

The Silicon Valley Innovation Cluster: Six Perspectives

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Submodules with sources and topics

1. History of Silicon Valley

- a. Learning goals: Innovation clusters are recognized as crucial components of an economy's innovation engine. By far the most successful innovation cluster has been (and still is) Silicon Valley. The goal of this submodule is to gain insight into how such a wildly successful innovation cluster came to be. There are several narratives that focus on different aspects of this history, and the three below are not the only ones. Stanford's role is more directly addressed in the next submodule.
- b. Background: Steve Blank on the history of SV and lean entrepreneurship
<http://ecorner.stanford.edu/videos/4684/Entrepreneurship-Strengthens-a-Nation-Entire-Talk>
Reading with history and multiple perspectives on the relationship between Stanford and Silicon Valley:
<https://www.newyorker.com/magazine/2012/04/30/get-rich-u>
- c. Topics:
 - First narrative: A new age of entrepreneurship. Encouraged by their Stanford professor, Frederick Terman, David Packard and William Hewlett began their famous company out of a garage that is now a historic landmark. Stanford started encouraging students to commercialize their ideas. Terman was also behind the beginnings of the Stanford Industrial Park, which became home to the research labs of innovative companies.
 - Second narrative: Early dominance of defense funding. Much of the early research done in Stanford Industrial Park and at Stanford itself was classified, done for defense contracts. The rise of the Silicon Valley innovation ecosystem is intimately connected to defense research. See <https://steveblank.com/secret-history/>
 - Third narrative: The history of computing is at the center of the rise of Silicon Valley. William Shockley and Shockley Semiconductors (1956) is often seen as the beginnings of Silicon Valley in this connection, but the longer history of computing is a nice backdrop for developing this story of Silicon Valley (census machines; vacuum tubes; integrated circuits; personal computers). The Computer History Museum, which is only a few blocks from Googleplex, has online exhibits:
<http://www.computerhistory.org/exhibits/>.
- d. Assessment questions:

- What were the contributing factors to the emergence of the Silicon Valley innovation cluster, where not long ago there were mostly fruit orchards?
- Which of these factors are unique to Silicon Valley? Which ones are reproducible elsewhere?
- If a city were to endeavour to create an innovation cluster based on lessons from the history of Silicon Valley, what policies and strategies might it implement?

2. Stanford University

- a. Most students of innovation clusters agree that a university is a necessary component of a successful cluster. This is certainly the case for Silicon Valley, where Stanford has always played a central role in the ecosystem. The previous submodule describes Stanford's role historically. In this submodule, students will explore the role of Stanford today, and more broadly the role of universities in innovation clusters.
- b. Background: Richard Florida on tech, talent, and tolerance
<https://www.aacu.org/publications-research/periodicals/flight-creative-class-new-global-competition-talent> ; and John Hennessy, president of Stanford University, on the university and commercial progress
<http://ecorner.stanford.edu/podcasts/2111/Innovation-as-the-Crux-of-Entrepreneurship>
Stanford and its Startups (New Yorker):
<http://www.newyorker.com/business/currency/stanford-and-its-start-ups>
Reading with history and multiple perspectives on the relationship between Stanford and Silicon Valley:
<https://www.newyorker.com/magazine/2012/04/30/get-rich-u>
- c. Topics:
 - Florida's three T's: technology, talent, tolerance.
 - Stanford's special place in the SV ecosystem
 - What is the relationship between basic science, applied science, and innovation? Do the distinctions make sense? How? Why or why not? Stanford's many Centers connect scientists with entrepreneurs and commercial problems that need solutions. These problems sometimes shape research directions, and research shapes commercial ventures. Basic vs applied science and innovation become intertwined and the distinction becomes less useful.
 - Greed and SV: has it become too central to the culture? Is that affecting how Stanford students see their roles in society, how they see their futures?
 - What role should universities play in innovation ecosystems?
- d. Assessment questions:
 - In your opinion, is there a tension between the educational mission of a university or college and its potential role in innovation in the community where it's located? Explain your answer in detail, and support it with evidence from the readings and discussion.

- Do you think your college or university should play a larger role in encouraging and supporting innovation and entrepreneurship in the region where it's located? Explain your answer in detail. How should it play a larger role (if you think it should)? Why should it not play a larger role (if you think it should not)?

3. Science, entrepreneurship, and QB3

- a. Learning goals: While the popular perceptions of the startup culture that has recently burgeoned in the US often feature a new app or software startup, entrepreneurship can play a very important role in science-driven innovative products and even in creating new scientific discoveries. The first and second submodules touched on some aspects of this phenomenon, and this submodule focuses in on startup culture in the natural sciences.
- b. Background: Explore <http://qb3at953.com/>
- c. Topics:
 - What is a science incubator, and how is it different from other incubators?
 - History and description of QB3, services they provide, tenants
 - Funding model: angel investors and VC firms come to the site, establish relationships; corporations look for acquisitions.
 - Mission Bay Capital: the venture funding connection
<https://www.missionbaycapital.com/>
 - Success stories: <http://www.viewpointtherapeutics.com/>,
<http://www.celldesignlabs.com/>
 - History of corporate research labs (late 19th century Germany, e.g. Bayer, then in the US, with GE, Kodak, Dupont, etc.), and how this new model of science incubators changes the landscape of science innovation.
- d. Assessment questions:
 - Explain what the unique challenges of science based entrepreneurship are. Discuss questions of funding, timeline for return on investment, staffing, space, startup culture. How does a life sciences incubator address these issues? Feel free to answer using the example of a specific incubator.
 - The rise of science based entrepreneurship suggests a model for innovation that differs significantly from the corporate model dominant in the twentieth century. Explain some of the differences. Is this startup model a threat to the large corporate lab? Is it complementary to it? Speculate whether the entrepreneurial science startup approach is likely to gain importance.

4. Band of Angels

- a. Learning goals: Innovation can only flourish if there is a healthy funding environment. In this submodule, students learn about funding by studying one very famous group of angel investors and their funding approach, their philosophy, their views of Silicon Valley.

- b. Background: Explore <https://www.bandangels.com/>, watch videos here: <https://www.bandangels.com/about/>, and check [https://en.wikipedia.org/wiki/Band_of_Angels_\(investors\)](https://en.wikipedia.org/wiki/Band_of_Angels_(investors)); listen to some interviews on <https://www.angelpodcast.com/>
- c. Topics:
 - Who are they? What have they funded? How many companies do they fund, with how much money? What is their role in those companies? How are they different from other types of investors? (Use their website and additional web research to explore these questions.)
 - Angel investors are often involved in shaping startups and their cultures. Discuss the importance of these qualities to a healthy innovation ecosystem: tolerance; less fear of failure; openness; contagious enthusiasm; optimism; emphasis on collaboration; problem-solution oriented attitude.
- d. Assessment questions:
 - Explain the role of angel investors in the life of a startup. If you were to start a company, what would you look for in an angel investor? What questions would you ask someone who got investment from an angel investor group before you seek investment from them?
 - Angel investors help early stage startups. Why do they do it? What's in it for them? Also, what other sources of financing are there for an early stage startup? What would be the advantages and disadvantages of turning to an angel investor as compared to those other sources?

5. The Cultures of Silicon Valley

- a. Learning goals: Innovation clusters are considered highly desirable and communities all over the world promote them. The hope is that creating a cluster will ignite the local economy, and bring progress and prosperity. The spectacular success of the Silicon Valley innovation cluster has certainly changed the communities around it significantly. In this submodule, students will learn about some of the impacts that the cluster has had on those communities.
- b. Background: Look at www.svcv.org; and <http://www.newyorker.com/culture/culture-desk/how-silicon-valley-nails-silicon-valley>; [watch an episode of the show]; <http://www.npr.org/sections/alltechconsidered/2014/01/16/263088398/hackers-techies-what-to-call-san-franciscos-newcomers>; and <https://hbr.org/2014/01/how-silicon-valley-became-the-man>.
- c. Topics for discussion
 - “The future is already here--it's just not very evenly distributed.” William Gibson. Silicon Valley is sometimes seen as a cultural avant-garde, the future that might come to other places. In what ways is this true? In what ways is it definitely not true?
 - San Francisco used to not want to be associated with SV at all. Now they want to be the heart of SV, and the tech elites are changing SF. Is this simply an example of the natural evolution of society and of cities? Or

should the city's governance somehow counteract, regulate, or guide these changes?

- The culture of Silicon Valley in the past has been seen as meritocratic. More recently, the extremely rich network of social connections have made "whom you know" more important. Is there a conflict between meritocracy and the power of social networks?
 - Some have argued that the postwar counterculture movements played an important role in the creation of Silicon Valley (see the HBR interview). Google, Facebook, and other tech companies used to make a point of being in opposition to corporate culture. (See Google's motto: "Don't be evil.") Have the successful tech companies now become like those corporations they used to despise?
- d. Assessment questions:
- What do you see as characteristics of "Silicon Valley culture?" Based on the readings and discussion, what evidence is there of these characteristics?
 - Discuss how the spectacular rise of Silicon Valley has affected the communities in the area, including San Francisco.
 - [Answer this question for your home community or your college community.] Has your community experienced growth in innovation and entrepreneurship? If yes, explain how it has impacted the community. If not, explain how you think such changes would impact the community.

6. The inside dissenter: Jaron Lanier

- a. Learning goals: Silicon Valley has become synonymous with the new economy that turns on knowledge and information. In this submodule, students will consider the broader implications of the transition from a manufacturing economy to an information economy. Jaron Lanier has been a Silicon Valley insider who has thought, speculated, and written extensively about those implications, and his perspectives will form a stimulating starting point for discussion.
- b. Background: www.jaronlanier.com and <http://www.jaronlanier.com/poleconGadgetqa.html>. Also <http://www.newyorker.com/magazine/2011/07/11/the-visionary> ; and selections from *Who Owns the Future?*
- c. Topics for discussion
- The wave(s) of new technology since the mid nineties have brought a lot of optimism and hope that more people will have more opportunities, and that technology will empower people. Is this optimism justified? In what ways has it been borne out? Has it led to disappointment in some ways?
 - Power is becoming equivalent to information superiority: economic power (for companies), political power (highly advanced, computationally intensive campaigning strategies, data analysis), and military power (cyberwarfare). What are the social effects of this change? What does it mean for young people today?

- People using the internet (doing searches, communicating on social media, buying, reviewing products, selling, etc.) are sharing a lot of information for free. This information is often used by companies to make money. Is this a sustainable and a fair system? Could it be different? How?
 - As a specific example, consider Google Translate, which relies on the multitude of translations online for its learning--translations that were done by people! Those people may have been compensated for translating something, but not for Google using it to translate other things. Recently, Google also introduced Google Translate Community, which is a crowdsourcing platform where people can contribute to training Google's translation algorithms--for free.
 - Lanier argues that Silicon Valley is very diverse in many ways (as is San Francisco), but it has less and less cognitive diversity: the tech elites tend to think the same way. Do you see a tendency towards cultural homogeneity in the tech world? More broadly?
 - Young people are attracted to tech jobs, to coding camps, to be part of the tech elites--better paid, with more opportunities. Is there a new divide between those young people who are on the "tech track," and those who are not building such skills?
- d. Assessment questions:
- Lanier's analyses move between two opposing views: tech optimism and hope that the new information age will make the world better, and a perception and worry that new technology will lead to more inequality, exploitation, and oppression. Which view are you more inclined to believe? Why?
 - Based on the readings and discussion, what is your view of how the cultural and technological changes that are identified with Silicon Valley affect your life? Discuss both the past (how they have affected your life so far), but also the future (how they are likely to affect your life). Have these readings and discussions changed how you see your own path in life?