Small Business Innovation, Research, and Development

By David P. Colvin

Historically, small businesses have been the innovation engine of the United States, with significantly more than half of the new technologies and products coming from small enterprises. In 1992, there were more than 21 million small businesses with fewer than 500 employees each in the United States, including 4.5 million small corporations, 1.6 million partnerships, and 15.1 million sole proprietorships. Although most small businesses have considerably fewer than 100 employees, they employ more than half the private U.S. work force, contribute more than half of all sales in the country, and are responsible for over half of the private sector’s products. From 1976 to 1990, small firms also generated 65% of the net new jobs. From 1988 to 1990, all of the net new jobs in the U.S. economy were created by small firms. Indeed, small business is really big business in the United States.

Small businesses are also responsible for much of the applied research that is necessary for new product development. Throughout the economy, small businesses create more innovations per employee than larger firms, and this inventive capacity will likely become increasingly critical to our country’s global competitiveness in the 21st century. Small businesses assume higher risks; their owners are often required to mortgage their companies or personal property to raise the necessary operating capital. Small business operators also have a longer-term view of the markets; they are less driven by next quarter’s bottom line, as are so many larger, publicly traded companies.

Studies by the U.S. Small Business Administration have shown that approximately 4% of all federal industrial research dollars go to small companies; this is about half the level of private sector investment in small business research. Yet it is these same small businesses that will develop well over half of the technologies and new products necessary for global competitiveness in the next century. Recognizing this fact, in 1982 Congress initiated the Small Business Innovation Research (SBIR) program as a result of the 1980 White House Conference on Small Business. The SBIR program has grown from 40 awards in response to 600 proposals in a pilot program at the National Science Foundation in 1975, to 3,800 awards for 26,000 proposals last year at 11 federal agencies. In fiscal years 1995 and 1996, SBIR expenditures will be no less than 2% of extramural federal research and development dollars and will increase to 2.5% after fiscal year 1996. Statistics also show that the SBIR program is very likely the most competitive federal program, with 1-in-25 odds for winning both Phase I and Phase II awards. It is likely that this intense competition, along with the innovation and willingness of small enterprises to take early risks, is producing the outstanding results which are being seen.

The productivity of research is a factor that is seldom addressed. Academic research is more basic, and only recently have universities begun to evaluate the potential spinoffs or applications that may result. In industry, however, commercial application is the major reason for research. Research money is increasingly difficult to find, and downsizing of large corporations to meet global competition means that more of the research will fall to small businesses. This may be good news, because small businesses typically have lower overhead and are far more nimble than their larger counterparts. Because of the capital required, however, larger corporations are still more competitive for large-scale manufacturing and global marketing.

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Academic research, understandably and rightly, is directed toward more basic investigations. Consequently, it is estimated that significantly less than 1% of university research actually results in new products or technologies. Some large corporations feel that a 3% return on research investment is quite acceptable. In 1990, Congress asked the General Accounting Office to assess the productivity of the relatively new SBIR program. To its surprise, the productivity of the SBIR program was found to be approximately 25%; that is, one fourth of the SBIR programs were moving to commercialization after seven years. In contrast, it typically takes 10 to 15 years to develop a new and mature product or technology for the marketplace. In 1992 Congress, impressed by this statistic and with SBIR companies' testimony and technology demonstrations, reauthorized and expanded the SBIR program into the next century.

To date, Triangle Research and Development Corporation (TRDC) has won well over 50 SBIR awards from six federal agencies for technologies ranging from thermal science, medicine, and shock and vibration control to optics, robotics, and safety. More important, over half of these SBIR awards have moved to commercialization in one form or another with over 20 patents (domestic or international). Many of the resulting products are being commercialized through licensees or through joint ventures with other small and large firms. In addition, four spinoff corporations have been established to manufacture, manage, and market some of the technologies. In 1991, 60 leading SBIR companies similar to TRDC formed the Academy of Technology Entrepreneurs and Innovators, a national organization that represents small technology-based entrepreneurial enterprises and provides a forum for multidisciplinary SBIR education and nationwide internal networking.

Research teaming is now becoming a cost- and time-effective way to develop new products and technologies. Based on the success of the SBIR program, in 1992 Congress initiated the Small Business Technology Transfer (STTR) program, which requires teaming with small businesses to receive allocated research dollars. This pilot program will direct 0.1% of federal research and development dollars in fiscal year 1995 and 0.15% in fiscal year 1996 to such research teams, which must include small businesses but may also include universities, nonprofit institutions, and selected federal laboratories. It is too early to tell how well this teaming program will succeed, but its conception and emphasis probably will change the way U.S. research views small business.

As we move into a new century, there is a need to develop a foundation for research that uses the potential and skills of the entire team. The universities and small businesses in the United States are considered by many to be the best in the world. Many of our large businesses are becoming more competitive in a global economy. We should decide how much research money should go to maintain our leadership where we have it and recover it where we do not. Successful programs such as SBIR and STTR should indeed be expanded—at least to match the level of investment by the private sector of approximately 9%. Furthermore, more creative and effective ways for capital formation should be investigated to ensure the timely commercialization of these new ideas and products. Finally, if cost sharing is a requirement in programs such as TRP and ATP, it should be on a sliding scale proportional to the size of the business in order to avoid discriminating against the very small businesses, which usually have the newest ideas.

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