



Universiteit Utrecht



Climate-KIC Scout Report – Silicon Valley

Shortening the learning curve of software and life sciences entrepreneurs



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About this report

This study was part of the Climate-KIC Innovation Scouts program. Climate-KIC is Europe's largest public-private partnership; its mission is to address the challenge of climate change. An important part of Climate-KIC's efforts is to facilitate entrepreneurs in bringing clean tech innovations to the market, by providing funding, training, and access to a network of academic institutions, governments, corporates, and investors. As Innovation Scouts, we provide input to help Climate-KIC fulfil its mission. We study what makes entrepreneurial ecosystems work, and what lessons we can learn from other programs that aim to accelerate (clean tech) startups. We do so by collaborating closely with and interning at local key stakeholders, such as start-up incubators. Our results will be open and shared with the rest of the world, thereby providing value for Climate-KIC, local stakeholders, and the world wide startup community.

This document contains an analysis of the Silicon Valley, which is still the largest and most successful high-tech cluster in the world. This makes Silicon Valley an excellent case study to identify best practices. Although the majority Silicon Valley's start-ups and incubators operate in the software industry, we wanted our findings to have broader applications. We therefore partnered with qb3, the life sciences incubator of the universities of California. This enabled us to explore the differences in accelerating software start-ups vs. accelerating start-ups in science-based industries, like life sciences or clean tech. In doing so, we focused on the role of incubators in shortening the learning curve of entrepreneurs. A total of 72 interviews was conducted with entrepreneurs, incubators, investors, universities, and other key stakeholders of the Silicon Valley ecosystem.

Our main findings are:

- Incubator partners are more effective than external mentors
- Incubators shouldn't make life too easy for entrepreneurs.
- Taking equity in start-ups doesn't necessarily mean that interests of incubator and start-ups are aligned.
- Incubator models differ strongly depending on the industry in which their start-ups operate.
- Similar to software start-ups, science-based start-ups pivot.

The remainder of this document is structured as follows. We will first discuss the Silicon Valley ecosystem, followed by the most important lessons we can learn from this region. We will then discuss some interesting models to accelerate (clean tech) start-ups.





1. The Silicon Valley Ecosystem

With local success stories (e.g. Apple, Google, Dropbox), top-tier universities (Stanford & UC Berkeley), and entrepreneurial role models (e.g. Elon Musk, Mark Zuckerberg, Jack Dorsey), Silicon Valley still captures the imagination of entrepreneurs around the world. Despite the rise of other start-up hubs, 'the Valley' is still regarded as the number one start-up ecosystem. Many attempts have been made to explain its success. A variety of factors have been identified, such as Silicon Valley's unique risk-taking culture, the presence of world-class universities, military R&D spending, etc. In addition, the presence of the major tech companies provides a favorable exit climate (Google alone acquires one company a week, on average), and start-ups benefit from the large domestic market of the US. It takes too far to discuss these factors in detail. Instead, we want to focus on two characteristics that are really unique to Silicon Valley, and (in our opinion) most important to its success.

The first one is **ambition**. Big companies are the result of big ideas, and Silicon Valley entrepreneurs are known to set higher goals and work harder to achieve them than entrepreneurs elsewhere. The interviews revealed multiple explanations. First of all, entrepreneurs have no fear of failure. Failure is not regarded as a bad thing, but as a badge of honor: it means you have learned a lot and will not make the same mistakes in your second start-up. The second reason is that, with examples such as Google, Facebook and Twitter, Silicon Valley is home to companies that have indeed changed the world. These companies act as role models to inspire new generations of entrepreneurs. Third, there is a healthy competition between entrepreneurs, as they are inspired by the progress and ambitions of their peers. Finally, as we will discuss in section 2, venture capitalists push start-ups towards chasing ambitious ideas and targeting big markets.

The second unique characteristic is **experience**. Silicon Valley has more entrepreneurs than any other region in the world. Even more important is the number of *serial* entrepreneurs in the region. This means that a lot of the 'tacit' skills that are required for building a company, such as fundraising, mile stone setting, customer development, etc., are abundant in Silicon Valley. Combined with the technological know-how of universities and corporates, this provides an enormous knowledge base. And it's possible for everyone to access this pool of knowledge, due to the Valley's famous 'pay it forward' culture: people who are successful are always willing to share their lessons with the new generation of entrepreneurs, because the successful entrepreneurs know what it's like to be in their shoes. One of the interviewees very nicely described the result: *"If you have any question... whether it's something technological, or operational, there's always someone within 30 minutes driving who has dealt with that before, and who's willing to talk about that. You don't have to repeat the mistakes they made"*.

The interviews also revealed some downsides to Silicon Valley's success. First of all, the attraction of start-ups and (well-paid) employees means that both rent and wages are very high. Silicon Valley start-ups therefore have a high burn rate compared to their European counterparts. Secondly, the Valley's focus on software start-ups means that investors are used to making large, quick returns with relatively small investments. This means that start-ups operating in industries like biotech and clean tech, that typically require larger investments, and have a longer time to market, may have more difficulties finding funding.





2. Lessons learned

Below are some lessons that can be drawn from Silicon Valley and its incubators:

- **Partners, not mentors.** An important task of an incubator is to provide the (typically technical) entrepreneurs with business support: helping them to find product-market fit, shape their pitches, set milestones, etc. There are two main channels through which this advice is provided: mentors and incubator partners (the incubator's founders). Mentors are usually domain experts and provide part-time advice to a limited number of the incubator's start-ups. The incubator's partners more closely involved and typically provide advice to *all* start-ups. The interviews with entrepreneurs suggested that the partner model is more effective. Because partners are closely involved with all the incubator's start-ups, the partners are able to learn from all these experiments, and leverage this collective knowledge to new entrepreneurs. One entrepreneur illustrated this: *"They have seen hundreds of start-ups. They have a good understanding of what works and what doesn't. They provide a shortcut to learn from the experience of all those start-ups"*.
- **Don't cuddle entrepreneurs.** When discussing European incubators, some interviewees argued that European incubators make life too easy for entrepreneurs. An incubator in Silicon Valley is not an easy place to be: the competition is very high, there's significant pressure for upcoming demo day, and the incubator partners are further increasing the pressure: *"During the office hours, we would talk about our progression. And the incubator partner was very direct with us: 'how long before you reach that milestone? Two weeks? No... No... That's too long. I'm afraid you guys won't last for another two weeks if you don't move faster"*. However, start-up life is very tough, and the vast majority of start-ups will fail. Increasing the pace of start-ups is therefore for their own benefit, as one partner explained: *"All this accelerator program does is for you to set up the pace that every startup should have. Every startup should be working originally at this pace with this demeanor. And it's just very hard for some people to do that"*. According to several interviews, this is also the reason why Y Combinator decided to discontinue its 'Start Fund', in which VCs offered every start-up an additional investment of \$150,000 upon acceptance into Y Combinator. Apparently, some of the entrepreneurs got too comfortable because of this investment, and it took away some of the pressure to perform.
- **Some considerations on taking equity.** An incubator's business model is always a point of discussion. In this study, we roughly observed two models. In the 'real estate' model, entrepreneurs pay monthly rent for being allowed to use the incubator's office, laboratory, and other facilities. Incubators with such a model have been criticized for having a vested interest in 'filling the place up', which is not necessarily aligned with the interests of entrepreneurs. We found support for this argument, as 'real-estate' incubators not always have an incentive to provide services beyond office space, even though that would be in the best interest of their tenants. Many experts therefore suggest an equity based model, in which the entrepreneur gets financial support, and can use the incubator's resources in exchange for equity. Taking equity, however, does not mean that objectives of investors (or incubators) and entrepreneurs are





aligned, either. Incubators and investors invest in a portfolio of start-ups, most of which will fail. Therefore, the successful start-ups need to be big successes, because they need to cover the investments lost by investing in the failed startups (and create a nice return as well). This means that investors have an incentive to push entrepreneurs to chase ideas and markets with a high return, and high risks. This is not necessarily in the best interest of the entrepreneur, who has a portfolio of just one. Indeed, some entrepreneurs described how their investor pushed them to chase high-risks / high-return markets, which, in hindsight, caused the start-up to fail. This conflict of interest is particularly relevant for accelerators that have small stakes in many companies, which means that the risk profiles of entrepreneurs and accelerators are very different. Also, incubators that do not take an equity stake might build more trust with their entrepreneurs, as another entrepreneur illustrated: *"[The incubator managers] are the only advisors we have that we can be totally honest with. We have investors who are in our board and advise us, but automatically they're connected to other investors. So we don't really want to tell them if we're having problems or if we don't know what to do"*.

- **Science-based and software incubators use different models.** Incubators were found to use different strategies, depending on the characteristics of the start-ups they support. Accordingly, we found many differences between incubators that support software start-ups and incubators that focused on supporting start-ups in science-based industries. The accelerator model fits well with software start-ups, as they develop very rapidly, and can exit within a couple of years. This means that accelerator programs, which typically run for a three-month period, can make a substantial contribution to start-ups in this period, and can make a relatively quick return on their investment. However, science-based start-ups need more time and capital. It is therefore hard to translate the accelerator model to biotech or clean tech. Greenstart is an example of a clean tech accelerator, that changed their model as three months was simply not enough time to have a large enough impact on their portfolio companies. Besides providing support for a set period of time, another characteristic of accelerator programs is an emphasis on mentoring. This is another aspect that does not translate well to other industries. Incubator managers felt that mentoring is less desirable when entrepreneurs are older and more experienced. Indeed, science-based entrepreneurs were on average ten years older than software entrepreneurs, and the data showed that perceived value of mentorship decreases with the age of entrepreneurs. Finally, science-based start-ups cannot operate from a local coffee shop, but need access to specialized equipment and technological expertise. Incubators supporting these start-ups therefore benefit from a link with a university, to provide such resources.
- **Science-based firms do pivot.** The lean startup methodology has become a dominant philosophy in the domain of software start-ups. Some argue that concepts of lean startup and customer development do not apply to science based businesses, as their risk does not lie in market adoption, but in technological development. As Steve Blank said in his book 'The Four Steps to the Epiphany': *"There are domains where using the customer development methodology is inappropriate. [...] For example in biotechnology startups [...] It doesn't take a formal process to figure out that there will be huge demand for the drug"*. Our data shows something different. Of





the 33 life sciences firms that we interviewed, only 3 interviewees explained that their start-up's business model and underlying technology hadn't changed significantly. All other start-ups experienced at least one major iteration. Similar to the software start-ups in our sample, life sciences start-ups were found to experiment with using different technologies, targeting different markets, or pursuing different revenue models. This shows that the 'build the product and the customers will come' philosophy does not hold in life sciences. Similar to software start-ups, life sciences start-ups need to spend time finding a product-market fit before they start scaling up their activities. However, the experimental learning approach that is emphasized in the lean startup philosophy is less applicable to science based start-ups. The higher capital requirements, as well as the regulated nature of life sciences markets, means that trial and error learning is not an option.

3. Interesting models to support start-ups

Silicon Valley has numerous incubators and accelerators, including some of the most well-known and successful ones. We will now discuss some models that these incubators use:



500startups: peer-to-peer acceleration

500startups is an accelerator and early-stage investor in software start-ups, located in Mountain View. One way 500startups accelerates its portfolio companies is by allowing start-ups to be inspired and encouraged by the progress of their peers. A lot of entrepreneurs emphasized the encouraging role of seeing the progress of their peers: *"Your fellow batch mates are making progress. So that would push you to make progress yourself as well, every single week. We all know that demo day is coming. You don't want to be the only team in your batch that did not get funded"*. Accelerators therefore facilitate entrepreneurs showing each other their progress, for example at Demo Day rehearsals. Another example are Y Combinator's weekly 'Tuesday Dinners', at which entrepreneurs are encouraged to bring their prototypes and show each other the progress they have made during



Qb3: enable life sciences entrepreneurs to focus

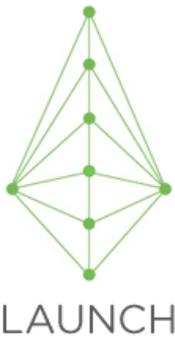
Qb3 is the life sciences incubator of the university of California, with multiple facilities around the Bay Area. Start-ups need to move fast, which means that they should be able to focus on their business. However, the daily life of an entrepreneur provides a lot of distractions: ranging from fundraising to bookkeeping and office management. Especially for technical founders, who don't have experience with these things, it can be time consuming to learn all this. Qb3 wants to help life sciences entrepreneurs to focus and spend their time more efficiently. There is a joint purchasing program, an extensive network of service providers so that entrepreneurs can outsource for example their bookkeeping or grant management, etc. 500 startups and Y Combinator use a similar strategy: *"At YC you're only allowed to do two things: build your product and talk to your users. You can't afford to be distracted by anything else"*.





Y Combinator: empowering entrepreneurs

Y Combinator, established in 2005, is the most successful and prestigious accelerator in the world. It has backed 566 start-ups so far (including success stories like Dropbox and Airbnb), that have raised a total of approx. 1.5 billion dollars in venture capital. Raising capital can be a real challenge for entrepreneurs in incubators. In contrast with venture capitalists, who have negotiated hundreds of deals, entrepreneurs usually deal with these issues for the first time. As a result, there are information asymmetries in the fundraising process that favor the investor. Y Combinator tries to tilt the balance in favor of the entrepreneurs, by providing a platform for entrepreneurs to exchange experiences. An entrepreneur explains: *"Say that somebody wants to invest in your company. You can see what somebody else's experience was working with that investor. Did they show up at board meetings? Do they help you? Did they muck around with the deal? It works really well. The investors know we have that database. So they know that if they don't play nicely with YC companies, they will be in this database and it will show that"*.



LAUNCH: working *with* the system, not *against* it.

LAUNCH is a joint initiative of NASA, the Department of State, and Nike, and aims to tackle global challenges related to for example health, energy or water. According to LAUNCH, entrepreneurs trying to tackle challenges in these fields mainly fail because they do not fit within the current system, for example because they are a threat for incumbent players, or because of regulatory restrictions. LAUNCH tries to solve this by first bringing together the established players within the system. Together, they outline future scenarios and the main barriers and challenges. This outline forms the basis for a 'call for solutions', in which start-ups are identified and selected that address these challenges. Then, together with the system stakeholders, LAUNCH supports the start-ups to implement their solutions.



SBIR: bridging the valley of death

The Small Business and Innovation Research (SBIR) program is a federal research fund to encourage small businesses to engage in R&D with the potential for commercialization. In the US, federal agencies with R&D budgets that exceed \$100 Million are required to allocate 2.5% of their R&D budget to small businesses. SBIR grants in phase I amount to \$150,000 max, and phase I grants go up to \$1 Million dollars. Many of the life sciences start-ups that were interviewed received their initial funding from the SBIR program. Many startups were created as university faculty, staff or students applied for and were granted SBIR funding. As such, the SBIR grants serves to further develop the technology (outside the academic environment) up to a point where the start-up has 'de-risked' the technology enough to attract venture money from investors or big pharma companies.

