CHAPTER 9

The Research University's Potential as an Area's Growth and Prosperity Stimulant

Peter Preuss

BENEFICIAL EFFECTS OF A UNIVERSITY ON THE ECONOMY

The very presence of a college or a university has a beneficial effect on its surrounding community and region. Moreover, the economic effects of a research university or universities can be especially significant, as can be seen in California's Silicon Valley.

When University of California President Dr. Richard Atkinson was director of the U.S. National Science Foundation, he commissioned a study of the impact of research on the economy. The economists writing the report coined the name "new growth theory," and showed that research is the number one creator of an expanded economy and job growth. Simply stated, they assigned central importance to science and technology-based innovation as factors accounting for 50 percent of this nation's economic growth and its international competitive position.

The U.S. Small Business Administration goes even further. It notes that while major U.S. companies were "downsizing," small businesses were expanding. In the past eight years, they have hired more people than the big companies have let go and are the major factor in the reduction of unemployment in the United States (Glover 1998).

The innovative, high-tech culture in Silicon Valley was born when the communications lab of Stanford University Dean of Engineering Dr. Frederick Terman became the focal point of brilliant engineers, like William Hewlett and David Packard, founders of Hewlett Packard in 1939. Terman main-

tained many contacts with the business community and acted as a one-man network, introducing his engineers to other engineers, businessmen, professional service providers, and others. Encouraged by the Hewlett Packard success, many other Terman engineers created companies. The Silicon Valley miracle had begun.

Later, Dr. William Shockley, a Nobel laureate and co-inventor of the transistor, left Bell Labs and returned to his boyhood home, Santa Clara County, to found Shockley Laboratories (Malone 1985). Chosen by him partly for its proximity to Stanford University, Shockley Labs quickly spun-out most of the fabled semiconductor industry, including Intel, National Semiconductor, and many others.

The San Francisco Bay Area, comprising nine counties, is now home to 7 million people, has a gross domestic product exceeding $200 billion annually, supports 4,000 high-tech companies employing more than 200,000 people, including 509 bioscience and medical device companies, and is home to the University of California, Berkeley; U.C. San Francisco; U.C. Santa Cruz; U.C. Davis; Stanford University; and Santa Clara University. There is no doubt that Stanford University and the legacy of Frederick Terman is the reason Silicon Valley is where it is!

A research university can help generate jobs, particularly if it is committed, in addition to educating students, to reaching out to private high-tech industries and effectively supporting their undertakings. Such outreach programs can have many dimensions and can be pursued with different degrees of commitment and intensity.

A number of university programs help stimulate innovation and technology. For example, the University of Texas IC^2 (the Institute for Innovation, Creativity and Capital), founded by the legendary entrepreneur George Kozmetsky, teaches courses and publishes books and reports on innovation and entrepreneurship. It has an incubator for new companies. Under its new director, Robert Ronstadt, it plans to reach out to provide more "networking" with the local high-tech business community.

The Minneapolis-St. Paul region of Minnesota, because of the University of Minnesota; Seattle, Washington, because of the University of Washington; and Research Triangle Park, because of Duke University and the University of North Carolina, are also fertile fields for high-tech companies, but have no active university/small business networking organization.

I don't claim that university outreach programs are absolutely essential for economic development, but only that they can enhance the university presence. Beyond the university's physical presence, outreach programs can make a research university the incubator and seedbed of exciting new products and processes so crucial to high-tech firms and their development. With the objective of stimulating economic development and facilitating the creation of

new high-tech firms and the growth of existing ones, the university can help develop partnerships of high-tech companies in the region by encouraging fruitful cooperation between them and the university. This objective can be achieved when, for example, an arm of the university assumes some of the following functions:

1. It collects relevant business information about existing firms in the region and widely disseminates it.
2. It sponsors conferences, lectures, and colloquia in which up-to-date high-tech information is imparted.
3. It assists start-up companies in finding funds.
4. It helps build effective networks for members of the high-tech industry.
5. It educates the community and its elected officials on the needs of its growing companies.

THE CONNECT PROGRAM

An example is the CONNECT Program at the University of California at San Diego. The university has determined that business development is a desirable goal and has encouraged the program to do all of the above and also help its industrial members locate and recruit well-trained high-tech engineers. UCSD CONNECT, founded in 1986 by then UCSD Chancellor Richard Atkinson and Associate Vice-Chancellor Mary Walshok, now has over 600 member companies. High-tech companies that have participated in CONNECT events have raised over $5 billion in equity capital, much of which has benefitted the local community. In San Diego, CONNECT has become a catalyst and a recognized benefactor of the community. Clearly a CONNECT-like organization centered at a university can make that university the hub of economic activity.

UCSD CONNECT, under the enthusiastic direction of Bill Otterson, has a staff of 15. Its primary strategy is the creation of events that have strong community participation. It organizes over 60 separate events each year, more than one a week. These events are the networking opportunities that start the system working.

CONNECT's Springboard provides early mentoring by experts to start-up firms by preparing a young researcher or entrepreneur to present their concept for an existing or planned new company to a panel of approximately 10 experts, including CEOs and management from related industry, CPAs, lawyers, patent experts, and technologists. The feedback is specific and tough.

As the company matures, there comes a time when funds from friends, family, and lines of credit are not sufficient. CONNECT's Financial Forum brings in 100 venture capitalists each year to review business plans from

emerging companies. Months before the event, a community of local service providers meets to identify the best and most ready company for venture capital. Typically, 60 to 70 companies apply for the event, and the committee selects the best 35. The committee then works with the 35 companies to ensure the quality and clarity of each one's presentation.

Each November, Corporate Partnership Forum brings many of the world's largest pharmaceutical and device companies to San Diego to hear presentations from biotech and medical device companies seeking corporate investments. Again, a UCSD CONNECT committee identifies the potential presenters, selects the best, and coaches the CEOs to present their partnering opportunities in the best light.

The annual Most Innovative New Products Award luncheon celebrates innovation among all local companies in the marketplace. Once again, a committee is organized to identify the best new products in a number of categories, select the finalists, and then to have a big celebration to honor the best products.

Another way of marketing what is going on in the region is the annual UCSD CONNECT directory of members and sponsors. CONNECT now has over 600 sponsors and members, and the directory gives each entity and the university a page to describe their business. The directory conveys the commitment of San Diego to the technology businesses and is the best source of information on technology companies.

CONNECT's Athena program is designed for women high-tech executives. It offers them a networking forum. Its programs meet the special needs of this important and growing group.

To help ensure that UCSD CONNECT meets the needs of industry and the university, it has two advisory boards. The UCSD CONNECT Advisory Board includes CEOs, three science deans from UCSD, venture capitalists, and senior managers from its service providers. The Scientific Advisory Board was formed to help find ways to expand relationships with the university and industry.

The Success of CONNECT

The following elements are the keys to the success of CONNECT:

1. Involving a major research university to provide the technology and the educated workforce.
2. Focusing on economic growth and community service.
3. Giving the customer (industry) what he or she needs—not necessarily what the university needs.
4. Developing a culture that is conducive to entrepreneurs.
5. Involving businesses and their suppliers—establishing the CONNECT community.

6. Working with everyone—excluding no organization or person who wants to participate.
7. Having a committed, entrepreneurial leader.

In addition to such a comprehensive outreach effort, more specific ones can play a major role in assisting the region's high-tech industries. As a consequence, the region's quality of employment opportunities and general prosperity will increase. Individual faculty members or teams that can include members of all institutions in the region can monitor such efforts. What any and all of these efforts have as their common goal is to assist (1) the founding of high-tech start-up companies and (2) the growth of existing ones, through both new and improved products and processes. Graduates who have learned state-of-the-art processes, techniques, or products in undergraduate or graduate school create most start-ups around a major research university.

Either fundamental or applied research results can also be transferred to private firms for commercial exploitation. The transfer can take a number of forms.

1. A faculty member can found a company that commercially uses the new knowledge or material he or she created as a faculty member.
2. The university can patent the new product or process and license it to a private firm.
3. The university can use the patent by joining a private firm in making commercial use of it, possibly founding a start-up company.
4. The university can by itself form a start-up company and make commercial use of the license.

In any of the above technology transfer initiatives, a major contribution is obviously made by the university's conventional teaching and training programs, including those tailored for executives, finance officers, and legal counsel.

Universities, in their historical role as learning communities created to teach, carry out research, and engage in public service, have been held as important to the well-being of society. In turn, society has supported the universities by contributing to their finances. Such an unwritten social contract has existed for sometime.

For various reasons in the recent past, government funding has been declining, putting at risk the ability of universities to fulfil their mission to their fullest capacity. One result could be a declining ability to create new knowledge, expert professional skills, and the ability to serve as technology transfer agents.

As research universities reach out to the community by more directly assisting in the creation and growth of high-tech companies, quality employ-

ment grows and prosperity increases. The region's private sector benefits, and so does the public sector. As employment and income in the region's jurisdictions grow, so do their tax receipts. In terms of the social contract between a state's population and its public universities, funding of research universities deserves to once again become more generous.

In this example, the university has a dual role. On the one hand, it helps generate industries, which then need well-educated employees. On the other, it produces the qualified graduates to fill these jobs.

CONCLUSION

Listed below are some of the advantages of outreach programs to the research university itself.

1. Such programs build a dedicated group of commercial supporters for the university.
2. Students may have opportunities for part-time jobs or internships.
3. Faculty may have opportunities for consulting.
4. Faculty may learn new and innovative techniques from industry that can enhance their research.
5. Successful entrepreneurs often return gifts to the university in the form of underwritten chairs, named buildings, etc.

To conclude, I would again like to quote from a speech given by U.C. President Richard Atkinson (1996) to the California Coalition for Science and Technology Summit.

> In opening this conference, I have only three messages. One is that we are living in one of the most exciting periods of intellectual discovery in history, and the economic potential of the explosion of knowledge is tremendous. Another is that we need to be much more active than we currently are in promoting industry-university partnerships in research. And the third is that we must organize ourselves in new ways if we hope to succeed in tapping the productive power of new knowledge to drive the California economy.

REFERENCES

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