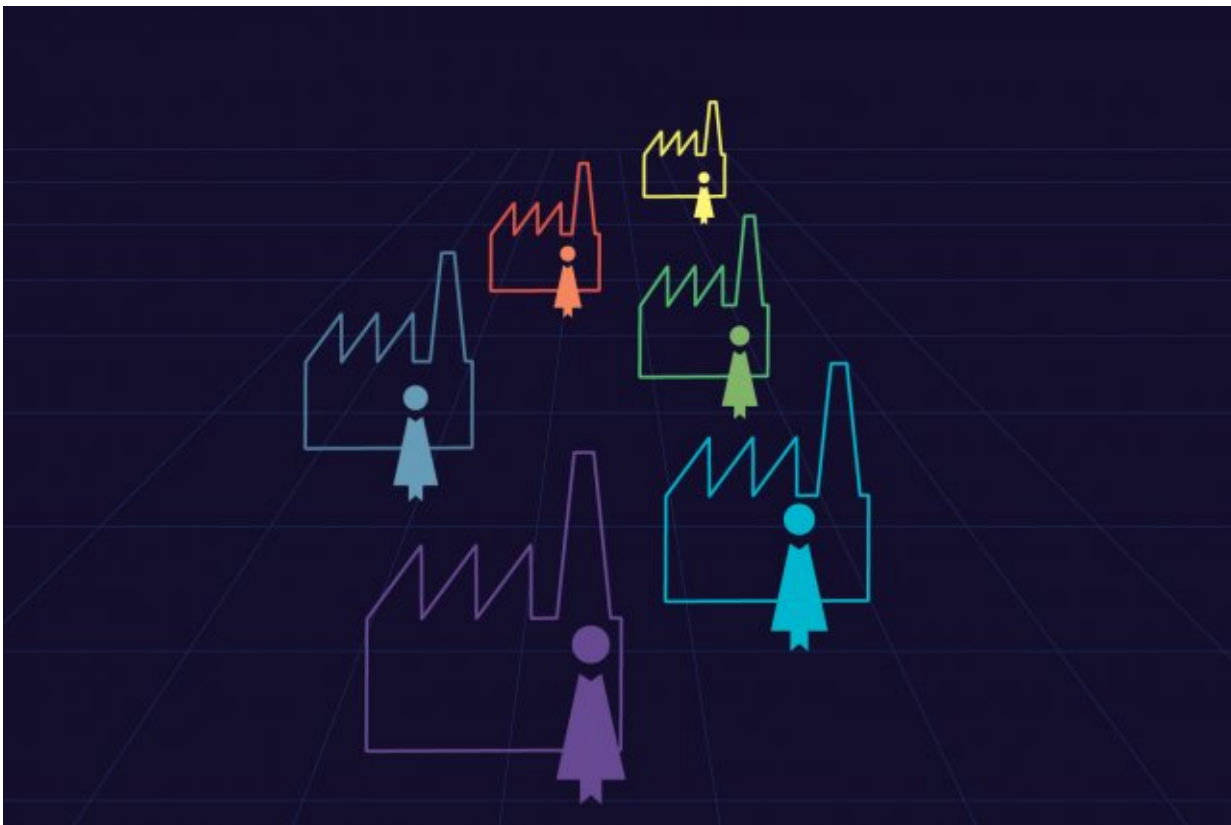


How different types of knowledge impact the growth of new firms

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Researchers in MIT's Collective Learning Group used data on the work history of an entire country to identify the knowledge flows that are more consequential for entrepreneurial activities. Credit: Collective Learning Group/MIT Media Lab

Diversifying into new industries is vital to an economy's ability to grow

and generate wealth. But to branch out into new industrial activities, a city, region or country must first have a pool of people with the right mix of knowledge and experience to make those pioneering firms a success.

So how do local economies ensure they have the right mix of experience to allow new ventures to thrive?

In a paper published this week in the *Proceedings of the National Academy of Sciences*, a team led by César A. Hidalgo, director of the Collective Learning Group in the MIT Media Lab, studied the effects of occupation-specific, [industry](#)-specific, and location-specific knowledge on the success of pioneer firms. These are firms operating in an industry that has not previously been present in a region.

They found these pioneering firms were significantly more likely to survive and grow when their first hires were people with experience in the same or a related industry, rather than those who had experience carrying out the same type of job.

The notion that knowledge is central to driving growth, for which economist Paul Romer was awarded the Nobel Prize in economics earlier this year, is already well-established.

The new paper also builds on [previous work](#) by Hidalgo's group over the past decade, including a paper in *Science* in 2007, in which the researchers developed measures of how economies are able to successfully move into new products based on how closely related they are to their existing product base.

"We know these diversification events are more likely to happen when you have related activities at a location, but someone must still be the first to enter," Hidalgo says. "That pioneer has to get their knowledge

from somewhere."

To understand where this knowledge comes from, and what type of knowledge is likely to lead to the greatest success, the team, who also included lead author and MIT PhD student Cristian Jara-Figueroa, MIT post doc Bogang Jun, and Edward Glaeser, the Fred and Eleanor Glimp Professor of Economics at Harvard University, investigated the different types of experience that workers carry with them when they join a new firm.

They used data from 2002 to 2013 from Brazil's Annual Social Security Information Report (RAIS). The RAIS dataset covers around 97 percent of the country's formal labor market, and includes fine-grained information on individual workers. Using this dataset, they studied the workforce hired by new pioneer firms within a region, to identify the industry, occupation and location of their previous jobs.

"So for a nurse in a hospital, their knowledge of nursing is their occupation-specific knowledge, while their experience in a hospital is their industry-specific knowledge," Hidalgo says.

They found that it is far better for pioneer firms to hire people with industry-specific knowledge, even if those workers had a very different occupation in their previous job.

They then compared these results with those of new firms in a region that were not pioneers, but instead were involved in an industry that was already present in the area. They found that industry-specific knowledge was significantly more important for pioneer than nonpioneer firms.

Location-specific knowledge proved to be the second most important type of experience, while occupation-specific knowledge was not significant at all for pioneer firms, and provided a small boost for

nonpioneers.

"These results strongly suggest that when regions try to develop new industries, they should focus on accumulating industry-specific knowledge that entrepreneurs can leverage," Jara-Figueroa says. "Once the industry has been developed in the place, both types of knowledge become important."

It may be that knowledge of an industry can only be acquired while working within it, making it harder to pass on to others than occupation-based skills and ideas that can be taught, says Hidalgo.

What's more, industry knowledge is important because it includes a familiarity with the social network within that sector. So, for example, someone who has worked in a particular industry for some time will have a better understanding of both the suppliers and customers within the sector, and the firm's competitors, Hidalgo adds.

The research has particular implications for governments in the developing world, according to Glaeser.

"This is related to the broad question of whether the [developing world](#) needs foreign direct investment, or whether it can succeed with home-grown entrepreneurship," Glaeser says. "Our paper supports the view that domestic entrepreneurship can work, as long as it has access to the relevant forms of industry-specific capital."

The research also suggests there may be a need for governments to develop more industry-specific, rather than occupation-based, education programs, Hidalgo says.

The research team now plan to investigate how this demand for industry-specific [knowledge](#) varies from industry to industry.

More information: C. Jara-Figueroa et al. The role of industry-specific, occupation-specific, and location-specific knowledge in the growth and survival of new firms, *Proceedings of the National Academy of Sciences* (2018). [DOI: 10.1073/pnas.1800475115](https://doi.org/10.1073/pnas.1800475115)

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