistics for regional ports and marine highways**

- **Industry 4.0 Technologies Include:**

- Automation and Artificial intelligence
- Data analytics and Sensors
- Industrial internet of things (IofT) and Quantum computing

- **Participants**

- GSU (PI), SIUE, SIUC, UIUC, UIC, & WIU
- Multiple private / public sector partners
- Illinois Innovation Network

1. Research Overview—Marine Highways and Ports

- **Importance of Upper Mississippi and Illinois River Ports**

- Essential to Upper Midwest commodity flows
- Strategic disadvantage due to low tonnage at each port
- Hard to compete for federal infrastructure funding and business

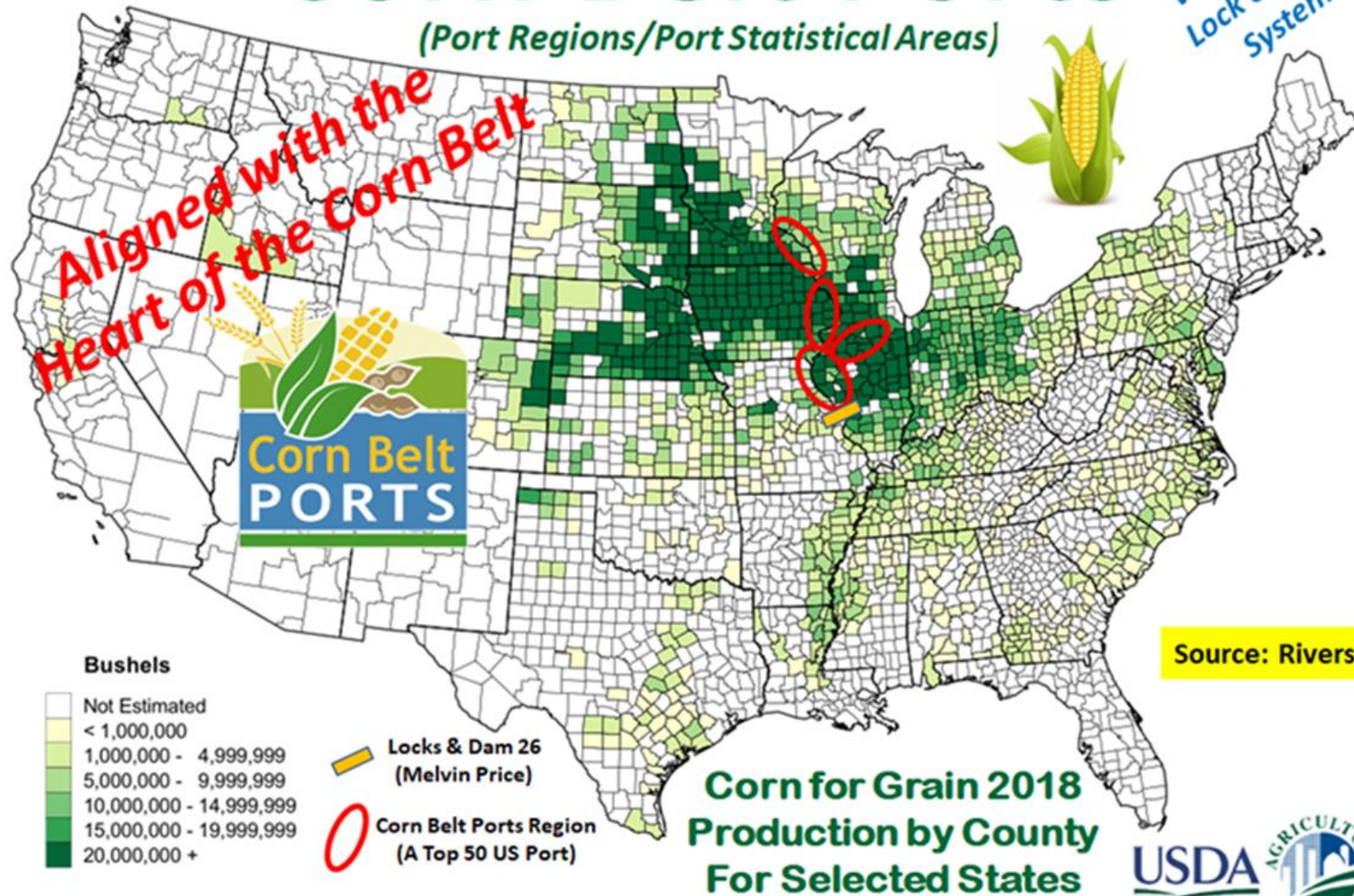
- **Creation of Regional Ports**

- Improve Upper Midwest port visibility and competitiveness
- Aggregate individual ports into **regional ports**
- Consolidated 19 ports and 253 barge terminals into four **regional ports**:
 - Mid-America Port Commission
 - Upper Mississippi River Ports
 - Northern Grain Belt Ports
 - Illinois Waterway (ILWW) Ports
- Collectively – Four regional ports form **Corn Belt Ports region**

Corn Belt Ports

(Port Regions/Port Statistical Areas)

Ports
Within the
Lock & Dam
System

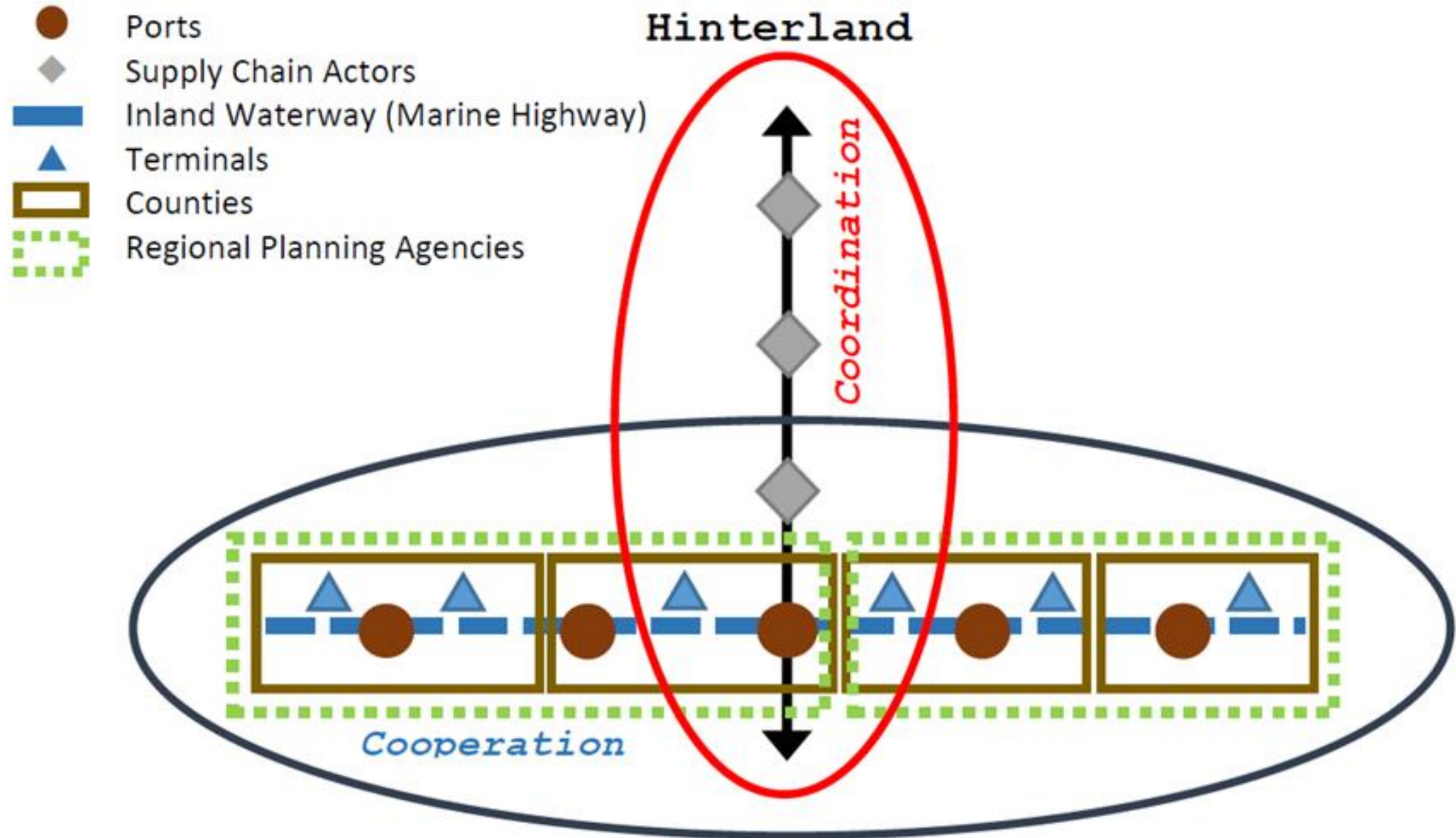


U.S. Department of Agriculture, National Agricultural Statistics Service

1. Research: Regional Ports as Business Clusters

- Business clusters can be catalysts for innovation
 - Silicon Valley (Tech), Detroit (Automotive), Hollywood (Entertainment), NoCal (Wine)
 - *“A geographic concentration of related companies, organizations, and institutions”* (HBR)
 - Regional ports **are** business clusters
- Each company in a business cluster could benefit from improved regional competitiveness but no entity can make large improvements on their own
 - The cluster, composed of private and public stakeholders, can only improve its competitiveness through **“joint action”** and governance
- This project studies Corn Belt regional ports as business clusters
 - Explore how stakeholders along the Upper Mississippi and Illinois River regional ports can **cooperate** to improve **coordination** along the regional supply chain
 - How can regional ports act collectively to innovate and improve competitiveness?

Regional Port Cooperation and Coordination



Adapted from Brooks et. al. (2010).

2. Methodology: Survey Variables

Conduct surveys that focus on 10 variables identified by previous researchers. The first five variables are “**inward-looking**” and examine the extent to which **coordinated** action is likely to take place:

- 1. Presence of leader firms.** Financial and relational resources to effect change
- 2. Presence and participation of public organizations.** These include regional ports, local and state governments, and planning agencies that can provide financial support, but also influence decisions beyond the region
- 3. Presence of an overarching organizational structure.** This organization welcomes stakeholders from multiple sectors with a shared interest in port success and economic development. This public entity “reduces the transaction costs of cooperation” (de Langen and Visser 2005, 174)
- 4. Community Engagement.** Is there a local interest expressed by the host community in supporting regional improvements in the port and supply chain?
- 5. Voice of Firms.** This is the capacity of local businesses beyond leader firms to influence economic development discussions

2. Methodology: Survey Variables

Five additional variables are “**outward looking**” and identify five strategy areas that a regional port, acting **cooperatively** as a collective action regime, could pursue:

- 6. Innovation.** Are there systematic strategies or cooperative agreements to conduct research or make investments in new technologies? This is important given the age of the inland waterway infrastructure, coupled with the explosion of data-driven technologies that could improve port and supply-chain efficiencies
- 7. Hinterland Access.** Are there collective agreements in place to improve supply chain infrastructure including roads, rail, air, or broadband?
- 8. Marketing and Promotion.** Does the collective action regime have a marketing strategy beyond what individual ports might do?
- 9. Internationalization.** To what extent does the regional port organize its constituent members to expand its perceived market area beyond the United States?
- 10. Training and Education.** Industry 4.0 Technologies are transforming our economy. Technologies include automation, AI, big data & analytics, sensors, and the industrial internet of things (IIoT), which already influence waterborne commerce. How can regional ports improve their workforce & implement 4.0 technologies to drive innovation?

2. Research Methodology: Survey Strategy

- Respondents recruited through stakeholder email lists
- Emails directed respondents to online survey hosted by WIU
- Survey conducted Spring 2024
- Estimated potential respondents contacted > 1,150
- N = 117 responses received for 10.2% response rate
- Responses from all four regional ports
- Responses from multiple sectors

2. Research Methodology: Survey Framework

- Ask respondents on a scale of 1-5, how **important** each variable is to port and supply chain operations
- Ask respondents on a scale of 1-5, the extent to which each variable is actually **present** in their respective regional port
- Identify **gap** for each variable between the importance of that variable and the extent to which it is present
 - ***Looking for variables that are important but not present***
 - The difference can guide future planning processes
- Also ask respondents to evaluate the importance of technology and other variables related to waterborne commerce

3. Survey Results

Table 1. Responses from Each Corn Belt Port

| Corn Belt Port | % | N |
|--|----------|----------|
| • Illinois Waterway Ports Commission | 41.03 | 48 |
| • Mid-America Port Commission | 20.51 | 24 |
| • Northern Grain Belt Ports | 23.08 | 27 |
| • Upper Mississippi River Ports (IL, IA) | 15.38 | 18 |
| Total | 100.00 | 117 |

Table 2. Respondents by Sector

| Industry | % | N |
|---------------------------------|--------------|-----------|
| Public Sector or Governmental | 36.75 | 43 |
| Planning & Economic Development | 17.95 | 21 |
| Grower or Producer | 17.09 | 20 |
| Transportation Sector | 8.55 | 10 |
| Terminal Facilities | 8.55 | 10 |
| Other | 11.11 | 13 |
| Total | 100.00 | 117 |

Table 3. Respondent Years Worked

| Years Worked | % | N |
|---------------------------|--------------|-----------|
| 0-4 years | 20.51 | 24 |
| 5-9 years | 11.11 | 13 |
| 10-14 years | 13.68 | 16 |
| More than 15 years | 54.70 | 64 |
| Total | 100.00 | 117 |

Table 4. Ratings of Port Business Cluster Variables

| Business Cluster Variables | Importance of Variable | N | Presence of Variable | N | Δ |
|--|-------------------------------|----------|-----------------------------|----------|----------|
| 1. Presence of Leader Firms | 3.79 | 116 | 3.45 | 107 | 0.34 |
| 2. Presence and Participation of Public Organizations | 3.98 | 117 | 3.33 | 107 | 0.65 |
| 3. Presence of an Overarching Organizational Structure | 3.82 | 117 | 3.30 | 107 | 0.52 |
| 4. Community Engagement | 3.74 | 117 | 2.86 | 107 | 0.88 |
| 5. Voice of Firms | 3.93 | 116 | 2.98 | 107 | 0.95 |
| 6. Innovation | 4.03 | 117 | 2.88 | 107 | 1.15 |
| 7. Hinterland Access | 4.21 | 117 | 2.82 | 104 | 1.39 |
| 8. Marketing and Promotion | 3.82 | 117 | 2.63 | 106 | 1.19 |
| 9. Internationalization | 3.59 | 117 | 2.68 | 107 | 0.91 |
| 10. Training and Education / Industry 4.0 Technologies | 3.86 | 117 | 2.73 | 107 | 1.13 |

Table 5. Ratings, Sorted by **Importance** of Cluster Variables

| Business Cluster Variables | Importance of Variable | N | Presence of Variable | N | Δ |
|--|------------------------|-----|----------------------|-----|----------|
| 7. Hinterland Access | 4.21 | 117 | 2.82 | 104 | 1.39 |
| 6. Innovation | 4.03 | 117 | 2.88 | 107 | 1.15 |
| 2. Presence and Participation of Public Organizations | 3.98 | 117 | 3.33 | 107 | 0.65 |
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Ranking on scale of 1-5, where 1 = not important and 5 = very important

Table 6. Ratings, Sorted by **Presence** of Cluster Variables

| Business Cluster Variables | Importance of Variable | N | Presence of Variable | N | Δ |
|--|------------------------|-----|----------------------|-----|------|
| 1. Presence of Leader Firms | 3.79 | 116 | 3.45 | 107 | 0.34 |
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| 9. Internationalization | 3.59 | 117 | 2.68 | 107 | 0.91 |
| 8. Marketing and Promotion | 3.82 | 117 | 2.63 | 106 | 1.19 |

Ranking on scale of 1-5, where 1 = not present and 5 = very much present

Table 7. Ratings, Sorted by **Difference between Importance and Presence of Variables**

| Business Cluster Variables | Importance of Variable | N | Presence of Variable | N | Δ |
|---|-------------------------------|------------|-----------------------------|------------|-------------|
| 7. Hinterland Access | 4.21 | 117 | 2.82 | 104 | 1.39 |
| 8. Marketing and Promotion | 3.82 | 117 | 2.63 | 106 | 1.19 |
| 6. Innovation | 4.03 | 117 | 2.88 | 107 | 1.15 |
| 10. Training and Education / Industry 4.0 Technologies | 3.86 | 117 | 2.73 | 107 | 1.13 |
| 5. Voice of Firms | 3.93 | 116 | 2.98 | 107 | 0.95 |
| 9. Internationalization | 3.59 | 117 | 2.68 | 107 | 0.91 |
| 4. Community Engagement | 3.74 | 117 | 2.86 | 107 | 0.88 |
| 2. Presence and Participation of Public Organizations | 3.98 | 117 | 3.33 | 107 | 0.65 |
| 3. Presence of an Overarching Organizational Structure | 3.82 | 117 | 3.30 | 107 | 0.52 |
| 1. Presence of Leader Firms | 3.79 | 116 | 3.45 | 107 | 0.34 |

Table 8. Ranking Importance of Technologies (Scale of 1-5)

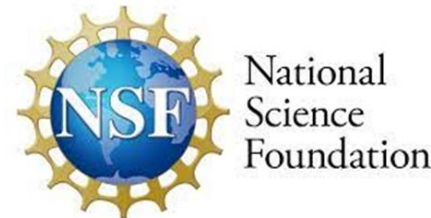
| Technology | Mean | N |
|---|------|----|
| • Smart Logistics | 3.07 | 98 |
| • Data Analytics | 2.99 | 98 |
| • Automation | 2.88 | 97 |
| • Big Data | 2.71 | 96 |
| • Cloud-based Computing | 2.60 | 96 |
| • Internet of Things (IoT) | 2.51 | 95 |
| • Electric Drones | 2.17 | 93 |
| • Electric vehicles (including electric-powered tugboats) | 1.80 | 89 |
| • Autonomous Vehicles | 1.76 | 84 |

Table 9. Ranking the Importance of Issues (Scale of 1-5)

| Variable | Mean | N |
|---|------|----|
| • Aging Infrastructure | 3.71 | 97 |
| • Broadband or Reliable Internet Access | 3.41 | 97 |
| • Regional Port Sustainability | 3.28 | 96 |
| • Sustainability | 3.25 | 97 |
| • Collaboration & Cooperation with other Stakeholders | 3.17 | 96 |
| • Renewable Energy Production | 2.73 | 96 |
| • Competition from other Transportation Modes | 2.66 | 93 |
| • Renewable Energy Storage | 2.59 | 96 |
| • Climate Change | 2.45 | 88 |

4. Conclusions and Discussion

- **Regional ports reorganized and elevated their visibility.**
 - Now—How can we take regional ports to the next level of competitiveness?
 - Project explores how regional ports operate as business clusters.
 - Engaged multiple groups of marine highway / regional port stakeholders
- **Use research outcomes as input into future initiatives**
 - National Science Foundation \$160 million – 10 Year Grant
 - How can regional ports be part of a larger logistics business cluster?
 - **Overall goal:** Improve logistics and economy in the Midwest
 - Questions and suggestions welcomed!
- **Thank you!**





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