

The future of Silicon Valley

Posted on Sep 15, 2018

Introduction

Silicon Valley in California (a small strip of land running from San Jose to San Francisco) is widely acknowledged as the leading innovation hub of the world. The combination of technological talent, business networks, venture capital and world class universities (in particular Stanford) have made the Valley a tech cluster that is difficult for other places to imitate. Between 2001 and 2018, venture capitalists invested \$ 168 bn in the Valley, or one third of the total investment in the US. The Valley is currently home to three of the world's five most valuable companies- Apple, Alphabet and Facebook (Amazon and Microsoft being the other two), having a combined valuation of about \$2.5 trillion. There are some 57 unicorns (private startups valued at more than \$ 1bn) in the Bay area. But as the Economist (Sep 1, 2018) has pointed out, the Valley may be gradually losing its edge. The Economist has also provided some interesting perspectives on how the global innovation ecosystem is changing.

Background

A brief history of Silicon Valley and its rise is in order. And such a narrative must begin with Hewlett Packard. In 1931, David Packard and William Hewlett began a long and rewarding partnership. In 1938, they obtained a loan from a Stanford professor, Fred Terman to make an audio oscillator. Unlike MIT, Stanford had not been significantly involved in any of the exciting engineering and scientific activities associated with the war. Despite this disadvantage, Terman, often called the father of Silicon Valley built a top class electrical engineering program at Stanford. By 1950, Stanford, despite its much smaller faculty, was awarding as many doctorates in electrical engineering as MIT. Terman also encouraged faculty and students to learn more about the region 's business and the opportunities there. Three initiatives introduced in the 1950s, helped Stanford to improve linkages with the industry. The Stanford Research Institute (SRI) conducted defense-related research and also assisted businesses on the west coast. The Honors Cooperative Program opened Stanford's classrooms to local companies.

Terman also promoted the development of the Stanford Industrial Park, one of the first such parks in the country.

If there is one technology, the Valley is known for, it is semiconductors. And like HP, Intel is one of the pillars of the Valley. In 1955, William Shockley set up Shockley Labs in Palo Alto. Two years later, Gordon Moore and Robert Noyce set up Fairchild Semiconductor. In 1959, Noyce filed a patent for the integrated circuit. Five years later, Moore formulated his famous law: The number of transistors that fit into a chip would double every two years. In 1968, Noyce and Moore quit Fairchild and pooled \$250,000 to set up Intel, which introduced its first microprocessor, 4004 in 1971.

A combination of university research, military spending, and entrepreneurial risk-taking gave momentum to the valley. By 1975, the region's technology enterprises employed well over 100,000 workers. The Valley's agglomeration of engineers, electronics firms, specialist consultants, venture capitalists, and supplier infrastructure was paralleled only by that of its East Coast counterpart, Route 128. While the Boston cluster specialized in minicomputers, the Valley excelled in commercial semiconductors. Route 128 was characterized by large companies organized along traditional, hierarchical lines and somewhat inward looking. In contrast, the Valley saw the rise of a more open mindset. It was ok for employees to leave an established firm and join competitors or launch their own startups. And this probably explains why the Valley moved far ahead of Route 128, as explained in detail in Prof AnnaLee Saxenian's landmark book, "Regional Advantage".

Apple, Oracle, Sun Microsystems and Cisco came into existence in the late 1970s and early 1980s, undoubtedly a golden era for the US Tech industry. "Full stack capabilities" developed in the Valley! In 1976, Apple was set up by Steve Jobs and Steve Wozniak and went on to make (in 1980) the biggest public offering since Ford (in 1956). In 1977, Larry Ellison set up Software Development Laboratories, the forerunner of Oracle. In 1982, Sun Microsystems was founded by Stanford University students, Vinod Khosla, Scott Mc Nealy and Andy Bechtolsheim. In

1984, the husband-wife team of Leonard Bosack and Sandra Lerner set up Cisco Systems to develop networking technology.

The mid 1990s triggered off the Internet era. The defining moment came in 1994, when Jim Clark and Mark Andreessen set up Netscape. A year later, Netscape went public. In 1997, Steve Jobs returned to the struggling Apple and started a remarkable comeback for the company, that would emerge in the next 20 years as the world's most valued company. Various internet startups including Google and Facebook, which operate at the user interface level, have emerged as stars in the last 20 years or so. And as mentioned earlier, there are many unicorns too, like Airbnb and Uber. Silicon Valley's writ now extends to smart phones. The Valley can take credit for the operating systems which run on more than 95% of the world's smart phones. Tesla which promises to revolutionize the automotive industry is also based in the Valley.

Why the Valley succeeded

The transformation of the Valley from a region of apricot and prune orchards into a global innovation Centre shows that competitiveness has more to do with mindset and culture rather than heritage and pedigree. The Valley rapidly became famous for its risk taking culture, where the penalties were not for failures but for not trying. Failure became a badge of merit. The business environment encouraged 'repeaters' who often failed in a new venture but learnt the lessons well and came back to tie up venture capital and run a successful business. The Valley's strong belief became: " Good ideas are the most precious commodity and an entrepreneur who has them and stumbles comes away with enough lessons to get it right the next time."

In the Valley, the absence of any pedigree and its distance from established economic and political institutions facilitated experimentation with novel and productive relationships. Firms were organized as loosely linked confederations of engineering teams. Though not exactly by design, the Valley's engineers and entrepreneurs created a more flexible industrial system, one organized around the region's professional and technical networks rather than around the individual

firm. Many Silicon Valley entrepreneurs became rich as they succeeded. A few did flaunt their wealth but most were motivated less by money and more by the challenge of independently pursuing a new technological opportunity. Status was defined less by material success and more by technological achievement.

Another point to note is that in the Valley, the venture capitalists were not finance professionals. They were entrepreneurs who understood technology well and could create, nurture, build a company and then sell out. When problems occurred with any of their investments, they would step into the business and provide help. Geographic proximity helped build and sustain these mentoring relationships.

The Valley's business culture ensured the diffusion of understanding the knowledge of both the firm and the industry at all levels of the workforce, from the lowest technicians to senior engineers.

Current scenario

Now there is clear evidence that the outlook for the Valley is changing. In 2017, there was a net exodus of Americans out of the Valley. And in a recent survey, some 46% of the respondents indicated that they might leave the Bay area in the next few years. There are also indications that Silicon valley investors are increasingly betting on startups outside the cluster.

What explains this trend? To start with, the Bay area has become a terribly expensive place to do business. The median price of a home in the cluster is \$ 940,000 or about 4.5 times the American average. A family in San Francisco earning less than \$ 120,000 is considered to be poor! Other challenges include crowded freeways that have substantially increased the commute time for employees. The Economist report mentions that local politicians are doing precious little to deal with these problems of housing and transportation. Instead like in India, many of the tech companies operate their own private buses to transport employees to and from the work place.

Retention of employees is another challenge. In other cities, talented employees are less likely to be poached, compared to the Valley. There are also reports of social problems as evident in used drug needles lying here and there and homeless people on sidewalks.

Technological developments are also having an impact. The rise of cloud computing could shift the center of innovation to Seattle where Amazon and Microsoft are based. The rise of block chain will decentralize things in a big way, may spawn off a new generation of startups and undermine the importance of any single hub. And as quantum computing takes off, China may rise in importance. At the same time, communication tools and virtual workplaces mean that even Silicon valley firms can get a lot of their work done in other cheaper locations. The trend of keeping the headquarters in the Valley and shifting a lot of the work elsewhere is being called "Off Silicon Volleying."

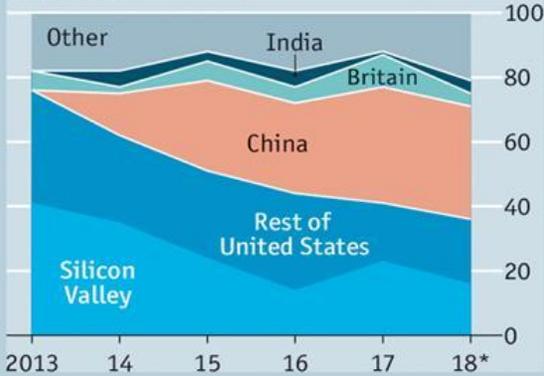
Based on factors such as employee compensation, retention, taxes, available funding, weather, etc., other cities are emerging as strong rivals to the Valley. These include Seattle (home to Microsoft and Amazon), Portland (Oregon), Austin (Texas), Dallas, Phoenix, (Arizona), Boulder (Colorado) and Miami -Fort Lauderdale. Outside the US, Vancouver, London, Berlin, Beijing and Shenzhen are emerging as formidable contenders.

Many venture capitalists in the Bay area have already started to diversify their geographical presence. And tech companies may find that domain expertise is often key to success while disrupting some if not all of the traditional industries. In such cases, it makes sense to be based in cities where such expertise is available.

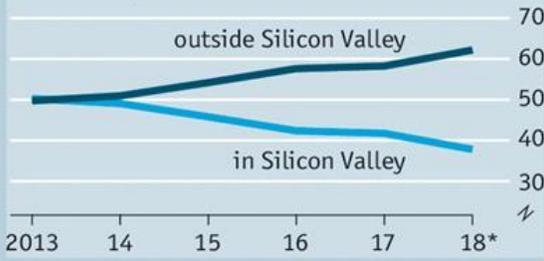
Smaller shares

4

Location of privately held startup companies valued at over \$1bn, %



Silicon Valley-based venture-capital investment, %



Source: CB Insights

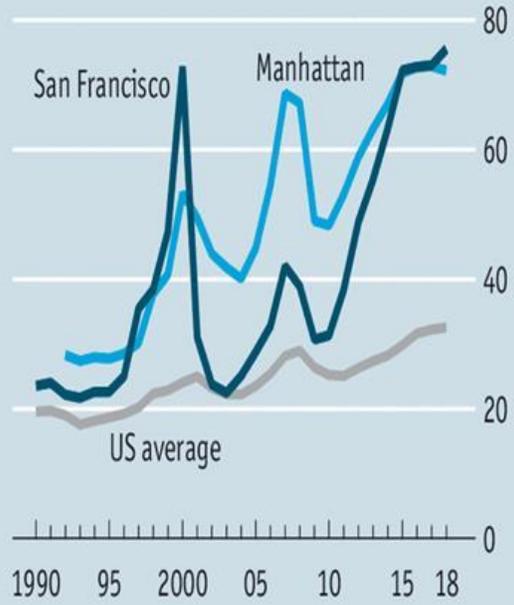
*To August 23rd

The Economist

Peninsula v island

3

Office rents*, \$ per sq ft



Source: CBRE

*Asking price

The Economist

Positive returns

2

United States, venture-capital investment
Selected metropolitan areas, \$bn



Source: Pitchbook

*To August 23rd

The Economist

Challenges for start ups

Even in the best of circumstances, the probability of a startup succeeding is quite low. So when costs have gone up so much and it has become so difficult to attract and retain talent, we would expect less people to take the risk and plunge into a new venture.

And it is not just about Silicon Valley vs other places. The Economist report also talks about some fundamental challenges facing the innovation ecosystem: "The problem is that the wider playing field for innovation is also being levelled down..... If Silicon Valley's relative decline heralded the rise of a global web of thriving, rival tech hubs, that would be worth celebrating. Unfortunately, the Valley's peak looks more like a warning that innovation everywhere is becoming harder."

Things have become much more difficult for startups. Big companies are able to use scale to their advantage. It is easier for a tech company to move into new areas today than a large semiconductor company could do in the early days of the valley. The ideas of startups and technologies can be easily imitated or acquired by the large companies. Thus in 2017, the number of first financing rounds in the US was down by 22% from 2012.

The large companies also pay handsomely to attract talent. With the payoff from working for a startup not all that attractive, compared to a large company, the ability of startups to attract talent has decreased. In 2017, Alphabet, Apple and Facebook issued \$ 16.2 bn in stock based compensation. The median compensation in Facebook is estimated to be \$ 240,000 and that in Google \$ 200,000. The key point to note here is that the same talented individual in a startup would be more likely to work on a wild idea than as part of a large company, how much ever that company tries to be innovative.

Today, it is possible for employees to make big money. For example, people with specialization in AI can earn \$ 5-10 mn a year. This also implies that there has been a dilution in the work ethic in the Valley. There was a time when people in the

Valley were focused less on making money and more on bringing innovations to the market. But today, some VCs complain that the employees in the Valley are more focused on material benefits, free lunches and other perks. Comparisons have been made in this context with the hard working Chinese entrepreneurs.

Immigrants have played a big role in the emergence of the US as a tech superpower. More than 50% of the top American tech companies have been established by immigrants or children of immigrants. But today, immigration restrictions are making it difficult for tech companies to bring in overseas talent. There are reports that it can take tech companies, on occasions, as many as 18 months to onboard overseas talent. According to Randy Kamisar of Kleiner Perkins, a top VC firm, "If you ask me ten years from now, why Silicon Valley failed, it will be because we screwed up immigration."

Concluding notes

In the 1980s, Silicon Valley faced a major existential threat from Japanese memory semiconductor manufacturers. In the 2000s, the dotcom bust happened. But in both cases, the Valley recovered and continued to rise. Today, the challenges faced by the Valley are of a different order. While costs have gone up, there has been a dilution in the work ethic. The environment for startups has become more challenging, as the digital titans become more and more powerful. Can the Valley reinvent itself? Let us wait and see how the future unfolds.