MEASURING UP:
2013 Annual Report Card on How Arizona’s Technology Sector is Performing and the Contributions of Science Foundation Arizona

REPORT HIGHLIGHTS

SFAz and Battelle’s Technology Partnership Practice have advanced the concept of a “Registry” to address and monitor how SFAz program activities and Arizona’s technology-based economy are performing. The following is drawn from the fifth annual Registry, Measuring Up: 2013 Annual Report Card on How Arizona’s Technology Sector is Performing and the Contributions of Science Foundation Arizona, published June 2013

Science Foundation Arizona: Generating Significant Returns for the State

In its latest annual assessment of the cumulative economic and innovation impacts of Science Foundation Arizona (SFAz), Battelle reports a significant and growing record of success and tangible economic benefits across all regions of Arizona.

Research Initiatives

The report measures impacts of six full years of strategically targeted investments by SFAz in grant programs designed to strengthen and diversify Arizona’s economy and education system. It finds SFAz is successfully advancing this mission by consistently increasing its leverage of additional funds as well as other key metrics associated with research outcomes and technology commercialization.

- Among SFAz grants to university and nonprofit research institutions funded primarily with state money, for every $1.00 in public funding an additional $4.83 was raised in support of the grant activities from industry matching and non-state research funding including federal grant awards, venture capital, and foundation funding. This leverage ratio has risen progressively over six years.

- Additional cumulative results from grants to university and nonprofit research initiatives continue to mount despite a slowdown in public funding. As of FY 2013, SFAz grantees now report:
  - $298 million in cumulative industry match and non-state research funding, which represents a significant economic impact of $597 million over the past six years
  - 207 cumulative patents filed and/or issued
  - 24 cumulative technology companies formed in Arizona
  - 23 cumulative technology licenses in place.
The direct job gains from SFAz grant programs, however, while still substantial and growing, are significantly slowing down as State funding for new grants wane and initial grants reach their completion. These cumulative jobs directly related to grant activities total 1,865.

**The Power in Staying the Course: Expanding Cumulative Impacts from SFAz Programs**

SFAz continues to make strong progress. Over six years (FY07–FY12), its grant programs have shown significant gains across the range of key outcomes. Two that stand out:

- Total funds leveraged by industry match and other sources have increased to $4.83 from non-state sources for every $1 in funding, primarily from the state.
- Cumulative direct jobs associated with the grants have steadily increased and now total 1,865.

SFAz’s commercialization performance stands out compared to typical statewide university activities—pointing to the success of its focus on moving scientific advances to the marketplace:

- One patent applied for or issued for every $1.6 million in total university research funding generated over the past six years, well ahead of the six-year Arizona university-wide average of one patent per $4.2 million in funding.
- One new company start-up for every $14.2 million in total university research funding generated over the past six years, well ahead of the six-year Arizona university-wide average of one start-up per $86.7 million.

**STEM Education Initiatives**

In education and talent advancement, SFAz is growing the next generation of high-skilled workers in Arizona through STEM initiatives at all levels from K-12 and community colleges to supporting top talent in doctorate programs. Its STEM education initiatives are achieving significant scale:

- Over their initial six-year existence, STEM initiatives have cumulatively impacted nearly 385,000 students and 10,656 teachers at the K-12 and community college levels through direct or indirect participation.
During the 2012–13 academic year, SFAz education programs had 70,742 student and 2,583 teacher participants involved either directly or indirectly (the majority are direct program participants while some are impacted indirectly by having a teacher participate in a program or vice versa).

Initiatives have supported a total of 263 graduate research fellowships for PhD students in STEM fields at Arizona universities. Arizona has retained 38% of the graduates working in post-doctoral positions and 50% of graduates with permanent jobs.

Surveys of program quality continue to reveal very positive ratings from both teachers and students.

Regional Impacts
While SFAz grant activities are focused broadly on targeted partnerships and technology commercialization statewide, each tends to have a more primary focus and set of impacts in the region in which the Principal Investigator (PI) and/or institution is located. SFAz grants are generating significant impacts on a regional level:

Grants based primarily in Southern Arizona have had the most success in generating total jobs (911 to date) and companies (14), and raising additional funds ($111.5 million). The University of Arizona hosts the most Graduate Research Fellows with 124 in Southern Arizona. SFAz STEM education initiatives have a strong footprint in Southern Arizona with 89 teachers and more than 4,000 students engaged either directly or indirectly in these programs during the 2012–13 academic year.

Grants to Central Arizona institutions and PIs have generated a leading number of scientific publications (687 to date) and key intellectual property activities with 112 patent applications and 35 patents issued. Central Arizona has 116 Graduate Research Fellows attending Arizona State University. The region has seen the greatest impact in terms of teachers and students involved either directly or indirectly in STEM education programs sponsored by SFAz during this year with 2,474 teachers and more than 65,000 students.

Despite the relatively smaller size of Northern Arizona University as an institution and, consequently fewer grants than the other regions, Northern Arizona grants have generated 79 scientific publications, 97 total jobs, and $8 million in additional funds leveraged. Twenty three Graduate Research Fellows are conducting their research and graduate studies at Northern Arizona University. In STEM education programs, 20 teachers and 769 students in the region participated either directly or indirectly in this most recent academic year.
Arizona’s Annual Technology Report Card

In addition to reporting on SFAz and the returns to its grants, the report evaluates Arizona’s position in technology development more broadly relative to the nation and selected comparison states. The Report Card portion of the report was inspired by the Stardust Foundation.

Arizona’s Technology and Innovation Performance Improving Though Remains Behind Much of U.S.

Arizona’s recent performance—both against the U.S. and 12 benchmark states—shows improvement but suggests a number of key challenges for the state in areas critical to building a top-tier technology ecosystem. In most cases the state is failing to keep pace with national indicators, including:

- Nonexistent venture capital in Arizona in the critical seed and early stages for technology companies, while the nation saw gains over the year.
- A concentration of technology industry employment and growth that remains just below U.S. averages.
- Concentration of R&D expenditures that lag the nation across both university and industry.
- Achievement deficits in middle school math and science performance and lower incidence of postsecondary degrees in key science and engineering fields.

Improvements and gains, however, are evident in several innovation areas, including:

- Technology transfer outcomes at Arizona universities including an increase in startups and patenting at an above-average rate.
- Industrial R&D expenditure growth nearly double that of the national rate.
- Rapid over-the-year growth in postsecondary degrees in key science and engineering fields.

The performance metrics indicate the need for sustained and targeted investments in areas where SFAz is making inroads and advances. Still, despite the very positive performance of SFAz in its initial six years, sustained funding is essential to continue this level of excellence and partnerships are critical. Philanthropic and public sector support are critical if this record of achievement is to be sustained in the years ahead.