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Build a Better Mousetrap—Fast

New facilities let entrepreneurs create physical products at speeds and costs that were once unthinkable

By GEOFFREY A. FOWLER

SAN FRANCISCO—For entrepreneurs who prefer creating things in a wood shop rather than on the Web, the tools to turn their ideas into real products have never been closer at hand.

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Last summer, while working as an architect at [Gap Inc.](#), 32-year-old Max Gunawan spent evenings and weekends at a TechShop Inc. workshop in downtown San Francisco. There, he used computer-operated laser-cutting and milling machines to test a few ideas.

Several months later, Mr. Gunawan had a prototype lamp in the shape of a book that he called Lumio. He quit his day job and raised nearly \$600,000 in funding from the website Kickstarter to build his lighting-design business. "This is my unofficial office," he says of a table

in the TechShop workshop where he worked through many versions of his design.

For inventors, the growing number of facilities and accelerator programs that provide access to high-end tools is opening opportunities to create physical products at speeds and costs that were once unthinkable. A laser cutter to shape his light's wood cover alone might have cost Mr. Gunawan thousands of dollars. At TechShop, he had access to several of them—along with more than a million dollars' worth of wood cutters, metal punchers, 3-D printers, design software and other equipment—for a membership fee of about \$125 per month.

Creative Subculture

Over the past six years, TechShop has attracted more than 4,000 members to facilities in six cities, from Round Rock, Texas, to Pittsburgh, and it has three more in the works. On most Friday nights, they hum with dozens of hobbyists, academics, students and artists sawing, blasting and carving. They have their own version of a "genius bar," with experts in tools and manufacturing on standby.

Elsewhere, about 40 communities in the U.S. and more than 100 in other countries now have Fab Labs, workshops born from a project at the Massachusetts



Jamie Tanaka for The Wall Street Journal

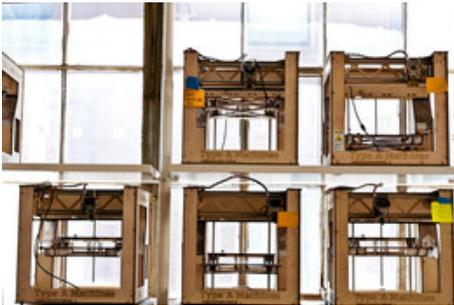
Max Gunawan developed his Lumio lamp in TechShop's San Francisco workshop, which still serves as his office.

Institute of Technology that gives youth and adults access to about \$100,000 worth of tools like laser cutters. Some cities have homegrown nonprofit hacker spaces where inventors can share tools, such as Brooklyn's NYC Resistor; Artisan's Asylum in Somerville, Mass.; and Chicago's Pumping Station: One.

The growth of these facilities has come in tandem with the rise of America's "maker" movement, a subculture of do-it-yourselfers who make everything from drone planes to sculptures.

Many of these tinkerers are now starting businesses.

"It's easier and cheaper now to prototype and get from production volumes of tens of units to hundreds or thousands of units," says Rob Coneybeer, managing director of venture-capital firm Shasta Ventures. Thanks, too, to improvements in wireless technology, microprocessors and battery power, venture capitalists are looking to invest in hardware startups.



Jamie Tanaka for The Wall Street Journal

TechShop's machines include 3-D printers.

TechShop, based in Menlo Park, Calif., has been at the forefront of this trend. The company was founded 6½ years ago by inventor Jim Newton, who had a thick notebook of some 200 product ideas and wanted access to the tools to make them.

"There is no better hardware incubator than this spot," says TechShop Chief Executive Mark Hatch. "The ability to prove that there is a market by putting something up on [eBay](#) or Etsy or Kickstarter and selling a thousand of them...frankly, it changes everything."

TechShop has helped produce prototypes and early production lines for dozens of hardware companies, including Square Inc., a credit-card processing service that makes a small device that attaches to smartphones and tablets, and Type A Machines, which sells \$1,400 3-D printers and is currently raising funding. A company called Prototank has set up an office in TechShop's San Francisco facility to help other companies develop prototypes, as well as work on its own projects, including lamps and electric signs.

Of course, taking a product from tinkering project to market isn't easy.



Jamie Tanaka for The Wall Street Journal

Patrick Buckley began creating an iPad case at a TechShop facility in Menlo Park soon after [Apple Inc.](#) announced the product in 2010. He learned how to use advanced cutting tools and then crafted his first few iPad covers, which were made of wood and bound like a traditional book. He set up an online shop to sell the product, called the DODOcase, for \$49.95. Getting to that point cost him about \$500, not including the iPad, which he borrowed from his mother. "It was really scrappy," says the 32-year-old.

Patrick Buckley moved to his own space when sales for his iPad case took off.

When he started getting orders in droves, he had to figure out how to keep up with demand. Initially, he thought he could make 10 to 20 cases per day, cutting

the bamboo for them in the TechShop workroom. Then he asked permission from TechShop executives to use their machines extra hours, late into the night. "When we got to the point where 800 orders came in per day, we thought, this isn't going to work," says Mr. Buckley.

Eventually, he bought his own woodcutters, silk-screening equipment, laser cutters and 3-D printers for a 10,000-square-foot factory in San Francisco, with 30 employees. "We have built our own TechShop, but specific to the needs of our business," he says.

Help for Entrepreneurs

While DODOcase did it on its own, support is available for tinkerers looking to start businesses. In San Francisco, an incubator program called Lemnos Labs offers hardware entrepreneurs mentorship, funding and access to equipment.

In Boston, a six-month program called Bolt promises to help entrepreneurs get businesses off the ground by providing access to prototyping equipment and help with design, manufacturing, packaging and distribution.

There is help for conquering manufacturing in China, too. An accelerator program dubbed Haxlr8r takes in 10 startups at a time, gives them some \$25,000 in funding, office space and tools, while it runs them through a 3½-month program inside the world's largest tech shop: Shenzhen, China. The program offers translators, mentors and introductions to local suppliers and factories. The goal isn't just "launchable" products, but "manufacturable" ones, says Haxlr8r director Zach Smith.

Mr. Gunawan, creator of the Lumio light, is going it alone for now. In April he was in Shenzhen, seeking manufacturing partners to make 10,000 of the lamps.. "It can be really stressful," he says. "Things always happen and take longer than you expect, especially when you are manufacturing."

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