



## Small Firms Make More Than Their Share of Big Inventions

That small firms stimulate innovation in biotechnology, medical, and information technology is widely accepted as fact, but until now it has not been very well quantified. A new study produced under contract to the Office of Advocacy attempts to quantify the small firm contribution to technical change in this country. The report, *Small Serial Innovators: The Small Firm Contribution to Technical Change*, was written by Diana Hicks, of CHI Research, Inc.

Between 1996 and 2000, 1,071 U.S. firms were awarded 15 or more U.S. patents. One-third of these firms were small, employing fewer than

500 people. Each of these small firms has survived long enough to establish a substantial public record of innovation represented by their patent portfolios, and such firms are termed “serial innovators.”

Small serial innovators obtained patents that were more technically important than the patents of large firms. Their patents were cited 28 percent more often by other inventors, they were twice as likely to be among the top 1 percent of the most widely cited patents, and they were twice as closely linked to scientific research than large firms. Serial innovators were found to be concentrated in health and information technologies.

**Serial Innovators Produce More Important Patents.** A patent represents a technical advance of unknown magnitude. A few are extremely valuable, while most are

not. One measure of the importance of a patent is the number of times it is cited in other patents (how frequently other inventors rely on it). Citation rates vary by technology and over time. Using a citation index (expected value = 1.0), which compares a patent’s citation count against the citation counts of other patents issued in the same year and in the same technology area, the authors found that the citation index for serial innovators’ patents averaged 1.53 while the large firms’ patents averaged 1.19. Hence small firms were found to be more effective than large firms in producing high-value innovations.

Small firms’ effectiveness was most noticeable among the patents with the highest citation indexes. While small firms accounted for 6 percent of the patents issued to the

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### Technologies with Small Firm Patenting

Technology Area	Percent of Patents from Small Firms	Total Number of Patents	Percent of Firms that Are Small	Total Number of Firms
Biotechnology	25	3,886	71	45
Pharmaceuticals	19	6,453	68	59
Medical Equipment	11	8,437	45	88
Unclassified	11	2,511	31	26
Medical Electronics	11	2,974	64	14
Chemicals	9	15,760	29	91
Agriculture	8	2,561	28	18
Semiconductors and Electronics	5	13,893	44	43
Office Equipment and Cameras	4	9,268	43	37
<b>All Technologies</b>	<b>6</b>	<b>193,976</b>	<b>33</b>	<b>1,071</b>

Source: *Small Serial Innovators: The Small Firm Contribution to Technical Change*, CHI Research, Inc. Produced under contract to the Office of Advocacy, 2003.

## Economic News

### Small Business Economic Indicators Show Small Firms' Resilience

The Office of Advocacy's recently released publication, *Small Business Economic Indicators 2001*, brings together much of the latest U.S. and state data on small business. The report shows that small businesses felt a good deal of economic hardship during the slow-down that took hold in 2001. But their strength and resilience were evident as their overall numbers remained about level with the previous year.

- The labor market signs were mixed. Private sector employment

remained steady at 111 million, but unemployment rose to 4.8 percent. While this was an increase over the prior year, it was still a historically low figure.

- As the economy hit the brakes and equity markets tumbled, an increasing number of banks reacted by tightening their lending standards. Credit became harder to find, and small firms reduced their demand for loans.

- The number of businesses was relatively level with the previous year. Self-employment fell to 9.8

### Where to Go for Tax Information? Start at IRS.gov

Are you ready for the new tax year? The small business page on the IRS website ([www.irs.gov/smallbiz](http://www.irs.gov/smallbiz)) has a number of improvements to help businesses file their taxes. Here are some of the changes for the 2003 tax season.

**Virtual Small Business Workshop.** The IRS's helpful introduction to tax topics, the Small Business Workshop, is now available online. IRS.gov's online classroom uses video streaming technology to let business owners and the self-employed "attend" this helpful workshop whenever and wherever it is most convenient.

[www.irs.gov/businesses/small/article/0,,id=97726,00.html](http://www.irs.gov/businesses/small/article/0,,id=97726,00.html)

**Filing Addresses.** The new filing addresses for this tax year have been added, and they are easier to access. Up-to-date filing addresses for businesses are now available from every page on the site by selecting the Where-to-File link on the left navigation bar.

[www.irs.gov/file/content/0,,id=105081,00.html](http://www.irs.gov/file/content/0,,id=105081,00.html)

**Small Business Tax Calendar.** The new Small Business Tax Calendar lists significant dates and the steps necessary to comply with your business tax filing requirements.

[www.irs.gov/businesses/small/article/0,,id=104682,00.html](http://www.irs.gov/businesses/small/article/0,,id=104682,00.html)

**Offers in Compromise.** This site provides comprehensive information on the Offers in Compromise program and how to use this important option. The program provides a useful mechanism for settling tax claims with the IRS.

[www.irs.gov/businesses/small/article/0,,id=104593,00.html](http://www.irs.gov/businesses/small/article/0,,id=104593,00.html)

**International Taxpayer Information.** International taxpayers will find more information available for their specific tax needs. This page will help both overseas U.S. taxpayers and foreign taxpayers in this country meet their unique obligations.

[www.irs.gov/businesses/small/international/index.html](http://www.irs.gov/businesses/small/international/index.html)

### The Small Business Advocate

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million from 9.9 million, and employer firms rose from an estimated 5.7 million to 5.8 million.

- Business births and closures converged. New firm births declined 5.0 percent and closures rose 4.5 percent.

- Business bankruptcies rose 12.8 percent to 39,719. However, this level was still less than half the figure reached in the early 1990s.

- Small businesses fared better than large firms; proprietors' income rose 4.0 percent while corporate taxes, a proxy for corporate income, declined 1.8 percent.

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## Message from the Chief Counsel

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### A Great First Year for Small Business

by Thomas M. Sullivan, Chief Counsel for Advocacy

What an exciting and extraordinary year it's been. In January 2002, the Senate confirmed me as chief counsel for advocacy, a job that I believe is the best one in government. As chief counsel, I head a small office of talented lawyers, economists, regional advocates, and communicators who are dedicated to representing small businesses' interests before Congress and the federal regulatory agencies. In my first full year on the job, our team has done better than I could have possibly hoped for.

Most importantly, we are led by a president who truly believes in small businesses and their key contributions to the United States: the livelihoods that they create and the unique new products and inventions they introduce to our society and foreign lands. President Bush has delivered on his commitment to small business again and again over the past year.

In March 2002 President Bush announced his Small Business Agenda, which put small business issues front and center stage. The agenda calls for tax incentives for small business, initiatives to help small firms provide health care, new efforts to tear down regulatory barriers to small business—in part by strengthening the Office of Advocacy—and for more information to be made available to small businesses via the Internet.

Throughout the year, the president has delivered on these key points. He delivered on his promise to strengthen the Office of Advocacy and help us do our job better in August, when he signed Executive Order 13272. In EO 13272, the president directed his cabinet and regulatory agencies to be accountable and more effective at considering the impacts on small businesses before regulations are written. In the months since, our office has

worked closely with agencies as they create their plans for giving small business due consideration.

It has also been an outstanding year because of the cost savings Advocacy has helped achieve for small business. In FY 2002, Advocacy's efforts to improve agency compliance with the Regulatory Flexibility Act resulted in more than \$21 billion in first-year cost savings, with an additional \$10 billion in annually recurring savings.

As head of the Office of Advocacy, I have been assigned the unique responsibility of representing small businesses, the most important businesses in America. To get the job done, I have been aided by a team that shows true professionalism and a president who is behind us 100 percent. We have one tough record to improve on in Year Two. And we've already launched our drive to do just that.

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### 2003 Advocacy Awards Judging

On Feb. 25, nearly 50 judges met at SBA headquarters to review nomination packets and select national advocacy award winners in 10 categories. The 2003 small business advocacy award recipients will be honored at SBA's National Entrepreneurial Conference and Expo, which will be held in Washington, D.C., Sept. 15–20, 2003.

At right, Deputy Chief Counsel for Advocacy Shawne Carter McGibbon discusses the nominations process with national judges.



**Innovators, from page 1**

1,071 most innovative firms, when these patents were ranked by citation index, small firms accounted for 8 percent of the top 10 percent; 9 percent of the top 5 percent; and 14 percent of the top 1 percent.

**Small Firm Patenting by Technology Area.** Small firms' contribution to technical change is not spread evenly across technologies. Small firms are most heavily represented in health-related areas. In biotechnology, small firms produced one-quarter of the patents in this study and account for 71 percent of the patenting firms. Small firms are also over-represented in pharmaceuticals, medical equipment, and medical electronics. The catch-all category, "unclassified patents," includes patents on gaming: 21 percent of the patents that contain the words toy, game, gaming, snowboard, or golf in their titles belong to small firms.

In information technology, a different pattern emerged. The small firm share of patents is lower than

6 percent, but the share of small firms is more than one-third. This suggests that although small firms are active in these areas, large firms have a higher propensity to patent and so overshadow the small firm effort when simple patent counts are examined.

**Conclusions.** Serial innovators, small firms with multiple inventions and patents, produce high-impact, leading-edge technology and are particularly important to innovation in newer and science-intensive technologies.



Tensar Earth Technologies, one of the firms analyzed in the *Small Serial Innovators* report, is a small company based in Atlanta, Ga. Tensar brings a high-tech approach to earth retaining and reinforcement systems utilizing its patented Geogrids (shown here).

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