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## THE ROLES OF INNOVATION AND VENTURE CAPITAL IN ECONOMIC DEVELOPMENT

The “new economy” is alive and well despite reports to the contrary. It did not die with the collapse of the dot-coms and the “irrational exuberance” of the 1990s and it threatens to leave behind those states and communities that fail to grasp its significance and its opportunities. Is it really new? Tell a person in the year 1900 that in 50 years, people would fly in metal tubes at speeds faster than sound. There were millions of people in 1900 who believed that human beings would never fly. By 1954, the B-52 bomber made its maiden flight. It took only 51 years to go from a rickety wooden airplane flying at 10 MPH, to a gigantic aluminum “tube with wings” flying at 550 MPH. By the late 1950s, the Boeing 707 was routinely making transcontinental and even trans-Atlantic flights. A dozen years later, Americans set foot on the moon. Today, things change even more rapidly and those changes affect the people of our state in dramatic ways.

The new economy in which we now live is knowledge, idea, and innovation driven. Innovative capacity is present where there are scientists and engineers, research and development activities, entrepreneurial drive, and advanced telecommunications capability. These elements, together with applied science and technology,

have become integral parts of economic development plans in most states.

This memorandum will take a look at how South Dakota compares with other states in various science and technology indicators. It will also review economic development efforts this state has made and some of the efforts that have been made in other states.

### **Science and Technology Indicators**

A recently completed United States Department of Commerce (DOC) study ranked the fifty states based on various science and technology indicators. These indicators reflect the condition of each state’s science and technology infrastructure.

The study reviewed the amount of science, technology, and research resources flowing into the states from governmental and private sources. It appears that South Dakota is severely lacking in these resources, with the state ranking 49<sup>th</sup> in research and development (R&D) expenditures from all sources and 50<sup>th</sup> in the expenditures for R&D at universities.

The DOC study indicated that long-term economic development is highly dependent on the R&D activities of

scientists and engineers. The study shows that not many R&D activities, when compared to other states, are currently going on in South Dakota.

The DOC study looked at the ability of the labor market to support the science and engineering needs of technology-based businesses. Here, South Dakota ranked very high. The state ranked 1<sup>st</sup> in the percent of population completing high school, 2<sup>nd</sup> in the percent of bachelor's degrees granted in the fields of science and engineering, and 15<sup>th</sup> in the percent of the workforce with a master's degree in science and engineering. These rankings help support the widespread belief that we are training the technical workers of the future; but, unfortunately, the state's brightest young people are leaving the state for technical jobs located outside the state.

The study measured the amount of financial and business support being provided to state businesses. Since the ability to attract capital is a major factor considered by entrepreneurs in deciding where to locate businesses, the study looked at the availability of capital in each state. Capital takes various forms, including early stage seed and venture capital, loans, grants, and public offerings. With the exception of capital in the form of loans, the state lacks in the other forms of capital. South Dakota was ranked near the very bottom in the percent of venture capital invested in businesses in the state.

In addition to capital, the study looked at the number of business incubators available to serve businesses in each state. Business incubators offer specialized physical facilities at reduced rates, flexible lease terms, shared support services, and business

assistance services to start-up companies to help them stretch their resources further and develop their capacity to grow. Over half of all business incubators are sponsored by government and non-profit organizations. These incubators are used to facilitate job creation, economic diversification, and expansion of the tax base. Another quarter of the business incubators are affiliated with academic institutions. These incubators are primarily used to commercialize technology developed at the institution. The study shows that South Dakota ranks only ahead of Wyoming in number of business incubators available to serve businesses in the state.

Finally, the DOC study looked at various output measures. It looked at the extent to which a state is growing the types of businesses that are classified as high-technology. High-technology businesses include both manufacturing and service businesses where technology is rapidly evolving. The state ranked 49<sup>th</sup> in the percent of the state's business base that is classified as high-technology and 46<sup>th</sup> in the formation of new high-technology businesses. These rankings indicate that the state's business base is not very well poised to capitalize on new technology and that the state hasn't created and sustained the formation of new high-technology businesses as well as other states. Another output measure was the number of patents issued in each state. The level of patent activity is a measure of the amount of intellectual property being created within a state. The state didn't fare well in this area, ranking 47<sup>th</sup>. In other output indicators the state also didn't fare so well. The state ranked 48<sup>th</sup> in the average annual earnings per job and 33<sup>rd</sup> in the percent of households with Internet access. One high ranking the state received was in

labor force participation. The study indicated we have a good work force with a high level of the population participating in the labor pool. South Dakota is ranked 5<sup>th</sup> in this area. This high labor participation indicator could also be indicative of low wages in the state. Families just can't afford to live on one job.

In summary, this study shows that South Dakota's technology-based economic development conditions are definitely lacking when compared to other states and that there is a lot of room for improvement. The following table compares South Dakota's rankings with surrounding states for selected indicators.

## STATE SCIENCE AND TECHNOLOGY INDICATORS

### State Ranking

	SD	Iowa	Neb	ND	Minn	Mont	Wyo
Funding for Research & Development (R&D)							
R&D Expenditures/\$1,000 of GSP*	49	32	39	38	16	40	50
University R&D/\$1,000 of GSP*	50	3	11	13	39	4	41
Human Resources							
% of Population Completing High School	1	9	5	29	3	11	7
% of S&E BS Degrees Granted/Total Bach's Degree	2	18	38	7	25	3	1
% of Workforce w/Recent S&E MS Degree	15	44	5	50	30	42	49
Capital Investment & Business Assistance							
Venture Capital Invested/\$1,000 of GSP*	48	45	37	46	14	23	N/A
Business Incubators/10,000 Businesses	49	41	18	32	9	27	50
Technology Intensity of Business Base							
% Establishments as High-Tech Businesses	49	46	44	50	8	42	41
% Employment in High-Tech Businesses	29	26	32	38	18	47	46
Net High-Tech Formations /10,000 Businesses	46	42	39	45	6	29	48
Outcome Measures							
Patents Issued/10,000 Businesses	47	26	39	41	5	40	48
Average Annual Earnings/Job	48	37	40	49	12	50	45
Labor Force Participation	5	8	11	2	1	34	6
% Households w/Internet Access	33	24	39	38	8	34	24

\* Gross State Product

Source: The Dynamics of Technology-based Economic Development, State Science and Technology Indicators, Office of Technology Policy, Department of Commerce, April 2003.

## State Economic Development Efforts

In 1987 Governor George S. Mickelson proposed and the Legislature approved the establishment of two funds to be used to enhance economic development in the state. The Revolving Economic Development & Initiative (REDI) fund was established to make low-interest loans to companies to help create jobs, to increase capital investment in the state, and to diversify the state's economy. The primary focus of this fund was to serve as a financial incentive to encourage companies to relocate to South Dakota. The REDI fund was initially \$40 million. A temporary one cent increase in the state sales tax was used to finance the REDI fund. The other fund that was established in 1987 was the Employer's Investment in South Dakota's Future Fund. This fund, commonly referred to as the Future Fund, was to be used for purposes related to research and economic development. It was to be used by the Governor primarily to attract research projects to South Dakota. The revenue for the Future Fund comes from a portion of the money paid by employers for unemployment compensation. The annual revenue that goes into this fund is approximately \$6.5 million.

Over the last fifteen years, these two funds have been used to spearhead the economic development efforts of the state. The REDI fund loans have been used to help create more than 22,000 new jobs in the state, have been responsible for \$405 million of capital investment in South Dakota, and have helped increase wages in the state. The fund has grown to over \$84 million. The Future Fund has been used primarily for grants to companies to provide workforce training, for grants to technical institutes for equipment

upgrades, and for a wide range of technical assistance grants to provide teacher training, to assist local economic development efforts, and to fund numerous other projects which fit under the broad definition of economic development. Over the last five years about \$29 million has been spent from this fund. Only a small portion of the fund has been used for supporting research.

Since 1987 there have been a few changes to the REDI fund. In 1992, legislation was passed to allow two million dollars of the REDI fund to be used to make loans to venture capital investment companies. Any venture capital investment company receiving a loan was required to commit at least two dollars of private investment for each dollar to be received via the loan. This program, unfortunately, has never really worked as originally planned. These loans have not been very attractive to venture capital investment companies. These companies are primarily in need of equity investment, not a loan. In 1999, legislation was passed to create a Value-Added Agriculture Subfund in the REDI fund. The subfund was funded with an initial \$3 million appropriation from the REDI fund and with approximately \$400,000 each year from off-road motor fuel tax unclaimed refunds going to replenish the fund on an annual basis. This subfund was created with the intent of making grants or loans for marketing and feasibility studies that promote capital investment in processing facilities using South Dakota commodities. By the end of FY2002, almost one million dollars had been used from this fund to fund 25 projects. Finally in 2003, a Value-Added Tourism subfund was created by the Legislature. Three million dollars was designated from the REDI fund to be

used for this subfund. The subfund is to be used to make grants or loans for tourism development, feasibility studies, or marketing.

### **Constitutional Restrictions**

Before getting into a discussion of what other states have done to promote economic development, it would be prudent to first mention a couple of constitutional restrictions that affect what can legally be done in this state. Many states, most recently Maine, have issued general obligation bonds to raise hundreds of millions of dollars for economic development. However, Article XIII, § 2, of the South Dakota Constitution prohibits the state from going into debt by more than one hundred thousand dollars. Consequently, without a constitutional change general obligation bonds are not an option in this state. Another tool used by other states is the equity investment of state funds in venture capital funds and the investment of state funds in the part ownership of businesses to help beginning businesses grow. The South Dakota Supreme Court ruled in 1990 that Article XIII, § 1 of the South Dakota Constitution prohibits the state from becoming the owner of capital stock of a corporation or acquiring an equity position in a private enterprise. This would restrict the investment possibilities of most state funds, including the state general fund and the REDI fund.

Since 2000, however, the South Dakota Constitution has been amended to allow the state investment council to invest four constitutionally established trust funds in stocks, bonds, mutual funds, and other financial instruments as provided by law. These funds are the permanent education fund, the health

care trust fund, the education trust fund, and state cement plant trust fund. Thus far, the state has not faced the question whether a portion of these funds could or should be invested as venture capital.

### **Research and Development Assistance and Intellectual Property Policies**

Many states are investing in research and development in an effort to improve the science and technology capacity of their states and to stimulate innovation. South Dakota has been sorely lacking in this area. The increased acquisition of grant money from government sources would be an important component of any attempt to improve our situation. South Dakota currently does not seem to get its fair share of federal R&D grant money. Both higher education and the private sector in this state trail the other states in the amount of money received, apparently because we don't ask. According to the National Science Foundation, in 2001, the total R&D expenditures per person in South Dakota were \$42.30 per person compared to the United States average of \$113.20 per person. In addition, the expenditures for R&D in the surrounding states of Iowa (\$149.80), Nebraska (\$139.70), North Dakota (\$133.40), Montana (\$118.50), Minnesota (\$93.50), and Wyoming (\$83.50) were all significantly above the expenditures in South Dakota. If higher education could improve on its performance in attracting research grants; if the state could take advantage of its present political clout in Washington; and if then those awards could be used to engage in competent research, opportunities for developing commercial applications in South Dakota would significantly improve.

Since 1980, the Bayh-Dole Act has enabled universities to retain rights to any intellectual property created (materials, processes, or products invented) through the use of federal funds. This has resulted in a huge increase in the number of patents issued to universities. To stimulate innovation, states have adopted policies to allow professors to earn a cut from their inventions. In this state, since December 2002, the policy of the Board of Regents has been to reward the creator of the intellectual property with a minimum of 50% of the first \$100,000 generated by an invention, net any direct costs incurred by the institution in developing any copyright or patent, and a minimum of 25% of the net income beyond the first \$100,000. This policy appears to be pretty consistent with the royalties paid to university inventors in other states. Therefore, this policy does not appear to be a major reason the state lags behind other states in patents issued to universities.

Many states have funded technology centers on universities. These centers help streamline the process of patenting and licensing intellectual property developed at a university. They provide expert guidance to help entrepreneurs attain commercial viability. These centers also create a linkage between the business community and university researchers to help get university-developed technology commercialized or to move the results of university research into the real world in other ways. California is an example of a state that has successfully invested in technology centers.

It appears that this state has not done a good job of encouraging or supporting university professors to develop intellectual property. While teaching

contracts allow for research and regential policy permits professors to share the financial benefits, teaching loads fill so much time that little research can be undertaken. Also, there is insufficient funding to involve students in the research process. Thus, few of our students can take advantage of the opportunities that grant-enabled research present. Important strides have been made in creating businesses and jobs in other states where research grants are a higher priority and where some time is provided for university faculty to experiment and to then move successful experiments beyond the lab. Aggressively pursuing more grant money and assisting professors in efforts to commercialize intellectual property would appear to be key to making South Dakota more innovative and bringing the benefits of the new economy to this state.

Along those lines, the Board of Regents in August of this year decided to request additional state funding in the 2004 Legislative Session to support research on the state's campuses. The regents would like to raise the spending for various university research efforts by more than \$9 million. About \$4.6 million of this increase would be used to hire more faculty members who would primarily do research, to pay graduate assistants, and to provide additional lab space. About \$3.5 million of the increase would be used to supply the state match for various federal and private research grants and programs. The remaining amount would go to a program that rewards faculty research performance.

## Other Means of State Assistance

Beyond the research and development phase, the important elements that allow any state to build new economy businesses include an entrepreneurial culture, avenues to share knowledge, appropriate physical infrastructure, a technically skilled workforce, and capital. In pursuit of these elements, states have tried to assist in many different ways.

Several states have helped create angel networks and capital networks. An angel is a high-net-worth individual with an interest and knowledge in a particular business sector. Angels can help a start-up company with their considerable experience. Across the nation networks of angel investors have assembled to help start-up companies with capital and expertise. Iowa recently dedicated funds to support workshops in the state to help aggregate, educate, and mobilize angel networks. Capital networks have been formed to match start-up companies with suitable investors through computer databases. New Hampshire, Kansas, and Texas have successful capital networks.

Business incubators, as previously mentioned, have been constructed or assisted by many states to help fledgling businesses get off the ground. Here in South Dakota, the Governor's Office of Economic Development has recently provided \$1.8 million to help start a technology innovation center in Sioux Falls. The facility, which will accommodate 10 to 30 businesses, will provide leased space, including a secure biotechnology laboratory, as well as accounting, legal, and business planning assistance.

Most states have been improving their education systems to build a skilled workforce. A technically skilled workforce means exposing more K-12 students to math and science and encouraging more people to pursue careers in science and technology. Arguably, those states that have fared better at preparing themselves for participation in the new economy are those that contribute to K-12 education, universities, transportation infrastructure and research and development. Indicators show that South Dakota has done well in this area. We now need to do a better job of utilizing this strength.

States have helped new businesses in a variety of ways to secure the necessary capital to begin and to continue to operate. Some states have allocated state funds for venture investing. This has been done by direct investing by state agencies, such as North Dakota does with its state bank, or by investment in privately managed, geographically restricted funds, which has been successful in Colorado. Kansas and Oklahoma now invest public funds in private companies. In the not too distant past, their constitutions prohibited such investments just as South Dakota's does today. Citizens in those two states voted to amend their constitutions to allow public investment in private entities. Many states use state income tax credits to encourage citizens to invest in venture capital funds. This has proven to be a good source of revenue to support the formation of private venture capital funds. Kansas, Indiana, Minnesota, and Vermont are states that have successfully used this method to stimulate these funds.

Around our region, states are currently involved in a range of activities to enhance their opportunities in the new

economy. Indiana has targeted four areas for economic development: advanced manufacturing, life sciences, information technology, and high-tech transportation/distribution. Using \$700 million in tobacco settlement monies to fund tax credits, venture capital, research and development funding, technical centers and commercialization support, Indiana seeks to create new business endeavors and encourage college graduates to stay home. Iowa, through the creation of a Grow Iowa Values Fund, targets similar areas for economic development and proposes to fund a life sciences program including university research facilities and seed money for companies. The Grow Iowa Values Fund is intended to be a \$503 million dollar fund with \$100 million dollars coming from the federal government and the rest coming from moneys credited to the general fund of the state as a result of entering into the streamlined sales and use tax agreement. North Dakota has recently provided assistance for the development of centers of excellence at its state universities to support research and educational opportunities and has also established a fund to provide financial assistance to entrepreneurs and to improve the state's technology infrastructure. Several states are establishing or considering the establishment of commissions or advisory boards to develop a better understanding of the technology and science industries and issues in their states.

### **Lessons Learned in Other States**

In 2000 a report entitled "Growing New Businesses with Seed and Venture Capital: State Experiences and Options" was completed for the National Governors' Association. The report took

a look at what role states had played to expand the knowledge of seed and venture investing, to promote the visibility of entrepreneurs to investors and of investors to entrepreneurs, to create investment capital to fill a gap or grow a business sector, and to create investment capital to build a seed and venture capital industry.

States have tried many experiments to increase access to capital. The report highlighted the characteristics of the best programs. The report found that the best program of investment is one which is not rigidly governed but is run by experienced professionals. This ensures the investments do not become overloaded by details and constraints to the point that the best professionals cannot do their work and, indeed, may not want anything to do with the program. Quality investment programs are built on carefully selected, quality people who are then allowed to use their abilities to produce winning ventures.

The best programs share a long-term perspective because making the right investment decisions takes time and building an organization that manages such investments may take a long time. Good programs understand that venture capital investing and company building is about understanding the need and uses for venture capital and seed money, the steps involved in creating a competitive enterprise, and how to recognize and avoid traps. More than making capital available, it involves creating a culture of innovation, risk-taking and business building. The best programs treat the state as a valued, though passive, financial partner, not as a source for easy funds. The best programs look to make money. Patience and fortitude are required and government sponsors should not expect

results for at least five years during which period they must ensure they don't do anything to impede or derail the process. Government support and policy guidance combined with private investor discipline is effective to help create and accelerate economic development and herald entry into the new economy.

## **Observations**

South Dakota has sometimes been charged with recruiting too many cost-sensitive commodity businesses. This charge obscures the success the state has had in recruiting businesses that are still in the early stages of their growth curve. However, as competitive pressures increase, many businesses are now looking overseas for lower cost areas in which to set up shop. South Dakota needs to shift its efforts to developing more businesses at home. Central to this change is the need to improve the resources needed to innovate and to focus on quality jobs that will allow our citizens to remain here and earn at least the national average in salary and benefits. While there is a need to focus on cutting-edge ideas, a major concern in South Dakota is the shortage of equity capital. South Dakota arguably has sufficient capital to loan to businesses, but fledgling enterprises often cannot meet the strict repayment schedules consistent with the issuance of debt. New businesses, especially those for which a market is just emerging, need more flexibility in the way capital is put to work and the manner in which investment gains are recouped. Equity investments where the investor shares both the risk and the upside gain potential make more sense for new economy businesses of the kind that have the capability to create jobs and wealth.

Venture capital is a frequent source of equity investment. From the state's perspective there are different kinds of venture capital participations. There is the kind that is invested through broad-based fund managers who seek out venture capital opportunities and would not necessarily be invested within the borders of South Dakota. There is also local venture capital that has as at least part of its mission the creation of wealth and jobs in South Dakota. Here, state funds could have an impact. Since the purposes of the state of South Dakota encompass more than just return on investment, the state may decide to apply some of its funds (the trust funds, for example) to the purpose of increasing business creation and economic activity in the state.

State money can help but it must serve as a supplement and an enticement to private funds. If an entrepreneur can tell private investors that the state will match, to a specified extent, the dollars provided privately, that is an attraction to private investors because they can leverage their outlay. If the state would put in one dollar for every two or every three dollars ventured by private parties, the latter then realize that they have a larger pool of funds to work with relative to their investment and that provides a needed incentive for them to participate. Matching state dollars to private investments but leaving the management of the project in private hands retains the needed investment discipline and clear investment objectives that private investors bring to projects. It also places much of the risk upon private investors which is important in a political environment. The focus can be on access to capital, not the cost of capital, and can adopt an approach that new companies that are growing and becoming profitable

produce the most desirable economic development.

A government fund used for investment purposes at the venture capital level could operate much like a mutual fund, placing its money in several different ventures rather than funding on a project-by-project basis. This approach increases the chances of funding a successful, job-producing endeavor; diversifies risk; and deflects criticism in the event of failure. It would also inject investment discipline and avoid even the appearance of political influence.

### **Conclusion**

In the new economy, economic growth comes from technological innovation. Although South Dakota currently lags in many areas important to innovation the

state can still position itself to participate in the new economy. We have a good workforce and a good education system to serve as a foundation for economic development. We also have constitutional restrictions that other states do not have that hinder the development of venture capital funds. We have to decide whether to remove these restrictions or to try to find other ways to make venture capital programs work with these restrictions. If we want to attract innovators, we need to better assist them in finding equity funding and in making their innovations commercially viable. If South Dakotans could focus on innovating or quickly taking advantage of innovations in areas where we can have an impact, the new economy presents great opportunities for our state to grow.

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**This issue memorandum was written by David L. Ortbahn, Principal Research Analyst, and James Fry, Director, for the Legislative Research Council. It is designed to supply background information on the subject and is not a policy statement made by the Legislative Research Council.**

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