



GROWING IOWA'S
ENTREPRENEURIAL ECONOMY:

STRENGTHENING THE ENTREPRENEURIAL SUPPORT INFRASTRUCTURE

Prepared For:
Iowa Department of Economic Development

Prepared by:
Battelle's Technology Partnership Practice

June 2006

Battelle
The Business of Innovation

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Table of Contents

	<u>Page</u>
Abbreviations.....	iv
Executive Summary.....	v
Introduction.....	1
Economic Development, Innovation, and Entrepreneurial Activities	1
Why Focus on Entrepreneurs and Entrepreneurial Companies?	2
The Climate for Entrepreneurship in Iowa	3
Key Findings	4
Challenges Facing Entrepreneurs in Iowa.....	5
Strategies to Support and Encourage Entrepreneurship.....	9
Providing Comprehensive, In-Depth Support to Entrepreneurs	9
What Others Do: Oklahoma’s i2E.....	10
What Others Do: Pittsburgh’s Idea Foundry	11
Iowa’s Situation.....	12
Facilitating Networks	14
What Others Do: San Diego’s CONNECT	15
What Others Do: High Tech Council of Maryland	15
Iowa’s Situation.....	16
Accessing Capital at All Stages of Development	17
What Others Do: Commercialization and Pre-seed Funding	17
What Others Do: Encouraging Investment in Early-Stage Capital	18
Iowa’s Situation.....	19
Commercializing University-Developed Technologies.....	22
What Others Do: Carnegie Mellon University.....	23
What Others Do: Commercialization Centers	23
Iowa’s Situation.....	23
Promoting a Culture of Entrepreneurship.....	25
What Others Do: Northern Ireland’s Campaign to Encourage Entrepreneurship	26
Iowa’s Situation.....	27
Summary of Iowa’s Entrepreneurial Support Infrastructure	27
Recommendations.....	29
Conclusion	37

List of Figures

Figure 1: Capital Needs at Stages of Company Development.....	6
Figure 2: Idea Foundry Addresses Idea Development and Start-Up Company Phases of Development ...	12
Figure 3: Iowa Capital Sources by Stage of Development	22
Figure 4: Iowa’s Entrepreneurial Support Programs	28
Figure 5: Iowa’s Entrepreneurial Support Centers.....	30

List of Tables

Table 1: Venture Capital Investments in Iowa Companies, 1997–2004.....	7
Table 2: Iowa Seed and Venture Capital Funds.....	21

Abbreviations

ATN	Advanced Technology Network
BCM	Baylor College of Medicine
BCMT	Baylor College of Medicine Technology
CEO	Chief executive officer
CMU	Carnegie Mellon University
CTT	Center for Technology Transfer
EVA	Entrepreneurial Ventures Assistance
FY	Fiscal year
GEM	Global Entrepreneurship Monitor
i2E	Turning Innovation into Enterprise
IDED	Iowa Department of Economic Development
IEN	Iowa Entrepreneur Network
IF	Idea Foundry
IP	Intellectual property
IPRT	Institute for Physical Research and Technology (Iowa State University)
ISU	Iowa State University
ISURF	ISU Research Foundation
JPECs	John Pappajohn Entrepreneurship Centers
MTI	Maine Technology Institute
NIACC	Northern Iowa Area Community College
OTCC	Oklahoma Technology Commercialization Center
R&D	Research and development
SBA	U.S. Small Business Administration
SBDCs	Small Business Development Centers
SBIR/STTR	Small Business Innovation Research/Small Business Technology Transfer
SSTI	State Science and Technology Institute
TAI	Technology Association of Iowa
TBF	Technology Business Finance
UI	University of Iowa
UM	University of Maryland
UNI	University of Northern Iowa
VNI	Venture Network of Iowa

Executive Summary

INTRODUCTION

Governor Vilsack and the state of Iowa have committed to investing significant resources to grow Iowa's technology economy. The Legislature approved and the Governor signed legislation in 2005 creating the Grow Iowa Values Fund, which will provide \$500 million over a 10-year period to support technology-based economic development and other economic development initiatives. The state has developed and is implementing strategies aimed at supporting the growth of bioscience, information technology (IT), and advanced manufacturing firms, with a particular focus on firms with the greatest potential for growth. Investments are being made in building the state's research and development (R&D) base in these areas and putting in place an infrastructure to ensure that university research discoveries make it into the market, leading to new firm formation and more high-wage jobs for Iowa citizens.

Key to realizing these objectives will be the entrepreneurs who can turn innovation into successful businesses. Innovation, in and of itself, will not necessarily translate into economic activity. Rather, it is the application of that technology and its introduction into the marketplace that result in economic growth.

"Entrepreneurship is the ability to amass the necessary resources to capitalize on new business opportunities; and an entrepreneur is the one who combines smart business practices with innovation, without regard for resources under his or her control."

*Nurturing Entrepreneurial Growth in State Economies
National Governors' Association, 1999*

Supporting entrepreneurs and the growth of entrepreneurial companies must therefore be a critical component in Iowa's economic development efforts. To better understand the environment for entrepreneurs and start-up and growing companies in Iowa and the infrastructure that is in place to assist them as they grow, the Iowa Department of Economic Development (IDED) engaged Battelle Technology Partnership Practice to conduct an assessment of Iowa's entrepreneurial support infrastructure. The Battelle team interviewed entrepreneurs and service providers to obtain their input on the challenges facing entrepreneurs in the state and to discuss gaps in services and how they might be addressed. This report summarizes the findings from these interviews and recommends actions that could be taken to expand Iowa's efforts to encourage and support entrepreneurs and new ventures.

Key Findings

Many positive factors support entrepreneurs and the development of high-growth firms in Iowa, including the following:

- ***Iowa has a number of programs to help start-up companies. Although some entrepreneurs indicated that their experience with service providers had been mixed, entrepreneurs generally gave the programs high marks in terms of the assistance they received.*** These programs include the John Pappajohn Entrepreneurship Centers (JPECs), Small Business Development Centers (SBDCs), local economic development agencies, the newly established accelerators and programs directly administered by IDED (such as the Entrepreneurial Ventures Assistance [EVA] program). In addition, the state has sought to develop its venture capital markets by providing tax

credits for investments in both venture funds and technology companies, creating the Iowa Fund of Funds and facilitating the creation of community seed funds.

- ***Iowans have wealth to invest.*** A positive factor that was mentioned by entrepreneurs and service providers alike is that Iowa's residents have wealth that could be invested in start-up and growing companies; but, it is difficult to encourage them to invest in technology companies with which they are not familiar.
- ***Iowa's strengths include human capital, high educational attainment, and high quality of life.*** The interviews and findings from previous work conducted by Battelle show that Iowa's workforce is a true competitive advantage. Chief executive officers (CEOs) and entrepreneurs alike said that Iowa's workforce is hard working, dedicated, well educated, and inventive—all factors that provide a competitive edge for companies starting up or growing in Iowa.
- ***Iowa's universities are conducting high-quality R&D and developing new technologies.*** In fiscal year (FY) 2003, Iowa's universities conducted more than \$500 million in R&D, with the University of Iowa (UI) spending \$292 million and Iowa State University (ISU) spending \$225 million.¹ UI ranked 36th in the nation in National Institutes of Health (NIH) awards in FY 2004 and 43rd in terms of total academic R&D expenditures in FY 2003.² ISU conducts leading research in the biological and physical sciences and ranks second among universities in the nation for top technologies honored by *R&D Magazine*.³
- ***Venture Network of Iowa (VNI) is an effective mechanism for helping companies obtain capital.*** VNI provides entrepreneurs with an opportunity to present their business plan to potential investors. The network is sponsored and staffed by IDED, which seeks out entrepreneurs who receive mentoring from a volunteer committee to help them get their business ready for investment. Forums are held about five or six times a year at which entrepreneurs are given an opportunity to briefly present information about their companies and explain the business opportunities that they offer. The entrepreneurs interviewed gave high marks to VNI and reported that participating in VNI is a way to not only raise capital but also network with others in Iowa's entrepreneurial community.
- ***Entrepreneurs are generally receiving high-quality advice from service providers at the early stages of business development.*** Two-thirds of the entrepreneurs interviewed indicated that they were either very satisfied or extremely satisfied with the services they had received from publicly supported organizations. Twenty-nine percent, however, indicated either that they were not satisfied or that they were satisfied with the services of some providers but not with others. In those cases where the entrepreneurs indicated that they were very unsatisfied with the services received, the problem may have been that they required assistance from providers on more advanced issues such as managing and growing an enterprise rather than basic information such as writing a business plan or accessing capital.
- ***State government has initiatives to improve the climate for entrepreneurship, from tax credits for investing in venture capital funds and technology companies, to the EVA program, to funding for accelerators.*** The state of Iowa has created and supported programs, such as the

¹ Association of University Technology Managers, *Annual Survey*, 2004.

² *NIH Awards to All Institutions by Rank, FY 2004*. National Institutes of Health and *Academic R&D Expenditures, FY 2003*, National Science Foundation.

³ www.iastate.edu/about.

EVA program, that provide both technical and financial assistance to entrepreneurs and start-up companies. Initiatives funded as part of the Grow Iowa Values Fund include seed money to encourage the formation of regional accelerators to provide in-depth assistance to entrepreneurs and additional resources to support technology transfer and commercialization support activities at the state's three regent universities.

There was general agreement that the environment for entrepreneurship in Iowa has improved significantly but that barriers still need to be addressed.

Challenges Facing Entrepreneurs in Iowa

Battelle asked the entrepreneurs/CEOs interviewed to identify the key challenges they face in growing their companies in Iowa. The three areas that entrepreneurs indicated are their greatest challenges are talent, capital, and sales and marketing. Of these, the most significant obstacle to creating and growing entrepreneurial companies in Iowa is the **lack of experienced management talent**. There simply is no cadre of experienced, serial entrepreneurs who know how to turn an idea or a product into a successful venture. In addition to the lack of serial entrepreneurs, the interviewees indicated that they have difficulty finding workers in Iowa with expertise in particular technology areas or industry sectors.

The second challenge facing entrepreneurs in Iowa is to **access capital**. Entrepreneurs require access to capital at each stage of their development from early-stage, proof-of-concept and prototype development to venture financing. There was general agreement that there is a gap in financing for very early-stage, proof-of-concept activities. Virtually all of the interviewees reported that their initial capital came from founders and private investors. Several indicated that they had been able to obtain angel investment dollars either within Iowa or from out-of-state investors. They viewed the community equity funds as a good source of small amounts of financing. It was generally agreed, however, that there is a gap at the very early, proof-of-concept stage. It was suggested that there is also a gap at the \$1 million to \$5 million level as well. Such investments are too small to be of interest to larger investors and out-of-state venture funds, and few sources from which to obtain such investments exist within Iowa.

The third challenge that entrepreneurs face in Iowa is to **find customers and markets**. Entrepreneurship assistance programs usually focus primarily on providing financial, business planning, and incubator support to start-up companies to increase their chance of survival. And indeed, start-up companies face many obstacles. But, just because a start-up company remains in existence doesn't mean that success has been achieved. For many of these companies, and in fact for many of the companies interviewed, the real challenges come when they are ready to grow. They have a management team and an organization in place, they have obtained investment capital, and now they are ready to move to the next level. Fewer resources are available to assist these companies in finding customers, identifying new markets, and generally increasing sales—all factors that will determine the level of their contribution to the economic health of the communities in which they reside.

RECOMMENDATIONS

The entrepreneurs and service providers interviewed for this study identified the following six major needs that, if addressed, would greatly improve the environment for entrepreneurship in Iowa:

1. In-depth support and mentoring from people with experience in starting and growing companies
2. Access to management talent

3. Help in increasing sales and introducing products into new markets
4. Access to capital at all stages of development
5. Efforts to strengthen the culture for entrepreneurship in Iowa
6. Greater opportunities for networking with other entrepreneurs and university researchers.

Actions that could be taken to address each of these needs are listed in Table ES-1. The rationale for and description of each action is found in the body of the report.

Table ES-1: Recommended Actions to Improve the Environment for Entrepreneurship and Start-Up Companies in Iowa

Recommendation	Proposed Actions
<i>Increase focus, scale, and intensity of support for entrepreneurs and start-up companies</i>	<ul style="list-style-type: none"> • Encourage offices providing assistance to start-ups and entrepreneurs to be co-located (JPEC, SBDC, accelerator, etc.) and to use their resources collectively to create critical mass. • Scale up level of support for Iowa's entrepreneurship support programs based on performance. • Create a focal point for entrepreneurs within IDEED. The commercialization specialist could serve in this role. • Develop mechanisms (single Web portal, cross-training) to facilitate communication and cooperation among existing and proposed intermediaries. • Establish an agreed-upon set of system-level metrics that all organizations providing entrepreneurial assistance can use to measure progress. • Brief and educate professional service providers about Iowa entrepreneurial programs and tools. • Provide training for local economic development staffs on entrepreneurship and the entrepreneurial assistance provided by the various service providers.
<i>Address need for management talent by attracting and cultivating entrepreneurial talent</i>	<ul style="list-style-type: none"> • Investigate using the state's Iowa Careers Consortium to attract entrepreneurs and managers to Iowa. • Create an entrepreneur-in-residence program.
<i>Leverage Iowa's base of large corporations to encourage the creation of spin-off companies and provide a market for Iowa's entrepreneurial companies</i>	<ul style="list-style-type: none"> • Start a VNI-type program to showcase Iowa growth companies as potential suppliers to large firms and government procurement in Iowa. • Encourage large companies, particularly those downsizing or possessing developed technologies not pertinent to their core business, to allow technologies to be spun out by workers.
<i>Continue efforts to make capital available at all stages of development</i>	<ul style="list-style-type: none"> • Address impediments to using EVA funding to assist entrepreneurs who cannot meet Grow Iowa Values Fund wage criteria. • Provide support to companies to help them compete successfully for SBIR/STTR awards.

Table ES-1: Recommended Actions to Improve the Environment for Entrepreneurship and Start-Up Companies in Iowa (continued)

Recommendation	Proposed Actions
<i>Promote an entrepreneurial culture in Iowa</i>	<ul style="list-style-type: none"> • Nurture entrepreneurs through the state’s educational system. • Publicize entrepreneurial success stories. • Give entrepreneurs input into the policymaking process.
<i>Facilitate networking of entrepreneurs, investors, and researchers</i>	<ul style="list-style-type: none"> • Continue Equity Funds of Iowa • Support the development of networks such as the Iowa Entrepreneur’s Network and the Technology Association of Iowa.

CONCLUSION

Iowa has made a commitment to transition the state’s economy into a 21st century knowledge economy driven by innovation. The state has developed and is implementing strategies aimed at growing its bioscience, IT, and advanced manufacturing sectors. A key principle of these strategies is that they are all predicated on building on the state’s strengths, including its university and industry sectors, and encouraging the growth of new and existing business ventures. A strong entrepreneurial community will be essential to realizing these goals. Entrepreneurs, after all, are the people who turn research findings and discoveries into viable business opportunities. Iowa, however, like most of the industrial Midwest, does not have a long history of technology entrepreneurship and must therefore work to nurture and support aspiring entrepreneurs and, in some cases, attract them to locate in Iowa.

Iowa has a number of efforts in place to support entrepreneurs and start-up companies. The JPECs are a unique resource that not only provide support to entrepreneurs but also seek to promote entrepreneurial education at both the K-12 and postsecondary levels. A variety of programs have been put in place to increase the availability of capital at all stages, and accelerators have been initiated to help guide entrepreneurs through the commercialization and business start-up phase. The regent universities recently received additional funding to strengthen their technology transfer and commercialization efforts.

All of these efforts provide support for entrepreneurs; but, most programs are underfunded and organizations are not currently functioning as a unified network of support services. While each of these programs can contribute, more could be accomplished if they were able to leverage each other’s resources and present a seamless delivery system for entrepreneurs. Iowa is on the path to developing a strong entrepreneurial support network. Many of the pieces are in place; the service providers only need to receive adequate support and to determine how to function as a system. This report provides some options for accomplishing this.

Introduction

ECONOMIC DEVELOPMENT, INNOVATION, AND ENTREPRENEURIAL ACTIVITIES

Governor Vilsack and the state of Iowa have committed to investing significant resources to grow Iowa's technology economy. The Legislature approved and the Governor signed legislation in 2005 creating the Grow Iowa Values Fund, which will provide \$500 million over a 10-year period to support technology-based economic development and other economic development initiatives. The state has developed and is implementing strategies aimed at supporting the growth of bioscience, information technology (IT), and advanced manufacturing firms, with a particular focus on firms with the greatest potential for growth. Investments are being made in building the state's research and development (R&D) base in these areas and putting in place an infrastructure to ensure that university research discoveries make it into the market, leading to new firm formation and more high-wage jobs for Iowa citizens.

Key to realizing these objectives will be the entrepreneurs who can turn innovation into successful businesses. Innovation, in and of itself, will not necessarily translate into economic activity. Rather, it is the application of a technology and its introduction into the marketplace that result in economic growth. A number of studies and reports in recent years point to the importance of entrepreneurship in changing regional economies. Starting with David Birch's work, and validated by the Office of Advocacy of the U.S. Small Business Administration (SBA) and further refined by studies commissioned in recent years by the Kauffman Foundation and others, it is clear that technology, innovation, and entrepreneurship drive economic growth. "The large portion of entrepreneurial firms and the significant number of jobs created by newer, small firms in the U.S. are a strong indication that the entrepreneurial sector with its flexibility and capacity to adapt quickly is poised to become an even more important protagonist in the future economic growth of the country."⁴

Indeed, research demonstrates that entrepreneurial activity is closely tied to a state or region's level of economic growth. The Global Entrepreneurship Monitor (GEM), a leading research consortium that seeks to improve understanding of the link between entrepreneurship and national economic growth, suggests that levels of entrepreneurship may account for as much as one-third of the variation in economic growth among regions, states, and nations.⁵

A 2005 report prepared for the SBA's Office of Advocacy comparing regions with strong and weak entrepreneurial activity found that "the most entrepreneurial regions had better local economies from 1990 to 2001 compared to the least entrepreneurial. They had 125 percent higher employment growth, 58 percent higher wage growth and 109 percent higher productivity. This general finding held individually for large, medium and small sized regions but was most pronounced for large regions."⁶

Supporting entrepreneurs and the growth of entrepreneurial companies must therefore be a critical component in Iowa's economic development efforts. To better understand the environment for entrepreneurs and start-up and growing companies in Iowa and the infrastructure in place to assist them as

⁴ *Global Entrepreneurship Monitor: National Entrepreneurial Assessment USA 2003 Executive Report*, p. 7. See www.kauffman.org/items/cfm/536, 11/11/04.

⁵ *Global Entrepreneurship Monitor 1999 Executive Report*, p. 10.

⁶ *The Innovation-Entrepreneurship Nexus: a National Assessment of Entrepreneurship and Regional Economic Growth and Development*. Powell, Ohio: Advanced Research Technologies, LLC, April 2005, p. 5.

they grow, the Iowa Department of Economic Development (IDED) engaged Battelle Technology Partnership Practice to conduct an assessment of Iowa's entrepreneurial support infrastructure. The Battelle team interviewed entrepreneurs and service providers to obtain their input on the challenges facing entrepreneurs in the state and to discuss gaps in services and how they might be addressed. This report discusses the challenges facing entrepreneurs both in general and in Iowa specifically, presents strategies employed in Iowa and elsewhere around the country to encourage and support entrepreneurship, and recommends actions that could be taken to foster greater entrepreneurship in Iowa.

WHY FOCUS ON ENTREPRENEURS AND ENTREPRENEURIAL COMPANIES?

The state of Iowa wants to invest in high-growth “entrepreneurial” companies that will have the potential for creating wealth in Iowa, but what characterizes such firms? The National Governors’ Association puts forth this definition of entrepreneurship and entrepreneurs:

Entrepreneurship is the ability to amass the necessary resources to capitalize on new business opportunities; and an entrepreneur is one who combines smart business practices with innovation, without regard for resources under his or her control.⁷

It is important to note that, while most entrepreneurs start by forming small businesses, not all small businesses are entrepreneurial. The needs of small businesses and entrepreneurs may be similar at first during the start-up phase, but they quickly diverge as entrepreneurs focus on assembling resources and creating new innovative products or services that will lead to further investment and growth. Small business owners create companies to generate wealth and provide employment and income for themselves and others; entrepreneurs are interested in creating new innovative products or services that lead to further investment and growth.⁸ Most small businesses serve a local or regional market, whereas entrepreneurial companies often are focused on the national and global marketplace.

It is also important to remember that entrepreneurship includes more than just start-ups. Mature firms must be entrepreneurial in developing new products and entering new markets. Growth and development of existing companies must be a component of any entrepreneurship strategy.

States and regions that recognize the benefits of entrepreneurship and the role it plays in today's knowledge-based economy are developing policies and programs to establish an environment that creates, attracts, and retains entrepreneurs and an

Entrepreneurs

- Commercialize innovative products and services that improve quality of life
- Create dynamic and flexible new industries and firms to replace those that are no longer viable in a rapidly changing global economy
- Provide most new employment opportunities
- Create wealth that is reinvested in new enterprises and, through demonstrated philanthropic activity, in communities

About 35 percent of the companies on the Fortune 500 list are displaced every three or four years by more rapidly expanding firms. Entrepreneurs ultimately propel the country's largest businesses; they do not just run small companies.

Jeffrey A. Timmons

*America's Entrepreneurial Revolution:
The Demise of Brontosaurus
Capitalism*

⁷ *A Governor's Guide to Strengthening State Entrepreneurship Policy*, National Governors' Association, 1999.

⁸ Thom Rubel and Scott Palladino, *Nurturing Entrepreneurial Growth in State Economies*. Washington, DC: National Governors' Association, 1999.

infrastructure to support them. Iowa for many years has had programs in place to assist small businesses, as well as programs aimed at promoting entrepreneurship. During the past several years, a number of new entrepreneurial support initiatives have been put in place and others are in the early stages of implementation. This report focuses on the needs of entrepreneurs and firms with high-growth potential and the initiatives in place to support them.

THE CLIMATE FOR ENTREPRENEURSHIP IN IOWA

The above definition of an entrepreneur states that entrepreneurs are able to amass the necessary resources to realize business opportunities. The resources that they need access to include management talent, technology, capital, professional expertise, and a host of other services. They often need assistance in determining economic feasibility and identifying markets and distribution channels. They may also need access to specialized equipment and laboratories and to expertise to solve technical issues that arise during product development. They must be able to recruit key personnel and have access to small amounts of pre-seed capital. In states or regions that have a well-developed entrepreneurial climate, such as Austin, Texas, or San Diego, California, these resources are readily available. It is a challenge for states and regions seeking to nurture entrepreneurs and high-growth firms that these resources are not yet available in the private market because the demand for them has not reached critical mass. The first step in determining how to further encourage entrepreneurship and firm creation and growth in Iowa was to assess the current challenges facing Iowa's entrepreneurs.

Battelle interviewed 22 technology entrepreneurs (each of whom had received assistance from one or more of the state's entrepreneurship assistance programs) and 51 individuals who work with entrepreneurs and asked them how they would assess the climate for entrepreneurship in Iowa. The service providers included both staff of publicly supported programs and private service providers including lawyers, accountants, and bankers. The entrepreneurs interviewed were not randomly chosen. Rather, the service providers interviewed provided Battelle with a list of clients that they felt would provide valuable input for this analysis. This sample of companies included the following:

- ***The type of "high-growth" companies that the state is seeking to support.*** Total employment at the companies interviewed increased nearly 40 percent in the past 3 years. They now employ 461 workers, and employment is projected to more than double in the next 3 years.
- ***Both start-ups and established companies seeking to grow by introducing new products and entering new markets.*** Although half of the companies were started since 2000, the average age of the companies was 15 years, indicating that the sample included mature companies as well as start-ups.
- ***A large number of companies that have ties to the state's universities.*** Half of the companies interviewed have a link to a university. In some cases, the firm was founded by a university faculty; in others, the technology was licensed from an Iowa university or the university and firm had conducted joint R&D.

After completing the interviews, Battelle facilitated three focus groups to present the interview findings and seek input on how to address identified gaps in services; two of the focus groups were composed of entrepreneurs and one was composed of service providers. This section summarizes the input provided through the interviews and focus groups.

Key Findings

Many positive factors support entrepreneurs and the development of high-growth firms in Iowa, including the following:

- ***Iowa has a number of programs to help start-up companies. Although some entrepreneurs indicated that their experience with service providers had been mixed, entrepreneurs generally gave the programs high marks in terms of the assistance they received.*** These programs include the John Pappajohn Entrepreneurship Centers (JPECs), Small Business Development Centers (SBDCs), local economic development agencies, and the newly established accelerators and programs directly administered by IDED (such as the Entrepreneurial Ventures Assistance [EVA] program). In addition, the state has sought to develop its venture capital markets by providing tax credits for investments in both venture funds and technology companies, creating the Iowa Fund of Funds and facilitating the creation of community seed funds.
- ***Iowans have wealth to invest.*** A positive factor that was mentioned by entrepreneurs and service providers alike is that Iowa's residents have wealth that could be invested in start-up and growing companies; but, it is difficult to encourage them to invest in technology companies with which they are not familiar. Iowans have provided significant investment dollars for bioethanol plants because many of these investors made their wealth in agriculture and bioethanol is something that they understand. It is more difficult to convince Iowans to invest in technology areas such as the biosciences or IT in which they have less experience.
- ***Iowa's strengths include human capital, high educational attainment, and high quality of life.*** The interviews and findings from previous work conducted by Battelle show that Iowa's workforce is a true competitive advantage. Chief executive officers (CEOs) and entrepreneurs alike said that Iowa's workforce is hard working, dedicated, well educated, and inventive—all factors that provide a competitive edge for companies starting up or growing in Iowa. In addition, Iowa's Midwestern quality of life makes it easy to recruit skilled professionals and technical staff who recognize the tangible benefits of Iowa's quality public education system, traditional values, short commutes, and family-friendly living conditions. This environment may offer an opportunity to attract to Iowa entrepreneurs and people with experience in managing and growing entrepreneurial companies.
- ***Iowa's universities are conducting high-quality R&D and developing new technologies.*** In fiscal year (FY) 2003, Iowa's universities conducted more than \$500 million in R&D, with the University of Iowa (UI) spending \$292 million and Iowa State University (ISU) spending \$225 million.⁹ UI ranked 36th in the nation in National Institutes of Health (NIH) awards in FY 2004 and 43rd in terms of total academic R&D expenditures in FY 2003.¹⁰ ISU conducts leading research in the biological and physical sciences and ranks second among universities in the nation for top technologies honored by *R&D Magazine*.¹¹
- ***Venture Network of Iowa (VNI) is an effective mechanism for helping companies obtain capital.*** VNI provides entrepreneurs with an opportunity to present their business plan to potential investors. The network is sponsored and staffed by IDED, which seeks out entrepreneurs who

⁹ Association of University Technology Managers, *Annual Survey*, 2004.

¹⁰ *NIH Awards to All Institutions by Rank, FY 2004*. National Institutes of Health and *Academic R&D Expenditures, FY 2003*, National Science Foundation.

¹¹ www.iastate.edu/about.

receive mentoring from a volunteer committee to help them get their business ready for investment. Forums are held about five or six times a year at which entrepreneurs are given an opportunity to briefly present information about their companies and explain the business opportunities that they offer. The forum also features a keynote address by a leading Iowa or national entrepreneurial expert who provides insights on business trends and other issues of interest to the entrepreneurial community. The entrepreneurs interviewed gave high marks to VNI and reported that participating in VNI not only raises capital but also helps network with others in Iowa's entrepreneurial community.

- ***Entrepreneurs are generally receiving high-quality advice from service providers at the early stages of business development.*** Two-thirds of the entrepreneurs interviewed indicated that they were either very satisfied or extremely satisfied with the services they had received from publicly supported organizations. Twenty-nine percent, however, indicated either that they were not satisfied or that they were satisfied with the services of some providers but not others. In those cases where the entrepreneurs indicated that they were very unsatisfied with the services received, the problem may have been that they required assistance from providers on more advanced issues such as managing and growing an enterprise rather than basic information such as writing a business plan or accessing capital.
- ***State government has put a number of initiatives in place to improve the climate for entrepreneurship, from tax credits for investing in venture capital funds and technology companies, to the EVA program, to funding for accelerators.*** The state of Iowa has created and supported programs, such as the EVA program, that provide both technical and financial assistance to entrepreneurs and start-up companies. Initiatives funded as part of the Grow Iowa Values Fund include seed money to encourage the formation of regional accelerators to provide in-depth assistance to entrepreneurs and additional resources to support technology transfer and commercialization support activities at the state's three regent universities.

There was general agreement that the environment for entrepreneurship in Iowa has improved significantly but that barriers still need to be addressed.

Challenges Facing Entrepreneurs in Iowa

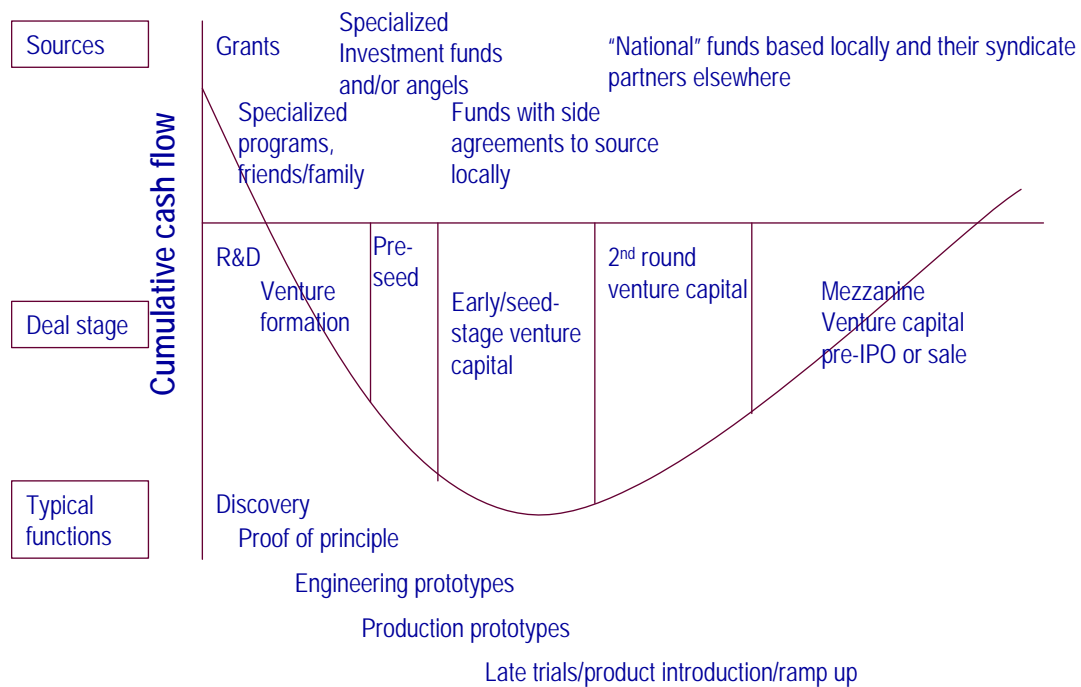
Battelle asked the entrepreneurs/CEOs interviewed to identify the key challenges they face in growing their companies in Iowa. The three areas that entrepreneurs indicated are their greatest challenges are talent, capital, and sales and marketing. Of these, the most significant obstacle to creating and growing entrepreneurial companies in Iowa is the **lack of experienced management talent**. There simply is no cadre of experienced, serial entrepreneurs who know how to turn an idea or a product into a successful venture. Such serial entrepreneurs are needed not only to lead new ventures but also to serve as mentors to help fledgling entrepreneurs develop their skills and increase their chances of success. They have contacts in the investor community, can recognize quality deals, and help to generate deal flow that helps firms access capital markets. Iowa does not have a strong history of technology entrepreneurship and, as a result, does not have a large number of people who have been successful in starting and growing companies. The interviewees expressed a strong desire for in-depth mentoring, but it is difficult to meet this need without a strong network of experienced entrepreneurs.

In addition to the lack of serial entrepreneurs, the interviewees indicated that they have difficulty finding workers in Iowa with expertise in particular technology areas or industry sectors. For a start-up bioscience company, for example, it is difficult to find managers with experience in the pharmaceutical industry.

Previous Battelle work found that attracting technology workers—particularly those with high-demand skills in areas such as software, IT, and engineering—is a challenge in Iowa. Several firms reported that they have had to use HB-1 visas to bring in staff from outside the United States. This may suggest, however, that they are dealing in areas with a national shortage of qualified workers rather than a shortage in Iowa.

The second challenge facing entrepreneurs in Iowa is to **access capital**. Entrepreneurs require access to capital at each stage of their development, from early-stage, proof-of-concept and prototype development to venture financing. Figure 1 depicts the funding cycle, the types of capital needed, and the usual sources of capital at each stage.

Figure 1: Capital Needs at Stages of Company Development



There was general agreement that a gap exists in financing for very early-stage, proof-of-concept activities. Six of the 22 firms interviewed reported that they received funding from IDED's EVA program, which provides funding in the range of \$50,000 to \$100,000, with a maximum of \$250,000 in the form of a deferred loan. EVA funding can be used to purchase machinery and equipment or for other business acceleration expenses. Five of the six firms agreed that EVA was very helpful in meeting companies' needs for early-stage funding. The one firm that disagreed indicated that getting the EVA funding was a painful process because the assistance is tied to job creation. It took so long to get the funding that it was no longer needed when it was finally available. It was suggested at one of the focus groups that the EVA funding may be spread too thinly and therefore unable to give targeted firms enough resources in the \$100,000 to \$500,000 range. Virtually all of the interviewees reported that their initial capital came from founders and private investors. Several indicated that they had been able to obtain angel investment dollars either within Iowa or from out-of-state investors. They viewed the community equity funds as a good source of small amounts of financing. It was generally agreed, however, that there is a gap at the very early, proof-of-concept stage.

It was suggested that a gap also exists at the \$1 million to \$5 million level as well. Such investments are too small to be of interest to larger investors and out-of-state venture funds, and few sources from which to obtain such investments exist within Iowa. Five of the firms interviewed have received one or more rounds of venture capital investment.

Data on venture capital investments show that few Iowa companies have received venture capital investments from formal venture capital funds in recent years. Between 1997 and 2004, \$114.3 million was invested in 40 deals in Iowa according to PriceWaterhouseCoopers *Moneytree Venture Capital Survey*. In 2004, \$10.3 million was invested in three Iowa companies. Thus far in 2005 (through the third quarter), there have been no venture capital investments in Iowa companies (Table 1).

The third challenge that entrepreneurs face in Iowa is to **find customers and markets**. Entrepreneurship assistance programs usually focus primarily on providing financial, business planning, and incubator support to start-up companies to increase their chance of survival. And indeed, start-up companies face many obstacles. But, just because a start-up company remains in existence doesn't mean that success has been achieved. For many of these companies, and in fact for many of the companies interviewed, the real challenges come when they are ready to grow. Once they have a management team and an organization in place, have obtained investment capital, and are ready to move to the next level, fewer resources are available to assist these companies in finding customers, identifying new markets, and generally increasing sales—all factors that will determine the level of their contribution to the economic health of the communities in which they reside. In addition, firms reported that they have difficulty keeping up with the competition, being aware of new discoveries that may affect their markets, and supporting continued

Table 1: Venture Capital Investments in Iowa Companies, 1997–2004

Year	\$ Invested	Number of Deals
1997	\$20,750,000	9
1998	\$24,161,000	15
1999	\$27,000,000	3
2000	\$17,496,000	5
2001	\$4,350,000	2
2002	\$2,000,000	1
2003	\$8,200,000	2
2004	\$10,300,000	3
Total	\$114,257,000	40

Source: PriceWaterhouseCoopers *Moneytree Venture Capital Survey* and Battelle calculations, 1997–2004.

product development. Some interviewees suggested that these are areas in which they would benefit from closer interactions with the universities and their researchers.

Strategies to Support and Encourage Entrepreneurship

Promoting entrepreneurship has not been part of the mainstream of traditional economic development policy; but, organizations and individuals focused on technology-based economic development have invested significant time, attention, and resources on creating an environment that supports both innovation and entrepreneurship. This report identifies five strategies used by states, regions, and communities to encourage and support entrepreneurship:

1. Providing comprehensive, in-depth support services that cover the continuum from idea generation and early-stage start-up to early and rapid growth leading to sustainable, established businesses
2. Facilitating networking among entrepreneurs, service providers, and university researchers
3. Helping companies to access financing at all stages of development
4. Encouraging the commercialization of university-developed technologies
5. Promoting a culture of entrepreneurship.

This section offers examples of how other states and regions have implemented these strategies and describes efforts underway in Iowa to address them.

PROVIDING COMPREHENSIVE, IN-DEPTH SUPPORT TO ENTREPRENEURS

“To ensure the greatest chance of success, entrepreneurs must have access to a comprehensive continuum of programs as they progress through the stages necessary to establish a thriving enterprise.”¹² The services do not necessarily have to be provided by a single entity, but they need to be readily accessible to the entrepreneur.

The support services that technology entrepreneurs value include

- Business mentoring by successful serial entrepreneurial managers who have been involved in similar businesses and business models,
- In-depth counseling and advice to prepare the entrepreneur to present investment-grade plans to angel and other informal investors,
- Access to capital sources at the pre-seed/seed to later stages, and
- Assistance with forming a business team of managers with commercial vision.

Specific services that can be provided to client companies include

- Forging partnerships among firms and between firms and universities;
- Identifying commercialization opportunities and resources;
- Assessing client opportunities and needs;

¹² *Guide to Entrepreneurship Programs*. Columbus, OH: State Science and Technology Institute (SSTI), forthcoming.

- Developing business plans;
- Consulting on a full range of management issues;
- Advising on human resource planning;
- Conducting market research;
- Conducting technical evaluations;
- Providing information on market, industry, and economic trends;
- Assisting with regulatory issues;
- Linking companies to sources of financing;
- Providing pre-seed financing;
- Evaluating the commercial potential of patented technologies for firms, individuals, faculty, and universities;
- Identifying businesses interested in licensing or commercializing technologies from the state or region's research institutions.

What Others Do: Oklahoma's i2E

An example of an organization that provides comprehensive, in-depth support to entrepreneurs is i2E (Turning Innovation into Enterprise) in Oklahoma. i2E is a nonprofit organization that operates the Oklahoma Technology Commercialization Center and administers Oklahoma's Technology Business Finance (TBF) Program. The OTCC was created in 1998 to provide a focal point for entrepreneurs and technology-based companies. It was designed to be a single point of entry that could assess their needs, guide them through the commercialization process, and link them to a comprehensive network of commercialization assistance services. The Oklahoma Center for the Advancement of Science and Technology, the state's technology-based economic development agency, awarded the contract to operate the commercialization center on a competitive basis. i2E manages the commercialization center.

Through hands-on educational and training support and detailed consulting, i2E plays an important role in positioning Oklahoma entrepreneurs to grow viable businesses. i2E helps start-ups focus their business plans and strategies. i2E also helps entrepreneurs secure angel financing and other early-stage funding, including through the TBF, which can provide up to \$150,000 for proof-of-concept work. The company agrees to pay the money back at a rate of 2:1 after 5 years if it is successful in getting a product to market. The initial investment in TBF was \$5 million; approximately \$1.5 million has been repaid by successful clients.

In addition, i2E has established a certified Service Provider Program, which identifies proven, quality service providers (representing intellectual property [IP] law, corporate law, business consultants, marketing, engineering, science, and financial consulting) who are interested in providing assistance and support to technology entrepreneurs.

i2E has a small centralized staff of highly competent professionals experienced in starting and operating technology companies, commercializing new technology, and transferring technology from the public to private sector. i2E has about 100 companies in its portfolio at any given time, adding about 35 new clients per year. i2E receives approximately \$2.7 million annually from the state of Oklahoma.

i2E staff perform an initial intake interview with potential clients. If there is a fit between what the client needs and what i2E can offer, i2E contracts for an outside technology assessment/market review of the firm's technology. The client pays i2E \$1,000, which covers the cost of the assessment. i2E works with the client to determine a path forward, and the client then prepares a business plan. i2E holds emerging enterprise valuation workshops where clients get feedback from a panel of investors and service providers. i2E reviews the client's PowerPoint presentations and introduces them to an investor network that includes both angel investors and venture capitalists. While finding CEOs is not a direct responsibility of i2E, it has a corps of mentors that can assist early-stage companies and serve as interim CEOs.

The most important contribution of i2E is to stimulate investment deal flow, as well as to improve the quality of deal flow to private investors. In its first 2 years of operation, i2E served 467 clients, of which 268 have received detailed project assistance and 74 have been presented to angel investor and other financing sources. Nearly \$15 million in hard-to-find pre-seed and seed capital dollars have been raised, leveraging more than four times the state's investment.

What Others Do: Pittsburgh's Idea Foundry


Pittsburgh is an example of a region that has created a network of technology development organizations to provide comprehensive services to entrepreneurs and technology companies. One of the most recently created organizations, the Idea Foundry (IF), was created to bridge the gap between "ideas" and start-up companies, an area that has been identified as needing attention in Iowa. Figure 2 displays the start-up life cycle of firms as depicted by the IF. As shown, IF focuses on idea development and the transition to start-up company stage. Other organizations in Pittsburgh focus on other stages. Carnegie Mellon University and the University of Pittsburgh have created organizations to focus on commercializing technologies developed within their universities. Innovation Works, one of Pennsylvania's Ben Franklin Technology Centers, makes seed investments in start-up and early growth companies. Additional nonprofit organizations in Pittsburgh, including the Life Sciences Greenhouse, focus on all stages of development within a specific industry sector.

The mission of the IF is to supply the critical ingredients to transform an entrepreneur's business idea into a Pennsylvania-based, fundable start-up. IF bridges the major gap in business skills, knowledge, funding, and relationships that are so important when launching an entrepreneur's new business.

IF has three full-time staff members who have significant start-up and Fortune 500 executive/officer experience. IF also uses part-time interns who are typically MBA students with at least 5 years of business experience. The annual budget, which comes from public and private sources, is \$2.2 million. The goal of IF is to launch 9 to 12 companies a year.

Figure 2: Idea Foundry Addresses Idea Development and Start-Up Company Phases of Development

Key Attributes of The "Start-Up Life Cycle"



	Discovery Stage	Idea Development Stage	Start-up Company Stage	Early Growth / Growth Stage	Rapid Growth / Steady State Stage
Employees	n/a (research team)	1-3	3-10	10-50	50+
Product(s)	Rough Prototype Proof-of-Concept <i>(can it technically be built)</i>	Solid Prototype <i>(understanding of costs to build one unit)</i>	First Generation Product <i>(customers can buy it)</i>	Second Generation Product/Multiple Products	Multiple Product Lines and Market Segments
Sales	None	None <i>(Identifying Prototype Customer Needs)</i>	Alpha/Beta Trial Customers	Early Adopter Customers <i>(initial Sales Pipeline)</i>	Complete Customer Base
Funding Levels	\$0-\$millions <i>(varying based upon type of research)</i>	\$0 - \$300,000 <i>(very difficult money to find, investor is betting on a product idea and an entrepreneur)</i>	\$300,000 - \$1,000,000	>\$1,000,000 <i>(late Seed, Series A & B)</i>	>\$3,000,000 <i>(Series B and beyond)</i>
Sources of Funding	University, Corporate and Government Research Grants, PDG, & PLSG	Pre-Seed Capital Limited Sources <i>(SBIR Grants, Savings, Friends, Family, Angels, PLSG, Idea Foundry)</i>	Seed Capital & Sales Limited Sources <i>(SBIR Grants, Angels, Idea Foundry, PLSG, IW)</i>	Late Seed/Venture Capital & Sales <i>(Angels, Strategic Partners, IW, PLSG, and VC's)</i>	Venture Capital, Debt, & Sales <i>(Traditional Bank Instruments, Strategic Partners and VC's)</i>
Time per Stage	1 month to 10 years	3 months to 12 months	3 months to 12 months	6 months to 36 months	12 months to 48 months
Elapsed Time		----- Elapsed time of 3 to 7 years (post discovery stage) -----			
Scope of Idea Foundry Services					

Source: Idea Foundry, 2004.

IF provides financial support, investments of \$100,000, and practical real-world mentoring assistance through a structured process. It also links entrepreneurs with a network of technology, commercialization, and financial advisors to assist them now and in the future.

In its first 2 years of operation, IF received 54 applications and selected 17, of which 14 are still under investment contract. IF helped four client companies attract \$1.8 million in follow-on funding.

Iowa's Situation

Iowa, like Pittsburgh, has a number of organizations that provide services to entrepreneurs and entrepreneurial companies. These organizations include JPECs, accelerators, and a proposed statewide technology commercialization entity. Each is described below.

John Pappajohn Entrepreneurship Centers

In 1996, John Pappajohn, president of Equity Dynamics, Inc., established five entrepreneurial centers throughout Iowa. The centers seek both to encourage entrepreneurship and to provide support to entrepreneurs and start-up companies. The centers are located at Drake University in Des Moines, at ISU in Ames, at Northern Iowa Area Community College (NIACC) in Mason City, at UNI in Cedar Falls, and at UI in Iowa City. Each center offers entrepreneurial educational programs and provides business assistance services, but each differs in the mix of services or programs offered and the emphasis that is placed on various program components. The UI JPEC, for example, focuses its efforts on entrepreneurship education programs, including training for K-12 teachers and youth entrepreneurship, while the ISU JPEC emphasizes services to entrepreneurs and start-up companies. The JPECs at NIACC and UNI have programs aimed at supporting entrepreneurship in rural communities. Drake University's JPEC offers no direct consulting to businesses, but rather focuses on introducing entrepreneurship into the curriculum at the university.

In total, the JPECs have 19 staff, 15 of whom are professionals. The services most often requested by clients are accessing capital, strategic and business planning, education and training, and market research. The JPECs do not charge for their services, although fees may be associated with course offerings. The JPECs interface with a large number of clients on an annual basis, particularly if all the individuals who participate in training and education programs are included. They also work with a much smaller number of entrepreneurs on a more in-depth basis, although this varies from center to center. The percent of clients receiving less than 10 hours of assistance ranges from 55 to 95 percent among the centers. The percent of clients receiving more than 50 hours of assistance ranges from 10 to 25 percent.

The JPECs also differ in the extent to which they work with start-ups as opposed to established firms. The percentage of each center's clients that are start-ups ranges from 10 to 40 percent. The budgets of the JPECs, not including SBDC funds, range from \$400,000 to \$600,000 annually.

Accelerators

In 2005, Iowa initiated a program to provide state support to a network of accelerators, three of which have recently become operational and four of which are funded but have not begun operations. Two additional sites have been identified for future accelerators. The legislation that authorized the Grow Iowa Values Fund directed IDED to help establish business accelerators that would provide technical assistance to "technology-based, value-added agricultural, information solutions or advanced manufacturing start-up businesses." The three accelerators that are in operation are the Economic Development Council in Cedar Rapids, New Ventures in Davenport, and one operated by the NIACC in Mason City.

Accelerator funding was awarded on a competitive basis in response to a request for proposal issued by IDED. Each accelerator is funded at \$75,000 for the first 2 years, with an additional \$25,000 in year 3 based upon need, for a total of \$175,000 per accelerator. These state funds must be matched with an equal amount of locally raised funds. The accelerators are expected to identify and provide intensive services to a small number of companies with high growth potential. The two accelerators that have been in operation the longest each report interacting with approximately 150 entrepreneurs and companies, a good percentage of which they referred to other service providers including the SBDCs, JPECs, and private service providers. They report working with 10 to 15 client companies, with some receiving extensive services and others more limited assistance. The accelerators are nonprofit corporations and can take equity in companies and/or charge management fees to cover some of the cost of the services they provide.

IDED has also provided support to UNI's Regional Business Center for the development of a Rural Business Accelerator Program, MyEntre.net, which works with local communities to support local entrepreneurs. The program builds community capacity through leadership training and business support services. MyEntre.net has a Web portal that serves as an online learning community, a resource center for entrepreneurs, and a venue for online counseling and mentoring. Five communities in northeast Iowa currently participate in MyEntre.net.

Proposed Commercialization Entity

The final component of the infrastructure to support commercialization and provide in-depth assistance to entrepreneurs in Iowa is a proposed technology commercialization entity. The proposal to create a statewide, freestanding commercialization entity was included in Iowa's Pathway to Bioscience Development, the state's strategy to develop its bioscience industry sector. A statewide commercialization entity was proposed because it was thought to be unfair and unrealistic to expect Iowa's universities to

take complete responsibility for technology commercialization and new venture formation in Iowa. While universities are significant centers for innovation and discovery and can be supportive environments for nurturing commercialization and business start-ups, experience around the country suggests that a stand-alone intermediary commercialization entity is often needed to ensure success. It was proposed that Iowa create a professionally managed, well-funded organization dedicated to facilitating business growth, providing access to experienced management talent, and streamlining business access to sources of capital.

It was proposed that the commercialization intermediary organization would

- Use experienced successful serial entrepreneurs for business plan development, due diligence, market assessments, technology assessments, and other planning activities;
- Operate competitive seed and prototype development funds;
- Help entrepreneurs access seed and early-stage funding by collaborating with Iowa's venture financing pools and maintaining close linkages to the private angel investor and venture capital community;
- Provide access to an experienced pool of managers and operations talent who can staff, mentor, or advise start-up enterprises; and
- Provide support and advice for accessing Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) funds and other sources of early-stage financing.

The Iowa BioAlliance has been overseeing implementation of the recommendations in the strategy. A proposal for funding to establish the commercialization entity is expected in the near future. It is anticipated that the commercialization entity will be funded at the level of approximately \$3 million. A separate \$5 million seed fund that would be managed by the commercialization entity is also under consideration.

It is clear that Iowa is dedicating more resources to supporting entrepreneurs and start-up companies and that recent initiatives (such as the accelerators and the proposed commercialization entity) are meant to complement earlier efforts by creating entities with the capacity and level of resources to provide the in-depth assistance that high-growth, start-up companies require. It is not clear yet how all of these organizations will interact or how to ensure that entrepreneurs and companies will be linked to the most appropriate source of assistance.

FACILITATING NETWORKS

One of the characteristics that distinguishes regions with high levels of entrepreneurial activity is the networking that occurs among companies and between researchers and the venture community. Networking is an extremely important way in which entrepreneurs can learn from others who have encountered similar obstacles. Indeed, research by GEM indicates that the extent of social networks is one of the most important factors in encouraging entrepreneurship in any region.¹³ For this reason, creating opportunities for networking has become an important component of state and regional efforts to promote entrepreneurship and the growth of entrepreneurial firms.

¹³ www.knowledgeclusters.com.

Networking can occur in a variety of settings, from breakfasts or luncheons where entrepreneurs make presentations or hear from service providers, to recognition events, to the casual interactions that occur among entrepreneurs who share space in an incubator or a research park.

Mechanisms that facilitate intensive networking within and between industry sectors cultivate a proactive environment. The most successful technology regions facilitate extensive and intensive networking both across the academic/industrial boundary and between companies in allied sectors or in a supply-chain relationship. In a very few leading communities like Silicon Valley, this networking has occurred naturally, with formal organizations like Joint Venture-Silicon Valley coming only later. However, in the vast majority of regions attempting to build technology sectors, formal networking organizations are built from the ground up; otherwise, the desired degree, scale, and intensity of networking will not occur.

What Others Do: San Diego's CONNECT

The CONNECT program at the University of California–San Diego is a network facilitation model that has achieved tremendous success in growing San Diego's technology-based economy. CONNECT was founded in 1985 to foster entrepreneurship in San Diego. CONNECT links entrepreneurs with the resources they need: technology, capital, markets, management, partners, and support services. "Its programs serve as a catalyst for the development and exchange of ideas, a forum to explore new business avenues and partnerships, and an opportunity to network with peers."¹⁴ CONNECT holds workshops and courses, hosts events where entrepreneurs can meet angel investors, and makes awards, such as the Most Innovative Product Award. CONNECT's Springboard program provides free assistance for companies at all stages of development. Companies participate in 3- to 8-week coaching sessions with Entrepreneurs in Residence or Springboard Fellows, after which they present their business model to a group of experts. CONNECT hosts 100 or more events per year. After 20 years, CONNECT is completely self-supported from membership dues, course fees, and corporate underwriting.

What Others Do: Tech Council of Maryland

The Tech Council of Maryland is a not-for-profit membership organization that represents the interests of technology companies throughout the state and brings together companies, educational institutions, government laboratories, and supporting service providers and other businesses. The Council has been nationally recognized as a model for its three-part role of addressing workforce/talent issues; networking universities and technical businesses with service providers; and effectively advocating favorable tax and regulatory policies, investments in higher education and workforce, and other efforts, including building Maryland's technology image nationally and internationally.

The Council serves two major industry clusters: the Bioscience Alliance (BioAlliance) and Advanced Technology Network (ATN). BioAlliance and ATN

- Provide business networking opportunities for their members;
- Create a forum for dissemination of best practices in advancing competitiveness;
- Advocate supporting public policies;
- Work with industry and academia to ensure the availability of a trained workforce; and
- Build investment in companies by showcasing opportunities, supporting entrepreneurs, and highlighting success.

¹⁴ www.connect.org/about/index.htm.

Along with industry networks, the Council has peer groups that meet on a regular basis including

- The CFO Forum,
- The CIO Roundtable,
- The HR Group, and
- Business development/resource teams.

The Council manages an incubator facility; and its predecessor organization, the Montgomery County High Tech Council, played a key role in (1) facilitating the development of a University of Maryland (UM) facility used by 11 UM campuses to offer classes in the region's high-tech corridor and (2) building a Johns Hopkins University satellite campus in the Life Sciences Research Park where UM is located. The Council also played a role in creating the Montgomery County Tech Prep Program, which is a partnership of the public school system, the community college, and UM.

Iowa's Situation

Iowa has a number of organizations that foster some level of networking among entrepreneurs, but most of these efforts are either fairly limited in scope or in a nascent stage of development.

The **JPECs** hold various networking events to bring entrepreneurs together and to bring in people who can act as resources for the entrepreneurs. ISU's JPEC, for example, holds Entrepreneur Forums every other month at which entrepreneurs, venture capitalists, and other business professionals talk about the issues involved in starting a business. ISU also has an entrepreneur's speakers program that brings entrepreneurs to the campus to expose students and faculty to entrepreneurship. The NIACC JPEC created an entrepreneur's exchange to give northern Iowa entrepreneurs the opportunity to exchange ideas and learn about ways to improve business. IDEd's **VNI** links Iowa entrepreneurs with a network of investors and venture capitalists.

The **Technology Association of Iowa (TAI)** (formerly the Software and IT Association of Iowa) promotes networking among its 240 member companies, universities, and related organizations. TAI, initially created with support from IDEd, has an annual budget of \$350,000. It is membership-supported through dues, events, and administrative grant fees. Companies interviewed for the IT Roadmap¹⁵ recently developed for IDEd by Battelle consistently cited TAI as an important and effective mechanism for promoting conditions for positive growth of Iowa's IT sector. TAI, which is increasing its scope to represent and encourage networking for all technology companies in Iowa, has the potential to promote the intensive networking found in more entrepreneurial regions of the country.

The **Iowa Entrepreneur Network (IEN)** is an initiative of the Iowa Business Council and the Iowa Alliance to provide Iowa entrepreneurs with a virtual "community of practice seeking to integrate entrepreneurial expertise and interests across the state."¹⁶ IEN's Web site contains reference materials, links to entrepreneurial Web sites nationally, and links to organizations that provide assistance to entrepreneurs in Iowa.

¹⁵ *Iowa's Information Technology Strategic Roadmap*, prepared for IDEd by Battelle Technology Partnership Practice, September 2005.

¹⁶ www.iowaentrepreneur.com.

An **Iowa Entrepreneurs Coalition** has been formed to provide a voice for entrepreneurs and ensure that their interests are represented in policy discussions. The Coalition has three objectives:

1. Inform Iowa's economic development decision makers and legislators on the contributions, potential, and priorities of Iowa entrepreneurs
2. Provide opportunities for networking among Iowa's entrepreneurs
3. Encourage Iowa's entrepreneurs to take leadership positions on initiatives designed to grow Iowa's economy.

The Coalition, which currently has about 20 member firms, holds monthly networking socials and has developed a number of recommendations that include organizing Iowa's entrepreneurial assistance services into an Iowa Entrepreneur's Institute, providing incentives to start-up companies, encouraging Iowa industry and state government to commit to purchasing from Iowa start-ups, and retooling the Grow Iowa Values Fund to be able to provide greater assistance to entrepreneurs and start-up companies.

It appears that a number of efforts are underway to provide networking opportunities; these need to be nurtured and grown.

ACCESSING CAPITAL AT ALL STAGES OF DEVELOPMENT

States and regions with thriving entrepreneurial sectors share one characteristic: they are home to a venture capital community that is both oriented toward early-stage financing and committed to local investment. Having state-based venture capital funds is critical. It is also critical to have financing available for each stage of development from early-stage proof-of-concept and prototype development to product expansion and later-stage venture financing. Leading technology states typically have access to commercialization funding, pre-seed and seed funding, and later-stage venture financing. States and regions wishing to grow entrepreneurial companies have used a variety of mechanisms to encourage investment in venture capital and to address market gaps, particularly at the commercialization and pre-seed stages.

Types of Capital Needed by Entrepreneurial Firms

- Commercialization funding, which can be used to assess and undertake a review of the commercial potential of completed R&D
- Pre-seed and seed funding, i.e., financing to support very early-stage start-up companies
- Venture financing, which is the capital needed prior to initial public offering.

What Others Do: Commercialization and Pre-seed Funding

It is generally agreed that, even if a region has sufficient venture capital, it is difficult if not impossible to obtain financing for pre-seed capital to fund the follow-on activities needed to determine the commercial potential of research discoveries. To address this market gap, 22 states provide funding for commercialization activities.¹⁷ These programs provide financing, mostly in the range of \$25,000 to \$100,000, to bridge the gap between basic science, which is most often funded by the federal government, and the development of technology with commercial potential. These funds provide support, usually in the form of a grant, for prototype development and other proof-of-concept activities. Some of the funds require repayment if a project is successful, usually in the form of a royalty. An example of a state-funded

¹⁷ *Laboratories of Innovation: State Bioscience Initiatives 2004*. Battelle Technology Partnership Practice. Washington DC: BIO, June 2004, p. 42.

program that seeks to address a firm's capital needs throughout the commercialization process is the **Maine Technology Institute (MTI)**.

MTI operates four commercialization financing programs:

- **Seed grants** of up to \$10,000 are awarded on a competitive basis to support very early activities for product development, business planning, or development leading to commercialization. These grants can be used for proposal preparation, market analysis, intellectual property filing, or other commercialization activities.
- **Development awards** ranging from \$10,000 to \$500,000 per project are used to support proof-of-concept work, prototype development, alpha or beta testing, product development, and designs for manufacturing.
- The **Accelerated Commercialization Fund** provides capital to bridge the financing gap between R&D and sales. Under this program, MTI provides additional capital to match other investors' capital in MTI-funded companies. MTI usually replicates the other investors' terms, generally in the form of equity.
- **Cluster enhancement awards** of up to \$200,000 are made on a competitive basis to seed collaborative efforts that lead to commercialization in Maine's technology-intensive sectors.

An increasing number of universities provide funding for commercialization, in some cases establishing freestanding commercialization centers. **Florida State University's Research Foundation**, for example, offers two funds to assist in technology commercialization. The BUILD Together Partnership makes awards of up to \$50,000 for pre-commercialization research conducted at Florida State University in preparation for establishing a spin-off company. The awards are also available in the form of a loan or equity investment if sought directly by the spin-off company involved. The Foundation's Prototype Development Projects program, which is managed by the Office of Technology Transfer, offers investigators up to \$25,000 for 6 months. These awards are repayable from royalties as a "related cost" under the university's IP policy.

What Others Do: Encouraging Investment in Early-Stage Capital

States use a variety of mechanisms to increase the availability of early-stage capital. They can encourage the development of the state's private venture capital industry, directly invest in companies, and use tax policy to encourage investment in technology companies and venture capital funds. The most popular mechanism to encourage investment in local venture capital funds is to create a "fund of funds"—often backed by tax credits—that will invest in private venture capital funds. To facilitate private investment and minimize the need for public appropriations, contingent tax credits are used to guarantee, at least partially, private investments made in the fund of funds. Iowa is among the states that have created such a fund of funds. States also offer tax credits to encourage individuals to invest in private venture capital funds. Once again, Iowa is one of the states that offers such a credit. Less common are tax credits offered for investing in a technology business. Nine states, including Iowa, offer tax credits to individuals or corporations that invest in technology companies. Thirteen states, as of 2004, reported investing directly in privately managed venture capital partnerships. In return, the funds agree to make a good faith effort to invest in companies located in the state. In West Virginia, for example, the state competitively chose seven qualified capital companies and invested \$24.25 million in state funds. These funds invest at the \$200,000 to \$4 million level.

Nearly all states and regions recognize that there is a gap at the pre-seed/seed stage, and some have addressed this by making direct equity investments in technology companies. This stage of funding, which usually requires \$25,000 to \$2 million in individual investments, constitutes a critical private sector market gap of investment dollars because this size of investment is usually too small for larger venture funds to consider. Yet, having pre-seed/seed funding is essential for building the pipeline of firms which, as they gain experience and need additional funds to expand, become candidates for “major league” funding from larger, more diversified venture funds both within and outside the state. To date, however, most state-supported seed funds tend to be small, ranging from \$1 million to \$12 million, with most at about \$5 million. Georgia, for example, has created an \$8 million Seed Capital Fund that makes investments of between \$500,000 and \$1 million.

Another way states seek to build their local venture capital market is by tapping state pension funds. The majority of state pension funds have a small portion of their capital in venture capital funds, primarily in national venture funds. This is the case for the Iowa Public Employees Pension System. A small amount of public pension funds, however, are invested in funds that are regionally managed to encourage investment in start-up companies within the state.

In **Oregon**, for example, the Governor signed a bill requiring the Oregon Investment Council, which manages the state public pension plans, to “look at Oregon opportunities for diversification unless, under the circumstances, it is not prudent to do so.” In response to this change in its investment mandate, the Council contracted with CS First Boston to operate a \$100 million fund of funds that will invest in four or five venture-capital partnerships that agree to significant exposure to Oregon deals. In Idaho, state pension funds are invested in venture funds that agree to open an office in the state.

Iowa's Situation

During the past several years, Iowa has employed a variety of the tactics described above to increase the availability of capital for Iowa entrepreneurs and start-up companies. These include the following:

- **Creation of an Iowa Fund of Funds.** In 2002, the Iowa Legislature enacted legislation creating a Fund of Funds that includes a provision for continent tax credits of up to \$100 million, which will be available to investors if their investment fails to achieve a designated return. The Fund of Funds will invest in privately managed venture capital funds that agree to have a physical presence in Iowa and commit to making a good faith effort to find and make equity investments in Iowa businesses.

In June 2005, the Fund of Funds received its first commitment through a \$10 million revolving loan fund provided by West Bank of West Des Moines to provide working and investment capital to the Fund of Funds program. Wells Fargo of Des Moines has committed to providing an additional \$5 million to support the investment program. The Fund of Funds plans to raise \$95 million and to invest \$2 to \$5 million in as many as 15 funds over the life of the Fund.

The Fund of Funds made its first investment of \$5 million in Prolog Capital II in 2005. This fund is managed by Prolog Ventures, an early-stage venture capital firm focused on life science investments based in St. Louis. Prolog has agreed to accept requests from Iowa firms.

The Fund of Funds will attempt to invest in funds focused on areas of technology of interest to Iowa, such as alternative energy and agricultural biotechnology, and will include in its portfolio funds that invest at varying levels, including at least one fund that would invest at the \$250,000 to \$500,000 level.

- Investment in Technology Companies, Community-Based Seed Capital Funds, and Venture Capital Funds.** Also authorized in 2002 are several tax credits designed to encourage investment in entrepreneurial start-up companies. Individuals who invest directly in a qualified business or in a community-based seed capital fund are eligible for a tax credit equal to 20 percent of the investment. Investors are limited to five credits per year, and the maximum amount for one investment is \$50,000. For companies to qualify, they must have (1) operations in Iowa; (2) been in business for 6 years or less; (3) successfully completed an entrepreneurial training program, such as those offered by the JPECs, or demonstrated experience, training, or education; (4) a net worth that does not exceed \$10 million; and (5) secured, within 24 months, total equity or near equity of \$250,000. Taxpayers who invest in venture capital funds can receive a credit equal to 6 percent of the individual's equity investment.

The impacts of these credits have been mixed. The tax credit for investing in community seed funds, in conjunction with assistance provided by IDED to communities to help them create a seed fund, has resulted in the establishment of community seed funds throughout Iowa as shown in Table 2. On the other hand, out of a total of \$10 million that was available for tax credits during the 2002 to 2004 time period, only \$1.7 million was claimed, suggesting that the credits are not being used to their full potential. Various reasons were given by those interviewed for the limited use of the credits. First, the program is not well understood by either the general public or the legal and accounting professionals who are in a position to promote its usage. Second, the opportunities to invest in start-up companies and/or venture funds in Iowa are limited by deal flow. Third, the criteria for qualifying businesses may be somewhat narrow, although the criteria stated above were broadened in 2005. Previously, qualifying firms could have been in business for only 3 years rather than 6 years and could have a net worth of only \$3 million rather than \$10 million. These changes may allow more firms to qualify.

- Direct Investment by State in Iowa Companies.** A portion of the **Grow Iowa Values Fund** is dedicated to direct business development and assistance financing. Specifically, \$220.5 million over the next 7 years has been allocated to fund current and new programs administered by IDED, with a focus on business start-ups, expansion, modernization, attraction, retention, and marketing. An example of a start-up company that received an investment from the Grow Iowa Values Fund is NewLink Genetics Inc., an Ames biopharmaceutical firm that received a \$6 million award to put toward a \$186 million expansion expected to create 350 jobs.

One of the programs funded by the Grow Iowa Values Fund, and administered by IDED, is the **Entrepreneurial Ventures Assistance** (Program, which provides both financial and technical assistance to early-stage technology companies. EVA provides an equity-like investment, usually in the range of \$50,000 to \$100,000, with a maximum of \$250,000, in the form of a deferred loan. The program is targeted to high-growth, technology-oriented companies. To qualify, applicants must have an endorsement from one of Iowa's accelerators. The accelerator is expected to mentor the firm and provide assistance following the EVA investment. Technical assistance funds of up to \$25,000 can be awarded for product testing and design improvement or the purchase of technical or professional expertise. Last year, EVA awarded approximately \$950,000 to 14 Iowa companies. Companies that had received EVA funds were very positive about the program, citing the fact that it provides funding for young companies at the time they need it most and gives them time before they have to start repaying it. One change in the program that may limit its effectiveness is the requirement that firms

Table 2: Iowa Seed and Venture Capital Funds

Fund	Size	Level of Investment	Location
Seed Funds			
Ames Seed Capital Fund	\$900,000	\$50,000 to \$200,000	Ames
Cedar Valley Venture Fund	\$1.6 million	\$100,000 to \$300,000	Cedar Falls
Eastern Iowa Angel Investors	\$1.1 million	NA	
Emerging Growth Group	\$2.5 million	Up to \$250,000	Des Moines
Great Quad City Angel Investor Network	\$1 million	NA	Davenport
Iowa First Capital Corp.	\$ 7 million	\$100,000 to \$500,000	Cedar Rapids
North Iowa Venture Capital Fund	\$1.69 million	\$50,000 to \$160,000	Mason City
Wellmark Ventures Fund	\$5 million	\$10,000 to 50,000	Ames, Cedar Falls, Iowa City, and Mason City
Venture Funds			
AAVIN Equity Partners	\$47 million	\$500,000 to \$3 million (late stage and expansion)	Cedar Rapids
Equity Dynamics	NA	NA	Des Moines
MorAmerica Capital Corp.	NA	\$750,000 to \$1.3 million (late stage)	Cedar Rapids

NA = not applicable.

applying for funding pay at least 130 percent of the average wage of the county in which they are located. This is a requirement of the Grow Iowa Values Fund, which is the vehicle that provides funding for EVA. Because this requirement has just been initiated, it is too early to say what its impact will be; but, entrepreneurs expressed concern that many start-up companies would not be in a position to meet this requirement. The Board that oversees the Grow Iowa Values Fund can waive the requirement if it feels it is warranted. Also, EVA funds received from prior investments do not have the same requirement.

- **Proposed Bioscience Seed Fund.** The Bioscience Alliance is continuing to implement the strategies recommended in *Iowa's Bioscience Pathway for Development*.¹⁸ One such recommendation was to create a \$25 to \$50 million Bioscience Seed Fund under the Iowa Fund of Funds. A \$5 million

¹⁸ *Iowa's Bioscience Pathway for Development*, prepared for IDIED by Battelle Technology Partnership Practice, July 2004.

proposal for a Bioscience Seed Fund that would be developed as part of a proposed statewide commercialization entity is under discussion.

Iowa has access to more early-stage equity capital than ever before, but entrepreneurs and service providers indicated that capital gaps still exist at the very early, proof-of-concept stage, as well as at the \$500,000 to \$1 million level of investment. Investments of \$5 million or more must be obtained from out-of-state venture funds. Figure 3 shows the various capital sources available to Iowa’s entrepreneurial firms.

Figure 3: Iowa Capital Sources by Stage of Development

Stage of Development				
Idea Stage	Start-up	Early Stage VC	Later Stage VC	Expansion
<\$100,000	\$50 – \$300,000	\$500,000 – \$5M	>\$5 million	
University Commercialization Funds (GIVF)	Angels	Prolog		
	Commercialization Funds	Proposed Bioscience Seed Fund	Other funds funded by Fund of Funds	
	Wellmark Ventures		Grow Iowa Values Fund	
	EVA			

COMMERCIALIZING UNIVERSITY-DEVELOPED TECHNOLOGIES

The presence of research universities with recognized areas of excellence is critical for regions and states seeking to grow technology-based knowledge economies. Research universities generate knowledge and technology that provide the basis for creating firms and introducing products into the marketplace. Generating new discoveries, however, is necessary but not sufficient for growing knowledge economies.

Universities that succeed in supporting knowledge economies are committed to fostering entrepreneurial development and facilitating commercialization of research findings. Such universities emphasize that faculty roles are not limited to education, research, and public service, but include contributing to economic development as well. These universities are also willing to commit resources to undertake aggressive technology transfer and commercialization efforts.

Universities and other research institutions find that potential market applications for research findings often go unnoticed unless funding is available to develop an idea or approach, conduct further applied research, undertake due diligence, or expose the research to people with differing perspectives. Prototype-development and proof-of-concept funds are used to address this need. Some universities have established independent entities to commercialize their research findings and to provide assistance including, in some cases, financial assistance to faculty and staff who create new companies around university-developed technologies. Other universities have used their endowments to capitalize local or regional seed and venture funds.

What Others Do: Carnegie Mellon University

Carnegie Mellon University (CMU) opened its Center for Technology Transfer (CTT) in 1993 to help researchers commercialize their technologies and to assist in launching new ventures around university-developed technologies. Since that time, more than 50 companies have been formed, and the university has entered into licensing agreements with about 65 companies. CTT reports that more than 120 companies in Pittsburgh have been founded by CMU principals or have been based on CMU-developed technology.

In 2003, CMU revamped its technology transfer functions to place more emphasis on encouraging entrepreneurial activities on campus and building stronger ties between university faculty and researchers and business leaders in southwestern Pennsylvania. One change the CTT made in terms of how it reviews discoveries is to use review teams composed of internal experts, alumni, external experts, specialists, people with financial expertise, and others with deep domain knowledge to review innovations and assess their commercial potential. These review teams have proven to be very valuable in terms of expanding the expertise of the CTT staff. The make-up of the board changes depending on the innovation being reviewed. In 2004, CMU launched four new start-up companies and completed 64 licenses.

What Others Do: Commercialization Centers

An increasing number of universities have created freestanding commercialization centers that attempt to create start-up companies around university-developed technologies. One of the earliest such centers, **BCM Technology (BCMT)**—a wholly owned subsidiary of Baylor College of Medicine (BCM)—was established in 1983 to help commercialize technology generated by the college. BCMT helps BCM's licensing office decide whether a BCM invention should be commercialized by a license or by formation of a spin-off company. In the latter case, BCMT catalyzes formation of a local company through a pre-seed investment and provision of interim management services. BCMT staff draft the preliminary business plan for the company; structure the company's initial ownership, including any shares granted to BCM in consideration of IP rights, serve as directors and interim executive management; and pitch the first-stage investment deal. BCMT also helps recruit the spin-off's first management team and structures a formal round of investment in which the College endowment and outsiders may participate. Since its founding, BCMT has started more than 35 companies. Since 1993, seven of its companies have become public; and, between 2000 and 2002, BCMT formed 12 companies that raised more than \$100 million in venture capital. BCMT claims a 40 percent "internal rate of return" on its investment portfolio and has returned substantial cash to BCM.

Iowa's Situation

Iowa's three regent universities, ISU, UNI, and UI, have programs to encourage partnerships with industry and to facilitate technology transfer and commercialization. All three universities house JPECs and SBDCs, and ISU and UI have research parks that house both companies and university research centers. The ISU Research Park operates the Iowa State Innovation System, a technology incubator; and the Oakdale Research Park at UI includes the Technology Innovation Center, a business incubator focused on new business ventures that make use of advanced technology.

At ISU, the ISU Research Foundation (ISURF) manages and licenses the university's IP. ISU ranks highly in terms of its technology transfer activities. In 2003, ISU ranked second nationally in licenses and options-yielding income and second in number of licenses and options executed among the 165 universities reporting to the annual survey of the Association of University Technology Managers.

ISU also has a record of creating start-up companies based on university-developed technology, forming six new companies in FY 2005 and 78 in the past two decades.¹⁹ ISURF recently added a staff person to assist companies in accessing the SBIR/STTR programs. Assistance is provided to help companies identify solicitations that match R&D capabilities. ISURF can also assist in writing and reviewing proposals.

The UI Research Foundation serves as the university's technology transfer agent. In FY 2003, UI received \$8.8 million in license income from 144 licenses and options and launched one company based on IP developed at the university.

The universities in Iowa have been proactive in recent years in changing rules, regulations, and policies that present barriers to technology commercialization and faculty entrepreneurship. Within the past 24 months, significant strides have been made, such as UI changing its policies to provide the first \$100,000 in royalties directly to the inventing faculty member.

Despite the progress being made, entrepreneurs interviewed suggested that there are still serious barriers for those seeking to spin out a company from Iowa's universities. Many of these issues were noted in *Iowa's Information Technology Strategic Roadmap*²⁰ as well. Issues raised include the following:

- Some entrepreneurs view the universities/university departments as being rather challenging to work with when negotiating joint R&D deals and IP access. They feel that the universities focus too heavily on the economic gain that they can receive, which therefore makes them focus more on licensing as a commercialization option rather than on company formation.
- Universities are viewed as rather slow and unresponsive during negotiations.
- There are challenges in encouraging and rewarding applied commercial research and faculty entrepreneurship and commercialization activities—particularly for younger faculty who believe that such activity will neither gain them recognition nor be taken into account positively in tenure decisions.
- A lack of early-stage pre-seed funds is felt at the universities to advance technology and innovation toward proof of concept or to perform basic market evaluations.
- University entrepreneurial assistance programs, incubators, and technology parks are viewed as seriously underfunded and understaffed. Technology transfer and IP protection staffing also is inadequate at the research universities. Even ISU, which has the largest staff, notes that it now seems to take 3 instead of 2 years to achieve patent protection.

Significant changes are planned or underway that indicate that the universities are addressing these issues and are being provided with additional resources with which to do so through the Grow Iowa Values Fund. The legislation that created the Grow Iowa Values Fund stated "It is the intent of the General Assembly that the three universities under the control of the state board of regents have as part of their missions the use of their universities' expertise to expand and stimulate economic growth across the state."²¹ To help them do this, the Values Fund is providing \$5 million to be used to build the universities'

¹⁹ISU Economic Development Accomplishments and Highlights of Technology Transfer Activities, FY 2005, www.vpresearch.iastate.edu/docs/techtransfer/2005TTRreport.pdf.

²⁰ *Iowa's Information Technology Strategic Roadmap*, prepared for IDIED by Battelle Technology Partnership Practice, September 2005.

²¹ House Files 809 and 868 passed by the Iowa legislature in 2005.

infrastructure in the area of technology commercialization, entrepreneurship, and business development. In FY 2006, UI and ISU will receive \$1.9 million and UNI will receive \$950,000.

UI will use \$1.4 million of its funding to support competitively selected commercialization projects based on the university's or partnering companies' IP. The remaining funds will be used to promote entrepreneurship and build new networks among people with technical, financial, and business expertise. ISU will also use a portion of its funding (\$825,000) to provide support for competitively awarded commercialization projects. Funded projects would be expected to result in formation of a company, development of a prototype to demonstrate feasibility, or deployment of a new technology. ISU will also use \$600,000 of its funds to strengthen its existing commercialization infrastructure, which includes the JPEC, the ISU Research Park, and the Institute for Physical Research and Technology (IPRT). ISU will use its remaining funds to support projects to develop new products and new companies. UNI will use its funds to support its technology transfer and business incubation efforts, continue support for the MyEntreNet program, provide market research for Iowa companies, build the capacity of regional economic development organizations, and expand the technical capabilities and staff resources of the National Ag-Based Lubricants, a national leader in developing bio-based lubricants.

The addition of these funds should position Iowa's research institutions to realize the commercial potential of their IP and enable them to both spin out new companies and help existing companies develop and market new products and processes.

PROMOTING A CULTURE OF ENTREPRENEURSHIP

States and regions vary greatly in the degree to which entrepreneurship and risk-taking is embraced and cultivated. Entrepreneurial climates vary based on a region's demographic makeup, history, and corporate composition and the priorities of its political leadership. Entrepreneurs in Iowa, and in the industrial Midwest generally, report "a climate less favorable to entrepreneurs, stemming from a history and corporate composition of traditional manufacturing and a risk-averse culture where there is very low tolerance to the inevitable failures associated with entrepreneurship."²² Yet, an entrepreneurial culture can be one of the biggest factors in determining whether a state or region will experience growth in today's economy. But entrepreneurial cultures are a matter of art. There is no precise way to define or build an entrepreneurial-driven economy, although it is evident when one exists. A challenge for regions that do not have a long history of entrepreneurship is to find ways to change mindsets so that they are open to the idea of starting and growing businesses.

Constructing an entrepreneurial culture does not happen overnight. It requires a range of initiatives and approaches, along with a willingness to maintain patience. The results come to fruition only after several years marked by more start-ups, more risk capital, more role models, and ultimately one or more firms that have successfully become major industry players themselves.

Specific steps that can be taken to develop an entrepreneurial culture include the following:

- ***Embedding entrepreneurship in education at all levels.*** Over the long term, the most important and effective means of creating a culture of entrepreneurship is to use the educational system to encourage students to be inventive and creative and to provide them with the skills and values to become

²² *Guide to Entrepreneurship Programs*, Columbus, OH: SSTI, forthcoming.

entrepreneurs. The National Governors' Association proposes that states use their K-12 and post-secondary educational system to nurture and encourage entrepreneurship by

- Building entrepreneurial readiness through the state's K-12 systems with (1) training K-12 teachers in entrepreneurship, (2) including entrepreneurship education in state competency standards, and (3) reaching out to teachers and educational leaders to build awareness of entrepreneurship as a profession and career path;
 - Encouraging publicly funded universities and colleges to incorporate entrepreneurship curricular and noncurricular activities into business, engineering, and liberal arts education; and
 - Supporting faculty entrepreneurship in the university system.²³
- ***Educating the media.*** Fostering good relations with key media outlets, educating them about entrepreneurship, and actively providing them with entrepreneurial success stories can help to encourage a positive attitude about entrepreneurship. Often the media don't distinguish between traditional small businesses and entrepreneurial businesses. It is important to educate them to the unique needs and challenges facing entrepreneurs.
 - ***Recruiting leading entrepreneurs to act as role models, champions, and spokespersons.*** Having strong leaders committed to stimulating entrepreneurial development activity can make a difference in promoting cultural change. Such entrepreneurial leaders need to be added to the boards of state and local economic development organizations and civic leadership groups.
 - ***Recognizing and rewarding entrepreneurship.*** Creating a strong entrepreneurial culture will require that the state's citizens understand the importance of entrepreneurship and the opportunities it offers for developing the state's economy. Successful entrepreneurs need to be rewarded and encouraged.

What Others Do: Northern Ireland's Campaign to Encourage Entrepreneurship

In 2003, Invest Northern Ireland, Northern Ireland's main economic development organization, began implementing a strategy to accelerate entrepreneurship in Northern Ireland. A key component of the strategy was to create a positive view of entrepreneurs and entrepreneurship through a sustained promotional campaign to inspire individuals to explore entrepreneurship, champion local entrepreneurs, and provide visible recognition and celebration of their success. Invest Northern Ireland initiated a media campaign that sought to not only spur to action anyone thinking about pursuing an entrepreneurial venture, but also promote general understanding and support of entrepreneurship among the citizenry. The campaign that encouraged citizens to "Go For It" included radio ads, outdoor posters, and even beer coasters carrying the message. In addition to the public education campaign, Invest Northern Ireland also provided mentoring, access to financing, and an integrated support network for entrepreneurs. The strategy also called for embedding an understanding and appreciation of entrepreneurship into all aspects of the educational system.

Total entrepreneurship activity in Northern Ireland, as measured by GEM, rose from 3.6 in 2002 to 5.0 in late 2004. Invest Northern Ireland, which credits the campaign, in part, for this increase in entrepreneurship, is launching a second phase of its campaign, which is expected to generate more than 22,000 inquiries from people interested in starting a business.

²³ *Governor's Guide to Entrepreneurship*. Washington DC: National Governors' Association, Center for Best Practices, 2004.

Iowa's Situation

Iowa's universities are home to the JPECs, one of the first entrepreneurship programs in the country to integrate entrepreneurship education with business, engineering, health sciences, and liberal arts and sciences. They also have highly ranked programs that offer entrepreneurship training to all students. At ISU, business majors can specialize in entrepreneurship, and students in other majors can minor in entrepreneurship. ISU also offers the Entrepreneurship and Innovation Learning Community in which student entrepreneurs can live with other aspiring entrepreneurs, acquire entrepreneurial skills, receive mentoring, and have access to a \$25,000 seed capital fund. UNI offers certificates in entrepreneurship for both business and nonbusiness majors and provides incubator space for student entrepreneurs. All UI undergraduate students may earn a Certificate in Entrepreneurship in addition to their undergraduate degrees. Performing arts students may earn a B.A. in Performing Arts Entrepreneurship. At the graduate level, MBA students may pursue a Concentration in Entrepreneurship as part of their program of study; graduate students outside of business may earn a Certificate in Entrepreneurship.

The JPECs also encourage the teaching of entrepreneurship at the K-12 level. They offer summer programs for K-12 teachers and summer camps for middle and high school students and sponsor various youth entrepreneurship programs, such as the youth entrepreneurship academy and entrepreneurs-for-a-day program. They also provide comprehensive entrepreneurial training and support programs for entrepreneurs and students.

In addition to the JPEC efforts, Iowa's education code requires that the state's technical and vocational schools incorporate entrepreneurship into their curricula and the State Dept. of Education provides professional development for teachers to help them incorporate entrepreneurship into their curricula. The Department of Education's Bureau of Community Colleges and Career and Technology Education houses a staff person, funded through the federal government's Perkins program, to work with schools to assist them in developing entrepreneurship programs at the K-12 level. The Community College system offers entrepreneurship training through continuing and adult education classes and some colleges offer certificates in entrepreneurship. But while the educational system is committed to promoting entrepreneurship, resources to do so are quite limited. No state funds have been appropriated specifically for entrepreneurship education. The Dept. of Education has succeeded in obtaining some federal funding to support these activities but federal funding for entrepreneurship education is also extremely limited. In comparison, in 2000, the state of Arizona spent approximately \$16 million on entrepreneurship programs.²⁴

SUMMARY OF IOWA'S ENTREPRENEURIAL SUPPORT INFRASTRUCTURE

Iowa has a number of excellent programs to support entrepreneurs and emerging growth companies. By and large, however, these programs are underfunded and understaffed. There is also a lack of experienced entrepreneurial talent in these organizations. As one interviewee said, you can count the number of entrepreneurs available to advise others getting started on one hand. The array of programs is confusing to entrepreneurs, and there are no clear distinctions among the organizations in terms of the services they provide and the type of clients they target. The various organizations have begun to work to address this. The JPECs, for example, have developed materials that describe the JPEC/SBDC network and the

²⁴ Thom Rubel and Scott Palladino. *Nurturing Entrepreneurial Growth in State Economies*. Washington: National Governors' Association, 2000.

services it provides, but there is a long way to go to achieve a seamless service delivery system for Iowa’s entrepreneurs.

Figure 4 shows where Iowa’s entrepreneurial support programs fit in terms of the business development model. The majority of the programs in place focus on the business start-up stage, and the new programs being funded by the Grow Iowa Values Fund—including the funding to increase technology transfer and commercialization capabilities at the universities and the proposed technology commercialization center—will provide resources to assist at the very early stages of commercialization. Fewer resources are available to companies as they move into the growth phase.

Figure 4: Iowa’s Entrepreneurial Support Programs

Clients	Business Stage Of Development		
	Concept, Planning and Verification	Business Start-up	Growth
Entrepreneurs and Entrepreneurial Companies	JPECs		
	University Technology Transfer and Commercialization Efforts	Accelerators	
		EVA	
	Proposed Technology Commercialization Center		
Small Businesses		SBDCs	SBA

Recommendations

The entrepreneurs and service providers interviewed for this study identified the following six major needs that, if addressed, would greatly improve the environment for entrepreneurship in Iowa:

1. In-depth support and mentoring from people with experience in starting and growing companies
2. Access to management talent
3. Help in increasing sales and introducing products into new markets
4. Access to capital at all stages of development
5. Efforts to strengthen the culture for entrepreneurship in Iowa
6. Greater opportunities for networking with other entrepreneurs and university researchers.

Actions that could be taken to address each of these needs are discussed below.

Increase focus, scale, and intensity of support for entrepreneurs and start-up companies. As discussed throughout this report, entrepreneurs who are just getting started need in-depth support as they work their way not only through commercialization and business start-up but also through rapid growth. Iowa has a number of programs that assist small businesses and entrepreneurs, and recent efforts have been made to create programs capable of providing more in-depth assistance targeted specifically to high-growth companies. These efforts are fairly new and just getting off the ground. But, the large number of programs with limited resources and the sheer number of service providers make it confusing for entrepreneurs. The following steps are proposed to strengthen the existing infrastructure of support for entrepreneurs:

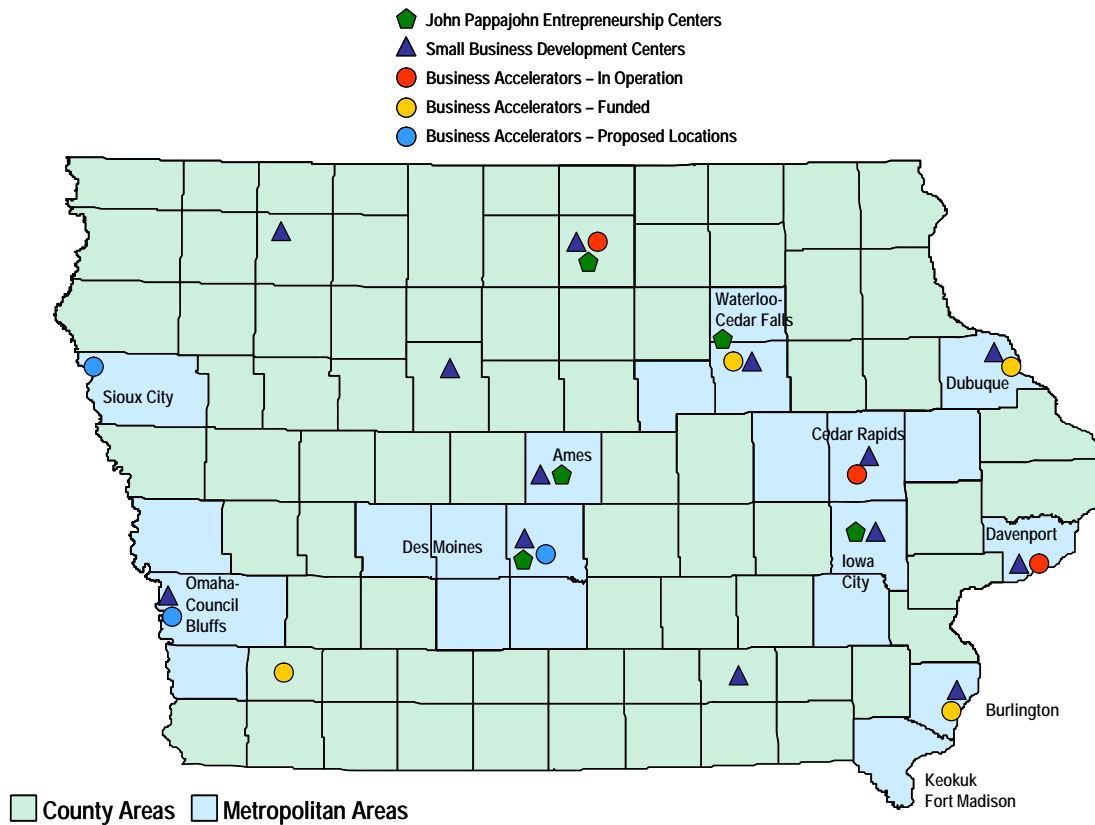
- ***Encourage offices providing assistance to start-ups and entrepreneurs to be co-located (JPEC, SBDC, accelerator, etc.) and to use their resources collectively to create critical mass.*** In several locations in Iowa, the various service providers are co-located and operate as an integrated unit in providing assistance to entrepreneurs. Figure 5 shows the location of the JPECs, SBDCs, and accelerators. In Ames, for example, the JPEC, the SBDC, the university's incubator, and the IPRT are all located in the ISU Research Park. An entrepreneur can come to one location and be directed to the individual or program that can best meet his or her need. NIACC in Mason City provides a similar integrated set of services as it houses the JPEC, SBDC, and an accelerator. The UNI Business Resource Center, which includes a JPEC, SBDC, and an incubator, serves as a one-stop shop for entrepreneurs in northeastern Iowa.

UI announced in October the creation of its Iowa Centers for Enterprise, Business and Commercialization Services. The Centers will have a physical location and will serve as a one-stop shop for entrepreneurs and businesses interested in accessing UI resources. The Centers include the UI JPEC; the UI Research Foundation; an SBDC; the Office of Corporate Partnerships; SBA programs; and the Technology Innovation Center, the university's incubator at Oakdale Research Park. The creation of the Centers will provide the opportunity to charter the collective resources of all of these entities to work to achieve common goals.

The state of Iowa should support the development of the type of integrated centers described above. It must be recognized, however, that not all areas of the state are served by these centers. Consideration should be given to establishing satellites of these centers in underserved areas of the state rather than creating any additional centers.

Figure 5: Iowa's Entrepreneurial Support Centers

Iowa's Entrepreneurial Support Centers



- Scale up level of support for Iowa's entrepreneurship support programs based on performance.** It is difficult to calculate the total dollars supporting entrepreneurship programs in Iowa, but it is clear that the level of support is low. The total budget of the 12 SBDCs is \$3.2 million, of which approximately \$900,000 comes from state government. The budgets of the JPECs total about \$1.5 million to \$2 million, a very small percentage of which comes from state government. A good percentage of the JPEC budgets is spent on entrepreneurial education as opposed to support services for entrepreneurs. Each accelerator currently receives \$75,000 in annual funding, for a total annual cost of \$525,000 for the accelerators thus far funded. Compare this with the budget of the Idea Foundry in Pittsburgh, which has an annual budget of \$2.2 million. The EVA program invests approximately \$1 million annually in new technology-related enterprises. When added together, these programs total only about \$5 million to \$6 million.

The state of Iowa has begun to address this issue. Resources available this year from the Grow Iowa Values Fund will provide an additional \$5 million to the regent universities to increase their capacity

to support commercialization and economic development. A portion of the \$5 million will be used to support entrepreneurs and start-up companies. The most significant proposal for increasing support to entrepreneurs is the proposed technology commercialization entity that would be funded at the level of several million dollars. The creation of a statewide commercialization organization will be an important step in growing Iowa's entrepreneurial economy; but, consideration also should be given to increasing funding to those organizations that can show that they are effective in creating sustainable, successful enterprises.

- ***Create a focal point for entrepreneurs within IDED. The commercialization specialist could serve in this role.*** Many of those interviewed indicated that it would be nice to have a one-stop shop where an entrepreneur could go for assistance. While it is not possible, nor desirable, to create a single entity to provide entrepreneurs with the array of services they need, it is possible to create a focal point within IDED where entrepreneurs could receive an assessment of their needs and be referred to the most appropriate service provider. The Grow Iowa Values Fund called for the creation of a commercialization specialist position within IDED. It is recommended that this position be filled by a person with entrepreneurial experience who can represent the views and needs of entrepreneurs in IDED policymaking. An initial responsibility of this position should be to review IDED's portfolio of programs and recommend changes, if needed, to make them accessible to entrepreneurs and start-up and growing companies.
- ***Develop mechanisms (single Web portal, cross-training) to facilitate communication and cooperation among existing and proposed intermediaries.*** As shown previously, Iowa has a number of entrepreneurial support programs that need to be connected to maximize resources and better meet entrepreneurs' needs. Co-location, shared staff, and other means need to be put in place to make connections and collaborations more frequent. Cross-training may be needed to ensure that the key staff of the various programs are familiar with the processes of all organizations so they can address firm needs as knowledgeable facilitators rather than as referral agents. Given staff expertise, it may be possible that a certain center would work with a particular industry sector or with companies needing a particular expertise. The JPECs have already begun to do this and to refer clients to each other. With the establishment of the new statewide commercialization center and new organizations at the universities, such coordination will become even more critical. IDED can act as the convener to bring the various entities together.
- ***Establish an agreed-upon set of system-level metrics that all organizations providing entrepreneurial assistance can use to measure progress.*** Iowa has a decentralized system of support for entrepreneurs that allows regions to tailor their programs and services to meet the needs of their local entrepreneurial community and to match their institution's strengths and capabilities. A common set of performance metrics would help this decentralized network of centers to operate as a more seamless service delivery system. Developing such measures and widely disseminating them would also help educate policymakers, legislators, and citizens to the fact that the number of jobs created is not the only measure and, in this case, is probably not the best measure by which these programs should be judged. Data on the number of companies launched, dollars of investment capital raised, and amount of sales can be used to ascertain whether the companies being supported are indeed contributing to the economic well-being of Iowa. Once the metrics are agreed to, it may be possible to develop a statewide database to track data on companies that have received funding and/or technical assistance.

- ***Brief and educate professional service providers (Iowa State Bar Association, Iowa Society of Certified Public Accountants, Iowa Bankers Association, etc.) about Iowa entrepreneurial programs and tools.*** Often, an entrepreneur will approach a banker, a lawyer, or an accountant to learn how to launch a new venture. If such service providers are aware of the programs available, they can play a key role in ensuring that these individuals get linked with the most appropriate service providers. In interviews with private service providers, it was suggested that Iowa's professional business development community is not aware of the services available to entrepreneurs. It was suggested, for example, that lack of knowledge about the state's tax credits available to individuals who invest in technology companies and venture capital funds within the service provider community may be one reason why the credits have not been used as extensively as might have been hoped.
- ***Provide training for local economic development staffs on entrepreneurship and the entrepreneurial assistance provided by the various service providers.*** Frequently, the first stop for an entrepreneur or company looking for advice is the local economic development organization or chamber of commerce. The local economic development practitioners interviewed indicated that entrepreneurs in their communities with a business idea "are desperate for someone to talk with about their idea and how they might operationalize it." These entities seek to link would-be entrepreneurs to sources of assistance, but often find that they are referring them to either inappropriate or underfunded service providers. Local economic developers could play an important role in identifying entrepreneurs and linking them to appropriate resources. To do so, the economic developers must understand what it takes to start and grow a company as well as what programs and organizations provide what types of services and to what types of clients. Otherwise, both the entrepreneur and the service provider can be frustrated if the referral is not appropriate to the entrepreneur's situation.

Address need for management talent by attracting and cultivating entrepreneurial talent. Both the entrepreneurs and the service providers interviewed indicated that the greatest challenge in terms of creating and growing new ventures in Iowa is the lack of experienced management talent. The state simply has very few people who have started and grown successful entrepreneurial companies. To address this issue, Iowa should

- ***Investigate using the state's Iowa Careers Consortium to attract entrepreneurs and managers to Iowa.*** Iowa's business community, educational institutions, professional associations, and state government have formed the Iowa Careers Consortium to attract highly skilled workers to Iowa by providing information on employment opportunities and promoting Iowa's high quality of life. The Consortium has a Web site, SmartCareerMove.com, where employers can list job openings, employees and students can post resumes, and students can access information on internship opportunities. Ways should be explored for using the Web site to provide information to out-of-state entrepreneurs, such as a list of technologies available for licensing from the state's universities or a description of new ventures looking for management talent. The Consortium also conducts recruitment trips to areas with a high concentration of Iowa alumni or targeted skilled workers. Such trips may also offer an opportunity to network with entrepreneurs.
- ***Create an Entrepreneur-in-Residence program.*** One of the most critical needs facing Iowa is the lack of seasoned experienced managers to steer new entrepreneurial ventures. One solution that St. Louis and Pittsburgh are experimenting with, and with some success, is to create a program that attracts experienced entrepreneurs and places them in a situation where they can mentor fledgling companies. Philadelphia is experimenting with a program designed to recruit seasoned entrepreneurs.

The Pittsburgh Life Sciences Greenhouse has a Bioscience Executive-in-Residence Program that provides a pool of experienced senior managers available to start-up firms as interim executives to manage company formation and the pursuit of pre-seed and seed funding. They often work with university faculty and other researchers trying to launch a new enterprise. Once the firm has obtained its first round of venture capital, the CEO can either join the firm as full-time management or be replaced by an externally recruited CEO and return to the executive corps to work with additional companies. The program provides an opportunity for bioscience managers who want to locate to the region or are between positions. Similarly, St. Louis has CEO-in-residence positions located at its two bioscience incubators, the Emerging Technology Center located close to Washington University and the city's biomedical complex, and the Nidus Center, which is a plant science incubator located close to the Donald Danforth Plant Science Center. The CEO in residence mentors firms in the incubator and is expected to eventually serve as CEO of a company that is ready to graduate from the incubator.

Philadelphia is experimenting with a pilot program to recruit management to develop companies around technology generated at the University of Pennsylvania. The University's Technology Transfer Center will identify technology with commercial potential, get it patented, and move it to the point at which it is ready for a commercial partner. Philadelphia Innovations, a nonprofit organization that seeks to promote technology-based economic development in the Greater Philadelphia region, will provide funding to hire a search firm to find a serial entrepreneur who has both experience in running an entrepreneurial business and also a network of contacts in the business and investor communities. The intent is to fund recruitment of six experienced entrepreneurs to match up with the most promising technologies in the University of Pennsylvania's portfolio. The search firm will take a small equity position as a portion of its fee, which keeps the cost reasonable and also gives the search firm an incentive to recruit the highest quality person. Philadelphia Innovation will also receive a small equity position in return for its initial funding.²⁵

It is proposed that the state of Iowa institute an Entrepreneur-in-Residence Program. The program would seek one or more serial entrepreneurs interested in relocating to the state and provide them with space, support, and access to entrepreneurial start-ups. IDED would provide funding that would be matched by the entity in which the entrepreneur is placed. Entrepreneurs in residence could be placed in existing incubators and accelerators and/or in the proposed statewide commercialization entity. It is suggested that this be started as a pilot program, with one or two entrepreneurs in residence.

Leverage Iowa's base of large corporations to encourage the creation of spin-off companies and provide a market for Iowa's entrepreneurial companies. A key challenge identified by the CEOs of the companies interviewed is their need to generate sales and find markets for their products. It is often when they get to this point that they have the most difficulty. They have a proven product or service and are ready to move from start-up to a growth phase, but they often lack experience in sales and marketing. One way to help them through this stage would be to encourage Iowa corporations as well as state government to become customers of these early-stage companies. This could be accomplished by the following:

- ***Start a VNI-type program to showcase Iowa growth companies as potential suppliers to large firms and government procurement in Iowa.*** The VNI program has been very successful in identifying investment-grade deals and giving entrepreneurs the opportunity to make their case before a large

²⁵ *Guide to Entrepreneurship*, Columbus, OH: SSTI, forthcoming.

number of investors. IDED could play a similar coordinating role by identifying innovative products and services being offered by Iowa entrepreneurs and allowing them to describe their product or service to a large number of potential buyers in both the public and private sectors.

- ***Encourage large companies, particularly those downsizing or possessing developed technologies not pertinent to their core business, to allow technologies to be spun out by workers.*** Iowa, as well as the nation, continues to experience layoffs in its manufacturing sector as a result of consolidations and downsizing. When this occurs, many workers and senior managers often prefer to stay rather than relocate to another state. In fact, in some regions of the country, the decline of one industry sector led to the creation of another. In San Diego, many scientists and engineers laid off because of the decline of the defense industry stayed and became the entrepreneurs who built the region's thriving bioscience cluster. The individuals who leave large companies may wish to pursue a potential commercial application of a technology on which they have worked but which the company is not interested in commercializing. Iowa's larger manufacturers could commit to encouraging such spin-outs, and the state could support these efforts by providing entrepreneurial training for downsized engineers and managers. An entrepreneurial training program could be very useful in helping them determine whether they want to go forward with a new business venture and, if so, understanding what it will take to be successful. It may also be possible to pair people with business and management expertise with start-ups and emerging technology companies. This effort could be undertaken in conjunction with the Iowa Business Council and Manufacturers Council proposed in *Iowa's Advanced Manufacturing Roadmap*.²⁶

Continue efforts to make capital available at all stages of development. Iowa has taken a number of significant steps to ensure that entrepreneurs have access to capital. The EVA program, the community seed funds, and the tax credits available to investors help to meet firms' needs for early-stage capital. The new funding provided to the universities from the Grow Iowa Values Fund will provide some needed funding for even earlier commercialization support. The Fund of Funds will hopefully attract venture capital funds to invest in Iowa companies. Building a venture capital market takes time; therefore, these efforts must be given time. Two actions, however, could help Iowa companies to obtain early-stage seed money. The first is to address the issues raised by the requirements imposed by the Grow Iowa Values Fund legislation on the EVA program. The second is to provide support to help Iowa's entrepreneurs compete successfully for federal Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) grants. Specific actions that should be taken include the following:

- ***Address impediments to using EVA funding to assist entrepreneurs who cannot meet Grow Iowa Values Fund wage criteria.*** The Grow Iowa Values Fund legislation requires that firms receiving assistance pay at least 130 percent of average county wages of the county in which they are located. Of the four firms that applied for EVA assistance since this provision has been in effect, two were unable to meet this criterion. The EVA program provides a small but critical level of support that is often required to keep a company going until additional investments are obtained. At this stage, however, companies tend to have few employees who are normally paid very little, if at all. One way to approach this issue is to find an alternative source of support for the EVA program, including using repayments to the program to fund new projects. Alternatively, the Small Business Council could work with the IDED Board, which oversees the Values Fund, to develop a set of criteria under which a waiver would be granted for EVA funding. Consideration might be given, for example, to

²⁶ *Iowa's Advanced Manufacturing Strategic Roadmap*, prepared for IDED by Battelle Technology Partnership Practice, September 2005.

companies in which the founders are not drawing a salary. Criteria other than job creation could be developed to ensure that the investment is in a company that can reasonably be expected to result in high-wage jobs in the long run in Iowa.

- **Provide support to companies to help them compete successfully for SBIR/STTR awards.** The federal SBIR/STTR program can provide early-stage capital to support new product and process development. This program requires all federal agencies with annual extramural R&D budgets of more than \$100 million to set aside 2.5 percent of those monies to competitively fund innovative research conducted by small businesses. Since it was initiated in 1982, the SBIR program has grown to become the single largest source of competitive early-stage research and technology development funding in the country for small businesses. Today, the SBIR program awards more than \$2 billion annually. The program is extremely attractive to small companies because they can get dollars for new product development without giving up any equity.

Nevada in 2002 became the first state in the nation to institute an entrepreneurship component in statewide high school competency examinations.

Iowa's track record on the SBIR program shows room for improvement. Between FY 1997 and FY 2002, Iowa companies received \$12.5 million in SBIR awards, ranking 41st among the 50 states in SBIR awards. In comparison, Kansas received \$20.9 million, Indiana received \$35.6 million, and Ohio received \$277.7 million during the same time period. In FY 2003, Iowa companies submitted proposals for 110 Phase I awards, of which 14 were successful. This hit rate is below national averages and further discourages firms from submitting applications. Part of the reason why Ohio ranks so highly is because for many years the state has had a program to encourage firms to submit SBIR proposals and to assist them in the process.

It is recommended that Iowa launch a statewide SBIR assistance program. Services that could be provided include the following:

- Distributing information on solicitation announcements, proposal deadlines, and regional and national conferences and workshops
- Holding workshops to increase understanding of the SBIR program and how it operates
- Providing assistance in topic selection and conducting pre-proposal reviews
- Aiding in proposal preparation, including providing small grants to cover the cost of writing a proposal
- Providing post-award assistance, including assistance in developing links with commercialization partners, particularly larger corporations with interest in the developed technology.

Promote an entrepreneurial culture in Iowa. A challenge for any state without a strong entrepreneurial tradition is to build a culture that supports risk-taking and accepts failure as part of the learning process. Over the long term, introducing students to the possibilities of entrepreneurship and encouraging innovative and creative thinking in the educational system will give people the skills and inclination to pursue entrepreneurial opportunities. Over the short term, efforts should be undertaken to increase the public's understanding and awareness of entrepreneurship's contributions to the state's economy. The following actions should be undertaken to promote a culture of entrepreneurship in Iowa:

- **Nurture entrepreneurs through the state's educational system.** The National Governors' Association has identified a number of ways that a state can use the K-12 and postsecondary

educational system to nurture and encourage future entrepreneurs. It recommends incorporating entrepreneurship-related skills and attributes into the K-12 academic curricula, developing entrepreneurship curricula for K-12 teachers, incorporating entrepreneurship in state competency standards, and reaching out to teachers and educational leaders to build awareness of entrepreneurship as a profession and career path.

- ***Publicize entrepreneurial success stories.*** There is general consensus that Iowa does not have a strong entrepreneurial culture. Creating such a culture will require that the region's citizens understand the importance of entrepreneurship and the opportunities it offers for developing the state's economy. Successful entrepreneurs, who can become important role models, need to be rewarded and encouraged. IDEED should increase the visibility of Iowa growth companies as part of a larger marketing and public awareness campaign and promote coverage by television stations and newspapers of human interest stories about Iowa entrepreneurs. The state or another organization could create and publish a Fast 50 list to recognize Iowa's 50 fastest-growing entrepreneurial companies.
- ***Give entrepreneurs input into the policymaking process.*** A mechanism should be created to give Iowa's entrepreneurial community an opportunity to provide input on state policies and programs. Such input could be provided by the Governor's Small Business Advisory Council, which may want to consider forming a working group of entrepreneurs.

Facilitate networking of entrepreneurs, investors, and researchers. Unlike traditional manufacturing, entrepreneurs and technology-driven firms relish networking opportunities and seek collaborators. Entrepreneurs are interested in learning from their peers and interacting with researchers so that they can stay at the cutting edge. Mature and emerging states trying to build a critical mass of entrepreneurial companies have found that the scale and intensity of networking must be considerable and multiple to lead to value-added relationships. Iowa has a number of nascent efforts to facilitate such networking. These need to be supported and strengthened. Specific actions that can provide opportunities for networking of Iowa's entrepreneurs include the following:

- ***Continue Equity Funds of Iowa.*** As discussed previously, the Equity Funds of Iowa Network, in addition to allowing entrepreneurs to make their pitch to investors, provides an opportunity for people to make contacts with Iowa's entrepreneurial community. The forum plays an important role in networking Iowa's entrepreneurs with experienced entrepreneurs and CEOs and others who can become resources to them as they seek to develop their businesses.
- ***Support the development of networks such as the Iowa Entrepreneur's Network and the Technology Association of Iowa.*** A number of initiatives just getting underway are designed to provide a forum for entrepreneurs to exchange information and to advocate on behalf of Iowa entrepreneurs. Such efforts should be encouraged, and the state should consider providing seed funding to help start such organizations, as was the case with the precursor of the TAI.

Conclusion

Iowa has made a commitment to transition the state's economy into a 21st century knowledge economy driven by innovation. The state has developed and is implementing strategies aimed at growing its bioscience, IT, and advanced manufacturing sectors. A key principle of these strategies is that they are all predicated on building on the state's strengths, including its university and industry sectors, and encouraging the growth of new and existing business ventures. A strong entrepreneurial community will be essential to realizing these goals. Entrepreneurs, after all, are the people who turn research findings and discoveries into viable business opportunities. Iowa, however, like most of the industrial Midwest, does not have a long history of technology entrepreneurship and must therefore work to nurture and support aspiring entrepreneurs and, in some cases, attract them to locate in Iowa.

Iowa has a number of efforts in place to support entrepreneurs and start-up companies. The JPECs not only provide support to entrepreneurs but also seek to promote entrepreneurial education at both the K-12 and postsecondary levels. A variety of programs have been put in place to increase the availability of capital at all stages, and accelerators have been initiated to help guide entrepreneurs through the commercialization and business start-up phase. The regent universities recently received additional funding to strengthen their technology transfer and commercialization efforts.

All of these efforts provide support for entrepreneurs; but, most of the programs are underfunded and organizations are not currently functioning as a unified network of support services. While each of these programs can contribute, more could be accomplished if they were able to leverage each other's resources and present a seamless delivery system for entrepreneurs. Iowa is on the path to developing a strong entrepreneurial support network. Many of the pieces are in place; the service providers only need to receive adequate support and to determine how to function as a system. This report provides some options for accomplishing this.