

From Point A to Point B: The Transportation and Logistics Cluster in Dakota County, MN

PA 5590 ECONOMIC COMPETITIVENESS FINAL PROJECT

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Introduction

In March 2014, the City of Rosemount, MN was selected through a competitive request-for-proposals process as the site for the 2014-2015 Resilient Communities Project (RCP), a university-community partnership between the University of Minnesota and a selected Minnesota community. Each year, the goals of the RCP are to find sustainable solutions to community problems by connecting university resources and expertise to local cities, businesses and organizations in Minnesota. As part of the selection process, the City of Rosemount identified 40 projects of interest focused on housing, community engagement, parks and recreation, energy and green technology, water management, transportation and land use, and economic development. One project of interest to the City of Rosemount was the industry cluster environment in Dakota County, in which Rosemount is located.

Through semi-structured interviews and secondary data collection, transportation and logistics emerged as a key industry cluster in Dakota County. The following report presents the findings from the Dakota County cluster study and identifies policy recommendations to leverage the county's competitive advantages.

Background

Dakota County is located in the southeast corner of the Minneapolis-St. Paul Metropolitan Area. Originally inhabited by the Dakota Indians, fur traders entered the land in the late seventeenth century and proclaimed it for themselves, forcing tribes off the land. In 1849, nine years prior to the establishment of Minnesota's statehood, the Minnesota Territorial Legislature established nine original counties, including Dakota County. Since its founding, Dakota County has experienced rapid population growth and is currently the third most populous county in Minnesota with 153,160 households and 408,509 residents (United States Census Bureau, 2014). Though known for its substantial agricultural lands, Dakota County maintains land uses of one third urban, one third suburban, and one third rural. The county is bordered by both the Mississippi River on the north and the Minnesota River on the east, creating unique geographic positioning within the state.

Demographic information for Dakota County residents is quite similar to other counties within the larger, seven-county Minneapolis-St. Paul Metro area and the state as a whole. While just over 32% of Minnesotans hold a bachelor's degree or higher, 39% of Dakota County residents hold such a distinction. Dakota County also has a higher percentage of residents with high school diplomas than both

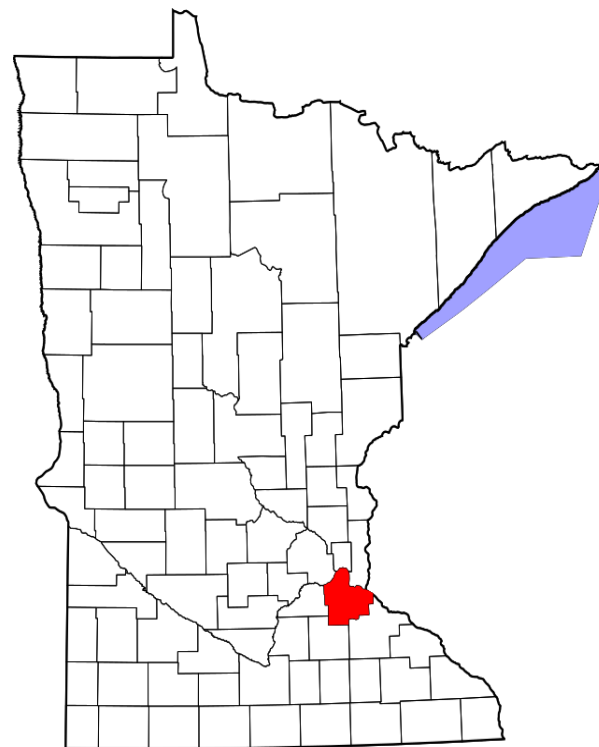


Figure 1

the state and nearby metropolitan Hennepin County. Nearly 11% of its population hold associate's degrees - a significant percentage of residents, especially relevant when considering the potential labor market needs of a transportation and logistics cluster within the county (United States Census Bureau, 2014).

Within Dakota County, there are 11 traded industry clusters as identified by the U.S. Cluster Mapping site. Those clusters with the largest employment figures, which include marketing (8,590), insurance (4,640), information technology (1,730), plastics (1,720), and transportation (4,930), are also ranked highly for their levels of specialization. The five clusters mentioned above are ranked among the top 5% in cluster strength of the over 3,000 counties in the United States analyzed by the cluster mapping tool. Dakota County's transportation and logistics cluster ranks as the 59th strongest in the country. Its marketing cluster and insurance services clusters rank 25th and 96th respectively (US Economic Development Administration, 2014).

History of Transportation and Logistics in the Region

The development of transportation and logistics has a long and vibrant history in Minnesota. Early settlers took advantage of natural resources in the area, most notably the Mississippi River, to begin specializing in industries such as fur trading, logging, farming and mining. Shortly after statehood in 1858, the Minnesota Legislature began to pass laws to guide townships in infrastructure development, with special attention paid to road and bridge building. From 1871-1905 the creation of a Railroad and Warehouse Commission allowed the state to develop policies and procedures for railway operation, established safety and handling regulations, and actively monitored

railway activity to ensure compliance. Throughout the years, federal legislation was passed and amended to further develop the state's roadway, rail, and air transportation systems (Minnesota Department of Transportation, n.d.).

Today, the Minneapolis-St. Paul (MSP) region is the epicenter of business and trade in the upper Midwest and is positioned behind Chicago and Detroit for the largest economy in the entire Midwest. The Twin Cities are home to 18 Fortune 500 companies and a thriving network of nonprofit organizations that greatly enhances the social and economic fabric of the region. These assets make MSP an attractive place to do business, thus making the region an important part of many global supply chains. While MSP's expansive transportation infrastructure and systems have historically supported the region's industries, freight transportation and emerging logistics industries continue to be major businesses on their own. The MSP region is ranked 5th nationally for both transportation infrastructure and business and was identified as a top ten logistics-friendly area by *Logistics Today* in 2006 (Cowell, 2010).

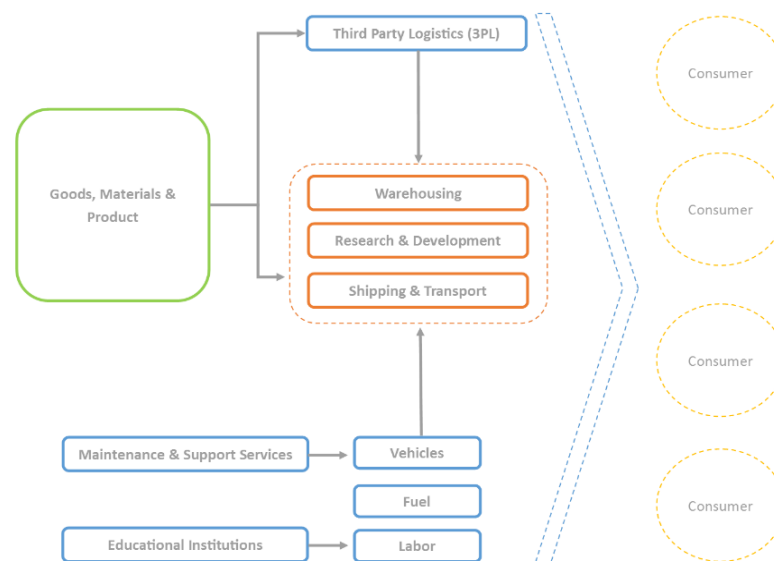
What is a Logistics Cluster?

As seen in Figure 2, there are many components that comprise the value chain for a transportation and logistics cluster. Such a cluster would not exist were it not for the demand for transport of goods, materials, and products, or even the existence of goods, materials, and products themselves. Operation of the cluster involves shipping and transport, research and development, and warehousing. These three operations are supported through essential support activities that can involve third party logistics services and the supply of vehicles, fuel, and labor.

Although typically seen as a support service, logistics-related firms receive benefits from locating in close geographic proximity in the same way that more traditional industry clusters do. Likewise, there are similar components necessary for the creation, survival, and growth of a logistics cluster including: a central location, sound transportation infrastructure, skilled workforce, and demand for the transport of goods either as factors of production, or the results. However, the logistics and transportation industries face certain unfamiliar challenges as well.

The reason for the existence of a logistics cluster lies primarily in the study of transportation economics and supply chain practices.

Figure 2: Dakota County Transportation and Logistics Value Chain



With the rise of globalization, the difficulties included in the movement of goods from producer to consumer are more complex than ever, and in recent years logistics and supply chain management have become an increasingly important area of study. Some of the largest firms in these clusters specialize in distribution, such as United Parcel Service (UPS) and FedEx Corporation. In fact, the location of FedEx's primary base of operations in Memphis, Tennessee has spawned a veritable cottage industry of local logistics-related

services. Some large producers or retailers keep many logistics services in-house through the construction of distribution centers in carefully selected, centrally located sites throughout the company. Smaller firms might choose to rent out space in one or more strategic logistics parks. Even then, however, these businesses will generally contract with transportation services – be it air, rail, water, or truck – to actually move the goods. Warehousing firms become necessary to store the goods at the beginning, end, or intermediate stops along a product’s journey to its consumer. For producers unwilling or unable to engage this complex network of relationships, they may choose to contract a third-party logistics firm (3PL), which will manage these services for them, as well as provide other services, such as facilitating customs at border crossings.

Defining what businesses do and don’t belong in a cluster is difficult. The U.S. Cluster Mapping site identifies 5 main subclusters in the transportation and logistics cluster, including: trucking, ground transportation support activities, bus and air transportation, and specialty air transportation. It is important to note the critical distinction in determining location quotients for sectors, which are identified by NAICS codes, and for clusters, which are not identified by industrial classification systems. However, clusters are comprised of subclusters, which often can align with NAICS code-classified

**Location Quotients of Transportation and Warehousing
Bureau of Labor Statistics, 2012
Dakota County, MN**

U.S. Total = 1.00

	MN Total	Dakota Co. vs MN Total	Dakota Co. vs U.S. Total
NAICS 48-49 Transportation and warehousing	0.86	2.07	1.79
<i>NAICS 482 Rail transportation</i>	2.57	-	-
<i>NAICS 484 Truck transportation</i>	0.87	2.25	1.95
<i>NAICS 48412 General Freight Trucking</i>	0.91	2.66	2.42
<i>NAICS 485 Transit and ground passenger transportation</i>	1.51	1.35	2.05
<i>NAICS 4859 Other ground passenger transportation</i>	1.14	2.76	3.14
<i>NAICS 488 Support activities for transportation</i>	0.54	3.21	1.72
<i>NAICS 4885 Freight transportation arrangement</i>	0.69	5.58	3.84
<i>NAICS 4921 Couriers and express delivery services</i>	0.90	2.78	2.50
<i>NAICS 493 Warehousing and storage</i>	0.43	1.01	0.44

TABLE 1

industries. But this is not always the case. For example, the Transportation and Logistics cluster in this paper includes trucking transportation (NAICS code 484), warehousing (493), rail transportation (482), and transportation support industries (488). In order to determine those industries that comprise the cluster, an initial identification of industries, possibly pertinent to a Transportation and Logistics cluster, and with LQs higher than 2.0, was conducted.

Seven of the nine subclusters and related industries, seen in Table 1, have high levels of specialization (>2), and a few are extremely specialized compared to the rest of Minnesota (Support Activities for Transportation [3.21] and Freight Transportation Arrangement [5.58]).

Transportation of goods tends to come in two forms: direct operations and consolidated operations. In direct operations, the carrier takes the shipment directly from the pick-up location to the delivery location via one conveyance carrying only the single shipment. It acts as the single cost-bearer and chooses the most direct route, much like a taxi. Consolidated operations, on the other hand, act more like a bus. In this strategy, a carrier picks up multiple shipments in a local region, consolidates them to share a larger conveyance for the trip, and then makes multiple deliveries in the destination region. Consolidated operations require much more integration and communication between producers and shippers. It is in a producer's interest to share a truck bed if he cannot fill it alone (known as LTL or less-than-truckload) in order to lower transportation costs. Likewise, it is in a shipper's best interest to fill her space with multiple types of goods because she can charge more while keeping her costs steady because nearly all cost factors of shipping are fixed regardless of fullness (Sheffi, 2012).

Many companies with similarly located distribution centers will collaborate horizontally and share conveyances to maximize these incentives for teamwork. Often, these shipper-shipper relationships will encourage distribution centers to locate in a logistics hub or park where even more spillover benefits can be extracted from reduced infrastructure costs, knowledge sharing, and increased coordination. Although a logistics park is the most apparent (and most efficient) physical manifestation of a logistics cluster, it is by no means a prerequisite for a cluster's existence – collaboration still can and does take place even in a more decentralized model.

Economic Conditions

The Minneapolis, MN Economic Area ranks 28th of 179 economic areas in prosperity with a GDP per capita of \$47,533, representing a 1.32% growth rate from 1998-2013. Since 1998, the Minneapolis Economic Area has experienced a .51% growth rate in employment, with a current unemployment rate at just over 5%. The Minneapolis Economic Area has also experienced a 3.05% growth rate in innovation, ranking 15th among U.S. Economic Areas (United States Census Bureau, 2014).

Since the economic downturn in 2008, many Minnesota industries that rely heavily on transportation and logistics have shown faster growth compared to the U.S. overall. These industries include mining, agriculture, and manufacturing. Minnesota is ranked seventh among U.S. states for exports, accounting for 4.4% of the U.S. total. Additionally, the U.S. Department of Transportation anticipates a 61% increase in freight tonnage from 2010 to 2040, increasing from 17 billion tons to 27 billion tons. However, Minnesota's shipping infrastructure has come under fire in recent years. For instance, after a long decline in investments, Minneapolis' Upper Mississippi Harbor, with its outdated infrastructure, is set to close in December 2014 (Associated Press, 2014). The current inefficiencies of the harbor have delayed state highway construction projects, and the closure is

expected to place additional burdens on ground and rail freight. Because freight transportations are often multimodal, inefficiencies or cost shifts in one system directly impact others.

Like most industries, transportation and logistics were significantly impacted by the economic downturn of 2008, and like most, they are recovering steadily (Figure 5). Between 2007 and 2009, total employment figures dropped for transportation and logistics in Dakota County nearly 3% - a loss of 118 jobs. However, between 2009 and 2011, employment in the sector grew nearly 10%, with employment numbers surpassing pre-recession totals. Employment figures continued to grow, and by 2012, 500 more people were employed in transportation and logistics than at the height of the recession. Since 2011, employment figures have remained relatively stable (US Economic Development Administration, 2014).

Equally important to employment figures in assessing a cluster's strength is its location quotient (LQ) value. The LQ for transportation and logistics industries has been relatively stable over the past decade - and in fact, the transportation and logistics cluster in Dakota County is more than twice the concentration of the base region,

indicating significant specialization (Figure 4). In 2008, mirroring the supporting industries' responses to the recession, the LQ dropped to 1.57; however, corresponding with trends in employment, the LQ has increased or remained stable from 2009 through 2011, hovering around 1.85, and since 2012, around 2.0. . Since 2008, the transportation and logistics cluster has experienced 46% change in LQ and is behind Hennepin County for highest real employment (Figure 3).

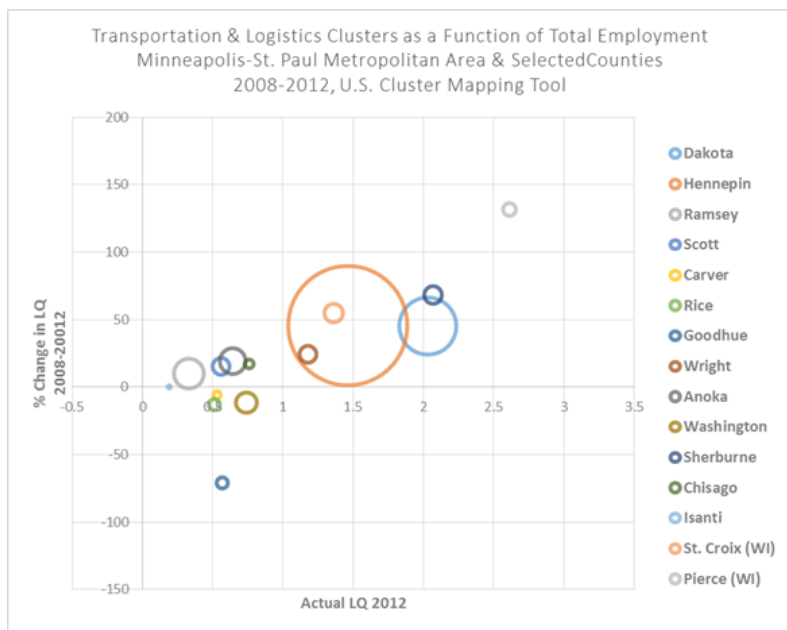


FIGURE 3

Changes in the Location Quotient of the Transportation and Logistics Cluster in Dakota County from 2007 to 2012

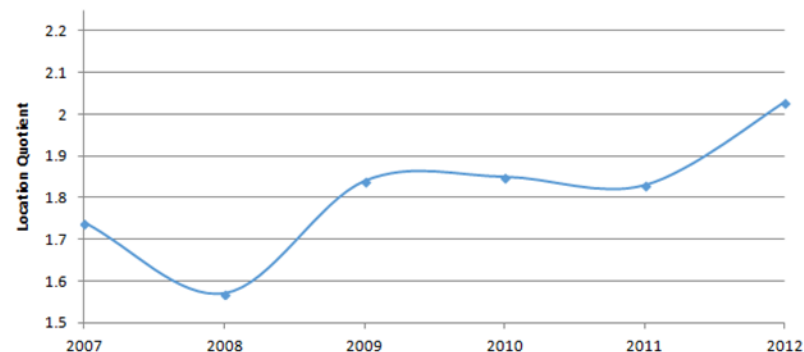


FIGURE 4

Changes in Employment in the Transportation and Logistics Cluster in Dakota County from 2007 to 2012

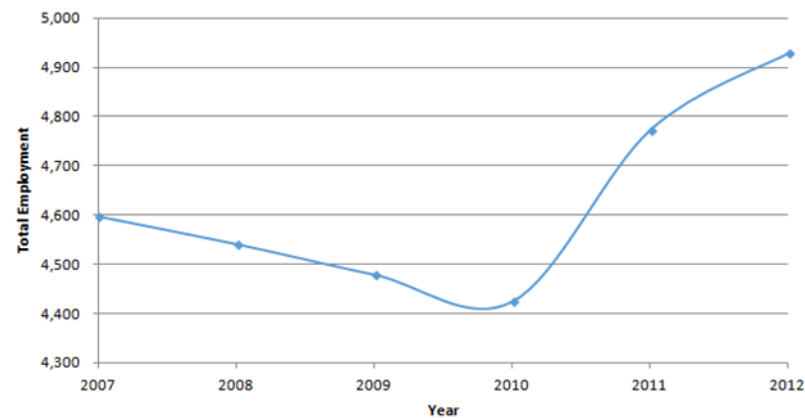


FIGURE 5

Porter’s Diamond of Advantage

Michael Porter, the father of modern cluster study, developed the Diamond of Advantage Model, which has become the standard of cluster analysis. . The Diamond addresses four aspects of the cluster: factor conditions, demand conditions, related supporting industries, and firm structure, strategy, and rivalry (Figure 6). The role of government, as well, is necessary to understand the growth of any cluster, and is included in the following analysis. The diamond model can also include elements of chance, some of which are synonymous with Dakota County’s factor conditions. In the following section we will apply Porter’s model to the Dakota County transportation and logistics cluster and use conclusions drawn from the diamond to inform our policy recommendations.

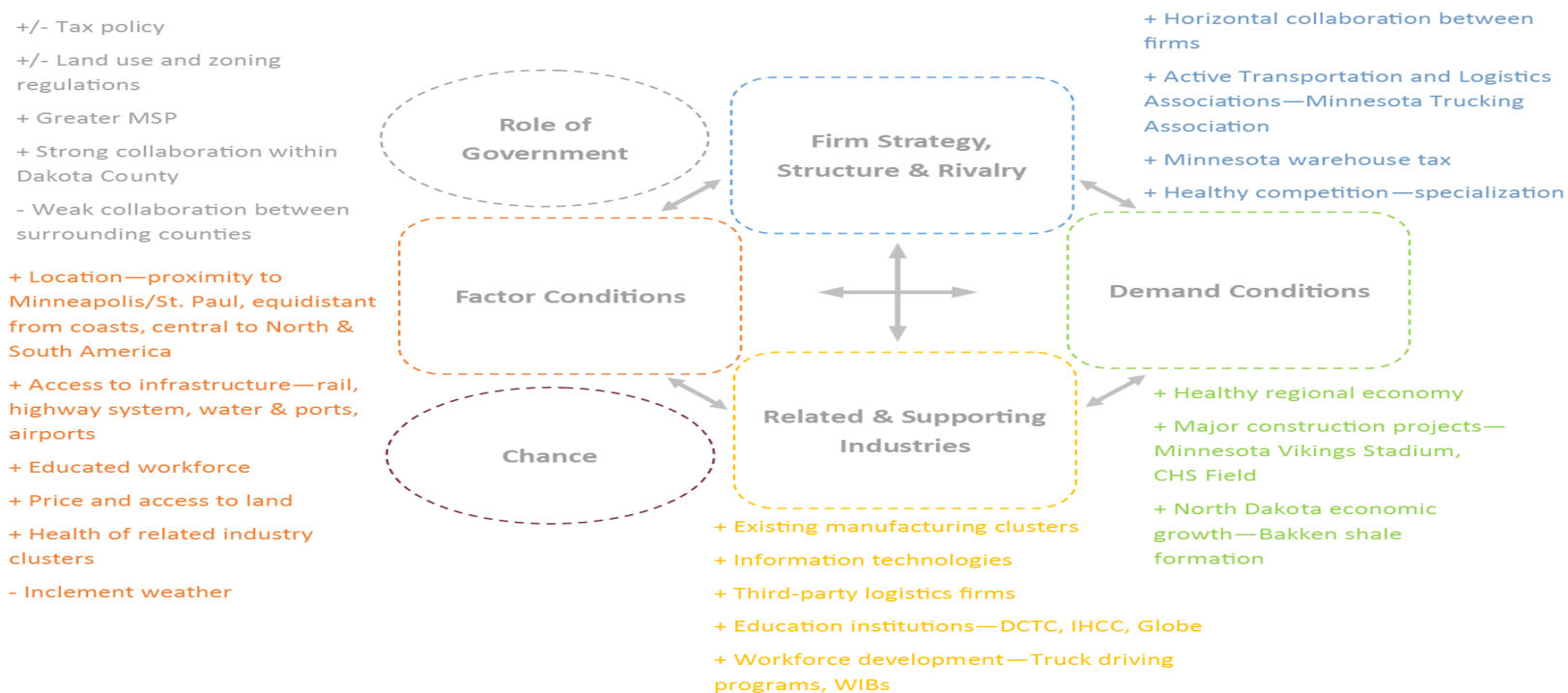


FIGURE 6: MICHAEL PORTER’S DIAMOND OF ADVANTAGE FOR TRANSPORTATION AND LOGISTICS, DAKOTA COUNTY, MN

Factor Conditions

There are six major factor conditions relevant to the transportation and logistics cluster, as seen in Figure 6. The first, location, plays a major role in the competitiveness of the Midwest in general and of Dakota County more specifically. The county, as part of the greater Minneapolis-St. Paul Metropolitan Area, enjoys a relatively equidistant position from both the East and West Coasts and, like St. Louis, can be seen as a gateway to the Upper Midwest for the country. Because of its position, Dakota County is included in the Central Time Zone, allowing for communications with businesses in the Eastern, Mountain, and Pacific Time Zones with minimal disturbances to traditional workday schedules. This is an especially important advantage when considering a transportation and logistics cluster, which requires extensive coordination among local firms, and among firms across the country as well. The county's location in regards to physical infrastructure also provides it with a competitive advantage. Dakota County is located near one of the most important Dakota County also enjoys access to the national highway system, including the U.S. Interstate Highways 494 and 35 - the latter of which connects much of Minnesota to the shipping hubs in Kansas City and Dallas before branching out to Central Mexico and the key port of Houston. Underground pipelines pump oil from the Upper Midwest and Canada to Rosemount's Flint Hills oil refinery.

freight corridors in the U.S. connecting the Great Northern Corridor and connecting the Midwest to the Asian import/export market through the Pacific Northwest. For travel times by mode from Dakota County to select logistics clusters, see Table 2 on the next page.

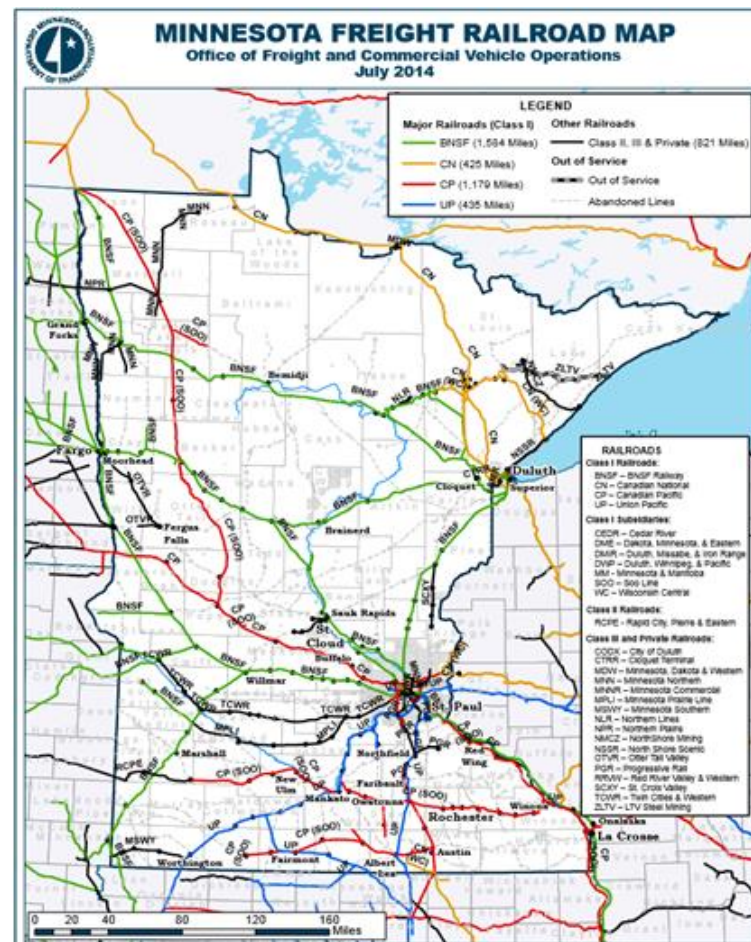


FIGURE 7

The local cluster also has access to an extensive local highway system, with a dozen state highways and two major U.S. Highways. In addition to a highly developed highway system, Dakota County is home to a system of Class I railroads, which includes BNSF and Union Pacific railways, and Class II, III, and smaller private railroads including locally-owned Progressive Rail (see Figure 7). Although Dakota County does not have a port on the Mississippi River, its close proximity to the busy Port of St. Paul allows it to capture some of the benefits of multimodality.

Perhaps one of the greatest infrastructure-related advantages afforded to Dakota County is nearby MSP International Airport. Though it is located in neighboring Hennepin County, MSP lies just on the border of Dakota County, with spillover benefits for both logistics and employment crossing county lines. The airport, which has undergone significant expansions since its first terminal was constructed in 1958, is consistently ranked as one of the top 20 busiest airports by aircraft movements in the world. MSP provides non-stop flights to 135 markets, including 114 domestic and 20 international




From Dakota County					What's there?
Travel time to: (in approximate hours, unless noted otherwise)	Chicago	8	1.5	n/a	3 rd largest intermodal port in the world; 6 Class 1 rail connections
	Memphis	12	2	2 weeks	World's largest cargo airport, major FedEx logistics hub
	Louisville	14	2	n/a	UPS Headquarters
	Bakken Oil Fields	9	2	n/a	Emerging market
	Winnipeg	7	1.5	n/a	<u>CentrePoint</u> Canada, the county's only foreign trade zone and tri-modal inland port
	New York City	19	2.5	n/a	Largest port on the East Coast
	Los Angeles	28	3.5	n/a	Nation's busiest port
	New Orleans	17	2.75	3 weeks	World's busiest port complex; 6 Class 1 rail connections

TABLE 2

Note: Freight rail times were not included because of their relatively higher susceptibility to variables, including assigned priority of shipment, sensitivity of commodity being delivered, rail yard congestion, etc. They generally, however, fall in the middle of the range of freight mode transit times – a quicker option than trucking, but slower option than barges.

markets and its cost to airlines per enplaned passenger is nearly half the national average (MSP Airport, 2013).

Although MSP's passenger flow ranks very high nationwide, its freight flow is substantially lower. This is not due to a lack of capacity; the airport has been the site of massive capital improvement projects, including renovations completed in 2009 that enabled all four runways to bear the 150% of the weight of the world's heaviest cargo plane. Nearly all of MSP's freight consists of small packages handled by FedEx and UPS, both of which have dedicated on-site facilities. Packages from small cargo planes are flown out from minor regional hubs in the Upper Midwest, land at MSP throughout the day, are sorted on-site, and depart on large carrier planes to Memphis or Louisville respectively in the early evening.

MSP's lack of air freight is largely a function of the composition of the Minnesota economy. Natural resources and agricultural products are better suited to rail or barge transport. Manufacturers of small devices, including Medtronic, prefer to ship their products overnight by truck to Chicago O'Hare International Airport for long-range flights. This setup is comfortable for regional manufacturers, who met attempts by MSP to get regular flights to Hong Kong and Frankfurt unenthusiastically.

Though the region's centrality provides it a competitive advantage, its location unfortunately also provides a very distinct disadvantage that cannot be ignored. This Upper Midwest region is especially vulnerable to inclement weather – significant amounts of precipitation and cold weather during winter months can create hazardous traveling conditions and significantly impact transportation times. The logistics industry places a huge emphasis on consistency, and the unavoidable weakness of the climate in that regard should be regarded as a major concern. However, it also presents the cluster with a unique opportunity to tailor its strategies, particularly those regarding research and development.

In addition to Dakota County's physical infrastructure, its residents present an important factor condition. The County is home to a relatively highly educated workforce. Nearly 39% of Dakota County residents have earned a bachelor's degree or higher, and 11% of its population have associate's degrees - figures similar to those of neighboring counties within the Metro area. While Dakota County may not have a significantly higher proportion of residents with these levels of education attainment than other counties, it still has a large percentage of residents with education levels appropriate for the potential labor market needs - both blue and white collar - of a transportation and logistics cluster.

Another key advantage in Dakota County is provided by both the price and availability of its land. In the county, land is less expensive than in many other parts of the Metro, and, perhaps more importantly, there is significant land available for development - an opportunity not provided in other areas of the Metro where earlier development has already consumed desirable parcels.

Dakota County is home to thriving industries in the greater Minneapolis-St. Paul Metro Area that require transportation and logistics services. Some of the Metro’s traded clusters with the highest location quotients and largest number of employees, like food processing and manufacturing, printing services, medical devices, construction products, lighting and electrical equipment, upstream metal manufacturing, and paper and packaging, need require transportation and logistics services to transport the materials to make their products and to get finished products to market. Dakota County itself also has clusters that support a transportation and logistics cluster, including: apparel, furniture, footwear, paper, and metal manufacturing as seen in Figures 8 and 9. A comprehensive list of clusters can be found in Table 8 in the appendix.

Major Industry Clusters in Dakota County by Location Quotient

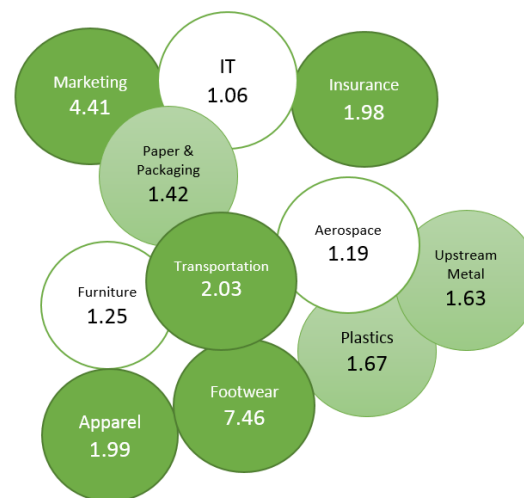


FIGURE 8

Major Industry Clusters in Dakota County by Employment

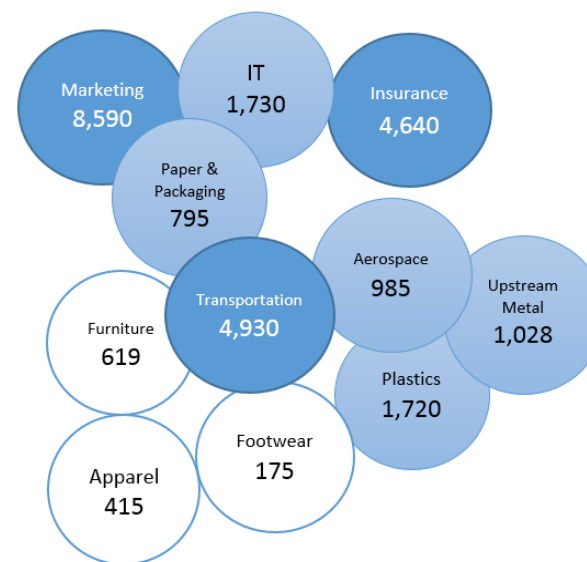


FIGURE 9

Demand Conditions

The demand conditions for a transportation and logistics cluster are unique. Because the cluster does not create a product, but rather *transports* a product, demand conditions are almost entirely dependent on the health of the overall economy and on the health of client industries, which is impacted by the demand conditions within those client industries. A successful transportation and logistics cluster, then, is largely dependent on the need for both exports out of and imports into the Minneapolis-St. Paul Metro area and its surrounding areas. Whether they are final products for sale, raw materials, or production materials for further assembly, imported and exported goods rely on efficient, effective, and developed transportation and logistics systems.

Though the region was not immune to the Great Recession and the impacts that it had on most industries, the Minneapolis-St. Paul metropolitan area has since rebounded, experiencing significant economic growth. Minneapolis's unemployment rate of 4.1% is substantially lower than that of nearby cities Chicago, Milwaukee, and Indianapolis. The area's median income is one of the highest in the nation, and surpasses that of Chicago, Los Angeles, and New York (Belz, 2013). As the state's dominant economic force, the metro area

Dakota County Transportation and Logistics Cluster's Competitive Position	
Advantages	Disadvantages
Extensive highway system and connections	Congestion on Interstates 35W and 35E
Proximity to MSP International Airport	½ mile spacing regulation for development
Diverse labor force	Insufficient number of blue collar workers
Diverse range of housing options for employees	Strip development (as opposed to node development)
More amenable taxes than in nearby Bloomington and Eden Prairie	Permanent agricultural zoning in the south
	Single user 12,000 square foot facilities only available in the north
	Development and land costs are high for manufacturing

TABLE 3

has driven Minnesota into the fifth-fastest growing state economy in the country as recently as 2012 (United States Census Bureau, 2014).

Local, large-scale construction projects have also increased the demand for transportation and logistics services. The Minnesota Vikings Stadium in downtown Minneapolis and CHS Field, the St. Paul Saints' Stadium in Lowertown, St. Paul, are two massive construction projects that require significant amounts and various types of materials to be brought into the region.

The Bakken shale formation-induced economic boom in North Dakota has also impacted demand conditions for Minneapolis-St.

Paul. Because so many people moved to the Bakken region so quickly, and because the area’s economy remains largely undeveloped, demand for imported goods and services has skyrocketed.

Minneapolis-St. Paul, one of the largest metro areas closest to the Bakken, has benefitted greatly from its proximity, as many North Dakota residents and businesses rely on the Twin Cities’ market.

Accompanying this increase in demand for goods, however, is the burden placed on the area’s infrastructure caused by the increase in its use. Not only does the need for imported goods for residents in the Bakken region impact infrastructure, but Bakken oil extraction, production, and transport processes themselves are having significant effects. According to David Christianson of the Minnesota Department of Transportation, 30 million tons of fracking sand from Minnesota and Wisconsin are transported to the Bakken region annually. Between 9 and 10 trainloads of oil, 70% of which move through Minnesota, are produced in the region daily (Christianson, 2014). Both the transport of sand into the region and of oil out it can displace significant amounts of traffic and pose considerable risks along roadways.

Firm Strategy, Structure, and Rivalry

Because cluster definition and categorization requires a level of interaction between related firms, the industry structure and

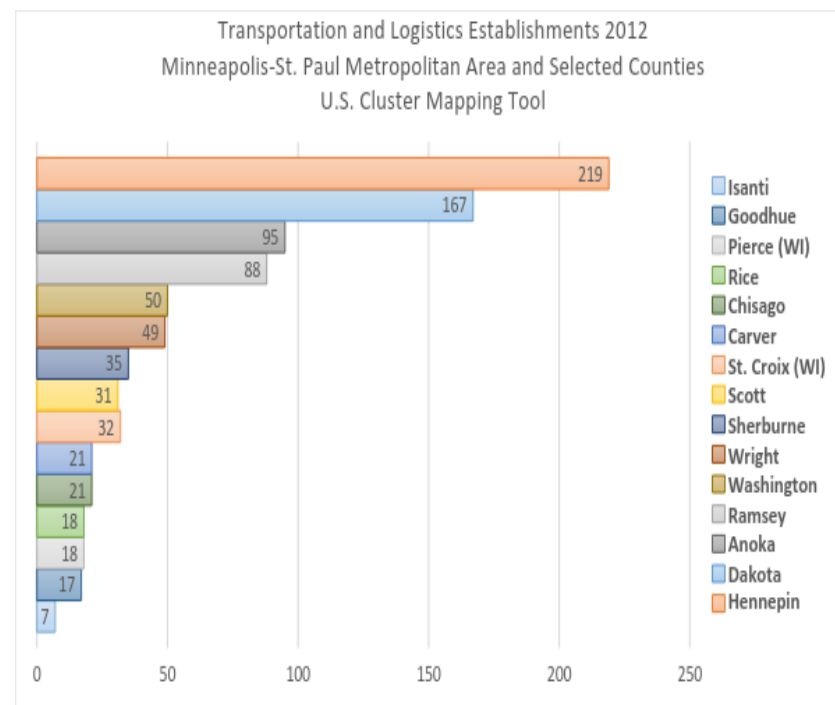


Figure 10

organization can go a long way towards explaining the successes or failures of a cluster. Although Dakota County’s logistics firms are unquestionably linked, their formal association remains limited. The Minnesota Trucking Association, a member organization comprised today of more than 675 member trucking companies, aims “to promote a positive image of the trucking industry, encourage safe and responsible transport of essential goods, and create an economic and political environment that allows for fair competition.” (Minnesota Trucking Association, 2014) The Association, founded in

1932 and headquartered in Roseville, MN, has become a very successful state lobbying group, giving its support to policies that promote highway safety, the economic success of trucking, and environmental goals (Minnesota Department of Revenue, 2014). Members share membership with the related Minnesota Warehouse Association. The MTA and MWA both played a critical role in securing the repeal of the Minnesota Warehouse Tax, which presented a major threat to the trucking and warehousing industries.

The Minnesota Warehouse Tax was slated to go into effect on April 1, 2014. It would have subjected business-related storage and warehousing services to a sales and use tax of 6.5%, in addition to any existing local sales tax, “due when a business buys storage or warehouse services for its tangible personal property.” It would have also charged an “added value” charge to separate products assembled for further delivery (Minnesota Department of Revenue, 2014). All told, projected revenues were more than \$100 million over its first two years. The Warehouse Tax, however, was repealed before going into effect, when Governor Dayton signed a tax reform bill in late March of 2014 after an extended lobbying effort from the MTA, MWA, and other various stakeholders. This remains one of the crowning achievements of the MTA and MWA, and while important, highlights the fact that it may take an existential threat to motivate both groups’ members to act. There is still much unexplored space for

more formal collaboration – a notion we will return to later in this paper.

Logistics-Related Firms in Dakota County

Dakota County is home to a variety of logistics-related firms and, in fact, is second only to Hennepin County as the county with the highest number of establishments (Fig 10 on the previous page). Table 4 on the next page provides a snapshot of the local warehousing and trucking components of the cluster, while Figure 11 depicts the spatial distribution of firms. The varied width and breadth of firms is beneficial for a logistics cluster. Smaller trucking firms are more likely to pair up with a small producer while the larger trucking firms are more likely to contract with larger producers. Moreover, as the quantity and quality of carriers expand, firms are likely to specialize in technology, destinations, or services in an effort to distinguish themselves from the competition. Cloverleaf Cold Storage in Eagan, for example, tailors its facilities for meat and produce.

The competition extends beyond carriers and even becomes a force between modes. Cargill, the international food conglomerate headquartered in neighboring Hennepin County, plays the barges and the trucks off of one another. It ships half of its grain from Minnesota to Memphis on barge down the Mississippi River and half by truck, depending on the price fluctuations.

Sample Trucking Firms in Dakota County				
Company Name	Establishment Date	Location in Dakota County	Areas of Expertise and Services Provided	Number of Employees
Alexander's Mobility Services	1953	Eagan	Focus on moving services for corporations, homes, government/military, commercial, and international relocation	250+
Eilen and Sons Trucking	1985	Hampton	Focus on dry bulk and liquid transportation services	55
FedEx Freight	2017	Proposed in Lakeville		250
Knight Transportation	1990	Eagan	Focus on dry, refrigerated and brokerage transport services	4,000+ (nationally)
Taylor Truck Line, Inc.	1957	Northfield	Dry van and flatbed operations.	250-499
YRC		Burnsville		250-499

Sample Warehousing Firms in Dakota County				
Company Name	Establishment Date	Location in Dakota County	Areas of Expertise and Services Provided	Number of Employees
CF Industries, Inc.	1946	Rosemount	General warehousing: bulk, dry, agricultural products, fertilizer and non-fertilizer products	37
CHS, Inc.	1929	Inver Grove Heights	General warehousing: agricultural products	70
Citi-Cargo and Storage, Inc.	1985	Eagan	General warehousing: short and long term and temperature controlled	20
Cloverleaf Cold Storage Co.	1952	Lakeville	Refrigerated warehousing: cold storage, food grade ambient temperature storage, and food processing facilities	40
Iron Mountain, Inc.	1952	South St. Paul	Special warehousing: document storage, processing, and shredding	50

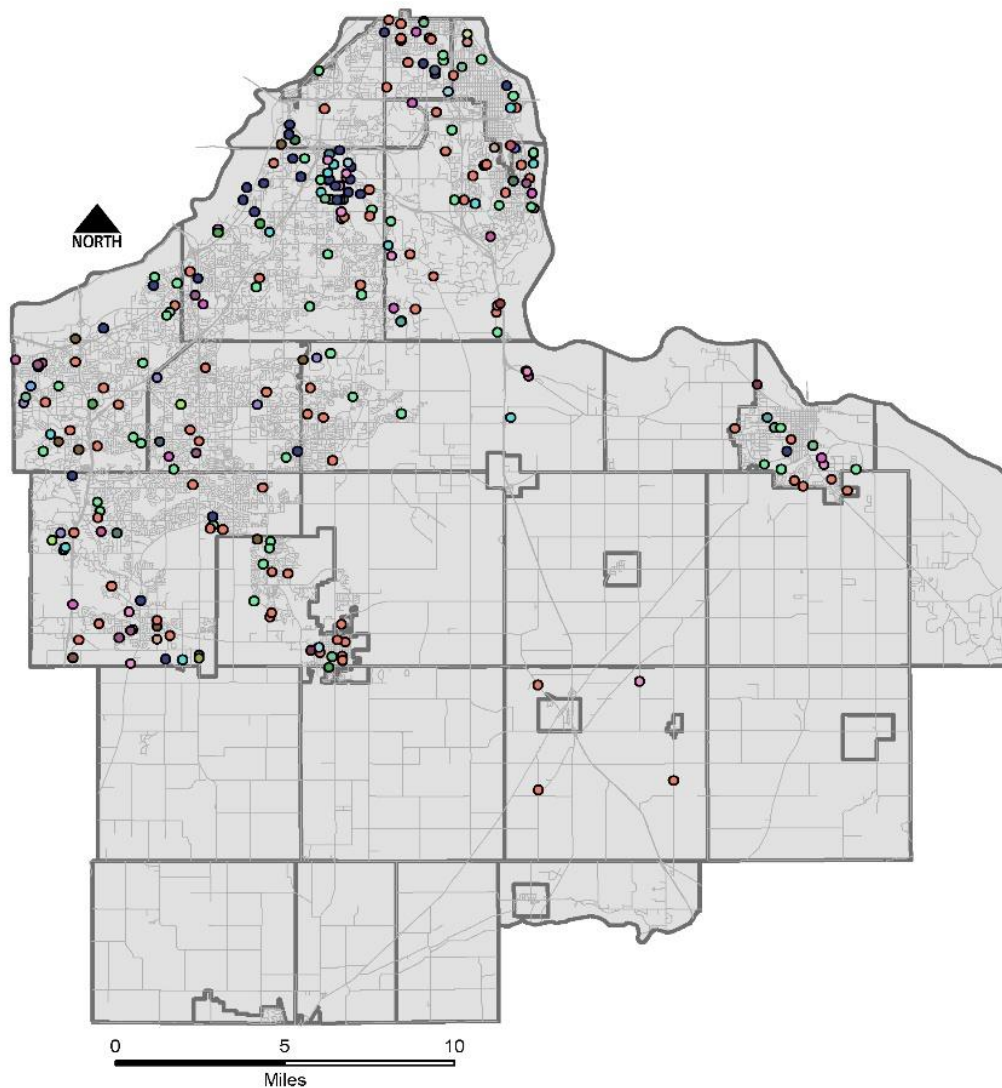
Regional Competitors

While we have covered some of the advantages in Dakota County's factor conditions and demand conditions, the cluster's strength also lies in the competitive position of the Twin Cities. For example, when FedEx chose to move its base of operations from Little Rock in 1981, it chose Memphis rather than Minneapolis. In Memphis, FedEx had unprecedented access to a major freight airport,

an incredibly central location, proximity to more integral freeways, a healthy port on a major shipping channel, agreeable weather, and a welcoming local government. While the Minneapolis area may not be able to compete with Memphis, it can still find great success as a regional hub for the Midwest - and Dakota County is a promising location for cluster development

Figure 11

Transportation and Warehousing Firms (NAICS 48-49) Dakota County, Minnesota



NAICS Categories

- AIR TRAFFIC CONTROL
- ALL OTHER SUPPORT ACTIVITIES FOR TRANSPORTATION
- ALL OTHER TRANSIT AND GROUND PASSENGER TRANSPORTATION
- BUS AND MOTOR VEHICLE TRANSIT SYSTEMS
- CHARTER BUS INDUSTRY
- COURIERS
- FREIGHT TRANSPORTATION ARRANGEMENT
- GENERAL FREIGHT TRUCKING- LOCAL
- GENERAL FREIGHT TRUCKING- LONG-DISTANCE- TRUCKLOAD
- GENERAL WAREHOUSING AND STORAGE
- INLAND WATER FREIGHT TRANSPORTATION
- LIMOUSINE SERVICE
- LINE-HAUL RAILROADS
- LOCAL MESSENGERS AND LOCAL DELIVERY
- MARINE CARGO HANDLING
- MIXED MODE TRANSIT SYSTEMS
- MOTOR VEHICLE TOWING
- NAVIGATIONAL SERVICES TO SHIPPING
- OTHER AIRPORT OPERATIONS
- OTHER NONSCHEDULED AIR TRANSPORTATION
- OTHER SUPPORT ACTIVITIES FOR AIR TRANSPORTATION
- OTHER SUPPORT ACTIVITIES FOR ROAD TRANSPORTATION
- OTHER WAREHOUSING AND STORAGE
- PACKING AND CRATING
- PIPELINE TRANSPORTATION OF CRUDE OIL
- PIPELINE TRANSPORTATION OF NATURAL GAS
- PIPELINE TRANSPORTATION OF REFINED PETROLEUM PRODUCTS
- POSTAL SERVICE
- REFRIGERATED WAREHOUSING AND STORAGE FACILITIES
- SCHEDULED FREIGHT AIR TRANSPORTATION
- SCHEDULED PASSENGER AIR TRANSPORTATION
- SCHOOL AND EMPLOYEE BUS TRANSPORTATION
- SPECIALIZED FREIGHT (EXCEPT USED GOODS) TRUCKING- LOCAL
- SPECIALIZED FREIGHT (EXCEPT USED GOODS) TRUCKING- LONG-DISTANCE
- SUPPORT ACTIVITIES FOR RAIL TRANSPORTATION
- TAXI SERVICE
- USED HOUSEHOLD AND OFFICE GOODS MOVING

In this respect, the Twin Cities and Dakota County find themselves in more direct competition with Chicago and its already formidable logistics cluster. Chicago's cluster is fully formed, operating across all modes, and is home to multiple efficient intermodal logistics parks. It is in a more advantageous location than Minneapolis with regards to weather and freeway access. If the Twin Cities want to compete with Chicago, it must either emphasize its existing advantages (river freight to the Gulf of Mexico) or create some of its own.

Not only must Dakota County compete by proxy of the Twin Cities, it must also compete with neighboring counties. Although it has competitive advantages in its proximity to Minneapolis-St. Paul International Airport and a wealth of rail and freeway infrastructure, land is cheaper to the west and south. At the time of writing, internet retail giant Amazon is rumored to be planning a massive distribution center in tiny Elko New Market (population: 4,513) in neighboring Scott County (Black, 2014).

Related and Supporting Industries

As mentioned earlier, existing manufacturing clusters play a very important role in developing the competitive advantage of the transportation and logistics cluster. The relationship between the two is direct: if existing manufacturing clusters are doing well and

increasing production to meet their demand conditions, transportation and logistics is slated to benefit as well. Of course, the inverse is also true, as is illustrated by the decrease in demand for transportation services during the Great Recession. As seen in the appendix's Figure 14, apparel, furniture, footwear, paper, and metal manufacturing are strong industries in Dakota County that require transportation and logistics services to get their goods to market.

There are a number of educational institutions in Dakota County that support the transportation and logistics cluster, depicted in Table 5 on the next page. Dakota County Technical College (DCTC) is located in Rosemount and offers degree programs in Heavy Duty Truck Technology, Auto Body Collision Repair, Automotive Technician, and a GM Auto Service Education Program. Additionally, DCTC offers continuing education courses focused on transportation and safety, including Class A and Class B CDL training and Corporate Truck Driver Training, a nationally recognized program that has been training truck drivers for over 35 years. Inver Hills Community College (IHCC) is located in Inver Grove Heights and offers educational programs in a variety of STEM fields, including computer science, information technology, and engineering. These are areas of study that could greatly benefit the transportation and logistics cluster in Dakota County.

Educational Institutions and Supporting Academic Programs Dakota County, MN		
Educational Institution	Location in Dakota County	Relevant Programs
Dakota County Technical College	Rosemount	CDL Training (Class A and Class B), nationally recognized Corporate Truck Driver Training , Heavy Duty Truck Technology, Auto Body Collision Repair, Automotive Technician, GM Auto Service Education Program
Globe University	Lakeville	Logistics Management, School of Business
Heavy Metal Truck Training	Inver Grove Heights	State-licensed Class A CDL training and certification
Interstate Driving Academy	Inver Grove Heights	State-licensed Class A CDL training and certification
Inver Hills Community College	Inver Grove Heights	Engineering fundamentals
Transportation Center for Excellence	Eagan	State-licensed Class A CDL training and certification

TABLE 5

The Minnesota School of Business/Globe University, a regional for-profit college with locations in Minnesota and Wisconsin, has a campus in Lakeville. Globe University offers an online associates degree in Transportation Business, as well as an associate’s degree in Logistics Management. Globe University also offers degrees in various fields of technology.

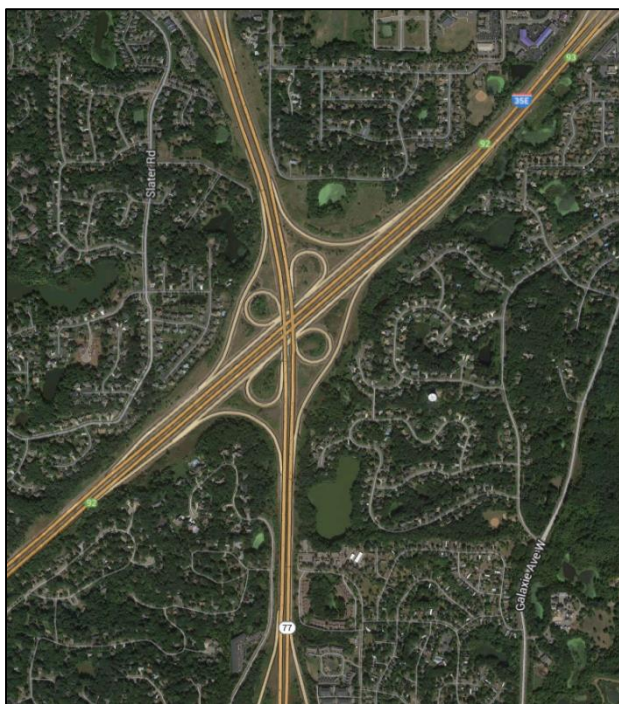
There are also a number of training programs within Dakota County that target the trucking industry, a key sub-cluster within the larger transportation and logistics cluster. These training programs include Heavy Metal Truck Training in Newport, Interstate Driving Academy in Inver Grove Heights, and the Transportation Center for Excellence in Eagan. These programs offer various workforce development courses to equip workers with the skills they need to

enter the trucking profession. Additionally, the Dakota-Scott County Workforce Investment Board has two locations in Dakota County (West St. Paul and Burnsville) and offers workforce development training aligned with employer demands.

Role of Government

The role of government is crucial to the success or failure of any cluster. This is especially true of logistics and transportation where the government is necessarily tied to the cluster through a variety of connections. Here, we will outline how government interacts with the cluster, but we will save specific policy recommendations for the next section.

Figure 12



A few of the stakeholders that affect a transportation and logistics cluster are government entities. The Metropolitan Council, for example has some control over spending for crucial transportation infrastructure. Similarly, the Minnesota Department of Transportation, the Metropolitan Airport Commission, and the local port authorities, among others, can directly affect Dakota County's cluster.

Infrastructure is the most immediately apparent relationship between government and logistics. Successful clusters require

intermodal facilities that can be publically owned (ports) or privately owned (rail). The strongest clusters are able to construct private roads connecting facilities across short distances to avoid weight restrictions on public roads, but this limit presents a deterrent to growth for most. This inextricable link of infrastructure is arguably the largest determinant of the quality of a logistics cluster. The necessary relationship to publicly owned infrastructure distinguishes logistics clusters from more traditional manufacturing or knowledge clusters. Different layers of government can present problems here – Dakota County might be willing to invest in road infrastructure, but it is ultimately at the mercy of the United States Department of Transportation and Congress' squabbling over the dwindling Federal Highway Trust Fund.

Local governments do have more control over another key element of logistics clusters – land use. Zoning regulations present a challenge to trucking and warehousing firms, which are generally designated as industrial land uses. This can limit the growth of firms and restrict them from locating in more desirable locations. As we can see in Figure 12, the key interchange at the confluence of I-35E and County Road 77 – an ideal location for freeway-intensive uses like trucking – is completely surrounded by single-family residential uses without so much as a single on-ramp.

As we saw with the swift repeal of the warehousing tax, taxation policy can influence the growth of a logistics cluster as well.

Governments can use taxation as an incentive as well, offering tax breaks to firms that relocate to their jurisdiction. Congestion pricing and voluntary taxes to reduce freeway congestion (a la Los Angeles) are potential factors on the horizon as well.

Policy Recommendations

We have provided a definition for logistics clusters, explained which factors can contribute to their prosperity, and assessed the situation of the cluster located in Dakota County. With those details in mind, there are steps that can be taken by various levels of local governments and by firms within the cluster that will benefit the region as a whole through nurturing the growth of Dakota County's nascent logistics cluster.

Capitalize on Dakota County's strengths in education and workforce development

Dakota County has a wealth of educational institutions and workforce development programs, many of which focus on transportation and logistics specific industries. Increasing collaboration between educational institutions and employers, with particular attention on clusters, will enhance the county's regional competitiveness. Matching educational programs to specific industries with projected employment growth is key to developing a workforce with the skills to meet current and future employer demands. Strengthening curriculum and making necessary investments in classroom technology, research, and development will ensure that workers have the skills desired by employers.

Community Economic Development departments, community colleges, and workforce development centers in Dakota County are in excellent position to do this work. DCTC is the host site for the Minnesota Transportation Center for Excellence and the Transportation Career Pathways Program, and the school benefits from partnerships with local K-12 educational institutions. Workforce Investments Centers provide general career counseling and skills training in a variety of fields. Because there are so many moving parts within the transportation and logistics cluster, coordinated efforts should be made to ensure that all institutions are actively engaging with each other to work towards common goals.

Foster collaboration between DCTC and FedEx to prepare for development of the Lakeville facility

Despite the projected growth in logistics related fields, our interviews suggest that a large portion of these jobs may be filled internally by major employers. Rather than requiring industry credentials or logistics related degrees, many employers may prefer to hire for entry level positions and move workers into supervisory, management, and operational roles. Because of this structure, DCTC should actively seek out opportunities to provide specialized trainings for employers. One such opportunity lies in the future FedEx Freight development in Lakeville, MN, which lies in the southwest corner of

Dakota County. This development will include loading docks, truck and trailer maintenance services and office space and is projected to create 125 to 150 new jobs.

Acknowledge tax disincentives associated with the trucking industry

A major challenge facing logistics clusters is the reluctance of local governments to embrace the trucking industry. Some of the industry’s disamenities are obvious – like more pollution, more

congestion, and more noise. Some, such as the extra damage on road infrastructure, are less apparent. However, the largest obstruction to cooperation between trucking firms and local governments is the unavoidable tax disincentives conspiring against them.

Table 6 shows a snapshot of twenty parcels located near the 35E/55/494 interchange in Eagan. Unsurprisingly, large commercial development provides the most tax dollars per acre, followed by multi-family residential, industrial uses (including warehouses), and

Table 6

Property Tax Information from Select Eagan Parcels						
Parcel ID	Property Common Name	Use	Street Address	Total Tax & Assessments (Payable 2014)	Acreage	Tax \$/acre
10-22531-02-020	Eagandale Office Center	Offices	1380 CORPORATE CENTER CU	\$202,369.56	5.92	\$34,184.05
10-77050-01-010	BCS Waterview Tower	Offices	1200 YANKEE DOODLE RD	\$198,367	6.39	\$31,043.35
10-22464-01-010	Best Buy	Big Box	1235 TOWN CENTRE DR	\$182,002.72	6.03	\$30,182.87
10-22508-01-030	Walmart	Big Box	3035 DENMARK AVE	\$379,962.66	15.01	\$25,313.97
10-45001-01-010	Home Depot	Big Box	3220 DENMARK AVE	\$331,181.54	16.99	\$19,492.73
10-22507-01-022	Strategic Warehousing	Warehouse	1190 EAGAN INDUSTRIAL RD	\$128,237.74	6.67	\$19,226.05
10-22525-02-010	Lemay Apartments	Multi-Family Residential	3005 EAGANDALE PL	\$314,287.32	17.12	\$18,357.90
10-22402-01-020	PCE Packaging	Warehouse	2945 COMMERS DR	\$124,255.24	7.24	\$17,162.33
10-41300-01-121	Bayberry Place Apartments	Multi-Family Residential	3395 YANKEE DOODLE LN	\$82,175.40	5.02	\$16,369.60
10-22500-05-041	Cloverleaf Cold Storage	Warehouse	2864 EAGANDALE BLVD	\$307,939.26	19.58	\$15,727.23
10-75892-01-090	(Private Home)	Single Family Residential	873 IVY LN	\$2,681.74	0.18	\$14,898.56
10-22504-01-010	Yankee Rd Distribution Center	Distribution	905 YANKEE DOODLE RD	\$247,853.74	17.36	\$14,277.29
10-22700-01-010	Ecolab	Light Industrial	940 LONE OAK RD	\$146,791.90	10.32	\$14,224.02
27-15150-04-020	(Private Home)	Single Family Residential	2464 BRIDGEVIEW CT	\$5,692.68	0.47	\$12,112.09
10-11800-01-010	Apollo Distribution Center	Distribution	900 APOLLO RD	\$305,898.18	28.42	\$10,763.48
10-55300-03-020	(Private Home)	Single Family Residential	1485 MCCARTHY RD	\$5,093.38	0.59	\$8,632.85
10-22465-01-010	Midwest Carriers	Trucking	3165 DODD RD	\$69,919.14	10.47	\$6,678.05
10-22501-00-041	Roadway Express	Trucking	2950 LONE OAK CIR	\$150,379.32	23.66	\$6,355.85
10-48175-01-010	Daily Transportation Inc	Trucking	3045 SIBLEY MEMORIAL HWY	\$114,430.36	18.59	\$6,155.48
10-80350-01-010	US Postal Service Bulk Mail Center	Distribution	3200 DENMARK AVE	\$0	87.81	\$0.00

single-family residential. Trucking comes in far lower than any other use except for the federally-owned 87-acre US Postal Facility, for which the City of Eagan receives no tax revenue. This disparity can be attributed to the fact that trucking facilities generally have no need to improve or expand structures – for them, the value of the land is almost entirely due to its proximity to major junctions.

The very low tax revenues from trucking explain why local governments like Dakota County might be hesitant to unilaterally encourage a logistics cluster from the ground up, yet we have seen the benefits afforded to a region with a strong cluster. Local redevelopment agencies and port authorities should pay special attention to this problem when dealing with industrial land use.

Strengthen stakeholder collaboration

In an effort to strengthen stakeholder collaboration, affected parties should move toward the formation of an institution for collaboration (IFC). An IFC can greatly enhance the development of an existing cluster, as it is intended to aid in managing the interactions of stakeholders, share their knowledge, and make effective use of such knowledge. Often formal organizations, IFCs can enhance a cluster by engaging its members in collaborative efforts regarding promotion, networking, research, tax regulation and public policy analysis, lobbying, and establishing quality standards. These organizations are

often comprised of industry associations, Chambers of Commerce, trade union members, and university researchers and alumni networks.

An IFC for the transportation and logistics cluster in Dakota County should involve several key players, including (but not limited to) the Minnesota Trucking Association, the Minnesota Warehousing Association, the Dakota County Regional Chamber of Commerce, the Rosemount Chamber of Commerce, the St. Paul Port Authority, and representatives from truck-driving training programs at DCTC and the other educational institutions. Initially, this first “chapter” of the IFC would be focused solely on Dakota County; however, because of the regional nature of a transportation and logistics cluster, the formation of additional chapters of the IFC in neighboring counties of the metro area would be beneficial. Ideally, a metro-wide IFC would carry substantial political weight.

Because IFCs can exist at various scales, their formation can be tailored to the context of a specific cluster. For example, the IFC can be a relatively information organization, in which the above groups come together on a voluntary basis. It might be structured much more formally: the above members may pay dues that would fund the operation of a brick-and-mortar IFC office and staff. If the more formal route is chosen, Rosemount could be an appropriate site for

the IFC's local office, whose personnel would be responsible for coordinating these joint efforts.

Continue to invest in infrastructure that supports cluster development

Dakota County is relatively proactive in its infrastructure investments. This can be seen by the county's recent vote to invest in 42 miles of 10-ton roads, or roads that are equipped to handle super-heavy trucks. Infrastructure investments such as this increase efficiency by reducing trip times and emissions, minimizing the number of trips required for transport, and ultimately make roads safer for freight to travel. For businesses, infrastructure investments strengthen Dakota County's competitive advantages by making it a more attractive place to do business. Therefore, Dakota County should be cognizant of regional policies that may impact the operational effectiveness of transportation infrastructure. If the county fails to give attention to infrastructure development, businesses may choose to locate elsewhere.

Invest in research and development

Because competitive advantages are achieved and maintained through continual innovation, research and development will be a component critical to the expansion of a transportation and logistics cluster. Investments in research and development should be focused

on three main issues: weather and its impact on transport processes, the efficiencies of transport processes themselves, and market research. This research could be conducted through DCTC, by individual businesses, or by the IFC. Were the IFC to conduct the research, smaller firms that often do not have the resources to conduct research themselves, could stand to greatly benefit.

Research dedicated to studying the impacts that weather has on transport processes and to developing ways to combat such effects can be essential to the cluster's development. There is no avoiding this negative factor condition - the Upper Midwest experiences some inclement weather - unless steps are taken to *adapt* to it. Research aimed at producing new weather-resistant technologies and fuel efficiencies may be one way to overcome, or at least mitigate, this factor condition.

Analyzing the transport processes may be another way to advance the cluster. Because transportation networks are multimodal, inefficiencies in one system directly impact the operations of another. For a transportation and logistics cluster to be as efficient as possible, analysis of the existing infrastructure network, identification of deficiencies, and recommendations for improvement are key. The University of Minnesota's Carlson School of

Management may be able to contribute supply-chain analysis and research.

Market research may be the area of study most beneficial to firms in the cluster. Analysis of market segmentation, trends, and needs could provide the necessary information for helping the cluster develop and maintain an advantage over competitors.

Facilitate construction of a logistics park

The ultimate manifestation of a transportation and logistics cluster is a logistics park. As the region matures and demand for imports and exports increases, the Twin Cities would do well to ensure that the shipping needs of its residents and businesses are met. A public-private partnership could be formed by the Metropolitan Council in order to develop a site for a logistics park. We have laid out in this paper why Dakota County would be an optimal site for such a facility. Access to key infrastructure, a balanced workforce and capable institutions are huge assets for the region that have not been fully capitalized on.

The Spanish city of Zaragoza provides an excellent example for the region to follow. Construction of its highly successful logistics park was facilitated by the state of Aragon and local governments, and the City of Zaragoza continues to maintain 20% equity in the park. The

symbiotic relationships and positive feedback loops between a healthy logistics cluster, manufacturers, and consumers should ensure continued growth and prosperity for the region.

Conclusion

Dakota County's logistics cluster has room to grow. Its strengths lie in its proximity to key infrastructure and the developing weight of its metropolitan region, while its weaknesses are found in the fierce competition on the national scale and a lack of helpful local policy. Through direct policy actions, local governments can fertilize this cluster and use its competitive advantages to improve the health of the regional economy.

Appendix

Figure 13

Selected State and Local Business Environment Characteristics 1998-2011 U.S. Cluster Mapping Tool

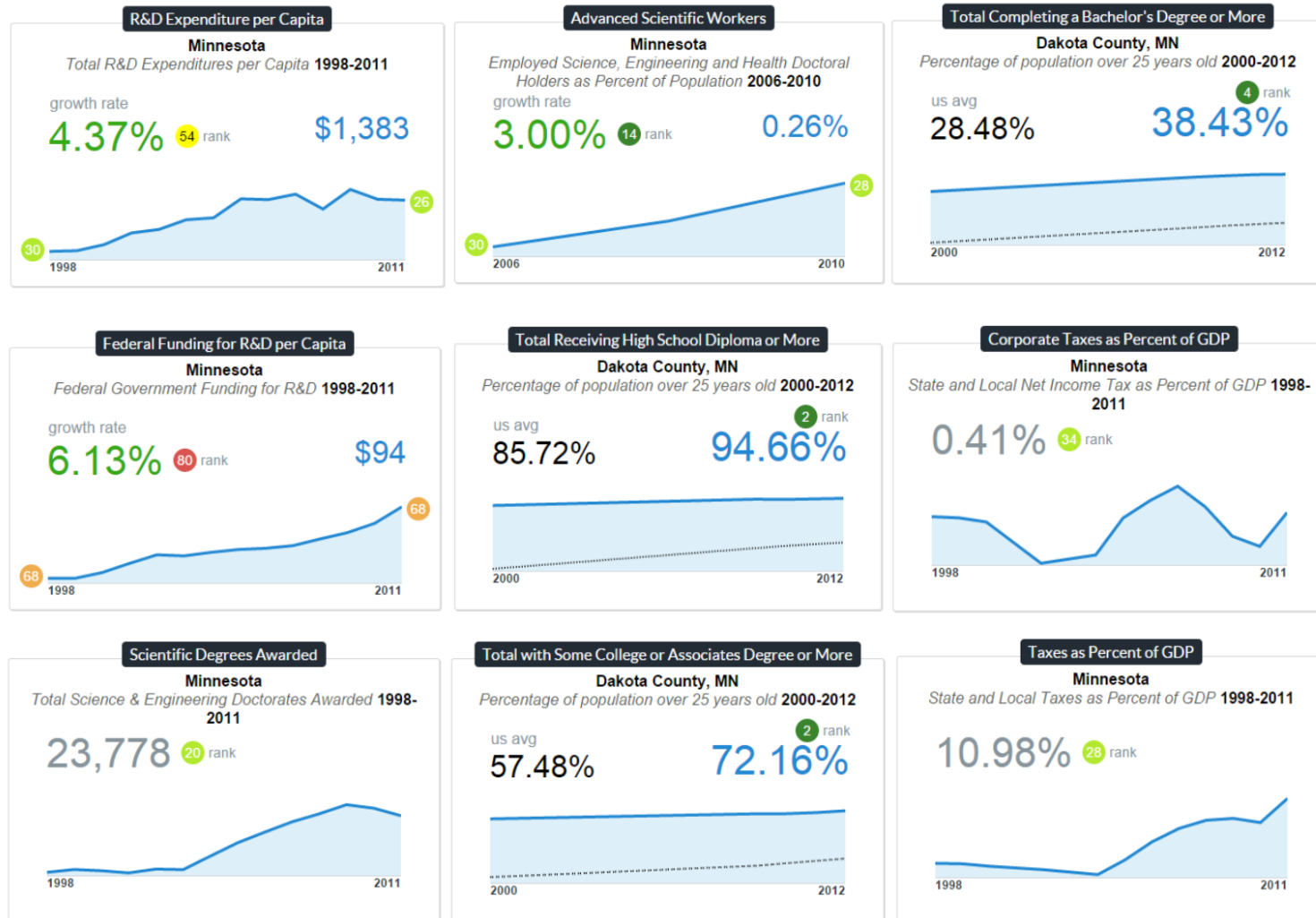


Table 7

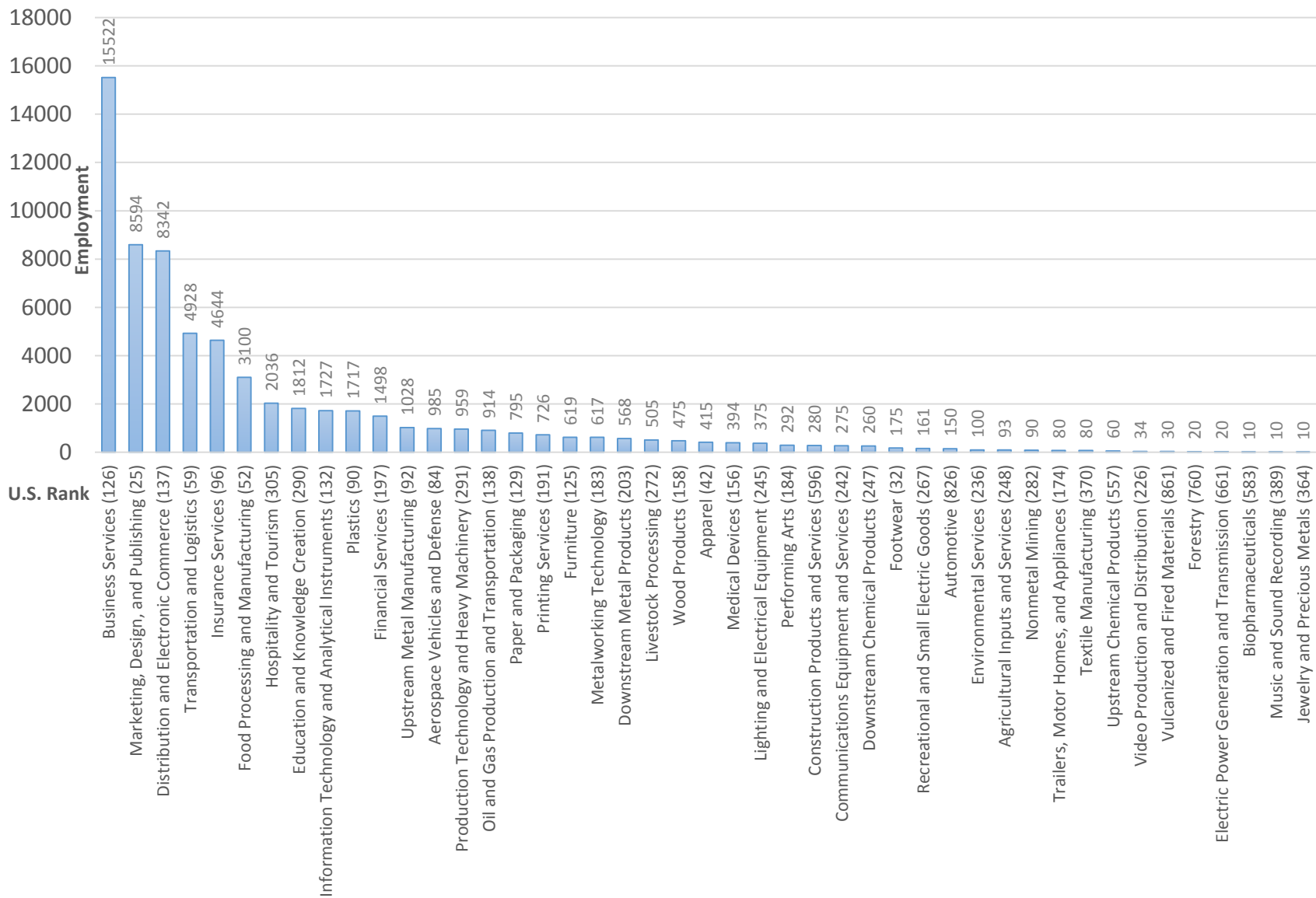
Transportation and Logistics Industry Characteristics Minneapolis St. Paul Metropolitan Area and Selected Counties 2012, U.S. Cluster Mapping Tool			
County	Employees	# of Establishments	Avg Wage
Dakota	4,928	167	\$49,934
Hennepin	21,412	219	\$59,612
Ramsey	1,341	88	\$48,033
Scott	417	31	\$40,815
Carver	90	21	-
Rice	210	18	-
Goodhue	195	17	-
Wright	424	49	\$54,439
Anoka	986	95	\$47,579
Washington	621	50	\$52,144
Sherburne	481	35	\$46,374
Chisago	116	21	\$33,028
Isanti	20	7	-
St. Croix (WI)	521	32	\$50,056
Pierce (WI)	2.61	18	\$36,955

Table 8

Comparison of NAICS Categories, Minneapolis-St. Paul Metropolitan Area and Selected Counties 2012																
Bureau of Labor Statistics																
	MN Total	Dakota	Hennepin	Ramsey	Scott	Carver	Rice	Goodhue	Wright	Anoka	Washington	Sherburne	Chisago	Isanti	St. Croix (WI)	Pierce (WI)
NAICS 11 Agriculture, forestry, fishing and hunting	0.82	0.52	0.10		0.35	0.60	2.85	2.27		1.00	1.00	1.00	1.00	1.00	1.00	1.00
NAICS 21 Mining, quarrying, and oil and gas extraction	0.37	0.46	0.14		0.86		0.70	-	-	0.40	1.18	-	-	1.46	1.16	-
NAICS 23 Construction	0.84	1.20	0.67	0.85	2.05	1.17	1.27	0.94	2.15		0.76	-	-		0.08	-
NAICS 31-33 Manufacturing	1.25	0.93	0.70	0.77	1.10	2.37	1.49	1.71	1.22	1.48	1.05	1.88	1.46	0.80	0.99	1.15
NAICS 42 Wholesale trade	1.11	1.03	1.05	0.81	1.07	0.88	0.96		0.84	1.68	0.84	1.14	1.44	1.30	1.74	1.51
NAICS 44-45 Retail trade	0.92	1.14	0.78	0.83	1.05	0.85	1.09	1.08	1.60	0.95	-	0.75	0.37			0.66
NAICS 48-49 Transportation and warehousing	0.86	2.07	1.01	0.63	1.07	-	-	1.41	-	1.21	1.53	1.25	1.12	1.60	1.18	1.13
NAICS 482 Rail transportation	2.57	-	-	-	-	-	-	-	-	-	1.05	-	0.44	0.55	1.16	1.56
NAICS 484 Truck transportation	0.87	2.25	0.32	0.89	0.82	0.32	1.36	1.74	1.38	-	-	-	-	-	-	-
NAICS 485 Transit and ground passenger transportation	1.51	1.36	0.64	0.66	2.81	0.68	1.50	3.71	2.19	1.54	1.05	2.01	0.72	0.53	2.35	3.83
NAICS 488 Support activities for transportation	0.54	3.21	1.11	0.87	2.19	-	0.59	0.41	0.43	1.83	-	2.23	-	-	0.83	-
NAICS 493 Warehousing and storage	0.43	1.01	1.44	0.44	0.93	-	-	-	-	0.91	0.72	0.48	0.13	-	0.74	3.46
NAICS 51 Information	0.96	2.29	1.06	1.40	0.33	0.54	0.49	0.60	0.40	2.51	0.49	-	-	-	-	-
NAICS 52 Finance and insurance	1.20	1.14	1.53	0.98	0.33	0.40	0.38	0.37	0.33	0.30	0.40	0.31	0.19	0.68	0.33	0.29
NAICS 53 Real estate and rental and leasing	0.97	1.06	1.64	0.95	0.61	0.65	0.30	0.58	0.48	0.40	0.94	0.28	0.29	0.53	0.53	0.75
NAICS 54 Professional and technical services	0.81	0.80	1.65	0.84	0.96	0.73	0.37	0.42	0.38	0.71	0.68	0.33	0.46	0.39	0.31	0.40
NAICS 55 Management of companies and enterprises	1.79	0.59	1.80	1.93	0.13	0.39	0.06	0.45	0.11	0.58	0.74	0.40	0.35	-	0.81	0.60
NAICS 56 Administrative and waste services	0.78	0.90	1.26	1.28	0.96	0.64	0.51	0.65	0.77	0.15	0.63	0.35	0.09	-	0.21	-
NAICS 61 Educational services	0.87	0.93	1.00	2.24	0.38	0.92	5.38	0.10	0.33	1.04	0.86	0.82	0.64	0.58	0.63	-
NAICS 62 Health care and social assistance	1.17	0.68	0.86	1.15	0.68	0.86	0.79	0.98	0.71	0.45	0.89	0.32	0.15	-	0.15	0.27
NAICS 71 Arts, entertainment, and recreation	0.94	1.00	1.01	1.06	3.79	2.13	0.73	0.63	0.71	0.82	0.89	1.18	1.77		1.03	0.61
NAICS 72 Accommodation and food services	0.84	0.99	0.93	0.92	1.44	0.98	1.18	0.98	1.40	1.41	1.85	0.83	1.39	0.54	1.02	1.26
NAICS 81 Other services, except public administration	1.00	1.22	0.92	1.11	1.44	0.71	0.97	1.16	1.14	1.05	1.48	0.99	1.10	1.02	1.35	1.97

Figure 15

Actual Employment and U.S. Rank by Traded Cluster 2012
 Dakota County, MN
 U.S. Cluster Mapping Tool



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