



TPEC TRANSPORTATION POLICY AND ECONOMIC COMPETITIVENESS

Medical Industry Cluster Forum

SUMMARY REPORT

Minneapolis, Minnesota

November 8, 2019



HUMPHREY SCHOOL
OF PUBLIC AFFAIRS
UNIVERSITY OF MINNESOTA

CENTER FOR
TRANSPORTATION STUDIES
UNIVERSITY OF MINNESOTA

Joining forces for economic competitiveness

Introduction

Minnesota has one of the highest concentrations of medical device companies in the US, and the value of those medical goods is a major contributor to the state's economy. The medical device industry is also a global leader in the development and distribution of these high-value, time-sensitive commodities.

While the medical device industry—including firms such as Medtronic—is generally concentrated in the Minneapolis–St. Paul metropolitan region, medical-device-related companies are spread throughout the state. The Mayo Clinic in Rochester, one of the most renowned health care facilities in the world, relies on timely delivery of medical devices and many thousands of biological specimens each week. Other areas of the state, such as St. Cloud, have a significant health care presence or are home to companies linked to the medical device industry.

The success of all these enterprises hinges on a reliable, multimodal transportation system, anchored by MSP International Airport. What is needed to retain this competitive advantage and encourage future growth? What are the implications for our transportation policies?

These issues were the focus of a forum held on the U of M Minneapolis campus on November 8, 2019. The forum brought together leaders for a discussion of the importance of the medical industry cluster to Minnesota's economy and its implications for infrastructure use and economic development.

This report summarizes the discussion. Our hope is to stimulate conversations—and actions—that support the medical industry and Minnesota's global economic competitiveness.

— *Lee Munnich, TPEC Director*



Lee Munnich, Tom Horan

TPEC Research: Setting the Stage

To set the stage for the forum, Tom Horan reviewed preliminary findings from a TPEC analysis of Minnesota's medical device industry. He and TPEC director Lee Munnich are co-investigators for the multi-phased work.

A vital role in economic competitiveness

"Minnesota has established itself as one of the forerunners in the medical device field," said Horan, a visiting scholar with the State and Local Policy Program at the Humphrey School of Public Affairs. Out of the \$22.7 billion in annual exports in 2018, the medical device and pharmaceutical industry made up almost 23 percent of Minnesota's total export value, according to the Minnesota Department of Employment and Economic Development (DEED).

The medical device industry in Minnesota also saw an increase in exports compared to 2017, with business relationships expanding beyond state borders to major global markets in Europe and Asia. In 2018, optics and medical devices made up the second-largest proportion of Minnesota's exports in value.

Minnesota's reputation as home to many well-established health care facilities plays an integral role in making Minnesota the headquarters for medical device companies, Horan said. In 2016, Minnesota had the fourth largest labor force—after California, Indiana, and Florida—in the medical device sector out of the 50 states.

Statewide economic development

While most of the medical device companies' headquarters and facilities are concentrated within the Minneapolis–St. Paul seven-county metro region, the medical device industry's success has also benefited Greater Minnesota. Suppliers who provide parts to medical device companies are often located outside of the metro. "Success in the Twin Cities metro area ultimately fosters the growth of other linked industries throughout the state," Horan said.

Linked industries that support the medical device industry cluster are dispersed in 80 counties of Greater Minnesota.

One common challenge companies share is finding skilled laborers. "The medical device industry is a specialized industry that needs a variety of talent, and it competes against other businesses nationwide and globally," he said.

Surface and air transportation

The medical device industry cluster relies heavily on a combination of surface and air transportation. "To satisfy national and global consumers, it is crucial to have a well-designed multimodal transportation system that supports not just the end delivery of medical devices but the medical device industry's supply chain," Horan declared.

The Minneapolis–St. Paul International Airport (MSP) plays a crucial role in enabling the export of medical devices, and these goods represent some of the highest value shipments out of MSP. "To date, policy surrounding MSP has been passenger-oriented, but additional attention to the air freight element is warranted," he said. "Air transportation has one of the greatest potentials to improve regional connectivity and increase economic gains."

The common benchmark used to measure freight movements has been the volume—rather than the value—of goods. "There is a need to look at the value based on price," he said. "Based on tonnage, air freight ships far less than trucks, but when the value of goods being transported is compared, it is the inverse."

Research and data needs

Horan closed by noting that a lack of comprehensive data impedes a complete understanding of the value flows from the medical device industry cluster. "This lack of data means that we don't fully know the economic and community value of the cluster and the role of transportation and related infrastructure improvements," he said.

Strengthening and Expanding Minnesota's Economy

Home to global heavy hitters like Medtronic, Boston Scientific, and Mayo Clinic, Minnesota has long been recognized, as medical industry association Medical Alley puts it, as a national “epicenter of health innovation and care.”

But leading thinkers from Minnesota’s business, government, academic, and nonprofit sectors say it’s time to think even bigger—to not just sustain that distinction as a national medical industry epicenter, but to elevate, even broaden it. Given the right data, collaboration, and planning, they believe the North Star State can be the wellness capital of the world.

Infrastructure fuels growth

While historically the Twin Cities and Rochester have anchored Minnesota’s medical industry cluster, increasingly, other communities such as St. Cloud are major contributors to it.

“St. Cloud is an important health care and education node for the region,” said Jennifer Erickson, the city’s business development director, citing CentraCare Health Systems, St. Cloud State University, and numerous medical device suppliers.

Rochester’s Mayo Clinic, with nearly 35,000 employees, is the state’s second-largest employer. That city’s success is Minnesota’s success, said Lisa Clarke, executive director of Destination Medical Center (DMC), a \$5.6 billion economic development initiative centered on Mayo. “My job is to promote Minnesota,” Clarke emphasized. Doing so requires sustaining Mayo’s stellar international reputation while also paving the way for new and complementary enterprises, she said.

DMC’s focal point is Discovery Square, a 16-block district in the city’s core billed as an “entrepreneurial ecosystem” designed to stimulate research and innovation, where startup founders mingle and trade ideas with leaders of corporate powerhouses. “We’ve learned in Rochester that infrastructure is critical for our success to grow,” explained Clarke. “We’re on fire.”

MSP handled \$8.6 billion in medical goods in 2015.

Global Minnesota’s president (and former Minnesota Secretary of State) Mark Ritchie pointed to the state’s current bid to host the 2027 World’s Fair as an opportunity to cement the state’s prominence and influence—and to step up its ability to attract talent from around the world. It helps, Ritchie said, that the “largely defined health care industry” is composed to a large extent of “values- and ethics-driven companies, generally speaking.”

“We do things [in Minnesota] that affect how people around the planet feel about us,” Ritchie said. And despite the harsh winters, he added, “once we do bring people here, we know they like to stay.”

Greater MSP’s Joel Akason, senior vice president for business investment and research, concurred, stressing the need to get more people to come to Minnesota in the first place. The panel’s ambitious vision requires a larger workforce: Minnesota Compass projects a statewide worker shortage of nearly 240,000 in just two short years. “The talent base is robust here, no doubt,” Akason said. “We just need 400,000 more people—tomorrow.”

Affordable housing for this workforce can’t be overlooked, said Judy Johnson, a member of the Metropolitan Council. “I serve on the transportation policy committee, and we are trying to figure out, with extremely

limited dollars, how to serve the workforce population [with] the biggest bang for the buck. For example, the C line bus rapid transit, which connects downtown and Brooklyn Park, is a more effective and efficient way to get workers to where they need to be.”

Johnson added that transportation availability—including public transit—is a factor when the Met Council works to attract new businesses. “How do we help people get into other modes so we can free up corridors to make sure commerce is being transferred effectively and efficiently?”

A common thread for the panelists was nurturing the growth of Minnesota’s preeminent medical technology and solutions industries. But they also articulated a need to recognize and foster connections between those industries and related enterprises: nutrition, fitness, recreation, and social and emotional well-being. It means, they agreed, becoming a worldwide leader not only in vanquishing illness, but in cultivating health—a mission that extends beyond treating patients and making medical devices.

A locus for well-being

As Lori Syverson, president of the Edina Chamber of Commerce put it, “we have a really strong base in medical assets . . . and we have a very strong base in well-being. There’s a much larger potential than maybe we had realized.” That potential can encompass everything from offering spas and fitness centers, to manufacturing plant-based protein products, to providing world-class hiking, paddling, and fishing.

All of these “wellness” industries align with and emanate from Minnesota’s unique culture, said Kevin McKinnon, deputy commissioner of the Minnesota Department of Employment and Economic Development (DEED). “It all starts with this sort of passion for improving and saving lives,” he said. “That’s why people are coming here.”

McKinnon noted the growth of allied and “supporting” businesses that serve the medical device and health care sector, such as finance, legal, IT, software, and packaging. The success of the medical industry can yield, as Ritchie said, “a fundamental lifting of all boats.”

Neal Young, director of economic analysis at DEED, echoed that, pointing out that although much of Minnesota’s medical industry cluster is within the Rochester–Twin Cities–St. Cloud triangle, suppliers and supporting businesses are located all over the state.



Lori Syverson, Kevin McKinnon, Neal Young



Mark Ritchie, Lisa Clarke



Judy Johnson, Jennifer Erickson

Attracting and retaining workers is only part of the picture; training them for an increasingly high-tech, ever-evolving industry is crucial, Young said. “One of our strategic goals is increasing our tech training, the programs that fund training, in the next fiscal year. We hope to continue building STEM skills that go toward this cluster.”

Medical Industry Relies on Multimodal Transportation

‘Aerotropolis’ model could guide high-value growth

An increasingly fast-paced and globally connected economy is changing the rules of industrial competition and business location as we know it, making major airports key nodes in global production and enterprise systems. *Aerotropolis* author John Kasarda described the Twin Cities’ potential to leverage the “aerotropolis” model and deliver competitive advantages to firms and municipalities in the region and state.

The new business environment at the center of the aerotropolis model is built around speed. “We all need to change our paradigm,” said Kasarda, director of the Center for Air Commerce at the University of North Carolina’s Kenan-Flagler Business School and president of the Aerotropolis Institute China. “We have to change our framework in terms of business recruitment and industrial location. The metrics are no longer space and distance—they are time and cost, and how fast you can connect.”

The aerotropolis model is multimodal. “The battle is won on the ground, not just in the air,” he said. “Ground movement is critical. How do you improve the efficiency of your multimodal transportation connectivity? Aerotropolis is about so much more than the locations of businesses and the connections to the airport.”

A successful aerotropolis strategy, he continued, is a coordinated set of interventions—infrastructure interventions, commercial real estate interventions, and government policy interventions—with three objectives. The first is to upgrade the airport-area urban and municipal employment assets; second, to reduce ground-based transportation times and costs; and third, to expand air route connectivity nationally and globally in order to attract investment and boost high-value trade in goods and services for the municipal and metro region—and for state competitiveness, job creation, and economic growth.

The aerotropolis model optimizes time; it creates an “urban pipe” that reduces the friction of space and distance. The aerotropolis also moves a region up the commercial and industrial value chain by recognizing that time is not just a cost but also a currency for many business people and businesses. “The fastest, best-connected places to do business will win in the decades ahead,” he said. “If you can create that urban pipe here, you will go a long way to substantially improving your competitive position.”

What is an aerotropolis?

The aerotropolis is an urban form where cities are built around airports, speedily connecting time-sensitive suppliers, manufacturers, distributors, and business people to distant customers, clients, and marketplaces.



The market for medical devices is growing fastest where populations are aging and incomes are rising: India and China.

—John Kasarda

MSP: an economic engine

"Airports are many different things to their respective communities," Atif Saeed said, "but one thing you will find in common is that they are an economic engine." MSP is the 17th-busiest passenger airport in the country and soon will cross the mark of 40 million passengers annually. "For a community to have an asset like that is incredibly fortunate," he said.

As an economic engine, "the ignition is air service," said Saeed, vice president of finance and revenue development with the Metropolitan Airports Commission (MAC). "Airlines respond to demand. An airport is not the creator of that demand. We become a facility in the middle, between the community and demand for the airlines," he said.

The community has come together in the last few years to help airlines realize the area's potential for the future and commit to air service. "The result is several new flights to MSP that would not have happened otherwise," he said, such as nonstops to South Korea and Dublin.

Saeed sees a need for different entities to align around a common denominator that provides for a broader "value proposition" to attract talent and businesses to the community, and then coordinate branding. "We'll be delighted to be part of that and have a seat at the table, to meet the needs of the community in whatever way we can and be an ambassador."



MSP has \$16 billion worth of direct and indirect impact on the region. 87,000 jobs are indirectly or directly associated with the airport. 21,000 jobs are directly associated with the airport.
—Atif Saeed

Surface freight: strategic investments foster growth

The Minnesota Freight Advisory Committee (MFAC) was established in 1998 as the first state-level freight advisory committee in the country. "That was a very important piece that elevated freight planning at MnDOT on the freight side," said John Tompkins, state planning director with MnDOT's Freight Office. "As we do our planning, we look to our customers for advice and support. As we've done plans throughout the years, one thing that came to the forefront was the return on investment for a project or a policy."

Tompkins then turned to the Corridors of Commerce program, which was established by the legislature in 2013 to improve the state transportation system in ways that specifically support Minnesota's economy. Under the program, MnDOT looked at where medical device companies are located along the belt of the Twin Cities and reached out to communities for input. "We learned it was important for those products and supply chains to get efficiently to the airport," he said. The department explored ways—such as apps—to inform truckers hauling commodities through the corridor and looked at whether MnPASS lanes could offer a framework for more efficient movement.



John Tompkins

One of the benefits of these projects, he said, is that they help MnDOT identify enhancements and make improvements in multimodal freight efficiency. "The bottom line for a lot of projects I've done with MnDOT is efficient competitiveness," Tompkins said. "Now as we do these projects, there's a bigger lens on efficient movement from these specific locations to the airport."

Hyperloop: a breakthrough technology?

Hyperloop is “arguably the first new mode of transportation in over 100 years,” began Chuck Michael, head of US feasibility studies with Hyperloop Transportation Technologies. The company is one of several worldwide developing hyperloop technology.

Michael described his company's system: Its electric motor is powered by solar energy, propelling a capsule that can carry people (or cargo) inside a depressurized tube. It doesn't travel on rails—it levitates above them. It uses no energy and is capable of giving energy back to the grid. “It has a top speed of 760 mph,” Michael said. “We started from scratch, and in about five years we've built a full-scale test facility in Toulouse, France.”

The company has developed arrangements and relationships with the USDOT to obtain certification and establish a regulatory framework. The first project in the US aims to connect Pittsburgh, Cleveland, and Chicago. “We've had tremendous support from jurisdictions in all those states, and all of the DOTs are in the strategic group,” he said.

Michael believes hyperloop would be an “ideal solution” for high-value, time-sensitive medical devices. Shipments from Minneapolis to Chicago could take less than 40 minutes, and people could travel between Rochester and Minneapolis in perhaps 15 minutes.

“Once you get down to 40 minutes or less between these city pairs, you essentially merge the labor markets,” he added. “Rochester to MPS is not the most profitable air route, but hyperloop could connect people in minutes. Rochester could be redefined as an extra terminal for landlocked MSP.”

The timeframe for projects, he said, “is a matter of the economics, because these projects need to be self-sufficient.” Construction could begin in Illinois and Ohio in about two years. A line in Dubai is starting construction and will be completed for World Expo 2020, he added.



Chuck Michael



Data and Research

Fully realizing Minnesota's potential as a global wellness capital will require ongoing research and skilled analysis of existing data—as well as identifying crucial new data that are yet to be captured. Academic entities such as the Center for Transportation Studies, the Humphrey School of Public Affairs, and the Transportation Policy and Economic Competitiveness program can play an integral part in building the state's leadership in the medical industry.

“When we recruit Humphrey students, this is one of the things we pitch: Minnesota is a great laboratory for policy research and for planning research,” said Lee Munnich, TPEC director. “We’re not the ones who are going to do the development,” he said, “but we’re the ones who can help facilitate progress.”

Munnich coauthored, along with Tom Horan, the most recent TPEC report (fall 2019) on Minnesota's medical device industry (see page 1). Among other things, that report points up the need for more extensive data about air cargo value to optimize the speed and efficiency of transporting medical devices and their components.

More air cargo data needed

Brian Peters, assistant director of commercial management and airline affairs at the MAC, echoed that. Useful air passenger data exist in abundance, Peters said, but while the creation of the Minnesota Freight Advisory Committee has helped, businesses and policymakers still face a dearth of information about the movement and value of medical goods from and within Minnesota. “We have reams of passenger data, but we don’t have a lot of good cargo data,” Peters said.

“There are opportunities to improve the time and cost-effectiveness of shipping goods out of here with greater air cargo use,” Peters continued. The MAC is looking “to learn more about our cargo market, learn more about what companies’ needs are, and communicate those to the cargo carriers.”

“We’re interested in ways of improving the data,” Munnich said. “We want to do some case studies; we’d like to identify a few companies where maybe we can get a little bit deeper.”

Munnich added that in the absence of more robust data—and better means of collecting and sharing information—conversations like the November industry forum become even more critical. “We’ve found that when you don’t have enough data, you have to do a lot more qualitative work. That means talking to people—talking to experts,” he added.

Discovering new connections

Another panelist spoke about a different kind of data with the potential to enhance Minnesota's standing in health innovation. Amanda Taylor, director of research at Greater MSP, said the availability of information about workers' skills via sites like LinkedIn could enable medical device companies to capitalize on expertise in other sectors, and vice versa.

“We have a large team working on telling the story of what our assets are here, and [examining] linkages between medical device and food and agriculture. When you look at skills-based evaluation of labor and talent in our market, that’s where you find connections,” Taylor said.



Brian Peters, Amanda Taylor

"We have one of the highest concentrations of biomedical engineers in Minneapolis–St. Paul because of the medical device industry," Taylor continued. "One thing we've been learning in the food and agriculture industry is that [one of its fastest-growing areas] is alternative protein development: plant-based protein. They need biomedical engineers. So part of our positioning is, 'Hey, we've got this medical device industry, and all this biomedical engineering talent in our market. Come grow with us.'"

Another factor that could affect Minnesota's competitive position is climate change. Participants agreed it's an evident issue.

In closing, Bill Goins of Access to Solutions made a case for ongoing roundtable discussions among industry leaders, researchers, and policymakers. "What we're talking about here is building strategic relationships," Goins said. Conversations among leaders from every affected sector—conversations like this forum—will help ensure that "10, 20, 50 years from now, this is truly the epicenter of helping the world with innovative solutions."

"This market has the resources to be an innovation epicenter for the globe."

—Bill Goins, Access to Solutions; Worldwide Account Manager (retired), FedEx Services



For further information:

Minnesota Medical Device Industry Cluster: Development, Linkages, and Transportation, Lee Munnich and Tom Horan, Oct. 30, 2019

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The University of Minnesota is an equal opportunity educator and employer. This publication is available in alternative formats upon request. • Jan. 2020 • Writing: Susan Maas and Pamela Snopl • Editing: Pamela Snopl • Design: Angela Kronebusch • Photography: Angela Kronebusch, Hyperloop Transportation Technologies (p. 6)

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