The Role of Data in Supporting a More Resilient U.S. Manufacturing Supply Chain

NIST Manufacturing Extension Partnership
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NIST MANUFACTURING EXTENSION PARTNERSHIP

https://www.nist.gov/mep/mep-national-network

MEP National Network™

A unique public-private partnership that delivers comprehensive, proven solutions to U.S. manufacturers, fueling growth and advancing U.S. manufacturing.

Our mission is to strengthen and empower U.S. manufacturers.

MEP National Network

Centers located in all 50 states and Puerto Rico.

Public-private partnership with local flexibility.

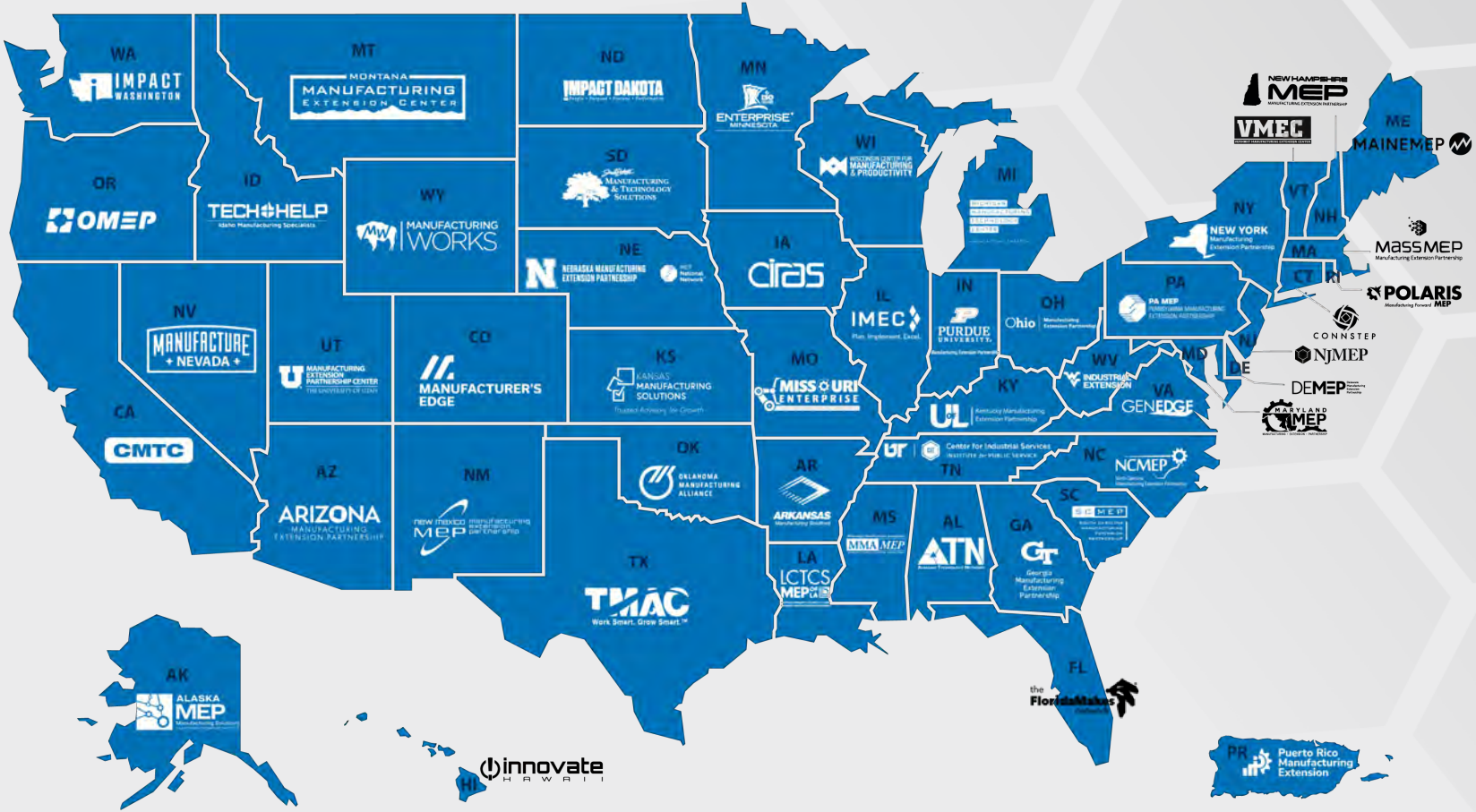
Federal funds, state investments, and private sector fees cover services.

Market driven program that creates high value for manufacturers.

Leverage partners to maximize service offerings.

Transfer technology and expertise to manufacturers.

MEP National Network



Business Solution Examples

Data is Core to the MEP Program and National Network

- Program relies on data to understand ROI, effectiveness, manufacturer challenges, and to stay on top of manufacturing trends
- The need for triangulation:
  - To be most effective, MEP needs to leverage:
    - Internal administrative and survey data (MEP Centers and individual manufacturing clients)
    - Other federal data sources (e.g. Census, BEA, BLS, etc.)
    - Independent third-party data providers (e.g. D&B, JobsEQ, IBISWorld)
- Important Focus
  - Establishing administrative "hooks" to leverage external data
  - Maintaining and curating these important linking variables

MEP Original Data Collection

MEP Center Quarterly Reporting

- Center Locations
- Center Staff
  - Count and names
- Center Partners
  - Names and locations
- Center Clients
  - Name and location
  - Size (employees)
  - Industry
- Center Projects
  - Title and description
  - Type and delivery mode
  - Intensity (hours)
  - Total value (dollars)
  - Internal vs. third party service delivery

Client Impact Survey

- New and retained sales
- Jobs created and retained
- New client investment
- Cost savings
- Client challenges
- Client satisfaction (NPS)
- Client suggestions (narrative)
- Survey response rate
- Percent of manufacturers improving competitiveness

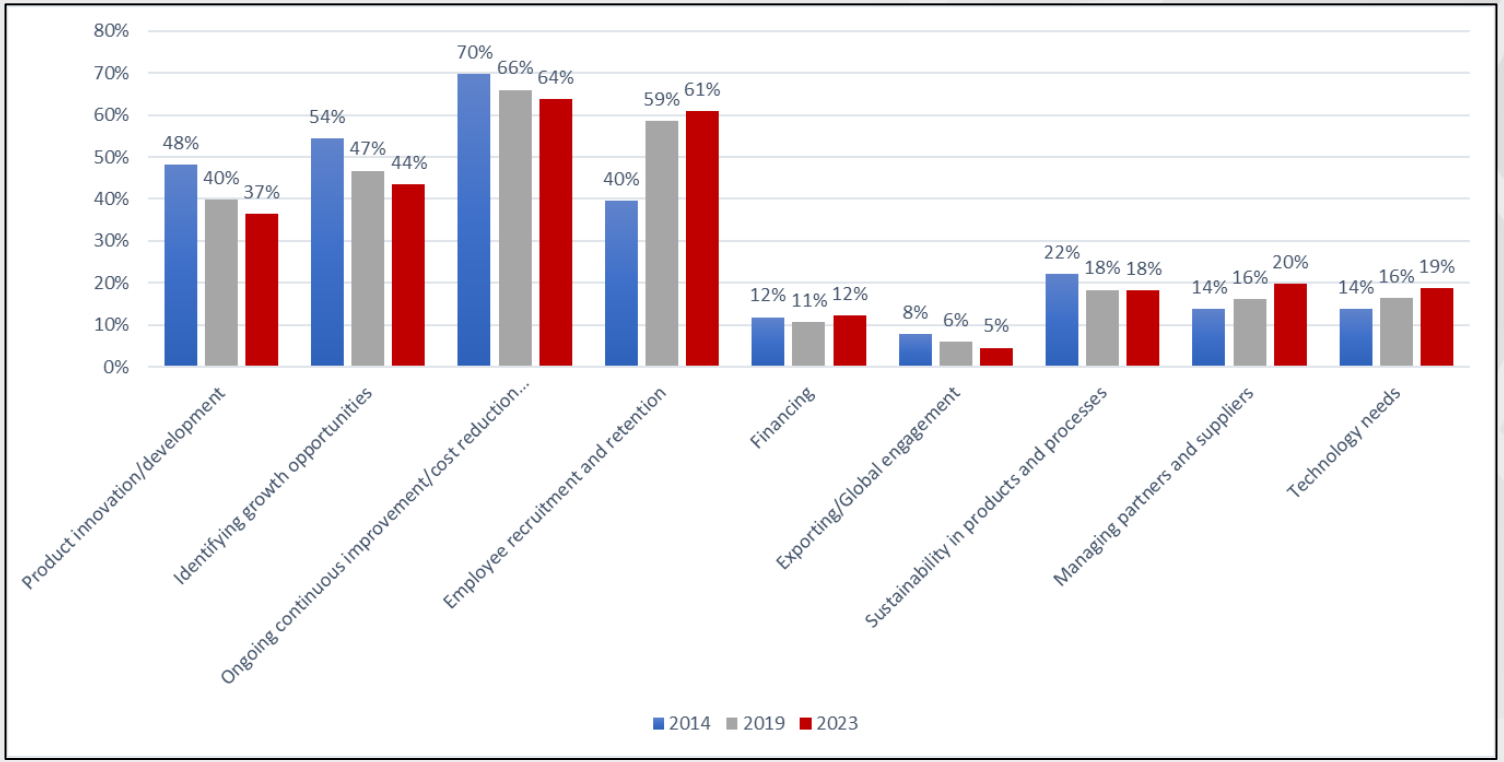
Other Data Sets

- MEP Center success stories
  - Client based
- Progress plans/technical reports
  - Semi-annual reporting
  - Narrative progress reporting
- Operating outcomes
  - Client engagement with very small, rural, and start-up manufacturers
- Supplier Scouting
  - Connections between businesses with a product need and manufacturers who can provide needed product

The U.S. Manufacturing Supply Chain Challenge

- Manufacturing is only as strong as the supply chain that supports it
- Reliable and timely sourcing of inputs and resources is critical, especially for smaller manufacturers
- Events of the past three years have exposed many vulnerabilities in supply chains
- MEP is uniquely positioned to respond to these circumstances
- MEP positions itself at all levels of the supply chain, from original equipment manufacturers (OEMs) to SMMs, as well as the relevant state and federal stakeholders

MEP Client Challenges



Example – A COVID Supply Chain Response

- NIST MEP received $50M to assist manufacturers to respond to the pandemic
- Distributed to MEP Centers to help manufacturers to increase production of personal protective equipment (PPE), cultivate new suppliers and reach new markets
- Administration provided listing of critically needed medical supplies to combat pandemic
  - Kicked off challenge of identifying critically needed goods-producing manufacturers

Finding Producers of Critically Needed Supplies

Critically Needed Supplies

- Medicines/Pharmaceuticals
- Sanitizing/Disinfectant Wipes
- Hand Sanitizer Bottles
- Hand Sanitizer Refills
- Hand Soap
- Cleaning Solution Spray
- Biohazard Waste Bags
- Digital thermometers
- Powered Air Purifying Respirators (PAPR)
- PAPR Hoods, All Sizes
- PAPR Filters
- Li-Ion Batteries, Small
- Gowns, Disposable, All Sizes
- N95 Masks
- Surgical Procedure Masks
- Surgical Procedure Masks w/Shield Attached
- Face shields
- Goggles -antifog, splash/impact-resistant
- Gloves, Exam, All Sizes
- Comfort Strips Impermeable Barriers
- Digital thermometers (forehead)
- Disposable Thermometers
- Disposable stethoscopes

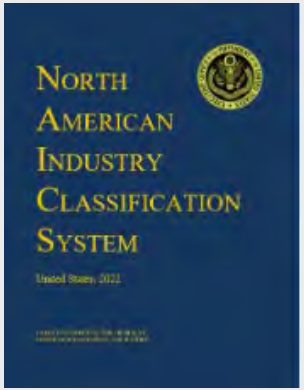
NAICS Industries Mapped To

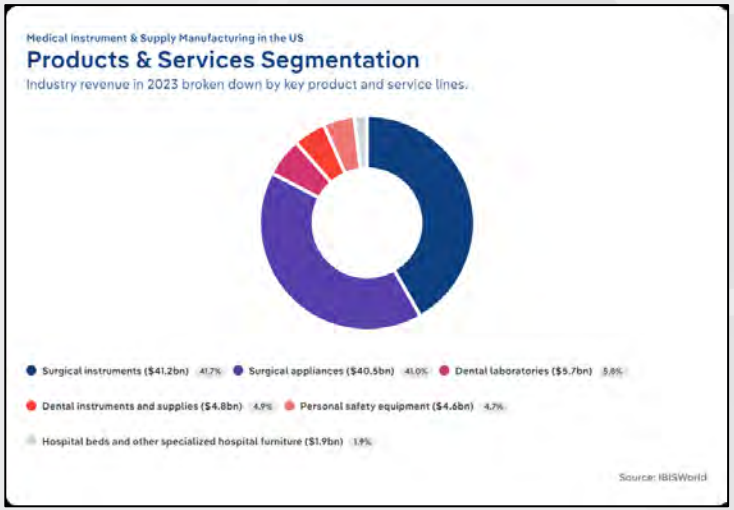
- 325412 - Pharmaceutical Preparation Manufacturing
- 32561 - Soap and Cleaning Compound Manufacturing (325611, 325612)
- 326111 - Plastics Bag and Pouch Manufacturing
- 33451 – Medical Device Manufacturing (334510,334513, 334516, 334517, 334519)
- 33591 - Battery Manufacturing (335911, 335912)
- 33911 - Medical Equipment and Supplies Manufacturing (339112, 339113, 339114, 339115)

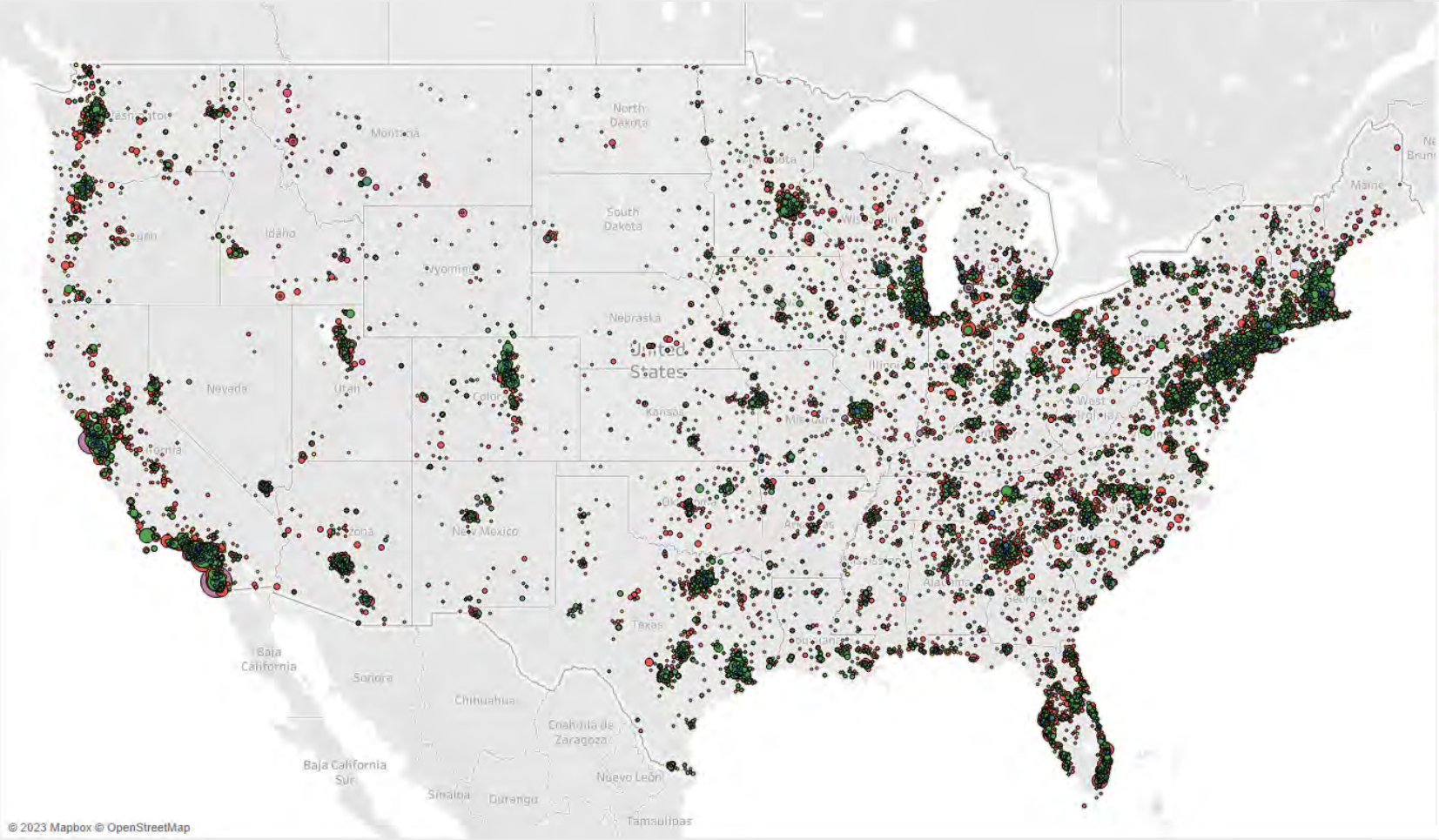
Product to Industry Mapping is Fuzzy

- Leveraged text scraping against MEP Center manufacturer interactions
  - Looking at a 5-year data set pulls in around 80,000 records
- Analysis of the NAICS Manual
- Leveraging Third Party data resources

XYZ is a manufacturer of portable test instruments for the chemical, food, and pharmaceutical industries. XYZ products include chart temperature recorders, electronic data loggers, probe digital thermometers, and pH meters. Its ABC program (and software) provides cold chain management to keep goods at the appropriate temperature. Its main manufacturing and distribution facility is in Modesto, California; it also operates a joint venture electronic assembly plant in Shenzhen, China. XYZ distributes its products worldwide.






Number of Estab by Zip
1
20
40
60
80
100
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Critical Industry
Battery
Medical Device
Medical Equipment and Supplies
Pharmaceuticals
Plastics Bag and Pouch
Soap and Cleaning
North Dakota
Montana
South Dakota
Idaho
Wyoming
Nebraska
United States
Nevada
Utah
Colorado
Kansas
Missouri
Illinois
Maine
New Mexico
Texas
Louisiana
Georgia
Florida
Baja California
Sonora
Chihuahua
Coahuila de Zaragoza
Nuevo León
Baja California Sur
Sinaloa
Durango
Tamaulipas
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End Use Producers Cannot Ramp Up or Pivot Production Without Necessary Resources

- MEP National Network was able to isolate companies in identified industries and begin outreach
  - Built company lists from MEP client database and D&B Hoovers
- Supply chain disruptions and workforce challenges delayed manufacturer's ability to produce needed supplies
- Need to engage the suppliers to identified producers to strengthen supply chains and ramp up production/pivot

Mapping Supply Chains Of Critically Needed Products is Even Fuzzier

- Anchored on the identified priority NAICS codes (5-digit and 6-digit level)
- Leveraged the BEA Supply-Use Framework to identify important supply chain components (amounts and shares of intermediate inputs)
  - Complemented data with modeling down to state level using third party capability
- Concentration interest
  - Low (ability to broaden reach for critical supplies)
  - High (ability to narrowly tailor requests for MEP Centers)

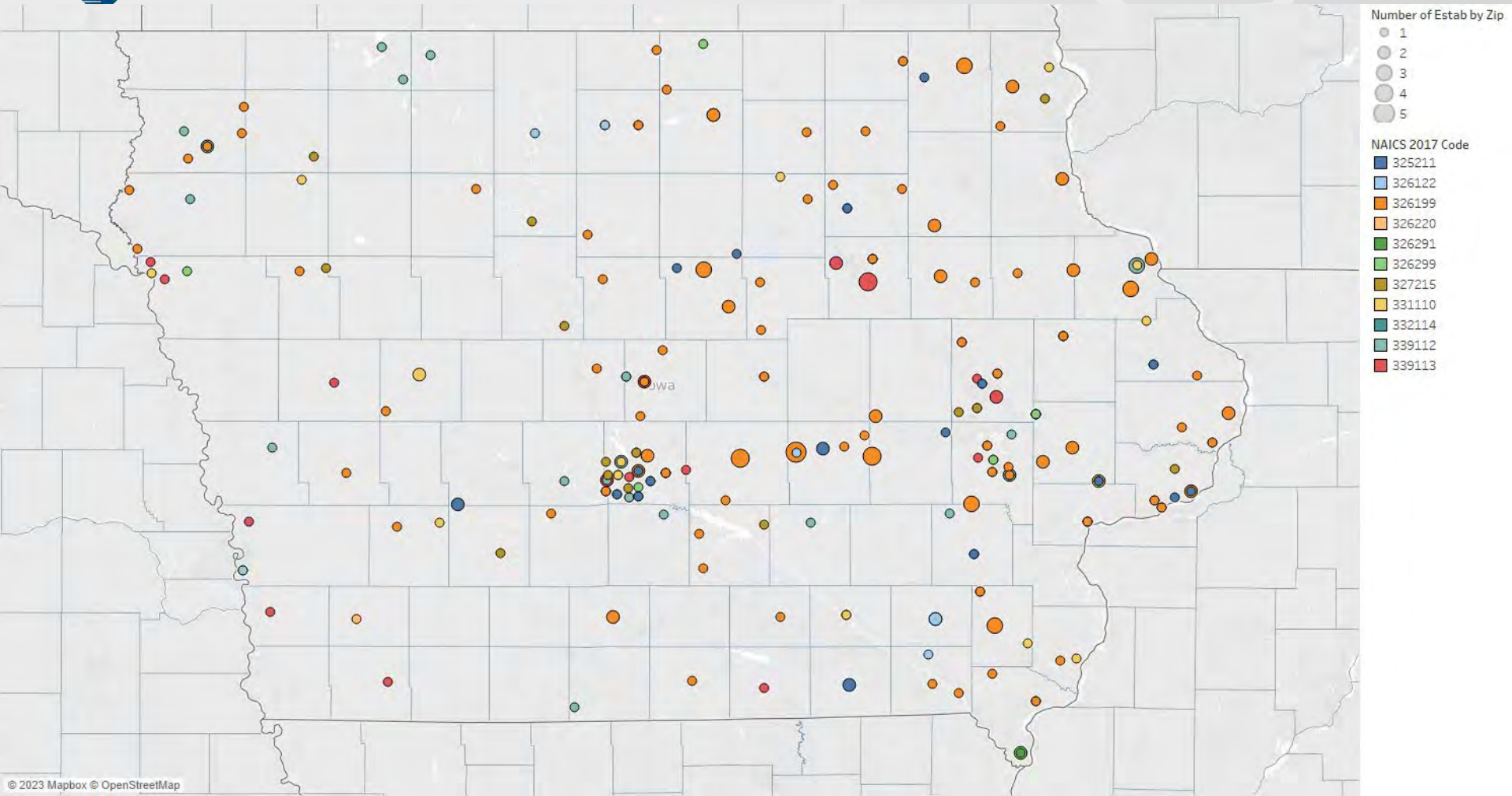
A Closer Look

Pharmaceutical Preparation Manufacturing (325412)

- High supplier industry concentration
- 58% of commodities purchased were from (Biological product (except diagnostic) manufacturing) NAICS 325414
- Other supplier industries include:
  - 325193 - Ethyl Alcohol Manufacturing
  - 325199 - All Other Basic Organic Chemical Manufacturing
  - 325411 - Medicinal and Botanical Manufacturing
  - 325991 - Custom Compounding of Purchased Resins
  - 325998 - All Other Miscellaneous Chemical Product and Preparation Manufacturing
  - 326199 - All Other Plastics Product Manufacturing

Surgical and Medical Instrument Manufacturing (339112)

- Low supplier industry concentration
- No single commodities represented more than 13% of total commodity inputs
- Top commodity need was from Surgical appliance and supplies manufacturing (NAICS 339113)
  - Only commodity over 10%
- Other supplier industries include:
  - 325211 - Plastics Material and Resin Manufacturing
  - 326190 - Other plastics product manufacturing
  - 326220 - Rubber and Plastics Hoses and Belting Manufacturing
  - 326291 – Rubber Product Manufacturing for Mechanical Use
  - 326299 - All Other Rubber Product Manufacturing
  - 327215 - Glass Product Manufacturing Made of Purchased Glass
  - 331110 - Iron and Steel Mills and Ferroalloy Manufacturing
  - 332114 - Custom Roll Forming
  - 339112 - Surgical and Medical Instrument Manufacturing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4
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NAICS 2017 Code
325211
326122
326199
326220
326291
326299
327215
331110
332114
339112
339113
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MEP National Network™

IOWA SUCCESS STORY

NEW NORMAL: DICKSON INDUSTRIES GROWING WITH GOWNS

ABOUT DICKSON INDUSTRIES INC. Dickson Industries Inc is a family-owned business founded in 1946 and located in Des Moines, Iowa. The company employs 48 people making quality fabrics for multiple markets, ranging from food processing garments to sporting goods.

THE CHALLENGE. Dickson Industries made its name making medical fabrics and garments before venturing into various lines of food-industry clothing and pre-consumer products, such as specialized netting used to enhance the flavor of meat during smoking. When the coronavirus decimated demand for food-industry products, Dickson officials realized that they were ideally situated to help fill part of Iowa's need for personal protective equipment (PPE). For help with this new venture Dickson turned to CIRAS, part of the MEP National Network™.

MEP CENTER'S ROLE. CIRAS Project Manager Kim Anderson told Dickson federal regulators issued emergency use authorizations (EUAs) in the early days of the pandemic to help meet an overwhelming PPE demand. Dickson made the gown decision after extensive conversations with CIRAS about what it would take to meet governmental safety standards going forward. CIRAS also provided training focused on growth option in medical manufacturing during the pandemic.
The combination of an existing supply chain and local manufacturing capability meant the company could be incredibly flexible and able to pivot quickly. Dickson also had existing relationships with medical supply distributors, making it easy for hospitals to purchase from the company. The company began producing hospital isolation gowns to fill emergency shortages and has since decided to continue.

"We're thinking this could become a permanent line item for us under the medical division. The comments we've received have been overwhelmingly positive."

-David Dickson, President

RESULTS

- 10 retained jobs, created 5 jobs
- $1,000,000 increased sales
- $100,000 investment in medical device programs

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ciras

MEP National Network Supplier Scouting Service

- Can be applied on a national, regional, or local scale
- Identify manufacturers with production and technical capabilities and connect them with larger and more diverse supply chains
- Identify and connect suppliers with purchasers, responding to the specific needs of agencies to meet Build America, Buy America requirements

Supplier Scouting Process

Supplier Scouting Opportunity

- Data on requestor
- Data on item to be scouted

Each MEP Center Scans Manufacturing Base

- All 51 responses are captured in MEP Information System
- Can be exact match, manufacturer possesses capability, manufacturer can produce similar item, or manufacturer possesses relevant capabilities to produce with limited retooling
- Or no match

Response to Supplier Scouting Opportunity

- Either no match is found (documented)
- Connection is made between organizations
- Report is generated

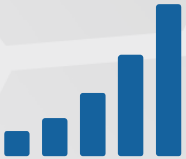
Supply Chain Optimization and Intelligence Network (SCOIN) aligns with the national strategy for advanced manufacturing and MEP's strategic priorities.

Manufacturing Supply Chains and Ecosystems	Enhance Supply Chain Interconnections	Foster Collaboration within Supply Chains
		Advance Innovation for Digital Transformation of Supply Chains
	Expand Efforts to Reduce Manufacturing Supply Chain Vulnerabilities	Trace Information and Products Along Supply Chains
		Increase Visibility into Supply Chains
		Improve Supply Chain Risk Management
		Stimulate Supply Chain Agility
	Strengthen and Revitalize Advanced Manufacturing Ecosystems	Promote New Business Formation and Growth
		Support Small and Medium-sized Manufacturers
		Assist Technology Transition
		Build and Strengthen Regional Manufacturing Networks
		Improve Public Private Partnerships

Vision: Post 2025

Map what suppliers exist today and what suppliers can pivot to increase U.S. manufacturing capacity.

Create a national network that can respond to needs of the country regardless of state or region.



Use data so SMMs can participate in larger supply chains as Tier 2-4 suppliers and support new industries that can possibly funded by OEMs.

Goal is to create a national ecosystem to support growing U.S. manufacturing by making more connections along the supply chain.

SCOIN Objectives:

Invested over $20 million in MEP National Network to:

- Expand existing MEP Centers capacity to provide services focused on national supply chain optimization
- Establish a national Supply Chain Optimization and Intelligence Network that will:
  - Comprehensively support supplier scouting services
  - Rigorously assess and analyze domestic manufacturing capabilities
  - Expand the inherent knowledge of each MEP Center's local manufacturing ecosystems
  - Build an integrated knowledge of U.S. supply networks
  - Work with OEMs to identify U.S. small and medium suppliers

Bringing it All Together

- Program brings unique perspective to federal supply chain knowledge and services
- Opportunities to better integrate into the federal supply chain data conversation
- Supplier Scouting and SCOIN bring new dimension to understanding domestic production capabilities

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