Entrepreneurs Take on Manufacturing

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(HBR – Mark Muro: 2-22-16)   When it comes to consumer-facing service industries like e-commerce, media, and ride- or apartment-sharing, it's not new to suggest that "software is eating the world," to use the phrase of venture capitalist Marc Andreessen.

However, in recent years a parallel explosion of digital tools and services has taken place in the manufacturing realm as well, drawing in computer-assisted design and 3D printing equipment to open-source operating systems, the cloud, and the Internet of Things (IoT).

Much has been made of this software-powered "hardware renaissance," particularly as it has spawned a vibrant local "maker movement" and hardware hobbyist community. But the locus and scale of this activity is now changing. Just as with software 15 years ago, start-up manufacturing is beginning to graduate to the bigger time. New tools, resources, and intermediaries are allowing a new generation of serious entrepreneurs to begin to bridge the worlds of hacker space and industry. As a result, software-enabled manufacturing start-ups are poised to have a large economic impact.

Examples of this trend include the Pebble, a Kickstarter-funded project that has now sold over one million smart watches (and which predated Google's Android Wear smart watch and the Apple Watch). Likewise, Nebia — a start-up water-efficient showerhead maker in San Francisco — recently scored investment money from Apple CEO Tim Cook and Google Chairman Eric Schmidt's family foundation. And then there is Drop, a startup that makes a $100 iPad-connected kitchen scale and software app now widely available in Apple Stores and the Apple website, and the well-known Fitbit.

Hardware startups like these haven't historically been so easy to get off the ground.

"A lot of lifestyle businesses used to not be able to get started in larger-run manufacturing which was a pitfall for any small-scale renaissance," observes Mark Hatch, founder of TechShop, a chain of urban maker spaces in U.S. metros like Austin, Pittsburgh, and the Bay Area. "Now, access to tools, capital, and other supports [make] manufacturable products like the [Oru] collapsible kayak possible."

The rise of hardware startups still has the feel of an insurgency. But in my research, and in conversations with hardware entrepreneurs throughout the country, I have noticed several developments that have put manufacturing start-up activity on a faster, more commercial track.

First, Kickstarter and other crowd-funding sources have opened up new options for initial finance. Second, a number of important inputs have gotten cheaper. Open-source operating systems, accessible design tools, and 3D printing are making development and prototyping easier, and the crashing prices of microchips, sensors, and other components now make it possible for a small company to design sophisticated, commercially relevant devices at reasonable cost.

Third, hardware entrepreneurs in some cities can now access a sophisticated supporting infrastructure, including a sizable ecosystem of hardware "studios," incubators, accelerators, and service-providers that has grown up to abet start-ups in dozens of cities from Austin to Providence to Miami.

Last year, for instance, Andy Rubin, the creator of the Android mobile operating system, announced that his new company Playground Global LLC will serve as a sort of incubator "studio" where entrepreneurs and small firms can focus on building new gadgets while Playground takes care of the physical-world challenges: engineering, manufacturing, scale-up financing, supply-chain management, and distribution.

Likewise, companies like PCH International and Dragon Innovation are now available to manage contract manufacturing and otherwise "make manufacturing feel easy" to entrepreneurs or small companies, as noted by The Wall Street Journal's Chris Mims last year.

And hardware startups that enter Y Combinator or other accelerators can now take

advantage of labs full of equipment for prototyping, provided by Bolt, a venture-capital firm associated with Dragon.

Lastly, big- and medium-sized contract manufacturers are taking an interest in this movement, and looking to work with start-ups in a way they weren't five years ago. In 2013, the multinational contract manufacturer Flextonics — which makes products for Apple and Microsoft — began offering Lab IX, a service that connects startups with manufacturing partners. Other contractors have also begun to engage, seeing real market value. Says CEO Nat Mani of the Silicon Valley contract manufacturer Bestronics: "We are increasingly seeking to work with start-ups as a form of business development, but also to stay on top of new technologies. The new guys are frequently trying new things that we need to know about."

The upshot: The same sorts of tools and support systems that have fostered the software boom are now becoming available in the hardware world and opening new avenues.

This opens up possibilities. For his part, Mims imagines an age in which "new products — actual, physical products — will go from idea to store shelves in a matter of months." Surely a surge of startup ferment would be energizing for America's manufacturing sector. Such an age could be beneficial for the U.S. given the nation's advantages in creativity, software, and cloud-based business organization, even if much of the resulting new production winds up offshore.

Beyond that, this surge could help cities. Currently, urban startup communities remain heavily oriented to software ideas and consumer internet ventures. That leaves urban economies narrower than they might be. By contrast, the emergence of new cloud-enabled, incubator-supported manufacturing startups could widen the aperture. New opportunities will be possible if physical-world inventors and entrepreneurs gain traction alongside virtual ones. Likewise, manufacturing enterprises could flourish without needing large exurban spaces. Ultimately, cities and their innovation districts will benefit if they can channel more of the hardware-oriented tinkering and entrepreneurship that launched Silicon Valley and other tech corridors in the first place.

In the end, it seems likely that both the national economy and U.S. metropolitan

areas can benefit if their advanced industry sectors become potent meet-ups of software and hardware competency. Given U.S. digital dominance and hacker dexterity, digital entrepreneurship looks set to further energize the manufacturing industries and give them a new shot at competitiveness.

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