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Mapping the Midwest's Future Regional Innovation Clusters and Competitiveness

Cowles Auditorium Hubert H. Humphrey School of Public Affairs University of Minnesota Minneapolis, Minnesota

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Transportation Policy and Economic Competitiveness Program

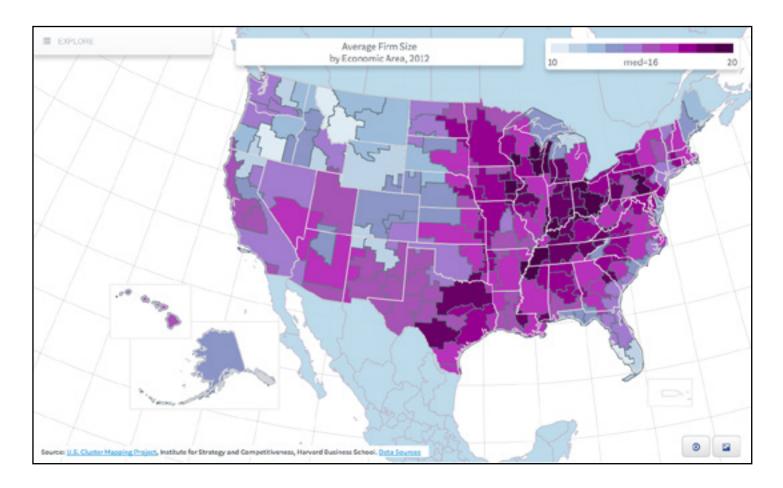
Introduction

The U.S. Cluster Mapping Portal is a national economic initiative that provides open data about regional clusters and economics to support business, innovation, and policy in the United States. The project is based on research led by Professor Michael Porter through the Institute for Strategy and Competitiveness (ISC) at Harvard Business School in partnership with the U.S. Department of Commerce and U.S. Economic Development Administration (EDA) and support from a number of academic and regional partners (including the University of Minnesota).

Professor Porter launched the new U.S. Cluster Mapping Portal (clustermapping.us) as part of this two-day conference, which was sponsored by the EDA, ISC, The Council of State Governments Midwest, and the University of Minnesota's Humphrey School of Public Affairs. Videos and slide presentations for the entire conference are available on the Humphrey School's *Regionalities* blog (http://blog.lib.umn.edu/slpp/regionalities/2014/10/mapping_the_midwests_future_re.php).

Conference attendees included more than 180 business leaders, policymakers, economic development officials, and academics from 12 Midwest states (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin) and 4 Canadian provinces (Alberta, Manitoba, Ontario, and Saskatchewan).

This report summarizes Professor Porter's keynote presentation, two transportation-related sessions, and a session on knowledge creation and education from the first day of the conference.



The website—clustermapping.us—lets users explore data by cluster or by region.

Clusters and Regional Competitiveness

Introduction: Tim Welsh, Board Chair, GREATER MSP (Minneapolis–Saint Paul Economic Development Partnership), and Director, McKinsey & Company **Keynote Presentation:** Michael Porter, Bishop William Lawrence University Professor, Harvard Business School

When Professor Michael Porter introduced the business cluster concept in 1990, this field of study rapidly attracted attention from governments, consultants, and academics alike. Now, in 2014, clusters—geographic concentrations of interconnected businesses, suppliers, and associated institutions in a particular field—are widely considered the key to increasing the efficiency, prosperity, and productivity that enable businesses to compete nationally and globally.

In his keynote presentation, Porter announced the launch of his latest work—the U.S. Cluster Mapping Portal (clustermapping.us)—and discussed his strong belief that the portal, and the data that drive it, are critical to creating the change required for successful economic development in a global environment.

Well before the deep economic recession hit in 2008, the U.S. was on the wrong economic path, Porter stressed. And although the nation's economy is slowly recovering, it is still on that same path. "Over the past several decades, the traditional approaches for economic development have not worked well for the average American business or citizen," he asserted. "This economy is on a very unhealthy trajectory that is creating inequality between the average person and the people with a lot of skill, ability, and perhaps capital. This inequality is going to tear us apart if we can't reverse the trend because if the average American can't do well, the average American is not going to allow the economy to do well."

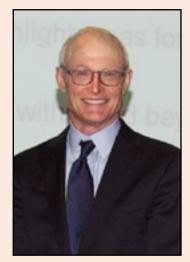
Cluster-based economic development is different from the typical approaches to economic development that many states and regions have taken over the years, Porter said. "If we're going to reverse that trend, we have to change our game and transform the way we think about economic development," he continued. "Our best hope, and the place where we are making

the most progress, is at the regional level...where we have to take a holistic view of what leads to successful economic development."

To do this, Porter continued, the first thing we have to do is stop talking about job creation and start talking about building competitiveness. This means regions must approach economic development from a cluster

perspective and build on both their existing and potential strengths. "They have to be realistic about the kinds of businesses, technologies, skills, and supplier bases that really exist, and then set priorities in sequence rather than trying to improve everything at once," Porter said.

When we think about an economy and about clusters, Porter explained, there are two major parts: the local economy that serves local needs, and the traded economy the businesses that trade with other states and other countries. "The wonderful thing about the traded economy is that [it] can grow way beyond the size of the local market for a particular product if a company can be good enough to be competitive in that part of the economy," he said. "We have to make sure that [economic development efforts] don't get in the way of the traded economy," he added, because it is ultimately what will provide the long-term vitality and opportunity to grow.



Michael Porter

As a critical mass, clusters promote efficiencies that individual businesses or industries cannot. The U.S. Cluster Mapping Portal's data are a detailed composition of regional economies since 1998 that enables users to look at any region and clearly see those areas with a critical mass, Porter said. The portal provides, for the first time, "a roadmap that allows us to see where a region is competing, where it is winning, where it is growing and sprouting new businesses and technologies, and where it is not."

Recent research also shows that strong clusters have higher wages, breed innovation, and accelerate new business. What this says, Porter explained, is that economies grow by building on strengths and moving into related fields. The cluster framework allows us to understand how to take advantage of the spillovers, linkages, connections, and relatedness to drive innovation and entrepreneurship and pull new businesses into our economy. "We now finally have the opportunity to do this in a rigorous, systematic, data-driven way; that's what the [U.S. Cluster Mapping] portal is all about," he said.

Porter concluded his talk with a call to action to business leaders and other influencers to explore the data available through the portal, register their organizations, and work with peers around the country to develop and enhance the practice of cluster-based economic development.



The portal allows users to examine industry clusters in regions throughout the country.

Freight Rail: The Backbone of the Midwest Economy

Introduction: Jim Hovland, Mayor of Edina, and Co-Chair, Regional Council of Mayors



Tom Horan, Steve Weiby, Matt Rose, Jim Hovland

University of Minnesota Freight Rail/Economy Study

Tom Horan, Visiting Scholar, Humphrey School of Public Affairs, and Professor, Claremont Graduate University

Minnesota has the eighth-largest rail system in the United States and it carries more than 3.6 million carloads of freight each year. Yet as vital as this vibrant freight rail network is to the state's economic success, it is one factor that is often overlooked.

This is one reason researchers at the State and Local Policy Program (SLPP) of the University of Minnesota's Humphrey School of Public Affairs embarked on a study analyzing and illustrating the freight rail/economy connection in Minnesota. "Our goal was to focus the nation's attention on the economic role of freight rail in the U.S., with a concentration on industry clusters and the relationship of these clusters to the freight rail system," Tom Horan explained. "And we discovered that the connection is pretty strong."

This study points out, for example, that Minnesota's gross domestic product (GDP) attributed to rail transportation is 40 percent higher than the national average. This means that freight rail not only is a conveyor of the economy, but also is a contributor to the economy in Minnesota and the Midwest, Horan said.

Overall, this research produced five key findings that represent policy directions for freight railroads and the government agencies that oversee them.

The first finding is an obvious but important one, Horan said, explaining that an efficient freight rail system is vital to economic competitiveness. "Freight rail is privately funded...it links to key economic clusters in Minnesota including agriculture, iron ore, heavy machinery, and processed food. It really is hand-in-glove with the regional economic cluster approach."

The second key finding is that partnership between Class I and short line railroads is essential for economic growth. "We need a robust network across the state to deliver our goods and products to world markets. But often, the short lines operate on older, unmaintained tracks, so there may be need for more public and private investments [in this area]." Related to this is the third finding: because rail infrastructure is generally the business of the private sector, the nature of the public-private partnership is unique. Unlike infrastructure systems such as highways, for example, where funding is mostly public, investments in the freight industry as a whole, and in railroads in particular, are from the private sector, which is forcing a new way of thinking for those involved in infrastructure policy.

Fourth, intermodal transportation policy represents an important new arena for ensuring the continued performance of freight transportation, Horan explained. As the economy improves, all modes of transportation will be required to move goods efficiently, thus establishing facilities that ease the transfer of freight from truck to train or train to truck. "Today, this is an area in need of major improvement. It is essential to find ways to develop public-private partnerships and fund intermodal improvements through public-private investments," he said.

Fifth, and finally, the study highlighted the need for the freight transportation community to maintain an ongoing dialogue with the public on freight rail. This is key, since freight rail, generally, is much less understood by the public than highway or transit programs are. "We found that an ongoing dialogue is needed to ensure the right public policies are in place to enable freight rail to contribute to the freight economy," Horan said.

Each of these five findings was supported by a range of data, much of which is summarized in a series of interactive maps. The final study report, *Understanding and Enhancing the Value of Freight Economy in Minnesota*, and the interactive maps can be found at freighteconomy.org.

BNSF Outlook

Matt Rose, Executive Chairman, Burlington Northern Santa Fe (BNSF) Railway Company

While the State of Minnesota is the 21st largest state by population, it is ranked 7th in terms of exports, with 4.4 percent of the U.S. total. This is due in part to the fact that Minnesota has a great multimodal freight economy, Matt Rose explained. "BNSF has invested nearly \$100 million in Minnesota this year, and will invest even more than that next year."

BNSF made overall record capital commitments in 2014 of approximately \$5 billion in total—approximately a \$1 billion increase over its 2013 capital spend. "In the Upper Midwest alone, we're spending \$1 billion in expansion infrastructure. By the end of next year, we'll have more than 100 miles of double track constructed, which is essentially a new railroad," Rose said.

These bold investments are partially in response to a U.S. Department of Transportation (USDOT) prediction that total freight tonnage in the U.S. will grow 61 percent from 17 billion tons in 2010 to 27 billion tons in 2040. In addition, the freight rail industry has been slowly and steadily adding units and tons since 2009, the Great Recession's "rock bottom," Rose explained, but with a different cargo mix than prior to the recession. "This requires more investment than if the same businesses had simply returned to the railroad."



Matt Rose

The Upper Midwest has been the epicenter of this new growth, which some people mistakenly believe is mainly growth in crude by rail, Rose added. There are categorical concerns that tanker trains carrying crude oil from North Dakota's Bakken region are squeezing other shippers off the tracks. However, he explained, "When you look at all of the growth occurring in BNSF, the markets have driven several big volume increases across the entire railroad. That is true of crude oil, but it is also true of other commodities."

Some of the growth in freight rail is directly related to constraints in the trucking industry from new hours-of-service safety regulations and a major shortage of qualified drivers. In any case, BNSF's vision for itself has always been its growth, Rose said. "If markets are bringing us more, then we will grow to handle it. We'll spend whatever it takes to recover, and then those investments will be a permanent fixture on the part of the network for the coming decades." Since America's freight railroads are almost entirely privately owned and operated, the industry will grow needed capacity through revenues and not government funding, he continued. However, policymakers can help ensure that America has adequate rail capacity in the future by making needed investments in road networks, particularly those that collect the freight and connect the modes.

"The Minnesota freight rail study is important work that adds to the impressive body of work that the Humphrey School does to [help government and other leaders] understand the key economic and policy connections within the state," he said. "[BNSF] understands and believes in the conclusions of this study: that a strong multimodal freight network delivers economic competitiveness for U.S. products in world markets and represents an advantage for American workers."



C.H. Robinson Snapshot

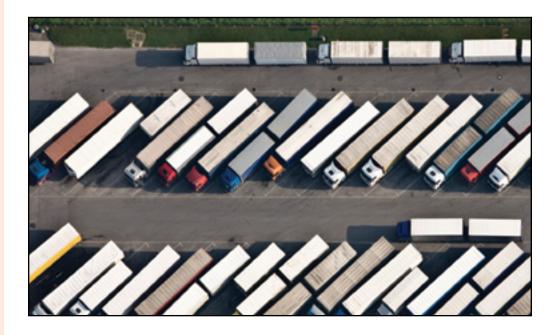
Steve Weiby, Vice President of Global Transportation, C.H. Robinson

Supply chains are inherently complex, especially when considering the number of nodes, the number and size of shipments, and the amount of velocity change from one shipment to another—not to mention the high expectations around scheduling and planning. For a company such as C.H. Robinson that sees 200,000 shipments every week, business clusters provide a unique opportunity to create simpler models that allow greater efficiency and the ability to aggregate freight in different ways, Steve Weiby said.

"[C.H. Robinson's] value add is primarily around the people, processes, and technology we bring to bear. It's creating insight, adding knowledge, and trying to come up with better solutions," Weiby said. More distinctly, he continued, it is around helping companies improve efficiency and manage spending, risk, and change. As the freight industry is now seeing and dealing with worsening capacity constraints, these things are becoming more and more valuable every day.

"If you think of the nature of some of the capacity constraints, historically railroads, which required long-term investments in rail, terminals, locomotives, and labor, have been inherently inelastic. An enormous investment is needed on the front end in order to be useful over time," Weiby explained. "Roads, on the other hand, have been pretty elastic historically—it has been easy to add trucks and acquire truckload capacity. But that is now changing: changing policy, changing financial capabilities, and changing expectations in terms of lack of investment in the actual highway system itself."

There is a long-term need for investment in both the highway system and in the availability of rail capacity, Weiby concluded. "Ultimately, we need more-reliable funding mechanisms. As we are pushing policy forward, we want to be sure we start to agree on longer-term funding mechanisms that support longer-term investment... this not only creates the platform for everybody else to invest, but also creates confidence for everybody to invest in their own assets—which helps supply a more effective and efficient freight environment."



Transportation and Logistics: Moving the Goods to World Markets

Moderator: Laurie McGinnis, Director, Center for Transportation Studies, University of Minnesota

University of Minnesota Cluster-Related Studies

Lee Munnich, Director, State and Local Policy Program, Humphrey School of Public Affairs, University of Minnesota

Since joining the Humphrey School of Public Affairs in 1991, Lee Munnich has been involved in two main streams of work through the State and Local Policy Program (SLPP). One is related to economic development with a focus on industry clusters; the other is transportation policy. The availability of cluster mapping data from the U.S. Cluster Mapping project over the past four years has enabled Munnich and his research team to merge these two streams of work together through several targeted cluster-based projects in Minneapolis–St. Paul (MSP) and Minnesota.

One recently completed study on the competitive industry clusters in the greater MSP region revealed that some important new clusters—water technology, robotics, 3D printing, and biorenewables—are emerging in the region from existing competitive clusters. "Whether or not [MSP] will become a major player in these clusters remains to be seen, but they are some to watch and may be areas where we need to spend more time in the future," Munnich advised.

A second cluster study, for the Minnesota Department of Transportation, leveraged quantitative data from the U.S. Cluster Mapping Portal in addition to information gained through interviews with several companies in varied clusters throughout Minnesota (glass, granite, processed food, and printing/publishing) to learn what issues are most important to them. Major transportation issues identified were weatherrelated delays, rail capacity and equipment issues, truck driver workforce and regulatory issues, regional air access, congestion delays in the MSP metro area, and carrier availability.

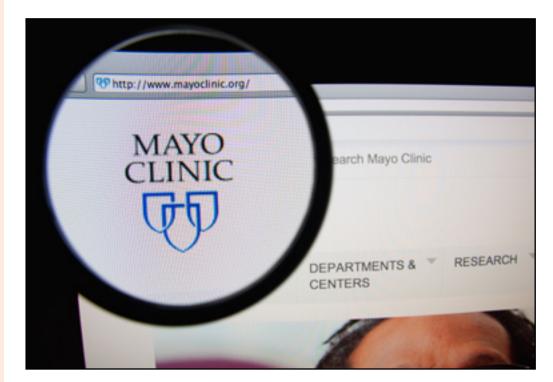
Researchers also used what are called location quotients to quantify how concentrated a particular industry is in an area relative to the nation as a whole. For example, the medical devices industry in the MSP region has a location quotient of 3.96—that is, a concentration almost four times the national average in that same industry, and thus an indicator it is relatively strong in the region.

One industry particularly important to northwestern Minnesota is recreational vehicle production, which has a location quotient of 17.22, or more than 17 times the national average for that industry. Recreational vehicle manufacturing is tied with the automotive industry as well as other industries in this region, and has two main players: Arctic Cat and Polaris. These are two very competitive industries in one of the most sparsely populated areas of the state, Munnich explained, and both face major transportation issues related to inclement weather and difficulty in finding skilled workers.

Moving to the other end of the state, Munnich's team found that Mayo Clinic in Rochester also has huge transportation problems. Mayo Medical Laboratories, for example, in Mayo Clinic's Department of Laboratory Medicine and Pathology, receives approximately 30,000 specimens daily from all over the world—most of which require time-sensitive processing. But on average, there are 9 or 10 bad-weather days a year during which airplanes cannot fly into Rochester because the airport is not equipped for such weather. On these days, the specimens have to be trucked from the Minneapolis–St. Paul International Airport, making them arrive later in the day and losing critical processing time. This affects their whole business, Munnich explained. "While there has been increased transportation service to Rochester and to Mayo Clinic, they are looking for more ways to improve this area."

SLPP researchers also recently completed a cluster-related project in southwestern Minnesota for MnDOT District 8. "We interviewed manufacturing firms in the clusters most important to this area, as well as area freight carriers, about their specific transportation needs in efforts to come up with some low-cost improvement strategies that could be implemented in the short term," he said. "We're just starting [a similar project] for MnDOT District 4 in west central Minnesota and also are currently working with the Minnesota Department of Employment and Economic Development and GREATER MSP [Minneapolis–Saint Paul Economic Development Partnership] on a water technology cluster initiative for this region."

Findings from cluster-based studies like these can be used to shape transportation policy, planning, and implementation to better direct Minnesota's economic successes, Munnich said, noting that there are several other initiatives in the works related to transportation investments to promote economic competitiveness that will potentially draw upon the cluster mapping work.



MICHauto Cluster Association

Glenn Stevens, Vice President, MICHauto, Strategic Development, Detroit Regional Chamber

As the study and use of cluster-based economic development has steadily increased in recent years, so too has the number of cluster associations. These organizations are designed to help promote economic development within a particular industry cluster by helping to improve the competitiveness of one or several specific business sectors.

MICHauto is one such cluster association. As an initiative of the Detroit Regional Chamber, MICHauto serves as a coordinated statewide network of all of the stakeholders in Michigan's automotive industry. "This includes pretty much everybody in Michigan," Glenn Stevens explained. "Everyone from original equipment manufacturers, suppliers, and service providers, to universities, community colleges, and so on. We focus on promoting, retaining, and growing the [automotive] industry, working from four basic pillars: awareness, business attraction, talent, and advocacy."

Michigan is a top transportation, distribution, and logistics (TDL) region for a variety of reasons, he continued. The Detroit region is served by a major international airport (Detroit Metropolitan Wayne County Airport) and, just seven miles from there, the Willow Run airport, which serves freight, corporate, and general aviation. The region is also served by four of the seven national Class I railroads, with eight intermodal facilities located in Detroit, and is home to three of the largest waterway ports along the St. Lawrence Seaway.

"We're a pretty substantial export region, with \$53.9 billion in goods exported last year, putting us fifth in the nation," Stevens said. "Detroit also is the busiest border crossing in the northern U.S. border economy and second nationally to the border crossing in Laredo, Texas. And, the Detroit-Windsor border is the busiest trade corridor in the world."

Although the region is "a very busy place," Stevens added, it has many infrastructure, and other, issues that need to be addressed as the region plans for the future. Thus, the State of Michigan has commissioned a third-party firm to develop a comprehensive state TDL strategy, which involves an industry assessment and subsequent development of a coordinated cluster strategy.

While Detroit has had a rough time economically the past several years, it has a very resilient attitude. The city is very close to emerging from bankruptcy, Stevens continued, and "there are some very exciting things going on." Construction has started on an M-1 Rail project that will link downtown Detroit three-and-a-half miles up Woodward Avenue to what's called the New Center area. "[Detroit] also just broke ground on a new \$800 million facility for the Red Wings [professional hockey team], and the city is experiencing a huge population growth in the downtown area."

Efforts will continue to grow and retain Michigan's traditional automotive industry, Stevens said, but at the same time, the region is segueing this cluster into next-generation mobility and intelligent transportation. "We are developing a hub for connected vehicle and related technology. We are positioning ourselves for the future and working to build a new mobility cluster out of our existing automotive cluster."

CentrePort Canada Inland Port

John Spacek, Vice President, CentrePort Canada, Winnipeg Inland Port, Manitoba, Canada

CentrePort Canada is North America's newest 20,000-acre inland port, located in Winnipeg, Manitoba. It is the only inland port in Canada to provide businesses with access to tri-modal transportation; a gateway to key markets in North America, Latin America, Asia, and Europe; and special trade benefits to foreign companies.

This new port is an exciting economic opportunity for Manitoba and for Canada at large, CentrePort's John Spacek said, as inland ports have become increasingly critical to the global supply chain in speeding the flow of cargo between ships and major land transportation networks and creating a more central distribution point.

CentrePort Canada was created through legislation passed in 2008 and is a unique partnership among governments, business, labor, and the community, Spacek said. The idea of this inland port came from a municipal task force that looked at how the region could leverage opportunities in the new world of supply chains passing through but not stopping in nearby communities.

"We subscribe to Professor Porter's approach in that it is about building competitiveness, and as such all of our investments have been strategic and centered on competitiveness," he added. Today, CentrePort Canada is focusing its business strategy development in six key sectors that best draw on the region's competitive strengths: agri-business, composites, mining/energy, biomedical, regional distribution, and ecommerce. "All of these sectors, except mining/energy, are within the cluster developments at the CentrePort site or adjacent to the site," Spacek said. "We are now drilling down into each of these sectors...and examining them in greater detail to determine CentrePort's strongest competitive advantages."

Knowledge Creation and Education: The Role of Public/Private Partnerships

Moderator: David Wolfe, Professor and Co-Director, Innovation Policy Lab, University of Toronto

University of Minnesota Strategic Planning

Brian Herman, Vice President of Research, University of Minnesota

In 2013, the University of Minnesota embarked on a strategic planning process designed to bring increased focus, alignment, and excellence for the University's research enterprise. The resulting research strategic plan—Five Years Forward—represents the collective voice of the University's leadership and research community, Brian Herman explained. The plan is designed to advance the research mission over the next five years through four cornerstones and a set of supporting goals that will guide these efforts going forward.

On one front, the University is working at proactively engaging industry partners to help determine what skill sets University students need to become good employees in the industries of the future. "We want our University to come up with real solutions to real problems for our global community...partnerships with the private industry will be an essential piece of that puzzle," Herman said.

The University also is thinking more carefully about what will help its private industry partners achieve their goals for growth. Part of this involves using transdisciplinary partnerships; that is, integrating and collaborating with what today are individual disciplines to create new disciplines with more breadth and practical applicability, Herman explained.

One of the many things the University already does well is develop new knowledge; what it does not do as well is translate that knowledge into practical use. "We have spent a lot of time over the past couple of years revising our technology transfer, intellectual property, and commercialization policies to make it much easier for our industry partners to access the new knowledge generated by the University," he continued. "We also realized that if we want to create bigger opportunities for the University, we need to understand that companies invest in things that will help them be successful. We now approach our public-private partnerships with the idea that it is an investment by the company that may have an expected return on it."

The last cornerstone of the Five Years Forward plan is creating a culture of serendipity at the University, Herman said. To that end, the University is working to cultivate an environment that "sparks rather unfocused, random conversations between very bright individuals across many different knowledge bases." The hope is that these informal discussions in some way lead to new ideas, thoughts, and innovations.

Nebraska Innovation Campus

Dan Duncan, Executive Director, Nebraska Innovation Campus Development Corporation

This notion of planned serendipity is also the thought behind the University of Nebraska-Lincoln's (UNL) new research park called Nebraska Innovation Campus (NIC). Operated by the Nebraska Innovation Campus Development Corporation, a private 501(c)(3) corporation, NIC has been designed to facilitate new and more in-depth partnerships between UNL and the private sector. It will focus on three interlinked clusters—food, fuel, and water—that are based on Nebraska's economy,

the areas of expertise within the University of Nebraska, and the niches in the North American research market.

"As we move forward with what we want to do with a modern innovation community...we know there has to be bold leadership...to create a sense of place where people want to come," Dan Duncan explained. Build-out of this campus will occur in phases, the first of which includes an office and conference center as well as a wet lab building, food processing pilot plant, and greenhouse complex. A number of companies, including ConAgra Foods, will have a presence on the campus, which Duncan said will create more jobs and allow faculty, staff, and students to work closely with the companies.

NIC also is striving to be a zero-waste facility. "As more and more companies calculate and pay attention to their carbon footprints, sustainability is key," Duncan added. "We are working with a local dairy to compost our organics, and we have smart buildings with daylight-harvesting fixtures and computer controls to manage the energy consumption." NIC is also located near one of Lincoln's wastewater treatment plants, which discharges 15,000 gallons of 60-degree water per minute. "We are borrowing that water and running it through a series of heat exchangers before it goes into a nearby creek. By doing that, we have a renewable energy source that will heat and cool up to 1.8 million square feet on campus as it sits today."

At full build-out, Duncan said, NIC will be a 2-million-square-foot campus with up to 7,000 people working, living, and playing in uniquely designed buildings and amenities that encourage people to create and transform ideas into global innovation.

Greater Omaha Economic Development Partnership (lowa and Nebraska)

Mark Norman, Greater Omaha Economic Development Partnership (Iowa and Nebraska)

Approximately 60 miles northeast of the Lincoln-based Nebraska Innovation Campus—and not too far from Iowa's western border—is the Nebraska city of Omaha, home of the Greater Omaha Economic Development Partnership.

This partnership is made up of six organizations from area counties, co-located at the Greater Omaha Chamber office. These organizations all work together to create jobs and encourage capital investment in the metropolitan area, Mark Norman explained. The partnership includes both urban and rural counties, including one county across the border in Iowa.

Earlier in 2014, the Greater Omaha Economic Partnership initiated a five-year economic development plan that was heavily influenced by Professor Porter's cluster theory, Norman said. The plan incorporates \$23 million over the next five years, or about \$4.5 million per year. About \$2.5 million of that is for economic development work geared around promoting and developing the six-county region's top business clusters: defense, financial services/transactions, and value-added agriculture.

Over the last 10-year funding cycle, the Greater Omaha Economic Partnership was directly involved in landing nearly 400 projects that have created or retained 22,235 jobs and created more than \$4.1 billion in capital investment. "We will ramp that up over the next five years and are hoping for more than \$1 billion a year in capital investment and more than 2,500 jobs per year created," Norman said.



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