

William R. Kerr

Professor of Business Administration, Harvard Business School

Edited by Kalle Heikkinen, Managing Partner, NAG

Talent clusters to rule them all

To stay in the forefront of new technologies, companies are building a presence at the hot spots of knowledge and innovation.

“May you live in interesting times” is a popular phrase for fancy occasions, ranging from toasts at business dinners to the political speeches of Robert Kennedy and Hillary Clinton. Wow, do we live in interesting times! Every issue of *Time* magazine, *Harvard Business Review*, or *McKinsey Quarterly* describes the latest breakthroughs—artificial intelligence, machine learning, the internet of things, blockchain, 3D printing. Yet “interesting times” are not always enjoyable ones. Indeed, the origin of “May you live in interesting times” was a curse for one’s enemies due to the insecurity, turmoil, and challenges it brings.

We start with the world of business, where “interesting times” abound. If the potential of future technology is causing heartburn for university presidents, business CEOs now have ulcers. Seventy percent of CEOs reported in a 2017 PricewaterhouseCoopers (PwC) survey that they were worried about the speed of technological change, up from 58 percent two years earlier. The challenges for companies are steep, as competition can bankrupt a firm much faster than a school. But challenges and opportunities can go together. Whereas universities mostly operate around fixed local campuses, businesses can go to where the talent is. If global talent is so crucial for this knowledge economy, what does a company do about it? For General Electric (GE), it involved moving 160 miles down the road.

General Electric’s transformation

GE has been a corporate icon since its founding by legendary inventor **Thomas Edison**. Today, GE employs more than three hundred thousand people globally across businesses like power generation, airplane engine manufacturing, and medical imaging. The internet of things provides exceptional opportunities for an industrial equipment company like GE but also an existential threat. Billions of devices, from railroad locomotives to overhead lights, will connect to one another and to the internet in the decade ahead, transforming business practice. Customers will demand new services, and firms will compete in new and unexpected ways.

To attack this opportunity, GE’s leadership decided to go after new skills. As then the CEO **Jeff Immelt** described: “Our new jet engines have a couple hundred sensors on them

providing this stream of data. We made the decision that we want to model that data on behalf of our customers and not relegate it to somebody else. That led us back into the chain of adding software talent, building a software platform. Our theory is that every industrial company is going to have to be a digital and software company. We wanted to lead that, and that's how we've invested." He also stated to employees, "If you went to bed last night as an industrial company, you're going to wake up this morning as a software and analytics company."

GE first opened a one-person office in Silicon Valley for **Bill Ruh**, an executive recruited from Cisco. From 2011 to 2013, Ruh grew his team to 150 people. Although GE employed more than 8,000 software professionals globally, 98 percent of Ruh's team were fresh hires from the Valley with new skills and ways of thinking. Initially designed to support GE's existing operations, this group grew into its own business unit, now branded GE Digital. The next step was even larger: in January 2016, GE announced the move of its long-time corporate headquarters from Fairfield, Connecticut, to Boston. GE wanted immediate access to the skills available in Boston, and it deemed them more important than the incentives offered by other contenders, including the Big Apple. When the transition is complete, GE's new headquarters will be home to 800 employees.

The ongoing transformation of GE surfaces three tasks that companies need to accomplish in the knowledge economy: understand the frontier ideas of their sectors, access the global talent to refine and apply these ideas, and facilitate strong information flow throughout their organization. GE is placing a lot of attention on a small number of employees in places like Silicon Valley and Boston while at the same time pushing information out to many divisions and a workforce 70 percent of which exists outside of America. Let's break this complexity down into steps, starting with the talent clusters: are these places really worth all the hype?

Clusters at the frontier

The economics of skilled work and global talent flows have favored the hyperdevelopment of places like London and Los Angeles. Do these places really matter so much more than suburban corporate labs? For a company with GE's brand and capabilities, is the tail starting to wag the dog? Admittedly, it can be hard to tell sometimes. In 2016, a German car executive described Tesla Motors as "a joke that can't be taken seriously compared to the great car companies of Germany." Within a year, however, Tesla's market cap rivaled all carmakers in the world, excepting Toyota. During the 2017 writing of this book, bitcoin's price fluctuated by over 2,000 percent! Future readers will know which of these valuations proved crazy, and both slipped a bit in early 2018, but many investors are betting heavily on them today. To wrap our heads around this, we need to discuss everyone's favorite: Moore's law.

Talent clusters matter because of the technological change that is disrupting many industries. Our cell phones now have greater computing power than NASA's supercomputers during the space race. Intel cofounder **Gordon Moore** famously predicted in 1965 that the processing power of a computer chip would double every two years, which has proved to be one of the greatest forecasts of all time. Through the decades that followed, this doubling rendered noticeable changes, such as the faster performance of an Intel 386 versus the 286, but these tech jumps were modest in size compared with everything else that determines business success.

Today, the size of the jumps affords staggering new capabilities. A doubling of computing power for a car in the 1990s meant the next cycle's models could have better brakes or fuel efficiency. Today, it means they may soon be driverless. You can think of it this way: a doubling of technology over the next two years means that what happens in twenty-four months is equal to everything that has ever come before it. **Marc Andreessen**, tech pioneer and venture capitalist, sums it up as "software is eating the world."

Andreessen says: "My own theory is that we are in the middle of a dramatic and broad technological and economic shift in which software companies are poised to take over large swathes of the economy. More and more major businesses and industries are being run on software and delivered as online services—from movies to agriculture to national defense. Many of the winners are Silicon Valley-style entrepreneurial technology companies that are invading and overturning established industry structures... Why is this happening now? Six decades into the computer revolution, four decades since the invention of the microprocessor, and two decades into the rise of the modern Internet, all of the technology required to transform industries through software finally works and can be widely delivered at a global scale."

Andreessen argues that this doubling process has hit critical mass, and highly popular books like *The Second Machine Age* and *Driver in the Driverless Car* describe how crazy large the numbers could get if the doubling persists. While physical limitations appear daunting for the trend to continue too far into future, optimists cite how advanced computing power and new innovations can help us overcome today's limits, as technological progress feeds upon itself. Others are more skeptical, as eighteen times as many researchers are required today to achieve this doubling compared with the 1970s.

Whatever the future holds, the size of technology changes being experienced today are already big enough to influence every aspect of companies, from business models to pricing designs to location choices to organization charts. And technology will increasingly outrank other key factors in corporate decision making like market size. Colloquially, companies are doomed if they hand off tech responsibilities to "two guys with ponytails" who don't have any real power or influence.

This imperative pervades every sector and extends beyond computing power: data on the web are accumulating at an even faster pace. Consequently, Goldman Sachs considers itself a technology firm, employs more engineers and programmers than the entire workforce of Twitter or LinkedIn, and has even changed its Wall Street dress code in places to accommodate tech talent. Boeing and Microsoft have launched a partnership for “digital aviation,” and Pitney Bowes, which introduced several key innovations in 1920 that made “snail mail” possible, is reinventing itself as a software company focused on its Commerce Cloud. Regardless of industry, companies fear that “Silicon Valley is coming”, to quote a 2015 letter from **Jamie Dimon** to shareholders of JPMorgan Chase.

Listening outposts everywhere

Many companies establish small outposts in talent clusters to catch up on frontier knowledge and learn the local scuttlebutt. An Asian bank desiring greater insight into what U.S. financial technology (fintech) start-ups are accomplishing with blockchain technologies or crowdfunding can establish a presence in the Boston ecosystem; the bank listens, learns, and perhaps makes a deal or two. One study demonstrated that British firms that had an innovative presence in America grew faster than their U.K. peers when American-invented technologies in their sector took off. This was especially true when the U.S. technologies were more advanced and gave extra value to those listening carefully.

Such absorption is not easy—while codified information is available via Google, real insight is harder to gather. A Japanese communications equipment manufacturer once withdrew from the U.S. market after being excluded from Federal Communications Commission hearings, because—even though transcripts were publicly available—it believed it would not observe the implicit decisions being made. Absorption is also complicated by the importance today of combining ideas together in novel ways. The upside is that big companies often just need a few “sparks” to reignite dormant innovation streams, which listening outposts can help gather. The challenge, though, is that the right pairings of ideas are typically hard to discern from the outset.

Much like start-ups, corporate outposts are benefiting from a decline in entry barriers. The anchor of the Boston start-up scene is CIC, formerly the Cambridge Innovation Center, which bills itself as having “more start-ups than anywhere else on the planet.” This may well be true, and start-ups located at CIC have raised billions of dollars in investment, with prominent tenants like Android, HubSpot, and GreatPoint Energy. Yet CIC also hosts other companies, such as the venture investors migrating in from Route 128. Large companies are attracted to the density of innovation activity, and CIC occupants have included Amazon and Apple—rumor has it that Siri was born there—but also Royal Dutch Shell, Bayer, and PwC. Requests for corporate outposts are so frequent that CIC has developed new types of spaces specifically for them.

Access to a hot spot does not guarantee success, of course, and the facility must be staffed with people good at networking, as a closed door does not let much in. Executives must also have the right combination of technical and business savvy to recognize unanticipated links to ideas that can best help the company. “Listeners” further need the power to act. Entrepreneurs are extremely busy and shun those who just want to hear what they are up to. Executives who are able to make deals will find larger crowds around them at the watercooler.

Technological forces are pushing corporations deep into talent clusters. Many corporations are further launching venture investment arms or accelerator programs to partner with start-ups. Some companies are now well positioned, while others are scrambling to catch up by sending boards and senior executive teams on exploratory missions. The end result matters. In 1995, America’s fifty largest companies by revenue as ranked by *Fortune* conducted 42 percent of their innovation in the ten largest U.S. patenting cities, which was fewer than the 51 percent average for the country. In 2017, the figure was flipped, and the Fortune 50 worked disproportionately in talent clusters, with a share of 68 percent versus 58 percent nationally.

These movements will affect big companies for years to come. If industrial and service companies are becoming technology firms, as their CEOs passionately suggest, then we have a crystal ball as to what their future will look like. These moves are also concentrating decision-making power in a handful of cities, for better or for worse.

*This article is a modified excerpt from William R. Kerr’s book *The Gift of Global Talent: How Migration Shapes Business, Economy & Society* (2018) specially edited for Boardview magazine by **Kalle Heikkinen**.*