

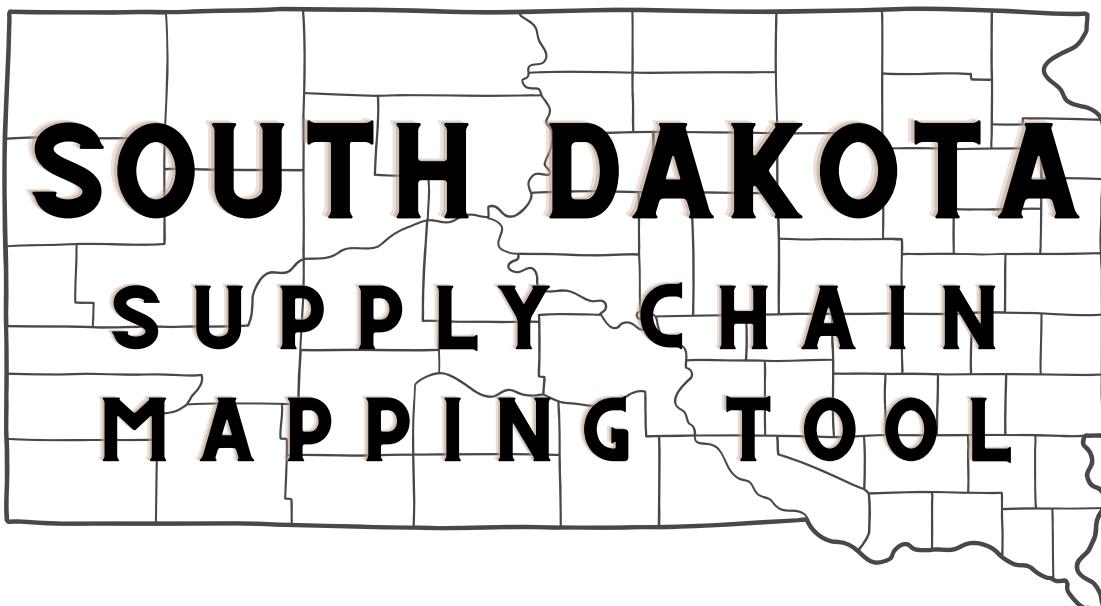


UNIVERSITY OF
SOUTH DAKOTA
BEACOM SCHOOL OF BUSINESS



FINAL REPORT

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Student Consultants: Kunjan Dodani & Tejas Budharamu
Faculty Advisor: Dr. Dan Tracy

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EXECUTIVE SUMMARY

South Dakota Manufacturing and Technology Solutions (SDMTS) partnered with Coyote Business Consulting to continue improving its Supply Chain Optimization and Intelligence Network (SCOIN) project. This phase focused on enhancing the Supply Chain Mapping Dashboard, a tool used to visualize and understand manufacturing activity across South Dakota.

The goal was to make the dashboard more insightful and practical by adding new performance and business data. The updated version now includes SIC codes and descriptions, headquarters identification, on-time delivery rate, lead time efficiency, order fulfillment accuracy, growth rate, and trade data such as HS codes, export details, and confidence levels.

These updates help SDMTS and state partners see how manufacturers are performing, how they connect through supply chains, and where new opportunities exist. The new data was gathered and verified through research, manual checks, and AI-based analysis to ensure accuracy and long-term usability.

Together, these improvements make the tool a stronger, more reliable resource that supports manufacturing growth and economic development across South Dakota.

INTRODUCTION

South Dakota Manufacturing and Technology Solutions (SDMTS) is the state's Manufacturing Extension Partnership (MEP) business center, headquartered in Watertown, South Dakota at LATC. The organization helps manufacturers improve productivity and competitiveness through lean training, consulting, and technical assistance.

Under the guidance of Angela Allen, SDMTS Supply Chain Business Advisor, and Dr. Dan Tracy, Faculty Advisor from the Beacom School of Business, the project aimed to refine and expand the existing Supply Chain Dashboard developed by a previous consulting team.

Our duties included:

- Enhancing the existing dashboard with new analytical metrics.
- Improving data accuracy and usability.
- Laying the groundwork for a future web-based, real-time version.

This continuation built upon the foundation established by prior teams while introducing additional performance metrics, trade data, and improved data organization to increase the tool's value and functionality.

METHODOLOGIES

Overview

Our approach focused on collecting, validating, and organizing data that could enhance the dashboard's analytical power. Each phase emphasized accuracy, usability, and sustainability.

Phase 1: Data Collection

Data was gathered from company websites, D&B Hoovers, Manta, and LinkedIn to obtain updated information on operations, reliability, and growth.

Each field was standardized in Excel to maintain consistency with the dashboard's existing structure.

Phase 2: Pattern Recognition and AI Support

AI tools such as ChatGPT were used to identify relationships between company size, location, and performance. This helped determine which data fields offered the most value to SDMTS.

A	B	AA	AB	AC	AD	US SIC 1987 Code	US SIC 1911
1 Company Name	Tradestyle	D&B Hoovers Industry	US 8-Digit SIC Code	US 8-Digit SIC Description			
2 BOTTLING GROUP, LLC	Pepsi Beverages	Beverage Manufacturing	20860300	Carbonated soft drinks, bottled	2086	Bottled an	
3 BOTTLING GROUP, LLC	Pepsi Beverages	Beverage Manufacturing	20860300	Carbonated soft drinks, bottled	2086	Bottled an	
4 Coca-cola Bottling Company High Country	Coca-Cola, Coca-Cola	Beverage Manufacturing	20860000	Bottled and canned soft drinks	2086	Bottled an	
5 Dakota Provisions, LLC		Food Manufacturing	20150800	Turkey processing and slaughter	2015	Poultry Sl	
6 Interbake Foods LLC		Food Manufacturing	20529905	Cookies	2052	Cookies ar	
7 Empirical Foods, Inc.		Food Manufacturing	20110000	Meat packing plants	2011	Meat Pack	
8 Royal Canin USA, Inc		Food Manufacturing	20470000	Dog and cat food	2047	Dog and C	
9 TYSOM INTERNATIONAL SERVICE CENTER, INC. ASIA		Food Manufacturing	20110101	Boxed beef, from meat slaughe	2011	Meat Pack	
10 Saputo Cheese Usa Inc.		Food Manufacturing	20229902	Natural cheese	2022	Natural, P	
11 Valley Queen Cheese Factory, Inc.		Food Manufacturing	20229902	Natural cheese	2022	Natural, P	
12 TYSOM INTERNATIONAL SERVICE CENTER, INC.		Food Manufacturing	20110101	Boxed beef, from meat slaughe	2011	Meat Pack	
13 Cimpl's, LLC	Cimpl Packing, Ameri	Food Manufacturing	20110100	Beef products, from beef slaug	2011	Meat Pack	
14 COCA-COLA BOTTLING COMPANY HIGH COUNTRY	Coca-Cola	Beverage Manufacturing	20860000	Bottled and canned soft drin	2086	Bottled an	
15 SMITHFIELD PACKAGED MEATS CORP.		Food Manufacturing	20110000	Meat packing plants	2011	Meat Pack	
16 Schlitz Foods, Inc		Food Manufacturing	20150600	Poultry slaughtering and proces	2015	Poultry Sl	
17 South Dakota Soybean Processors, LLC		Food Manufacturing	20759903	Soybean oil, cake or meal	2075	Soybean C	
18 New Angus, LLC	DemKota Ranch Beef,	Food Manufacturing	20130100	Prepared beef products, from pi	2013	Sausages i	
19 RED'S ALL NATURAL, LLC		Food Manufacturing	20990000	Food preparations, nec	2099	Food Prep	
20 MARS PETCARE US, INC.	Royal Canin	Food Manufacturing	20479902	Dog food	2047	Dog and C	
21 CASS-CLAY CREAMERY, INC.		Food Manufacturing	20229903	Processed cheese	2022	Natural, P	

Image description: Raw classified MEP DOM data

R	S	T	U	V	AA	AB	AC
1	Ownership Type	D&B Legal Status Type	Entity Type	Is Headquarters	D&B Hoovers Industry	US 8-Digit SIC Code	US 8-Digit SIC Description
2	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76990200	Tank repair and cleaning services
3	Nonprofit	Corporation	Parent	TRUE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
4	Private		Branch	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
5	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
6	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
7	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
8	Private	Corporation	Subsidiary	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
9	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76991401	Farm machinery repair
10	Private		Independent	FALSE	Industrial Machinery Repair and Maintenance	76991400	Agricultural equipment repair services
11	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
12	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
13	Private	Proprietorship	Independent	FALSE	Industrial Machinery Repair and Maintenance	76929901	Automotive welding
14	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
15	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76991401	Farm machinery repair
16	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76991400	Agricultural equipment repair services
17	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
18	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76940201	Electric motor repair
19	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76990504	Industrial machinery and equipment repair
20	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76920000	Welding repair
21	Private	Corporation	Independent	FALSE	Industrial Machinery Repair and Maintenance	76990502	Engine repair and replacement, non-automot.

Image description: Raw classified MEP DOM data

Phase 3: Geocoding and Mapping

Visualisation scripts converted company addresses into latitude and longitude coordinates. Three businesses with incorrect geocoding were manually corrected. BatchGeo and Excel Power Map visualizations were generated using these coordinates.

Phase 4: Data Validation

Every new entry underwent cross-verification and formula checks to ensure completeness and consistency. Filters and macros were tested after each update to ensure dashboard functionality was preserved.

DELIVERABLES

Overview

The main deliverable is an enhanced Supply Chain Dashboard that provides deeper insight into South Dakota's manufacturing sector.

Dashboard Improvements

The dashboard interface was redesigned for clarity, consistency, and ease of use.

- Streamlined slicers and filters.
- New dropdowns for HQ and performance metrics.
- Consistent formatting for all data columns.

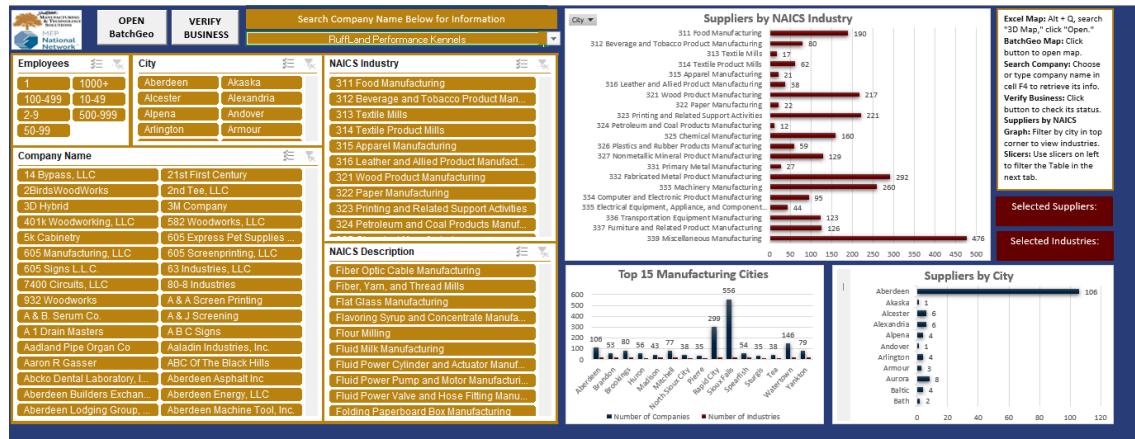


Image description: Modified SDMTS Supply Chain Dashboard

Dashboard Key Features

- Interactive slicers for dynamic filtering
- Buttons to open the Secretary of State site for verification
- Search bar for quick company lookup
- Chart visualization of top manufacturing cities
- Summary charts of suppliers by city and NAICS category

Updating the Dashboard:

- Existing companies: update tables to reflect new information; dashboard auto-updates.
- New companies: add to structured tables; ensure columns and rows match existing formats for macro compatibility.
- Changes to sheets may require updates in VBA code where references are used.

Sharing Recommendations:

- Hyperlink Excel Dashboard or BatchGeo Map on the SDMTS website.
- Include Standard Operating Procedures (SOPs) for reference.
- Sheet protections in place: password “sdmtsdash” for protected tabs.

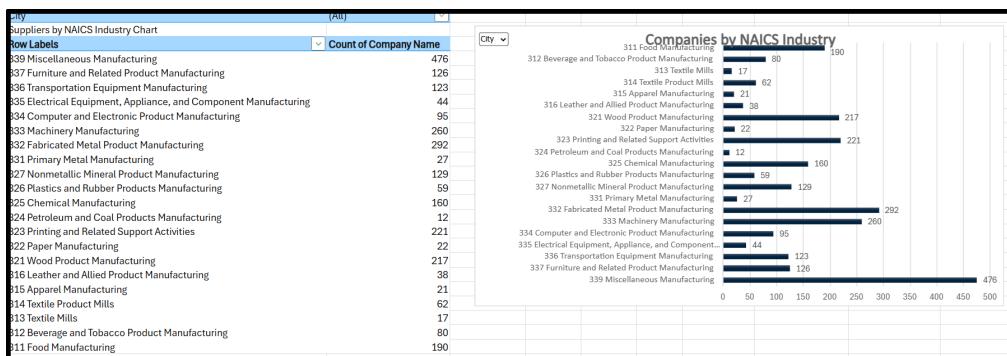


Image description: Updated graph categorization

Dashboard Key Additions

1. SIC Codes & Descriptions: Broader classification for international and historical comparison.
2. Headquarters Identification: Differentiates between local and branch facilities.
3. On-Time Delivery Rate (%): Assesses reliability and logistical performance.
4. Lead Time Efficiency: Evaluates production speed and responsiveness.
5. Order Fulfillment Accuracy: Measures precision in customer orders.
6. Growth Rate: Identifies expanding or declining businesses.
7. HS Codes & Trade Data: Connects state manufacturers to export activity and global trade metrics.

SIC Codes	SIC Description	On-Time Delivery Rate (%)	Lead Time Efficiency (Days)	Order Fulfillment Accuracy (%)	Growth Rate	Headquarters
3842	Orthopedic, Prosthetic, and Surgical Appliances and Supplies	94%	4	97%	10%	FALSE
3999	Manufacturing Industries, Not Elsewhere Classified	89%	6	94%	5%	FALSE
2759	Commercial Printing, Not Elsewhere Classified	91%	5	96%	7%	FALSE
3482	Small Arms Ammunition	92%	5	96%	8%	FALSE
3541	Machining Tools, Metal Cutting Types	95%	4	98%	11%	TRUE
3993	Signs and Advertising Specialties	90%	6	94%	6%	FALSE
3273	Ready-Mixed Concrete	89%	6	93%	5%	FALSE
2448	Wood Pallets and Skids	87%	7	91%	4%	FALSE
3444	Sheet Metal Work	90%	6	95%	7%	FALSE
3444	Sheet Metal Work	91%	5	96%	8%	FALSE
5712	Furniture Stores	88%	7	93%	5%	FALSE
3441	Fabricated Structural Metal	92%	5	97%	8%	FALSE
3599	Industrial and Commercial Machinery and Equipment, Not Elsewhere	93%	5	96%	9%	FALSE
3714	Motor Vehicle Parts and Accessories	95%	4	98%	12%	TRUE

Image description: Additional key features to the dashboard

Latitude	Longitude	Main Product(s)	HS Code(s)	HS Code Description(s)	Notes / Source Confidence	Exports? (Confidence & Source)
44.8869169	-97.0632687					
43.5484363	-96.7221053					
43.4795229	-96.7397423	Custom embroidered and screen-printed apparel	6109.10, 6110.20, 6217.10	Cotton T-shirts, Knitted or crocheted p	High – confirmed via company profile	<input checked="" type="checkbox"/> Likely – Apparel production often
44.1060005	-103.1505296					
44.07916156	-103.1580764	Press brakes & metal shears	8462.29, 8462.39	Bending/folding machines (other); St Press brake & shear manufacturer (I	<input checked="" type="checkbox"/> Yes – High (North American & a	
43.5522569	-96.7618205	Manufacture & maintenance of illuminated signs	9405.6	Illuminated signs	High	<input checked="" type="checkbox"/> Likely – Regional; some exports
43.543688	-96.727834	Ready-mixed concrete	3824.5	Non-refractory mortars and concrete Sioux Falls ready-mix producer.		<input checked="" type="checkbox"/> Likely – Low (local market)
44.1039524	-103.1405276	Wooden pallets	4415.2	Pallets, box pallets and other load ba	High – verified at acmepalletsd.com;	<input type="checkbox"/> Possible– Potential regional exp
44.111829	-103.1730375					
44.111829	-103.1730375	Sheet metal fabrication, ductwork, custom	732690	Other articles of iron or steel, n.e.s.o. sheet metal shop.	<input type="checkbox"/> Unknown — export not indicated	
44.3814745	-100.3027177					
43.3017674	-96.6269042					
44.1085157	-103.2713088	Custom machining and welding, OEM parts	732690, 761699	Other articles of iron/steel; Other art	custom machining & welding job sh	<input type="checkbox"/> Unknown — contract parts may
43.3017674	-96.6269042	Engine cooling systems & radiators	8708.91, 8419.50	Radiators; heat exchangers	High – company site	<input checked="" type="checkbox"/> Yes – Exports automotive parts

Image description: Additional Trading Data

BatchGeo Mapping

A BatchGeo map was embedded into the dashboard to visualize the geographical spread of manufacturers.

BatchGeo Map Description:

The map plots manufacturing company locations based on SIC and NAICS classifications. Each point is color-coded by industry, allowing users to identify regional clusters and growth zones. Clicking on a point reveals company details and trade styles, helping SDMTS visualize the distribution and density of manufacturing activity.

This interactive visual provides SDMTS with a clear picture of where manufacturing strength lies and supports regional analysis.

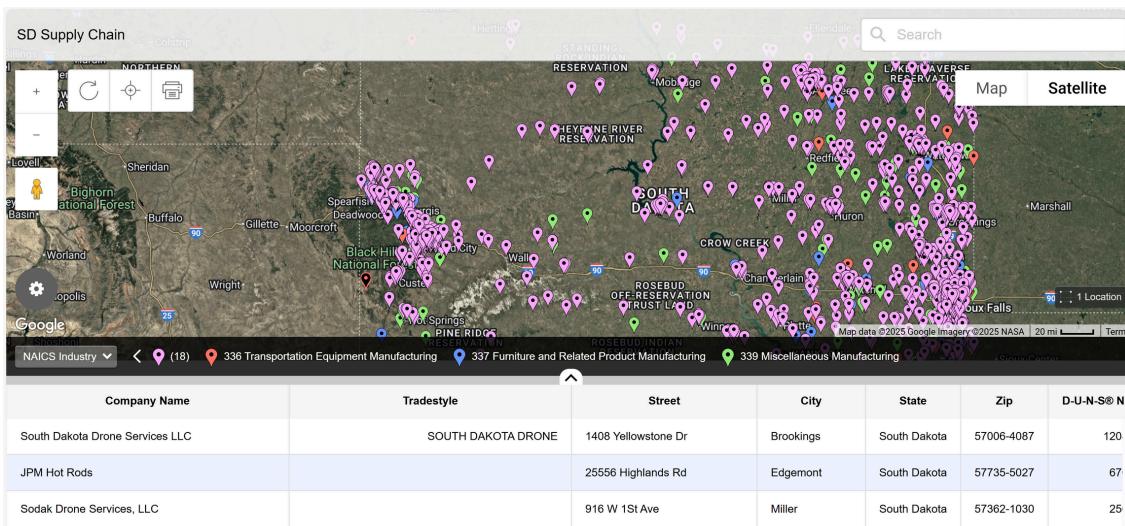


Image description: Map Visualization via BatchGEO

Gap Analysis

The enhanced BatchGeo and Power Map visualizations allowed our team to categorize South Dakota cities into three tiers based on the number of manufacturers located in each. These tiers provide a framework for identifying areas of opportunity and guiding economic development strategies.

Tier Breakdown:

Tier 1: 35+ companies (Sioux Falls, Rapid City, Watertown, etc.)

Tier 2: 15–34 companies (Belle Fourche, Harrisburg, Vermillion, etc.)

Tier 3: 14 or fewer companies (remaining towns)

Insights for Future Development

The gap analysis highlights both opportunities and risks:

- Medium-sized towns (Tier 2) represent a balance between infrastructure availability and growth potential.
- Geographic clusters reveal strategic advantages, but over-reliance on certain regions could create bottlenecks if supply chain disruptions occur.
- Integrating additional metrics, such as trade volume, workforce availability, and infrastructure capacity, can refine strategic planning and guide targeted economic interventions.

Overall, this gap analysis demonstrates how the enhanced dashboard and maps provide actionable insights for manufacturers, investors, and policymakers. By identifying underserved regions, industry clusters, and high-performing towns, SDMTS can leverage the tool to guide economic growth and strengthen South Dakota's manufacturing ecosystem.

Observations and Patterns

Geographic Clustering: Certain industries cluster near major interstates, such as Truck Trailer Manufacturing along I-29 or Transformer Manufacturing near wind farms north of Sioux Falls. These patterns indicate existing regional strengths and logistical advantages.

Underserved Areas: Some expected concentrations were not present. For example, explosives manufacturing exists only east of the Missouri River, despite significant mining activity west of the river. Similarly, Huron lacks Ready-Mix Concrete Manufacturing facilities, even though concrete demand is geographically widespread. These gaps represent potential opportunities for businesses to co-locate, fulfilling unmet regional demand.

Industry Distribution vs. Location Needs: By analyzing NAICS classifications against geographic locations, we can observe where critical industries are over- or under-represented. Industries with localized demand, such as concrete or specialized equipment, tend to be more evenly distributed, whereas industries tied to raw materials or transportation networks cluster strategically.

Policy Implications: Gap analysis provides valuable insight for state-level economic planning. Policymakers could incentivize new manufacturers to enter underserved regions, especially in Tier 2 or Tier 3 cities. For example, introducing tax credits, grants, or infrastructure improvements could attract suppliers for explosives, concrete, or other key industries.

WHAT'S FUTURE?

Web-Based Expansion: Integrating the tool as an extension of the SDMTS website to allow real-time data access, replacing the need for Excel-based updates.

Enhanced Visualization: Implementing interactive web dashboards with dynamic charts and geospatial layers for deeper insight and improved usability.

Comprehensive Database: Developing a detailed, dynamic data structure that provides a holistic view of South Dakota's manufacturing ecosystem, including SIC codes, HQ information, HS trade data, and supplier performance metrics.

Benchmark Towns: Selecting exemplary cities within each tier to serve as models for growth-oriented communities.

Expanded Supplier Metrics: Adding predictive analytics and risk-management indicators to better support decision-making.

Looking ahead, the proposed enhancements to the SDMTS dashboard offer opportunities for greater impact. A web-based platform with interactive, real-time data, a comprehensive database, benchmark towns, and predictive analytics would make the tool more dynamic and actionable. This project highlighted the importance of combining technical skills with strategic thinking, showing how data visualization and thoughtful design can guide decision-making, support economic development, and provide scalable, long-term solutions for South Dakota's manufacturing ecosystem.

CONCLUSION

The Excel Dashboard, Power Map, and BatchGeo Map provide South Dakota manufacturers with a practical tool for supply chain visualization, performance tracking, and strategic planning. By integrating SIC codes, headquarters information, HS trade data, and key supplier metrics, the tools help identify growth opportunities, evaluate supplier performance, and support data-driven decisions. They also offer insights for policymakers, highlighting underserved areas and industry gaps, which can guide infrastructure improvements and economic development initiatives. The project bridges academia and industry, giving SDMTS a strong foundation to advance the SCION initiative.

The team gained significant skills in AI, Python programming, web scraping, Excel automation, data visualization, and consulting practices while working under the guidance of Angela Allen and Dr. Dan Tracy. Overall, the enhanced dashboards and maps provide SDMTS and South Dakota manufacturers with scalable tools to visualize supply chains, uncover growth opportunities, and make informed strategic decisions, serving as long-term assets for the state's manufacturing sector.

Acknowledgments:

The Coyote Business Consulting team appreciates SDMTS and Angela Allen's support and guidance throughout the project. Their insights and collaboration were critical to the success of this project.