EXECUTIVE SUMMARY
Growing Jobs, Industries, and Talent:
A Competitive Advantage Assessment and Strategy for Nebraska

Prepared for: Nebraska Department of Economic Development and Nebraska Department of Labor

Prepared by: Battelle Technology Partnership Practice

September 2010
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Executive Summary

Nebraska has weathered the recession much stronger than other states and, as Governor Heineman explained in his 2010 State of the State Address, “...we have seized the opportunity to make Nebraska more competitive.” In that spirit of gaining competitive advantage and building economic momentum going forward, the Nebraska Department of Economic Development (DED), in collaboration with the Nebraska Department of Labor, has taken the opportunity to consider how Nebraska is positioned in economic development and what strategies and actions are needed for advancing the state’s economic prospects.

The focus of this study is addressing the terms of competition of today’s global knowledge-based economy. What differentiates the 21st Century from the past is competition on the basis of technological innovation and talent—and not simply on the basis of lower costs of production for low-end sectors of the economy.

This rising global competition in the knowledge-based economy calls for Nebraska to be more strategic and comprehensive in its economic development approaches. So, this assessment of Nebraska’s competitive advantage focuses on three highly inter-related building blocks:

- The underlying performance of specific industry clusters in Nebraska, based on employment trends, economic output, and geographic patterns of development. This analysis also considers expected national growth rates and identifies niche industry specializations that can inform targeted industry development for the state’s economic development efforts;

- The position of Nebraska in innovation and high-growth potential entrepreneurial development in the state, and how Nebraska is positioned in core competencies for future growth;

- The talent position of Nebraska overall and within its leading industry clusters, and how to establish more concrete strategies to link talent with the state’s overall economic development efforts.

The Nebraska Department of Economic Development, in collaboration with the Nebraska Department of Labor, selected the Battelle Technology Partnership Practice (TPP) to conduct the competitive advantage assessments and to assist in crafting a strategic plan of action, with concrete action steps.

Battelle TPP is the economic development consulting arm of the world’s largest independent non-profit research and development organization. Battelle TPP brings to this project a position as the national leader in advanced, technology-based and cluster-driven economic development practice with an established track record in developing and advising many of the most successful modern development programs in the U.S.
Key Findings on Nebraska’s Competitive Advantage Assessment

The Competitive Advantage Assessment offers a detailed, fact-based analysis of Nebraska’s industry performance, technology drivers, and talent base. While the assessment considered broad trends, it provides a unique multi-dimensional view of Nebraska’s primary industry clusters that are driving the state’s economy.

From an economic development perspective, it is particularly important to focus on those industries that address the “wealth-creating” sectors of the state’s economy, or what is often referred to as “economic base” or “primary” industries. These primary industries address needs beyond local residents and businesses and produce goods that are exported or substitute for imported goods and services from outside of the state. The most effective way to advance the economic development of primary industries is to focus on industry clusters found within a state’s economic base industries. Industry clusters have become a mainstay of regional economic analysis because of the recognition that individual industries do not stand alone within state and regional economies, but are part of a broader complex of industries that are inter-related.

The competitive advantage assessment found that Nebraska is well-positioned in the fundamentals driving economic development in today’s global knowledge-based economy.

Nebraska has a diverse set of twelve industry clusters that are driving the state’s economy. Industry clusters are the means by which states and regions compete in a global economy. These twelve industry clusters represent closely related industries that are logically connected and have a substantial level of activity in Nebraska. They are diverse in the markets they serve as well as in the geographic areas of the state in which they are found.

The twelve primary industry clusters include:

- Agricultural Machinery
- Agriculture & Food Processing
- Biosciences
- Business Management & Administrative Services
- Financial Services
- Health Services
- Hospitality & Tourism
- Precision Metals Manufacturing
- Renewable Energy
- Research, Development, & Engineering Services
- Software & Computer Services
- Transportation, Warehousing, & Distribution Logistics
Nebraska’s primary industry clusters have performed strongly in industry employment measures. These 12 industry clusters provide a balanced portfolio of growth opportunities. Five of them—financial services; transportation, warehousing, and distribution logistics; precision metals manufacturing; biosciences; and renewable energy—are current strengths, i.e., they have a larger concentration of employment than found nationally and they are adding jobs more rapidly than at the national level. Three other industry clusters—R&D and engineering services; health services; and hospitality and tourism—are emerging strengths and opportunities with strong employment growth in Nebraska, but they are not yet specialized in their overall employment concentration in the state. The remaining four industry clusters—agriculture and food processing; business management and administrative services; software and computer services; and agricultural machinery—fall into a retention category, being highly specialized in their employment concentration but not faring as well in employment growth.

Nebraska Industry Clusters and Recent Employment Change, 2001–07

Exercising the performance of the state’s primary industry clusters from an economic output perspective further shows their strength and suggests that some with lagging employment are generating strong gains in economic output. Overall, eight of the 12 Nebraska primary industry clusters outperformed the national average in growth in value-added output. Three of them—agriculture and food processing; business management and administrative services; and hospitality and tourism—did so despite being three of the six industry clusters in which Nebraska either declined in employment and/or didn’t keep pace with the U.S. average rate of employment growth. Two clusters that are retention
targets from the employment analysis—agricultural machinery and software and computer services—are falling behind the U.S. in both employment and economic output growth measures.

**Change in Value-Added Output by Industry Cluster, 2001–07**

![Chart showing change in value-added output by industry cluster, 2001–07.](chart_image)

Source: Battelle analysis of IMPLAN Input/Output Model for NE and U.S. Change calculated on nominal values (not adjusted for inflation).

Economic performance alone, however, does not provide a complete picture of the potential for economic growth of Nebraska’s primary industry clusters. In today’s fast paced, technology-driven economy, it also is important to consider how each of the primary industry clusters are positioned from a “know-how” perspective or what is often referred to as core competencies based on the state’s industrial, academic, and medical research base.

**Six of the 12 industry clusters driving Nebraska’s economic growth stand out in the presence of core technology competency drivers.** Four industry clusters have a substantial level of core technology competencies as measured by publications, patents, and new start-up companies; they are agriculture
and food processing; biosciences; R&D and engineering services; and software and computer services. Two others—renewable energy and transportation, warehousing, and distribution logistics—had a significant level in core technology competencies.

Broader economy-wide trends in Nebraska in innovation and talent also point to positive findings from the competitive advantage assessment.

**Nebraska is reaching critical mass in having a research and development (R&D) base across industry and universities.** This R&D base has been growing strongly over the last decade, and now with nearly $900 million in annual total research and development activity, there is a substantial base upon which to build. Of particular note is that industrial R&D rose in Nebraska by 60 percent from 2001 through 2007, well outpacing the national growth of 33 percent. Meanwhile, university R&D advanced by 51 percent, matching the national growth rate.

**Trend in R&D Expenditures in Nebraska and the U.S., by Performer, 2001–07**

![Graph showing trend in R&D expenditures in Nebraska and the U.S., by Performer, 2001–07.](image)

Source: National Science Foundation, Surveys of R&D Expenditures at Colleges and Universities and Industrial R&D.
Nebraska also has a solid talent pipeline and well thought of incumbent worker base. In the generation of science and engineering graduates, Nebraska is on par with the nation. Moreover, its generation of degree graduates in fields of engineering, computer science, life sciences, and business and financial operations is well above the level of job openings found in Nebraska, as shown in the chart below. Nebraska is well regarded by its industry for the strong work ethic of its labor force.

Annual Supply and Demand for Nebraska Workers in Key Occupations, 2008

The competitive advantage assessment found some significant areas of weakness in the development of Nebraska's primary industry clusters and in the state economy's overall talent and innovation trends.

Nebraska's primary industry clusters fall well short in comparison to the nation in economic output per employee, a key measure that represents the productivity and economic value of products being produced in Nebraska. Only three industry clusters in Nebraska (not counting renewable energy for which there are no data), outperformed the U.S. in productivity, and many of Nebraska's industry clusters had 15 to 20 percent lower productivity than the U.S. overall. The three primary industry clusters that fared well in economic output per employee were agriculture and food processing; transportation, warehousing, and distribution logistics; and agricultural machinery.
Nebraska also falls short in the use of high-skilled labor across its primary industry clusters. Only the primary industry clusters of financial services, health services, and hospitality and tourism in Nebraska were at or above the national average employment levels for high-skilled occupations.

The other primary industry clusters in Nebraska had high-skilled occupational employment ranging from 40 percent of the U.S. average in transportation, warehousing, and distribution logistics to 86 percent for research, development, and engineering services.

**Share of Workers in Nebraska Industry Clusters Employed in High-Skilled Occupations, 2008**

![Bar chart showing the share of workers in Nebraska industry clusters employed in high-skilled occupations, compared to the U.S. average.](chart)

Source: Battelle analysis of Nebraska Dept. of Labor, Occupational Employment Statistics and BLS QCEW data from IMPLAN.

**From a broader economy-wide perspective, there is a noticeable drop off in industry demand in Nebraska for high-skilled occupations, the reverse of what has been happening across the nation.** Over the last few years the demand by all industry in Nebraska for scientists and engineers declined, and Nebraska industry was far off the pace in the growth in employment of computer-related workers.

**There also is a clear shortfall in translating Nebraska’s growing research and development base into new products and new companies.** Nebraska has made considerable gains in both industry and university R&D since 2001, but the state is lagging behind in its entrepreneurial activity and risk capital associated with translating research and development into new high growth potential companies. Moreover, Nebraska’s level of industry patent activity—the sign of intellectual property supporting new product development—is not keeping pace with the strong growth in industry and university research and development found in the state.
Development Challenges Identified for Nebraska

Battelle did extensive field work, conducting 124 interviews, including 62 industry, 30 university and 32 stakeholder interviews in early 2010. Battelle also benefited from the insights and reactions to the preliminary data analysis by three focus group sessions conducted in late April 2010 that focused on how best to advance business attraction, retention and expansion and innovation activities. Finally, throughout the project the Battelle team received input from an advisory committee organized by the Department of Economic Development, in consultation with the Department of Labor.

The intelligence gathered from the quantitative analysis and industry interviews, along with input from the focus group meetings and the advisory committee, led to the identification of the following specific economic development program gaps:

- **Addressing the challenges related to the demand and availability of a high-skilled workforce is perhaps the most cross-cutting issue facing Nebraska’s economic development efforts.** This is the number one issue of Nebraska’s existing industry, and it is also of concern to economic developers who point to losing opportunities for attracting companies into the state due to workforce talent and workforce shortages. The fact that industry in Nebraska is not oriented towards creating more high-skilled engineering, computer science, or scientist positions, as indicated by the analysis of occupational trends, may reflect a self-fulfilling prophecy. Industry may not want to create high-skilled jobs because they are uncertain whether they can find workers within the state or recruit workers to Nebraska. But the data on university graduates shows that the talent pipeline for high-skilled workers is in place in Nebraska. This suggests a significant disconnect between industry and the students coming out of colleges and universities, which can and must be addressed. It is particularly critical to address these high-skilled workforce issues if the state is going to see its lagging economic output per employee rise closer to national levels and be able to generate higher quality jobs in the state.

- **The lack of technology-based development programs oriented towards entrepreneurial development, risk capital, and the translation of promising research discoveries into new companies and products is a glaring gap in Nebraska.** Again, the issue is not whether there is sufficient university or industry orientation towards research. There is simply a lack of resources dedicated towards technology development along with a major disconnect between industry and universities in Nebraska. Very few of the companies interviewed by Battelle are working with universities in Nebraska collaboratively on R&D, and the level of interaction on workforce and technical assistance is also low. And this lack of connection was occurring despite the fact that
Nebraska industry is growing its R&D activities and also is active in new product development. (The Nebraska DED business visitation program found that 79 percent of 81 economic base companies had introduced new products during the last five years, and 69 percent will introduce new products during the next two years.)

- **There also is a strong imperative to address modernization and technology deployment to raise the productivity and value added found across Nebraska’s industry clusters.** Given the low levels of economic output per worker across nearly all of the state’s primary industry clusters, the emphasis on modernization and higher value added is a critical economic development issue for Nebraska. From industry interviews, Battelle learned that there is a significant recognition for the need to upgrade technology and the value of products being generated in Nebraska by industry, but far too often they are working in isolation from expertise found across the state.

- **On the business attraction front, economic developers point to the need to be more competitive with other states by having ready sites as well as being able to make financial assistance available upfront.** Existing industry in Nebraska did not express problems with improving space because they are committed to being in the state and are able to access Nebraska Advantage performance-based incentives. However, in out-of-state recruitment, having ready sites and being able to provide direct financial assistance are viewed as important by many in the economic development community. This is particularly the case because of neighboring state efforts such as Grow Iowa Values Financial Assistance Program (GIVFAP), under which the Iowa Department of Economic Development (IDED) has awarded 579 job creation or retention projects that have helped create or retain almost 34,000 jobs since July 1, 2003. These include projects for Wells Fargo, Google, IBM, Clipper Windpower, and Green Plains Renewable Energy. Similarly, Kansas through its Biosciences Authority is able to provide more upfront assistance, such as a $500,000 loan to Megastarter to finance a portion of the cost for the company to acquire and improve a facility in Wamego, KS to which the company will relocate from Colorado; $350,000 to PRA International of Lenexa to expand with a new facility providing bioanalytical laboratory services for clinical trials in the pharmaceutical and biotechnology industries, and $1.5 million to AGCO in Hesston as a partial match of a $5 million renewable energy R&D grant from the U.S. Department of Energy.

- **There is a lack of an organized approach to tailoring economic development outreach and engagement through the industry clusters found in Nebraska.** Industry interviews identified a concern about the isolation in the business community across both industry sectors and geographic areas of the state. The focus group discussions pointed out that Nebraska does not have a strong infrastructure of industry-driven associations related to targeted industry segments outside of the broad chambers of commerce found in the state, with a few exceptions, such as the biosciences, represented statewide by Bio Nebraska, and the transportation and logistics cluster, represented by the Nebraska Logistics Council.
Nebraska needs to ensure that it can stay abreast of ever-changing requirements for broadband Internet services. Broadband Internet access is an essential link to how we live, work, and play in the 21st century. The ability to access high-speed Internet services defines not only services that can be delivered to homes and businesses, but the types of work functions that can be carried out. For rural communities, next-generation broadband Internet has important implications for enabling residents to have access to broader job opportunities which in turn has implications for population stability and growth as well as choice and flexibility in where to live. While recent studies have found that Nebraskans make extensive use of broadband services, the state falls short in its connection speeds.

**Action Plan**

To build upon the strong fundamentals found across Nebraska’s primary industry clusters and to address the weaknesses and development challenges facing Nebraska, a comprehensive development program is proposed that will feature three critical initiatives addressing specific needs of Nebraska to ensure the state’s economy is globally competitive in the 21st century:

- **A Nebraska Industry Cluster Initiative** that includes tailored, industry-driven initiatives for workforce development, retention, expansion, and business attraction targeted to Nebraska’s industry clusters.

- **A Nebraska Talent Advantage Initiative** to establish connections and incentives for high-skilled talent to remain, return, or be attracted to Nebraska.

- **A Nebraska Innovation Initiative** to assist and enable growth-oriented emerging and existing companies in Nebraska to succeed.

This development program is structured to complement the state’s highly successful signature economic development program, Nebraska Advantage, which is a comprehensive incentives program that helps attract out-of-state businesses to Nebraska, aids existing business expansion, and encourages new business start-ups. As reported in the many industry and stakeholder interviews, Nebraska Advantage is well regarded and viewed as the foundation upon which to continue to advance Nebraska’s future economic development efforts.
Overview of Strategic Rationale and Objectives

Nebraska Industry Cluster Initiative
Many state industry clusters share a common market that they serve, while others are based more on shared “know how,” such as in the biosciences or information technology. As the National Governors’ Association explains, it is critical that each state identify and focus on its specific industry clusters that can drive its broader economic growth in the global economy: “U.S. economic strength depends on the ability of each state to “compete” successfully in the world marketplace. Each state must exploit the unique advantages it has relative to other states and build on the strengths found in its local “clusters of innovation”—distinct groups of competing and cooperating companies, suppliers, service providers and research institutions.”

The Battelle analysis found that Nebraska lacks an organized approach to tailoring economic development outreach and engagement through its industry clusters.

Among the specific objectives being advanced under the Nebraska Industry Cluster Initiative are:

- Address common needs of firms in a cluster from workforce development to technical assistance to market access.
- Better organize and focus state economic development services to advance competitive industries.
- Enable more broad-based initiatives to engage colleges and universities to address industry needs and opportunities.

Nebraska Talent Advantage Initiative
Among the specific objectives being advanced under the Nebraska Talent Advantage Initiative are:

- Improve sharing of information on current and developing career opportunities in Nebraska with web-based tools.
- Strengthen connections between students and companies.
- Address high-demand, skill-shortage areas.
- Provide incentives to recruit high-skilled workers, especially targeting former Nebraskans to enable growth of the state’s industry base.

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Nebraska Innovation Initiative
Among the specific objectives being advanced under the Nebraska Innovation Initiative are:

- Improve the translation of Nebraska’s R&D base into new products and new companies.
- Support development of growth-oriented start-up companies.
- Upgrade the value-added activities and modernize Nebraska’s existing industry clusters.

Action Plan for the Nebraska Competitive Growth Initiatives
For each of these initiatives, specific actions are identified to address the key objectives for advancing industry clusters, promoting the growth and deployment of Nebraska’s talent base, and ensuring that Nebraska is able to translate its R&D strengths into new products and processes. These actions represent a mix of immediate, near-term, and long-term activities to be undertaken.
The full action plan is listed below:

<table>
<thead>
<tr>
<th>INITIATIVE</th>
<th>ACTION</th>
<th>Timeline</th>
<th>Resources Required</th>
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<tbody>
<tr>
<td><strong>NEBRASKA INDUSTRY CLUSTER INITIATIVE</strong></td>
<td>Enhance functionality of Nebraska Advantage Incentives for high-impact projects.</td>
<td>Immediate</td>
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<td>Establish state agency cluster resource teams, each with a lead DED staff person, with initial focus on “bio solutions.”</td>
<td>Immediate</td>
<td>-0-</td>
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<td>Establish a Nebraska Strategic Opportunity Fund for site and facility development.</td>
<td>Immediate</td>
<td>$10–$20 million annually</td>
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<td>Provide competitive, matching funds for project-based “cluster activities,” including formation of industry-led cluster organizations and industry-higher education collaboration centers.</td>
<td>Near-Term</td>
<td>$2 million annually</td>
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<td>Establish a major tourism destination (Mahoney-type) in the Sandhills that capitalizes on the region’s unique scenic, ecological, and recreational advantages.</td>
<td>Long-Term</td>
<td>TBD</td>
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<tr>
<td><strong>NEBRASKA TALENT ADVANTAGE INITIATIVE</strong></td>
<td>Promote on-site and distance-related postsecondary student internships across the state with businesses in economic base industries.</td>
<td>Immediate</td>
<td>$1 million annually</td>
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<td></td>
<td>Develop and market a Nebraska Jobs Search Site (NEworks) in collaboration with the Department of Labor, to serve as a portal and networking vehicle with specific emphasis on connecting students and graduates with employer needs in targeted, high-skill occupations.</td>
<td>Immediate</td>
<td>$1 million annually</td>
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<td>Revamp Career &amp; Technical Education in K-12 targeted to high-demand, high-shortage occupations, including through virtual high school enabled by expanded broadband.</td>
<td>Immediate</td>
<td>$1 million annually</td>
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<td>Enhance entrepreneurial opportunities by providing mentoring, training, and increased capital access, particularly for high-growth businesses.</td>
<td>Immediate</td>
<td>$500,000</td>
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<td>Create targeted skill centers at postsecondary institutions for documented skill shortage areas.</td>
<td>Near-Term</td>
<td>$500,000</td>
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<td>Provide for incentives in Science, Technology, Engineering, and Mathematics (STEM) occupations for graduates in high-wage, high-skilled fields to work in Nebraska in target industry clusters for which there is a critical skill shortage (similar to Rural Health Opportunities Program—RHOP).</td>
<td>Near-Term</td>
<td>TBD</td>
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<tr>
<td>INITIATIVE: NEBRASKA INNOVATION INITIATIVE</td>
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<tr>
<td>ACTION: Expand Small Business Innovation Research (SBIR) outreach efforts.</td>
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<td>Timeline: Immediate Resources Required: $300,000 annually</td>
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<td>ACTION: Enact an angel investment tax credit.</td>
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<td>Timeline: Immediate Resources Required: -0-</td>
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<td>ACTION: Provide a financing mechanism for modernization and expansion to manufacturing companies tied to investments in improved productivity and higher wages—modernization fund.</td>
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<td>Timeline: Immediate Resources Required: $15 million</td>
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<tr>
<td>ACTION: Develop applied industry-university research matching grants for next-generation product and process innovations.</td>
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<td>Timeline: Immediate Resources Required: -0-</td>
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<td>ACTION: Revise Nebraska Advantage Tiers to provide incentives for manufacturing firms to modernize their business operations in a manner that generates increases in sales and raises wage levels.</td>
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<td>Timeline: Immediate Resources Required: -0-</td>
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<tr>
<td>ACTION: Update efforts in modernization and technology advancement for manufacturing companies to also include a matching fund for product design, prototyping, and testing activities.</td>
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<td>Timeline: Immediate Resources Required: $400,000</td>
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<td>ACTION: Adopt and support minimum standards for broadband Internet service that continually exceed any Federal standards to help grow the mobile and entrepreneurial economy.</td>
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<td>Timeline: Immediate Resources Required: TBD</td>
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<tr>
<td>ACTION: Establish a statewide commercialization service to mentor and advise technology-oriented entrepreneurs and early-stage companies.</td>
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<td>Timeline: Immediate Resources Required: $500,000 annually</td>
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<td>ACTION: Establish a private sector-driven Nebraska Innovation and Technology Development Organization.</td>
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<td>Timeline: Near-Term Resources Required: $750,000 annually for operation</td>
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<td>ACTION: Create a private sector-driven venture financing entity for equity, near-equity, modernization, and working capital.</td>
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<td>Timeline: Long-Term Resources Required: One-time funding—up to $50 million</td>
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Note: Timeline = Immediate, within 1 year; Near-Term, 1–2 years; Long-Term, over 2 years.

**Sources of Funding**

Given the tight fiscal situation in Nebraska, it is important to consider where the funding will come for such a comprehensive economic development approach. Much of the funding for the proposed initiatives and specific actions can be accomplished by reallocating funding from ongoing programs that are not serving to advance the state’s critical economic development needs and by tapping existing sources of revenues.
Strong consideration should be given to reallocating funding from the following economic development programs:

- Redeploy use of variety of programs, such as Microenterprise Development Fund, Value-Added Grants, Experimental Program to Stimulate Competitive Research (EPSCoR) and Nebraska Heritage Fund, among others.
- Support venture financing with de-federalized Community Development Block Grant (CDBG) reuse funds.
- Reallocate a portion of existing Nebraska Advantage tax credits to provide for upfront assistance for identified projects.
- Redeploy use of Nebraska Training and Support Trust Fund.
- Redeploy state general appropriations for university research initiatives towards applied R&D with industry and talent connections.
- Consider broadening Affordable Housing Trust Fund to allow for support and development of business/industrial buildings and sites.

In terms of existing revenue sources to tap, consideration should be given to:

- Seek dedicated source(s) from existing state taxes, utilities fees, other fees, and settlements generated by industry activities, including from the cigarette tax and documentary stamp tax.
- Consider broadening use of Lottery Funds for educational purposes to cover Nebraska Talent Advantage functions and other talent actions.
- Consider use of Nebraska Investment Finance Authority (NIFA) to fund modernization fund.

It also is critical that Nebraska aggressively pursue federal opportunities for cluster initiative support from agencies such as the U.S. Department of Commerce’s Economic Development Administration, the U.S. Small Business Administration and the National Science Foundation. If these sources of funding are pursued, it is likely that the impact of the proposed new initiatives and actions would be quite small on the state’s overall general fund.

Pursuing this Nebraska Competitive Growth Initiatives development program in a fiscally sound manner will provide a strong complement to the state’s ongoing Nebraska Advantage tax incentive program by providing new economic development tools to advance the state’s ability to compete on the basis of technology modernization and innovation, as well as high-skilled talent—key ingredients for success in today’s global knowledge-based economy.