

# Supporting Innovation-Led Growth in Nebraska

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## Why does innovation matter for economic growth?

Innovation is the process of getting new goods and services into the market. Technological innovation impacts U.S. companies by increasing the productivity of companies that adopt new technologies (lowering their costs and increasing their competitiveness) and by increasing the revenue and market share of companies that are able to introduce new or better products and services.

Nebraska's ability to support innovation activities and the growth of knowledge- and technology-intensive companies will impact not only the pace of economic growth, but also the type of jobs created in the coming decades. Two-thirds of U.S. economic growth is attributable to technological change embodied in workers, production processes, and new products and services.<sup>1</sup>

Consequently, a state or region's capacity to support innovation impacts:

1. The competitiveness of its existing industry base,
2. The type of new companies a region can grow and attract, and
3. The wage level of the new jobs being created.

## What is the role of government in innovation?

In an ideal world, everyone has perfect information and the private sector allocates capital efficiently. In the real world, risk and imperfect information prevent a lot of innovation from occurring. Risk and lack of information can prevent:

1. Existing companies from adopting new technologies;
2. Entrepreneurs from pivoting their technology to the best business application; and
3. Investors (corporate, institutional and individual) from investing in the best startups.

However, state government can play a catalytic role in an innovation ecosystem by assessing how well or how poorly functional elements and key actors are operating at the macro level. Government agencies, like the Nebraska Department of Economic Development, can serve as honest brokers in an ecosystem connecting different actors and incentivizing collaborative behavior around a shared goal of improving the rate of technology commercialization and startup growth.

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<sup>1</sup> Solow (1956). "A Contribution to the Theory of Economic Growth. Robert M. Solow" *The Quarterly Journal of Economics*, Vol. 70, No. 1, pp. 65-94; Solow (1957) "Technical Change and the Aggregate Production Function," *The Review of Economics and Statistics*, Vol. 39, No. 3, pp. 312-320; and Dennison, *Trends in American Economic Growth, 1929-1982*.

## Gap analysis of Nebraska’s innovation ecosystem

Dynamic innovation ecosystems are built upon the performance of many different actors—entrepreneurs, startup companies, existing companies, investors, accelerators, universities, tech transfer offices, chambers of commerce, state and local government agencies, etc.—functioning at a high level both individually and collectively toward a shared objective of technology commercialization and the growth of startup companies.

### Innovation Ecosystem Framework



#### **SRI International**

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The Nebraska Department of Economic Development engaged SRI to perform a high-level assessment of Nebraska’s innovation ecosystem in order to identify gaps and opportunities that the state can target for future investment. SRI employed our innovation ecosystem framework for this gap analysis. The framework assesses regions based on five functional elements: idea generation, talent, risk capital, market access, and networks.

#### **SRI identified three major challenges in Nebraska: risk capital, market access, and talent.**

SRI analyzed available data on each of these functional elements—economic data, research and development expenditures, venture capital data, etc. We conducted interviews with startup founders representing AgTech, HealthTech, Biomedical, Software, and other sectors. We interviewed directors of accelerators; investors; university leadership, tech transfer office staff, and faculty; regional economic development agencies; and chambers of commerce.

From our assessment of Nebraska’s innovation ecosystem, SRI identified three major challenges to supporting more innovation-based activity and growth:

- Risk Capital
- Market Access
- Talent

SRI’s summary of Nebraska’s innovation ecosystem strengths and challenges are presented in the table below. The table presents a key functional element, common challenges that regions encounter with these functional elements, and SRI’s assessment of how Nebraska performs, as a whole, in this element. A “+” indicates that Nebraska’s ecosystem actors perform well in a particular functional element, while a “-” indicates a weakness or gap in a particular functional element. A “+/-” indicates that there are examples of both strengths and weaknesses among different actors throughout the state. Following the table are more detailed analysis and examples from our quantitative and qualitative analysis of each element.

**Table 1 Nebraska Innovation Ecosystem Assessment**

Functional Element	Common Challenges	Nebraska
Idea Generation	Low innovation rates among existing companies and startup companies	+/-
	Weak tech transfer by research institutions	+/-
Talent	Experienced entrepreneurs	-
	Mid-career manager or director-level talent	-
Risk Capital	Pre-seed/seed	+/-
	Series A venture capital	-
Networks	Connections among in-state actors	+
	Connections to out-of-state actors	-
Market Access	Productivity of startup connections to existing industry base	-
	Alignment of industry base with tech startup sectors	-

Source 1 SRI International analysis.

## Idea Generation:

Existing industry base: Most innovation happens in companies, because companies have the infrastructure (sales, supply chain, distribution, etc.) and skill sets for getting new products into the market. Within Nebraska's existing industry base, there are many examples of large companies that are investing in corporate innovation and in startups. Some examples include Nelnet, Union Pacific, Bryan Health, First Data Resources, etc.

Startups: The U.S. Census Bureau collects data on new business startups overall, but not on technology startups specifically. Nebraska ranks below the national average in total new business creation: 8.7 versus 10.2 nationally per 1,000 establishments.<sup>2</sup> A recent report indicates that Nebraska has followed the national trend with fewer total startups in this most recent recovery (2010-2014) than in previous recoveries (2002-2006 and 1992-1996) and with a heavy concentration of startups in more urban and densely populated counties, which is also a national trend and pattern.<sup>3</sup>

Investors, accelerators, and Nebraska startup founders who SRI interviewed indicate that they do see an upward trend in Nebraska's tech-based startup activity over the past five to ten years. This is supported by the available data, e.g., growth in deal flow and venture capital activity (see Risk Capital section). Who are Nebraska's startup founders? Nearly all of the tech startup founders interviewed by SRI had attended a Nebraska university at some point. Most had left the state for 10 to 30 years gaining a variety of industry domain and other experiences, and returned to Nebraska attracted by the cost of living, quality of life, and Nebraska Innovation Act programs.

Universities: While most innovation happens in companies, the source of these innovations can be external as well as internal. A recent survey of U.S. manufacturers found that 49% cited an external actor as critical to their most important innovation in the last two years measured by sales growth.<sup>4</sup> These external sources include suppliers, business-to-business (B2B) customers, competitors, startups, applied research organizations, universities, and government labs. Some technology areas are more science-driven than others, which is where a university's multidisciplinary expertise is a huge asset. It's also worth noting that students who work on applied research projects for industry are a primary conduit of university-industry tech transfer and commercialization.

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<sup>2</sup> U.S. Census Bureau. Business Dynamics Statistics.

<sup>3</sup> Economic Innovation Group (2016). The New Map of Economic Growth and Recovery. <http://eig.org/wp-content/uploads/2016/05/recoverygrowthreport.pdf>





<sup>4</sup> Arora, Walsh, Cohen.

**Talent:** Things don't innovate; people innovate. This is why corporate and institutional venture investors invest first in the management team and second in the value proposition, scalability, and IP position of a startup. As mentioned in SRI's Economic Development Ecosystem report, Nebraska farmers have always been entrepreneurial and innovative, finding ways to improve equipment and to improvise solutions to challenges encountered on a regular basis. However, SRI interviews found broad consensus that there is a dearth of experienced entrepreneurs in Nebraska who have founded and scaled high tech companies to \$20 million or more in revenue, especially outside the software/tech sector. Across the U.S., the profile of successful high tech entrepreneurs and startup founders tend to be people from industry who come out of the R&D, engineering or other functions within large existing companies. There is considerable tacit knowledge, or learning-by-doing, associated with getting a new product or service into the marketplace at a cost competitive price and scale. This is a challenge for Nebraska's innovation ecosystem, because the state does not have large R&D-intensive companies in all the technology areas where it has entrepreneurial activity.

On the other hand, if startup companies, such as Hudl, Blue Prairie Brands, Power Sports Nation, or others, are able to further scale over the next 10 years, this will have a significant and positive impact on Nebraska's ecosystem. One example of this impact is Centrix Solutions. Centrix Solutions is a privately held company in Lincoln that provides financial institutions with software products that detect fraud, manage risk, and simplify compliance. In 2015, Q2 Holdings, Inc., a publicly traded provider of secure, cloud-based virtual banking solutions for credit unions and community banks, acquired Centrix Solutions for \$20 million in cash. Centrix shareholders can expect an additional \$9 million return based upon the company achieving certain milestones. At the time of the acquisition, Centrix's offices employed 26 people all located in Lincoln. Shortly after the acquisition, Q2 Holdings announced plans to triple the size of the Lincoln office to 20,000 square feet to house current Lincoln employees, as well as new employees the company plans to hire, including developers, project managers, and implementation engineers. This type of growth will have a long-term positive impact on the startup ecosystem in Nebraska.

**Risk capital:** Like Nebraska, many states have made significant investments in innovation programs aligned to their economic development objectives. The table below compares investment levels by Nebraska and other states in programs that support technology commercialization and early-stage funding for startup companies. Normalizing these figures by the size of the economy (measured by GDP), Nebraska ranks fourth out of the four states noted below with \$62 of state investment in its innovation programs per \$1 million dollars of state gross domestic product (GDP).

**Table 2 Comparison of State Innovation Programs Funding Levels, 2015**

State Innovation Program	FY 2014 Appropriation (\$)	State GDP (\$)	Funding/\$1M GDP
 Ohio	\$132M	\$585.6Bn	\$225
 Utah	\$22M	\$142.7Bn	\$154
 Oklahoma	\$18M	\$183.0Bn	\$98
 Nebraska	\$7M	\$113.1Bn	\$62

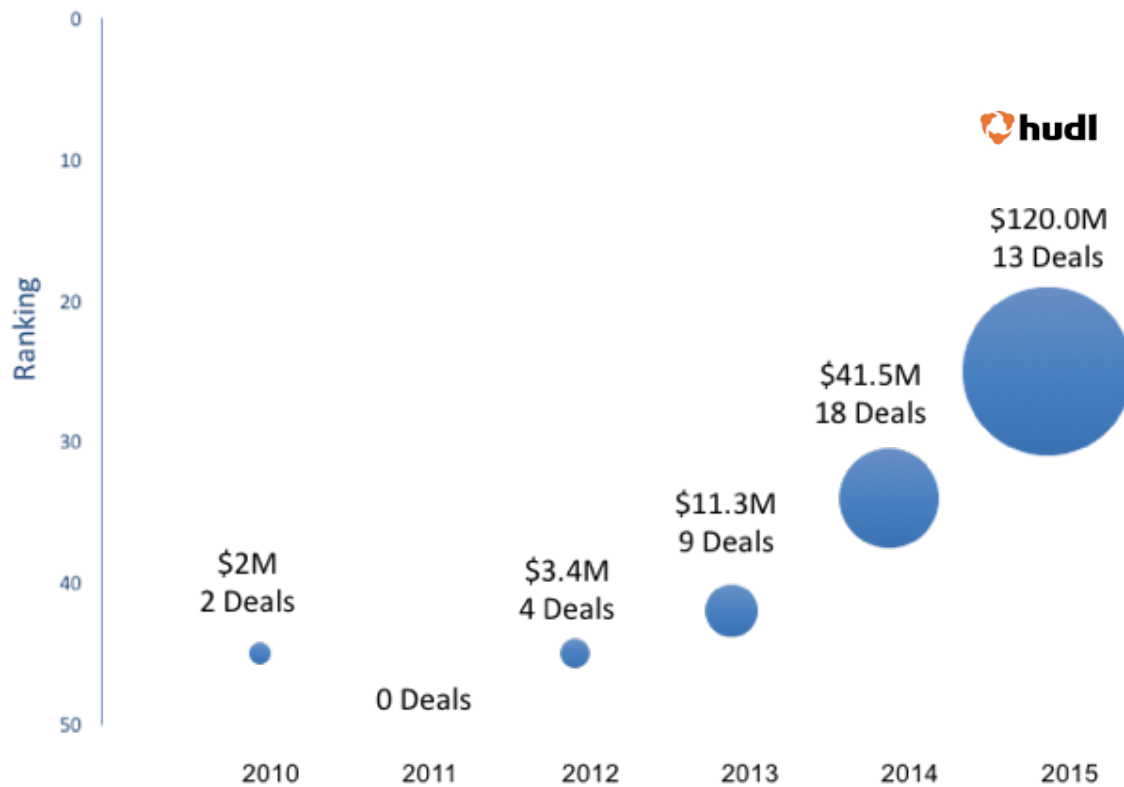
Source 2 Ohio Legislative Service Commission (2013) Greenbook: Analysis of the Enacted Budget, Development Services Agency, p.20, <http://www.lsc.ohio.gov/fiscal/greenbooks130/dev.pdf>; Oklahoma Center for the Advancement of Science and Technology (2013), FY2014 – 2020 Strategic Plan, p.14, <https://www.ok.gov/ocast/documents/OCASTStratPlan14-20.pdf>. Utah State Legislature (2015). Compendium of Budget Information, [http://www.le.utah.gov/lfa/reports/cobi2015/agcy\\_714.htm](http://www.le.utah.gov/lfa/reports/cobi2015/agcy_714.htm).

Note Ohio Third Frontier funding has been increasing over time up from \$73.5M in FY2012; OCAST's funding has decreased over time from \$22M in FY2010 due to across the board budget cuts; and USTAR's funding has stayed at the same level.

As startup activity has increased across the state, venture capital investment in Nebraska companies has grown significantly over the past five years. Hudl's impressive \$72 million venture capital round in 2015 aside, Nebraska companies have demonstrated year-on-year growth in venture capital investment since 2011.



Figure 1 Venture Capital Investment in Nebraska Startups, 2010-2015



Source 3 PwC Money Tree Survey

These deals, and others that have received angel investment and corporate venture investment that are not reflected in the institutional venture capital data above, have been supported by Nebraska’s Business Innovation Act Programs. In particular, Nebraska startup founders have heavily leveraged the state’s Prototype Grants, R&D Grants, Commercialization Fund (i.e., Invest Nebraska Seed Fund), and Value-Added Agriculture Grants to hit technical and business milestones needed to attract private investors. Startup investors cite the Angel Investment Tax Credit as being important to their investment decisions. The figure below shows the state’s funding for these programs. The Business Innovation Act includes funding for the SBIR/STTR proposal assistance and matching grant, R&D grants, Prototype grants, Commercialization (Invest Nebraska) funding, and Microenterprise Assistance.

**Figure 2 Nebraska's Talent and Innovation Initiative Programs**

Talent and Innovation Initiative				
Intern Nebraska \$1.5M	Business Innovation Act \$7M		Angel Investment Tax Credit \$3M	Site and Development Fund \$2.5M

Business Innovation Act				
SBIR/STTR Match	R&D Grants	Prototype Grants	Commercialization (Invest Nebraska)	Microenterprise Assistance
Includes Value-Added Ag				
\$6M				\$1M

**Source 4 SRI International**

**Networks:** SRI interviews indicate that Nebraska innovation ecosystem stakeholders believe they have good connections with different actors in the system (i.e., universities, accelerators, angels and VCs, startups, industry, state and regional economic development agencies). Especially critical in innovation ecosystems are productive relationships between companies and universities, existing industry and startup companies, and industry-university-government agencies around technology commercialization and startup support objectives.

Connection to existing industry both within and outside the state are important since existing companies are potential advisors, investors, partners, and customers of startup companies.

One indicator of the strength of industry-university connections is industry’s share of total research funding at academic institutions. A common, but pervasive fallacy is that innovation is a linear process that begins with basic research and moves to applied research and then product development and commercialization. As Dr. Kaigham (Ken) Gabriel, a former Google executive and Defense Advanced Research Projects Agency official and current CEO of Draper Labs at MIT stated, “The idea that basic research is unaffected by use-inspired applications is not valid.”<sup>5</sup> Meaning that closer connections between researchers in government labs and universities with companies has a noticeable impact on the commercialization rates (licensing activity) by universities and government labs. The university tech transfer data in the table below demonstrates this correlation between growth in the share of industry-sponsored R&D and growth in licenses executed.

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<sup>5</sup> Presentation by Dr. Kaigham Gabriel, President and CEO of MIT Draper Laboratories (2016). “Disciplined Innovation” Industrial Research Institute Annual Meeting, Lake Buena Vista, FL. May 25, 2016.

**Table 3 Tech Transfer Performance: University of Nebraska System vis-a-vis Peer States**

	Total R&D Expenditure (\$M)	Licenses and Options Executed		Gross License Income (\$M)		Startups Formed		Industry Sponsored R&D %	
	2014	2010	2014	2010	2014	2010	2014	2010	2014
Univ. of Utah System	\$450.5	68	105	\$37.5	\$76.5	18	16	11%	13%
Univ. of Iowa System	\$444.0	21	32	\$27.0	\$1.6	3	11	4%	4%
Univ. of Nebraska System	\$329.5	47	37	\$3.7	\$6.2	7	6	5%	5%
Univ. of Missouri System	\$325.6	54	67	\$10.1	\$10.8	7	5	3%	4%
Univ. of Kansas System	\$224.6	7	33	\$0.9	\$10.6	0	3	3%	5%

**Note 1** Iowa is an outlier. The reported number of licenses increased from 2010-2014, while gross licensing income declined dramatically over the same period. SRI would need access to more detailed data than AUTM provides to understand the underlying factors.

**Source 5** Association University of Technology Managers

**Market Access:** The number one reason that startups fail is due to a lack of customers, so access to potential customers early on is not trivial. As noted in the Networks section, a region’s existing industry can contribute to the innovation ecosystem by acting as advisors, investors, partners, and customers to startups. Nebraska entrepreneurs note that one advantage of Nebraska’s small size and strong in-state network is that it is relatively easy to get an audience with very senior executives in large companies. However, a challenge is that these companies are not always in industry sectors aligned to the technology sectors that the startups are in. For example, Nebraska has a small number of biomedical companies, and no clusters of companies in any one domain. Examples of Nebraska biomedical companies include GSK/Novartis in consumer health products manufacturing; LI-COR in scientific instrumentation, reagents and software; Streck in clinical laboratory products; and BD Medical Technology in drug delivery systems.

The same is true with regard to accelerators, angel groups and indigenous venture capital not necessarily having domain expertise and strong industry connections outside the state in biomedical, HealthTech, etc.

In such cases, leveraging the out-of-state industry connections that you do have is very important. Universities and their tech transfer and industry liaison offices have done this by getting more systematic in tracking the career paths of alumni. University development offices have been surprised to

see that alumni are more willing to provide gifts back to the universities when they are engaged in serving as advisors to university startups or involved with existing faculty as consultants or for sponsored research projects.

A second challenge is that some of Nebraska's large companies may not have strong external technology and corporate innovation functions themselves—they may not have a defined process for working effectively with startups. This is not just a Nebraska corporate innovation challenge, but a U.S. corporate innovation challenge. Like workforce and other issues important to industry, trade associations may be one vehicle for identifying and disseminating best practices for building corporate technology scouting functions. Another opportunity can be found in expanding regional efforts to encourage connections between existing companies and entrepreneurs through reverse pitches and other matchmaking mechanisms. A successful example of this is the Lincoln Partnership's JumpStart Challenge (formerly Healthcare Connect). Nobl Health was born from winning a nursing rounds management and communication challenge put forth by Bryan Health, a Lincoln medical center.

Access to existing companies is a good start, but improving the productivity of these relationships in terms of technology commercialization outcomes is important.

## Recommendations

From our assessment of Nebraska’s innovation ecosystem, SRI identified three major challenges to supporting more innovation-based activity and growth: risk capital, market access, and talent. Early-stage tech companies need capital to develop prototypes, conduct further testing, and advance technologies to a stage where potential customers and investors can evaluate them for investment decisions. As mentioned earlier in the report, Nebraska lags peer states in the level of funding appropriated for the Nebraska Business Innovation Act programs. SRI’s first recommendation is to increase the appropriation for the programs in line with growing demand. Second, the number one reason that startups fail is due to a lack of customers, and SRI finds that Nebraska can strengthen connections between startups and existing companies in the state. A good model here is the Illinois Startup Challenge and some successes Nebraska has already had with reverse pitch competitions. Finally, although most successful technology entrepreneurs come out of industry, nearly all of them have graduated with one or more degrees. The quality and dynamism of Nebraska’s higher education system and the range of applied research and entrepreneurial experiences offered can play an important factor in decisions to return to Nebraska after time away gaining industry experience in other parts of the country. Therefore, our third and fourth recommendations focus on how to maximize the state’s higher education institutions for innovation-led growth and economic development.

### 1. Risk capital: Increase appropriation for Nebraska Business Innovation Act Programs in line with growing demand

Commercializing new technologies is challenging and risky. Especially in the case of more hardware- or capital-intensive startups, funding is needed to develop a prototype and perform testing to validate proof-of-concept to effectively pitch the technology to potential customers and investors. Nebraska’s Business Innovation Act programs address this early-stage risk capital gap through its Commercialization, Prototype, R&D, Value Added Ag, and SBIR/STTR matching grants and investments.

Three observations emerged from our analysis of the data and discussions with recipients of Prototype, R&D, and SBIR/STTR matching grants and Commercialization (seed stage) investments from Invest Nebraska. First, there is clearly excess demand for the Commercialization, Prototype, and R&D grants. Secondly, startup company grant recipients stated that these competitive commercialization funding programs had helped advance their technologies and enabled them to raise additional follow-on investment. Third, several startup companies remarked that these are very well run programs highlighting NDED’s quick turnaround of applications and the ease of the expense reimbursement process against the grants. We highlight this feedback, because private sector stakeholders complimenting a government agency for operating at the “speed of business” is rare and high praise.

The table below presents 2013-2015 data for each of the Nebraska Business Innovation Act funding programs. Approximately one-third of Commercialization applications were funded and slightly more than half (57.3%) of Prototype applications were funded. SRI recommends increasing the appropriation

from its current \$7 million level to accommodate increasing demand if NDED and Invest Nebraska are having to turn away high-quality applicants for lack of funding.

**Table 4 Nebraska Business Innovation Act Program Demand vs. Actual Awarded, 2013-2015**

Program	# of applications	# of awards/ investment	Amount requested (\$M)	Amount awarded (\$M)
Commercialization (Invest Nebraska)	59	18	\$22.2	\$5.3
Prototype Grants	143	82	\$6.9	\$3.8
Academic R&D Grants	52	46	\$6.4	\$4.7
Value-Added Ag	34	34	\$3.1	\$3.1
SBIR/STTR	43	41	\$1.333	\$1.323

**Source 6 Nebraska Department of Economic Development**

## 2. Market access: Strengthen connections between existing companies and startups

The strength of productive relationships across different actors in an ecosystem is a key differential in regional innovation and economic performance. SRI sees an opportunity to build on Nebraska’s regional efforts to bring together existing companies and startups around complimentary technology needs and capabilities. As noted in the Gap Analysis section of this report, the Lincoln Partnership has piloted this program as a “reverse pitch” type of program. The Governor of Illinois launched a similar statewide program in 2013 called the Illinois Corporate StartUp Challenge. The goal of the program is to connect the state’s emerging, innovative startups with major corporations to drive growth in both companies. The Illinois S&T Coalition, a nonprofit organization, was selected as the intermediary organization to run the pilot program with strong support from the Governor’s Innovation Council. Nebraska could pilot a statewide Nebraska Corporate Startup challenge program to support and strengthen connections between existing companies and startup companies or entrepreneurs. More work still needs to be done by the Nebraska Department of Economic Development to figure out the best implementation model for the state. A case study of the Illinois Corporate Startup Challenge program is presented below.



# ILLINOIS CORPORATE STARTUP CHALLENGE

The Illinois Science & Technology Coalition (ISTC) is a non-profit organization whose membership includes large corporations, universities, federal labs, and regional economic development organizations. ISTC manages the Illinois Corporate Startup Challenge, an innovative ISTC program that pairs Fortune 500 companies with early-stage companies to address corporate innovation needs through a highly curated matchmaking process.

The process begins with the corporate partner. A cross-functional ISTC team conducts a “discovery day” with the corporation, taking a deep dive into technology opportunity areas specific to the company. Once the team has identified a set of technology needs, ISTC leverages its network of community referral partners (which includes universities, nonprofits, incubators, and the VC community) who then respond with specific startups that align with these technology areas. ISTC screens and performs due diligence on approximately 200 startups/early-stage companies. ISTC develops a portfolio of 30-35 startups for each corporate partner review. The corporate partner selects roughly 10-12 of these startups to present at a private demo day.

ISTC has achieved a fairly high “hit rate” with a number of successful outcomes, such as contracts with a sizeable first customer. When corporations decide to go ahead with a startup, it takes about 3-6 months for the validation of the product. He noted that even unsuccessful startups get invaluable feedback on their technology and company.

The program has gone through four “classes” of Startup Challenges, each with three to five corporate partners involved. Corporations pay a flat rate fee to participate in the Startup Challenge.

See Caterpillar’s promotional video about the Corporate Startup Challenge:

<http://www.caterpillar.com/en/news/caterpillarNews/innovation/10-companies-participate-in-the-caterpillar-startup-challenge.html>

### 3. Talent: Strengthen entrepreneurial opportunities for students at universities and community colleges to produce “T-shaped” individuals

Recently, in the press and in presentations, IBM executives have been underscoring their need for and commitment to retaining “T-shaped” individuals in the company. Although not a new concept, T-shaped individuals refers to those workers with both deep expertise in at least one area, usually technical, complemented with a broad working knowledge of multiple areas that enables them to interact effectively with various facets of an organization.

“We want people who can wrap their head around the whole thing and be part of teams... Truth be told, we would rather hire people from a startup, acquire a startup, or hire them from a failed startup than hire out of a university.”<sup>6</sup>

Jim Spohrer, Director, IBM Global University Programs

How do tech startups cultivate T-shaped individuals? Startups require founding team members to have or rapidly develop business, management, and communication skills, as well as grit and adaptability in the face of setbacks. In a speech given by IBM’s Chief Innovation Officer, Bernard Myerson said the way IBM retains its “T-shaped” individuals is by constantly throwing different opportunities at them left, right and center. “T-shaped” individuals thrive on learning and growth opportunities.

Workforce is an important issue for Nebraska given its small population, low unemployment rate, and growing demand for particular skill sets. While very few of Nebraska’s startup founders came directly out of its colleges and universities as faculty or graduates, nearly all of the founders interviewed by SRI had received at least one degree from a Nebraska university in the past. As Nebraska’s technology companies continue to grow, Nebraska will need to recruit mid-career talent from outside the state. Bringing in talent and new ideas from outside is never a bad thing for an ecosystem. On the other hand, the type of experiences that students have while at Nebraska institutes of higher education will shape their perception of Nebraska as they go out into the world. It will also be a calculation in their decision to return.

Like IBM, Nebraska needs to give the students it educates different opportunities left, right and center— e.g., working on applied research problems on behalf of companies, working on challenges that require a multidisciplinary approach, starting a company and going through a disciplined process of validating whether or not a customer need really exists for a technology. These experiences will impact the appeal of coming back to Nebraska to do something important later on.

In this vein, SRI recommends that Nebraska evaluate initiatives that can build upon the programs and investments that have already been made to provide Nebraska students and faculty with more applied research and entrepreneurial opportunities. One such program to explore is the NSF I-Corps Program.

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<sup>6</sup> Jeffrey Selingo (2016). “The myth of the well-rounded student? It’s better to be ‘T-shaped.’” The Washington Post, 1 June 2016.





The goal of I-Corps is to foster entrepreneurship among young scientists and engineers that will lead to the commercialization of technology that has been supported by NSF-funded research. The I-Corps curriculum teaches a disciplined process of extensive customer engagement in order to assess customer demand for a technology. Benefits from the program include:

- A greater understanding of why a technology has value and to whom,
- Finding a market for a technology not previously considered,
- Gaining an appreciation for what it takes to commercialize technology and the barriers to adoption,
- Access to an expanded network of like-minded peers, instructors, investors, customers and mentors,
- Exposure to an accelerated “fail fast” approach to commercialization that can prevent years of wasted time, money and resources.<sup>7</sup>

The impact of the I-Corps Program on Small Business Innovation Research (SBIR) success rates is telling: **The SBIR success rate for NSF teams that have not participated in I-Corps is 18%. I-Corps graduates have a 60% NSF SBIR success rate.**<sup>8</sup> This is likely due to the fact that teams that complete I-Corps training have engaged in a disciplined process to establish customer demand and have likely pivoted the technology they are trying to commercialize toward a market application they had not previously considered before talking to tens of customers. Having developed business and technical milestones toward meeting the requirements of these potential customers would make an SBIR proposal application much more compelling than a presumed customer need based upon online market research. Nebraska is trying to increase the number of SBIR awards going to Nebraska companies and research institutions, since the state is currently underrepresented.

NSF’s I-Corps Program is being adopted by NIH, USDA, DOE, DOD, and DHS among others. The University of Nebraska Omaha has an individual in the administration who was involved with the establishment of the NSF I-Corps program, who would be a great resource to leverage along with faculty champions.

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<sup>7</sup> University of Michigan, Center for Entrepreneurship, College of Engineering: NSF I-Corps Programs, <http://cfe.umich.edu/innovation-corps-commercialization-training/>

<sup>8</sup> University of Berkeley Haas School of Business, Lester Center for Entrepreneurship, Programs: NSF Innovation Corps, <http://lester.entrepreneurship.berkeley.edu/programs/nsf-innovation-corps/>

SRI also recommends that Nebraska explore innovation programs that target community colleges. As an Entrepreneur-in-Residence at Lorain County Community College (LCCC) in Northeast Ohio stated, their region has moved to embrace the concept of the community college as a “college of the community.” There is strong involvement by regional companies that serve on the boards of the community college’s incubator and seed fund. This is an extension of many companies’ active engagement with community college faculty and students through workforce programs, but also Lorain’s Maker Space, called the “Fab Lab” used to conceptualize, design, develop, fabricate and test a wide variety of product prototypes, Sensor Lab, and other specialized equipment.

The incubator serves students, as well as entrepreneurs and startups in the larger community. LCCC is part of the Blackstone LaunchPad program, which provides business assistance and \$25,000 proof-of-concept grants. An Innovation Fund provides up to \$100,000 loans to qualifying startup companies that require a dollar-for-dollar cash match and repayment over three years. While having strong Entrepreneurs-in-Residence is one facet of these programs, the EIR noted that coaching even two to three companies requires a lot of time. She attributed the ability to support more entrepreneurs and startup companies at scale and to provide the “stickiness” that keeps these startups in the region to the strong network the community college has developed with local companies. The companies that serve on the incubator, seed fund, and loan program boards do informal advising and make introductions for these startups that develop into deeper business relationships over time. Therefore, SRI encourages Nebraska to take a regional ecosystem development approach as it explores programs to leverage community colleges to support regional innovation.

#### 4. Networks: Strengthen university- government collaboration around economic development objectives

Universities are increasingly seen as hubs for regional economic development. Companies are looking to universities for multidisciplinary research expertise, new ideas, new technologies, and workforce talent. Therefore, continuing to improve information sharing and collaboration among various innovation ecosystem actors is important. In particular, some states have excelled in partnering with higher education institutions to market this important asset to companies that the state is seeking to retain or attract. One example is the co-location of various economic development and innovation ecosystem actors in a building on Georgia Tech’s East Campus. The Centergy building houses the Georgia Department of Economic Development, the headquarters of Georgia Quick Start (the state’s job-training program), the economic development office of Georgia Power, and Georgia Tech’s business incubator, the Advanced Technology Development Center, among others.

The benefits to both the university and DED of having a Nebraska Department of Economic Development presence on a campus include:

- Strengthening connections and information sharing between DED and universities
- Ability to better leverage DED to assist universities in making new connections to companies

- Improvement of outreach and dissemination of information about state innovation resources for entrepreneurs and startups
- Better coordination among NDED and universities in recruiting research-intensive companies

Another approach that has been used by Georgia is the appointment of an economic development liaison by the Georgia Board of Regents for the University of Georgia and Georgia Tech. The liaisons are university employees whose primary responsibility it is to help the Georgia Department of Economic Development identify the right expertise or representative as needed for various meetings, advisory boards, and discussions.