



Cloudy with a chance of disruption

By May Wong

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Artificial intelligence may be getting the lion's share of attention as the technological disruptor du jour. But another — albeit less sensational — advance could prove to be another game-changer: cloud computing.

The growing availability of convenient, seemingly endless cloud-based digital storage and services is “democratizing computing,” says Stanford economist Nicholas Bloom. New research he conducted with Stanford doctoral candidate Nicolas Pierri shows unprecedented rates of adoption for cloud-based services, spreading computing capabilities to hundreds of thousands of firms across the nation.

Most strikingly, their findings show that smaller, younger firms have been the quickest to take advantage of cloud computing — signaling a potential boon to entrepreneurship.

“The popularity of cloud computing has exploded during the last half-decade,” says Bloom, a senior fellow at the Stanford Institute of Economic Policy Research (SIEPR).

“This is not just a technology used by hipster startups in New York and San Francisco — it's being adopted all across the country.”

Cloud computing provides businesses with remote access to a pool of digital resources via the internet. The management of emails was one of the earliest such offerings, but now cloud services encompass all kinds of data storage and include IT infrastructure that provides the computer servers and related IT management to support behind-the-scenes business operations. Cloud providers also offer business service packages, such as data management, analytics and networking capabilities.

Essentially, cloud computing gives companies of any size a quick way to outsource some or all of its IT, avoiding the fixed investment costs associated with IT staff, computing hardware and data server centers. And cloud costs vary according to usage, so companies can nimbly scale their product or service up or down. Expanding — even globally — can be easier, and more secure, with cloud computing.

For instance, cloud computing helps one small dairy analytics company store huge amounts of data on cow movement to track pregnancy and milk production potential. The network feature of cloud computing also helps another company analyze patient data and played a key role in its expanding its services from Seattle to cities across the United States and as far away as Singapore and India.

The increase in use of cloud computing comes amid an apparent U.S. slowdown in new business creation — a worrisome trend as economists are also finding that super mega firms have grown evermore powerful in market share.

The democratizing force of cloud computing can benefit the Davids fighting Goliaths, the researchers say. And technology has been known to disrupt incumbents who least expect it.

“This is exactly the type of technology we need to both promote growth and hopefully address inequality by helping smaller startup firms,” Bloom says.

By cutting the fixed costs of computing, now even the smallest firm can satisfy large and unexpected computing needs, he explains.

It's getting more cloudy

Their research, believed to be the first comprehensive analysis of cloud computing adoption in the United States, tapped a massive dataset of over 1 million U.S. firms.

Cloud adoption rates have more than doubled every year, rising from 0.3 percent in 2010 — the first year of tracking firm usage of the technology — to 7 percent in 2017.

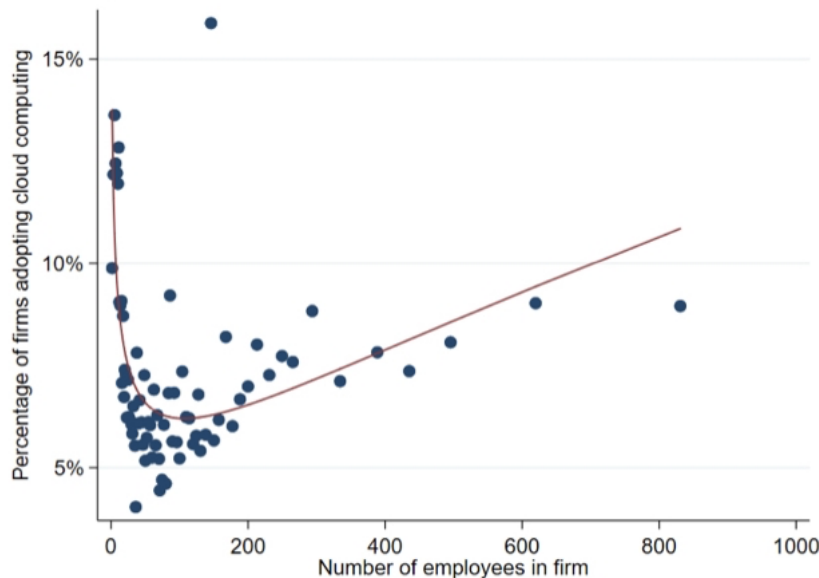
The steep rise has spanned across every broad industry group, including construction and manufacturing, the study found. And the technology has expanded broadly across U.S. counties, though urban and more educated areas were the earliest and heaviest adopters.

Pierri, whose research interests are productivity and innovation, then discovered age and size patterns that harbor potentially significant implications.

The smallest firms across all industries or firm types appear to be the quickest to utilize cloud computing. Firms with less than 25 employees had the highest adoption rates on average — with 10 to 15 percent of them using cloud services. Middle-sized firms with about 100 employees had the lowest adoption rates, while large firms of 500 employees or more had rates of 5 to 10 percent.



Cloud Computing Adoption is Heaviest Among Small Firms



Source: Researchers' analysis on Aberdeen US computing population 2016 file

Notes: Based on a sample of approximately 150,000 firms, divided in 100 groups according to firm size by employee. Plots the average firm size against the share of firms adopting cloud computing within each group. Excludes firms with 1,000 employees or more.

Young firms are also embracing cloud computing faster than old ones — an indication that entrepreneurial companies are the pioneers of adoption.

In contrast, looking back to the 1980s, two other major technologies — personal computing (PCs) and e-commerce — experienced a much slower uptake by small, young firms. Instead, those technologies had a “more classic” pattern of adoption, where larger, older firms tended to be the first adopters, the researchers say.

Will it rain benefits?

Evidently, cloud computing stands out as an unusual technology that appeals to small, young firms. Its ability to deliver high-powered computing without fixed overhead costs is probably a main reason for this, the researchers say.

But how that greater operational agility — which economists have found to be valuable for companies in the face of uncertainty or fast-evolving competition — ultimately fits into broader economic forecasts is unclear.

Recent research by others shows that cloud-based IT services have contributed to increased survival and growth rates of young firms, but studies measuring the overall economic impact of cloud computing — such as its potential to boost innovation or help reverse the nation's decline in productivity — have yet to surface. These questions will be compelling research challenges in coming years as the technology proliferates and more data gets collected, Pierri says.

“We don't have the numbers on the broad impact on firm growth, or on firm survival, so the data doesn't allow us to put the last piece of the puzzle together yet,” Pierri says. “But this technology helps firms compete, and now we have a very clear sign that we have a force that goes in the other direction. This is very positive.”

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