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Small Business Innovation Initiative in Minnesota

By Pamela Sarvela, Ed.D., CEcD, and June Kallestad

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The University of Minnesota Duluth (UMD) Natural Resources Research Institute (NRRI) recently received the Gold Excellence in Economic Development Award in Entrepreneurship from the International Economic Development Council for the Small Business Innovation Initiative-Product Development Fund. With the support of the Knight Foundation and Blandin Foundation, the NRRI created the Small Business Innovation Initiative to help small businesses and entrepreneurs succeed. The initiative allows NRRI to deploy expertise, research equipment, and laboratories around technological entrepreneurs' projects to develop new or improved products or production efficiencies.

small business innovation

INITIATIVE IN MINNESOTA

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INTRODUCTION

Have you ever had an idea that you did not pursue only to have someone else come up with it and make millions of dollars? Ideas come easier for some than others, however it is not the idea but the action to advance the idea to commercialization that separates the entrepreneurs from the rest of us.

The decision to start a new technology enterprise starts with the recognition of an opportunity and mobilization of both financial and human resources. And this is key: technical innovations and business start-ups are not shaped by creativity alone, but by the "presence of knowledge, financial, and other complementary assets that are available in a region." (Source: Audretsch & Kayalar-Erdem, 2005, p. 107) How regions or states organize around those assets is unique to each area. The literature on innovation discusses the importance of networks or clusters, so geography and proximity are major factors. Technical innovation depends on "knowledge flows" – the interactions among and between enterprises, universities, public institutions, and the diffusion of knowledge and technology to firms (Source: Nelson, 1993; OECD, 1997; Porter & Stern, 2001).

The following article outlines how the University of Minnesota Duluth's Natural Resources Research Institute (NRRI) organized around decades of accumulated infrastructure (physical assets, regional connections, intellectual capacity) to support product development without giving the client a grant to use on their own. The Small Business Innovation Initiative (SBII) builds on NRRI's niche of supporting entrepreneurs in manufacturing, product development, lean processes, equipment purchasing, and strategic decision-making. Supporting entrepreneurs in this manner builds upon an infrastructure to provide future job creators with networks and support.

NRRI researcher Brian Brashaw leads an entrepreneurial small business in lean manufacturing techniques.

NRRI believes that assisting two entrepreneurs today can result in hundreds of jobs in the future. The Small Business Innovation Initiative is replicable or transferable to any region that has a university or federal laboratory with an array of services beyond basic counseling.

"Coming together is a beginning; keeping together is progress; working together is success." – Henry Ford

NRRI'S HISTORICAL PROGRAM CONTEXT

In 1992, Mike Rone and Duaine Miranowski had a vision to utilize membrane press technology to manufacture high quality wood composite components to supply the kitchen and bathroom cabinet industry. They did not, however, have the research expertise nor adequate equipment to move it forward. The men had extensive experience

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in membrane pressing, production, and manufacturing, but needed the financial resources for the science and engineering research to develop their concepts. They recognized an opportunity, were motivated, and were ready to risk it all to make their dream become a reality – true entrepreneurs.

Rone and Miranowski brought their idea to NRRI, an applied research facility with the infrastructure to provide entrepreneurs with the science and engineering technology support needed to take an idea to commercialization. NRRI was able to provide that support because of a funding mechanism made possible through the State of Minnesota's Technology Fund to provide entrepreneurs with research and development (R&D) support. The company's name is Northern Contours, Inc., and in 2011 it employed around 400 people with $55 million in annual sales.

NRRI was able to help two entrepreneurs develop a cabinet product line that grew the company to employ about 500. Here, two employees work on the cabinet finishing steps.

Technological innovation and small businesses like Northern Contours, Inc. are recognized as key drivers in the United States' economy not only for their value to the nation but to keep the U.S. globally competitive. Taking a technological idea from concept to commercialization is not a single action but a complex process of interrelated sub-processes. Innovation is not just conceiving a new idea, nor inventing a new device, nor developing a new market – the process is all of these things acting in an integrated fashion (Source: Myers and Marquis, 1969).

The U.S. Small Business Administration defines small business as companies that employ fewer than 500 employees and generally have sales below $1.5 million, depending on the industry sector. In the U.S., small businesses represent 99.7 percent of all employer firms and employ roughly half of all private sector employees (Kobe, 2007). Often small business start-ups begin with technology entrepreneurs like Rone and Miranowski who have an idea but are limited in human and financial resources. Minnesota's Technology Fund sponsored the R&D support provided by NRRI in the early 1990s, and the business owners contributed intellectual and sweat equity with the end result being a successful small business – one that has a tremendous impact on economic development in their region.

Rone and Miranowski were entrepreneurs from the private sector who partnered with NRRI as a public resource. The public/private partnership that Northern Contours had with the institute was critical for their success and growth. Providing the applied R&D expertise fits with NRRI's broad mission to *foster economic development of Minnesota's natural resources in an environmentally sound manner to promote private sector employment.* NRRI is an applied research facility with over 25 years of experience working with industry. Of course, to keep its programs running, the institute needs funding. Unfortunately, the program lost its funding during a recession, which means technology entrepreneurs who do not have adequate financial resources or the connections may not be able to get the applied R&D support critical for technical innovation.

Little is known about how much innovation is lost because entrepreneurs do not have access to applied research and development capabilities. NRRI recognized the risk of not having funding available to provide technological entrepreneurs with access to applied R&D resources. As funding was reduced, so was the focus of NRRI's researchers.

NRRI Director Dr. Michael Lalich challenged the institute's researchers and business development staff to put together a strategy that would continue to support technological entrepreneurs. The Small Business Innovation Initiative (SBII) was developed in 2006, based on the premise that technological entrepreneurs who have access to NRRI's resources create a web of economic activities, including important experiential learning for future growth.

Largely supported by responding to requests for proposals through federal and state solicitations, the institute has built and maintained state-of-the-art knowledge and capabilities. Technology and/or knowledge transfer is critical for universities and federal laboratories, which generally are not responsible for (nor capable of) the commercialization of ideas. NRRI recognizes the importance of using its capabilities to support those entities that are ultimately responsible for job creation.

SMALL BUSINESS INNOVATION INITIATIVE (SBII) DESIGN AND PLAYERS

The goal of SBII is more than just supporting entrepreneurs with product or process development. The initiative was designed to take technological entrepreneurs through an experiential learning process around product development protocols. So while the program provides access to NRRI's capabilities, it also provides the impetus to set into motion a web of interactions among a number of institutions, further enhancing the region's entrepreneurial infrastructure.

Perhaps lending to its success is the sheer number of players involved in shaping the program. This included

Ryan Holman, owner of Ryan's Rustic Railings, was able to double the size of his product output with product improvement and production efficiency assistance from NRRI.

a number of scientists and engineers from within NRRI, and external players, such as the Northland Foundation whose director was instrumental in advocating with various funders on NRRI's behalf. The advocacy started with story-telling around past successes, such as Northern Contours, of what happens when technological entrepreneurs have access to NRRI's resources.

As it turned out, the Knight Foundation had ownership in the local newspaper out of the Duluth, MN, area and was interested in supporting more economic development activities. Polly Talen, the program officer, spent many hours in conversation with representatives from NRRI and other economic development professionals across the region to gain an understanding about what we were trying to do. There was great enthusiasm around the SBII program and the Knight Foundation brought in the Blandin Foundation to make sure that there was enough funding upfront for a successful launch and development.

In 2007, the Knight Foundation and Blandin Foundation invested a total of $350,000 with a goal of providing entrepreneurs with access to NRRI's applied resource and development capabilities. The SBII program parameters required the following:

1. *Need:* A clear indication of the client's needed support (beyond simple testing) in order to advance an idea or for process improvements, and NRRI's capabilities to provide the support. This could range from the whole continuum in the product development process or lean manufacturing training.
2. *Application Process:* An application is developed jointly between the client and a NRRI principal investigator to include scope of work, clearly defined goals and objectives, timelines, responsible parties, outcomes, and project costs.
3. *Clients' Contributions:* The clients are required to match the cost of accessing NRRI's resources dollar-for-dollar, with a combination of cash, material, travel, and in-kind contributions.
4. *Review Committee:* The principal investigator and applicant work with the program manager to finalize the application to bring before a review committee. This committee includes NRRI researchers and staff and external economic development professionals. Both the principal investigator and applicant are present to discuss various aspects of the proposal.
5. *Approvals:* Agreements are drawn up based on the application and signed, a budget is established for the principal investigator to charge against, client submits cash contribution… and the project begins.
6. *Important Point:* The program provides the client with *access* to NRRI's infrastructure. Money is not given to the client to develop the product or processes independently. A budget is established and the principal investigator charges time, materials, and equipment use to the account. The client works with the principal investigator, contributing time and materials. The principal investigator serves as a project manager using protocols in the same manner as when managing their own research program.
7. *At the conclusion of a project,* the principal investigator and client write a summary to report on the results. One year later, the company provides another summary to document the results after the fact.

IMMEDIATE IMPACT OF THE PROGRAM

"NRRI allows us to do more and progress further, faster." Greg Benson, President/CEO, Loll Designs

As part of the process, NRRI's supporters recognize success as both new products and processes brought to market but also the importance of not moving forward when the science, engineering, and/or economics did not support the idea. The emphasis is not on failure but instead is on the actions and learning processes of the clients for future ideas, investment, and interactions.

Here is an example of an SBII program client: MR Fence Tech came to NRRI with the desire to develop a fence post out of a new, environmentally sensitive material that could perform even better. The owner saw innovation potential in this industry that sells over 875 million linear feet of fencing in the U.S. each year. NRRI worked with the owner to develop the posts out of chemically bonded phosphate ceramic material. The testing was promising, but the cost of the raw materials was higher than anticipated. The idea was not scrapped but was shelved until the price of the raw materials comes down. This saved the business owner time and money.

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"NRRI's Small Business Innovation Initiative gets entrepreneurs the research and technical expertise they need to fuel their ideas, and connects small businesses with a broader network of support. Together we will build a stronger economy." – Polly Talen, Program Director/Knight Foundation

The Small Business Innovation Initiative allowed 20 entrepreneurs access to NRRI's applied research capabilities, resulting in new products conceived, tested, and commercialized; a client-to-client network and to other economic development players; roughly 100 jobs created/retained; and two or three companies that avoided investing in products that were not competitive or reliable. Results also included lean manufacturing training leading to reductions in waste and increases in revenue; one spin-off company; and knowledge transfer between NRRI and its clients.

But what is behind these numbers? Entrepreneurial passion! For example, Goodwill Industries in Duluth had a mattress recycling business, with no market for recycling springs (weekly volume/10,500 cubic ft.). NRRI provided product and market development assistance to support purchase and integration of spiral steel baling equipment. And, an entrepreneur came to the table to design a spiral steel baler – and it worked! Goodwill Duluth now employs five workers to separate materials and recycle some 16,000 mattresses a year. In 2012, the facility recycled 215 tons of steel, receiving $316 per ton. From this successful business model, the client envisions that the program could be replicated throughout the U.S., starting another entrepreneur on the road to success with a business to manufacture specialty mattress recycling equipment.

From the Goodwill project grew another web of interactions, finding markets for the other components of the mattresses. Across the bridge from Duluth, in Superior, WI, resides a company called Field Logic, a manufacturer of archery sporting goods. Working with NRRI, mattress components were tested for their target products. In the end, the team identified other "trash" that was saved from the landfill and used that material to create a new product line. NRRI provided contacts and resources to help this company experiment with bonding different materials and combinations for testing targets.

Business owner Loni Bright (right) grew her custom boat cover business and hired a part time assistant after receiving lean manufacturing assistance from NRRI.

The invention of the Coil Spring Compactor by a Duluth inventor helped NRRI find markets to recycle the components of old mattresses. The business model is a proven success at Goodwill Industries.

"The impact goes beyond here – scrap brokers, truckers, sales representatives in the stores…a lot of people benefit getting a new product to the customer." – Paul Merihart, Field Logic

Based on the parameters of the program, each client was required to match the SBII dollar commitment 1:1 – that means there would be an additional private sector investment of at least $350,000 through cash, in-kind, and material contributions. However, all projects had a cash component. Financial analysis of the pilot program reveals there was $984,000 in client contributions, or $2.81 match for each dollar from the program.

Another thing happens when clients work with organizations that provide support – relationships are developed. When the client's business is strengthened by product development or lean manufacturing processes, they eventually invest their own cash flow in applied research and development because they understand and experience the results.

One client in particular has continued investing in research at NRRI (over $200,000) because of the experience and trust that was built during the original project. The new product this company is launching will have far reaching environmental impacts for the future of our nation. Yet another client that continues to contract for services now sells products in over 5,000 retail stores throughout the U.S. and Canada and in over 50 countries throughout Europe, Asia, North America, and in Australia. But the jobs are in Minnesota.

WHAT WAS LEARNED

The Small Business Innovation Initiative is being expanded, based on what was learned from the 20 clients. For instance, the program would be enhanced with the addition of a manufacturing specialist to provide a combination of training seminars, best practice tours, and more availability to work hand-in-hand with rural small businesses. And, as part of the University of Minnesota, our principal investigators have the credentials and expertise in grant writing to serve as part of a small business research team. This could benefit some of the clients

The nation's capacity to innovate depends upon an environment that creates stronger linkages among all players (enterprises, universities, public institutions, nascent entrepreneurs), not just those with the ability to pay.

in accessing greater resources from the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program. The SBIR/STTR program is the largest single source of early-stage research and development funding for small business innovation in the United States. Between 1983 and 2004, roughly $17 billion for more than 82,000 projects was awarded.

Finally, future projects will be evaluated for the need to include a business consultant from Minnesota's Small Business Development Centers (SBDCs). If the client does not have internal capabilities, bringing in a business consultant will allow the NRRI researchers to focus on the technological aspects of the project while assuring that financial and marketing analyses are integrated into the overall equation in determining the economic viability of a project.

The objectives of the expanded SBII program are summarized as follows:

- Support small business ideas with access to NRRI's applied research and technology development capabilities – along the product development continuum.
- Enhance lean manufacturing education, implementation, and networking for rural small businesses.
- Create an awareness and support for Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) programs.

FUTURE SMALL BUSINESS INNOVATION INITIATIVE GOALS

The funding that fueled the Small Business Innovation Initiative has been depleted, but the results are serving as a catalyst to raise additional support to expand the efforts. NRRI is working to stabilize the program with a $1.5 million fund-raising effort, of which $250,000 will be reserved from NRRI with $1 committed for every $5 raised.

While the Knight Foundation no longer serves NRRI's region, the Blandin Foundation renewed its commitment to the program with another $150,000. And the Bremer Foundation approved $100,000 in funding. Minnesota Power and Great River Energy, prominent partners in the economic development arena for Minnesota, have committed future financial support/investment. Our funding partners provide more than financing, they help share NRRI's story about the program throughout the state of Minnesota and help generate additional support.

The greatest challenge NRRI faces is creating more of an awareness of the applied research and development capabilities of the institute and how providing access to entrepreneurs can support the evolution of entrepreneurship for the region and state. The future program outcomes are as follows:

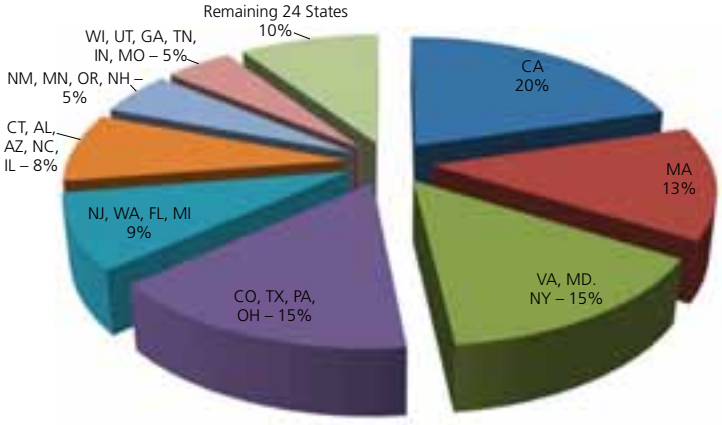
- Increased access for at least 50 entrepreneurs/small businesses to NRRI's scientific and engineering staff, laboratories, and technologies.
- Small business creates/retains 300 jobs creating the ripple effect of a stronger economy.
- Private investment of additional $1,250,000 cash and/or in-kind effort.
- Increased private sector innovation and commercialization.

REPLICATING AND IMPROVING THE PROGRAM

The SBII program described in this article is replicable anywhere across the United States or globe where some sort of public institution has an applied research and development infrastructure, financing mechanisms to create the programs, and individuals with innovative ideas. The nation's capacity to innovate depends upon an environment that creates stronger linkages among all players (enterprises, universities, public institutions, nascent entrepreneurs), not just those with the ability to pay.

The U.S. has a complex program to finance small business innovation, the previously mentioned SBIR/STTR program. The statistics on the program show that over 60 percent of all grants go to a handful of states. Success is known to create more success. States that are not one of the top four receiving the bulk of the awards should consider including more avenues for creating awareness and support systems to help technological entrepreneurs access the program.

SBIR TOTAL ALLOCATIONS 1983 TO MARCH 2011



Source: Innovation Development Institute, www.inknowvation.com

The best way for technological entrepreneurs to learn how to succeed in complex finance-granting processes, such as the SBIR/STTR program, is by aligning them with an organization like NRRI or other research institutes. If they are successful together, there are greater opportunities for funding to support the research and hopefully successful business/product launch with many multiplier effects.

At the state level, an inventory can be conducted of state universities and colleges to determine what kind of capacity is available for research and development support of technological entrepreneurs. NRRI is unique, because while it is part of the university system, the majority of the staff is not faculty and does not have teaching responsibilities, which means there is not the same focus on achieving tenure. NRRI's focus is on solving real world problems in the near- and long-term. States with similar institutions can support technological entrepreneurs who have both the passion and ability to commercialize technology with the necessary resources they lack to develop the technology.

At the regional level, consider the gaps that exist in the current infrastructure. If there is no access to an applied research institute like NRRI, it may be possible to cross boundaries to connect your technological entrepreneurs. A survey of regional foundations can help share the story about the importance of providing a program that teaches and supports entrepreneurs in the continuum of the commercialization process. If programs can be developed to support and connect technological entrepreneurs to existing resources, regardless of proximity to those resources, the state and regional capacity is optimized in a manner that benefits the nation.

Tim Doyle of Northern Sheer Veneer stands by the company's unique thin wood sheering machine. NRRI helped Doyle with marketing and new product development.

NRRI knows from firsthand experience about the importance of providing technological entrepreneurs with access to research and development capabilities. Thanks to the foresight of Minnesota state legislators, the leadership of NRRI Director Dr. Michael Lalich, and those entities willing to provide financial support for the program, our researchers and staff have the privilege of working alongside these innovative job creators for a stronger economy.