

# Shenzhen and its comparison to the Silicon Valley

Michael König and Florian Ploier

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## Abstract

Within only 3 decades, Shenzhen developed itself from a small village into one of the worlds hot spots for technology with a population of 12 million, making it one of the fastest growing cities of the world. But what are the reasons for its success? After a brief overview of the historical development, this work tries to explain the individual strengths of Shenzhen and one of the biggest competitors in this sector, the Silicon Valley in California. Furthermore, the factors that make these cities attractive for tech industry are compared through statistical facts together with strengths in their infrastructure. In the end, a prediction on the future development of Shenzhen and its importance for the technological sector is made.

## 1 Introduction

Since the early days of technology, the Silicon Valley near San Francisco counts as one of the high tech hot spots of the world. But in the last years, China developed into a competitor regarding technological progress, dominating many sectors of the industry. Shenzhen for example is one of the aspiring locations for the technological sector. But what are the reasons for this momentum China and especially Shenzhen is experiencing? And will it surpass the Silicon Valley and contest its title as the centre of tech world?

### 1.1 Motivation & Structure

This work explores what the reasons for the success of these regions are and what drives tech industry to settle in close proximity. Therefore, the history and strengths of both cities, Shenzhen in China as well as the Silicon Valley in the United States of America, are summarized. In specific, Section 2 starts with an overview of the history of Shenzhen, followed by characteristics of the city and its strengths. In Section 3, the same information is summarized for the Silicon Valley. Afterwards in Section 4, these both cities are compared, with special highlight on their individual factors that form the base of their success and why this is attractive for tech industry. In the end, Section 5 concludes the findings of the sections before and shall give an impression of possible development of both cities and the role they play for tech industry in the future.

### 1.2 Related Work

Since this topic is lacking of scientific sources and affected by language barrier, there do not exist many scientific papers. This is why this work is mainly based on videos and web articles of different journals, as well as other web based resources. The main source for our research is a documentary by WIRED [1], looking into the many facets of Shenzhen in detail.

However, the information and findings of two scientific papers have been included into this work. First, a work by Lindtner et al. [2] investigate the open-shared community of

Shenzhen together with the phenomenon of Shanzhai manufacturing. Furthermore, the work by Chen and Ogan [3] explores 'what are the key factors that make it an innovative ecosystem in which companies have thrived.' [3]

## 2 Shenzhen

Shenzhen is one of the paradigm cities in China when it comes to hardware and innovation. Half a century ago Shenzhen was an economic negligible city, that performed a massive transformation. Almost every renowned company in China has settled in this city. [4] Even the big technology players like Google, Amazon, Microsoft etc. have an branch there. This is caused by the regulations which apply to Shenzhen. Mentionable is, that taxes are much lower as in the rest of China and because of various other organizational and financially reasons this location is more appealing to companies and start-ups.

### 2.1 History

Shenzhen translates directly to “deep drains,” named after the drains that were created in the paddy fields around the rivers and streams in this region. [5] 40 years ago Shenzhen was a small fisher village near Hongkong with approximately 30,000 inhabitants. They had no considerable industry and infrastructure at all. Then in the 1980’s the Chinese government declared Shenzhen as China’s first special economic zone. With this step they attracted a lot of companies and people with high tech know-how to move to the city, which ended up with a population of approximate 12,5 millions today (Figure 1). [6] These people are spread across  $1,991km^2$ , which leads to a population density of approximately  $6,100/km^2$ .

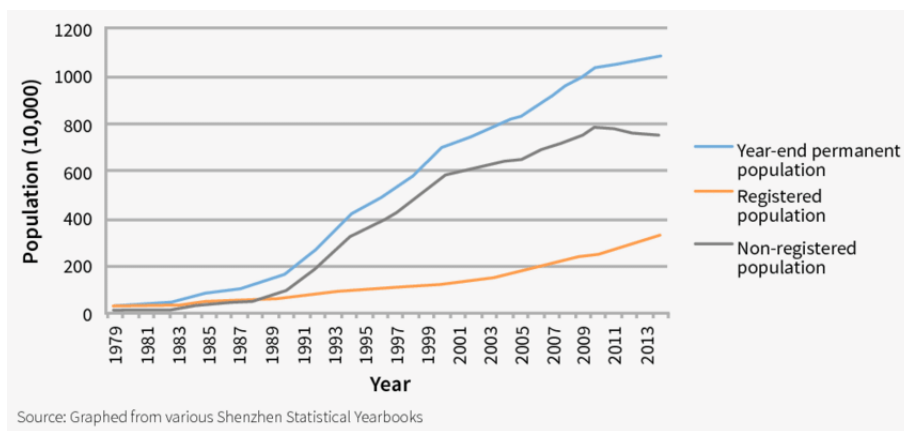


Figure 1: Shenzhen population since its declaration to a special economic zone.

The city’s main advances lie in the high tech sector, logistics, financial services and also cultural background. As a result of these conditions, a population and building boom happened over the last 35 years. The following picture (Figure 2) shows this geographical transformation process. According to Fac [7], the following milestones are responsible for the improvement and acceleration of this process:

- 1982 - The first foreign banks got the permission to open mainland branches in Shenzhen. This was a meaningful step and opened up the Chinese market for the world.
- 1987 - China has launched the first joint-stock bank in Shenzhen. This action provided companies there with features of a general partnership, in which owners of a

company split profits and liabilities. [8] Furthermore, it allowed shareholders to buy and sell stock on exchange. But most importantly, joint-stock banks are independent from the government, which is why it broke the monopoly of state-run banks.

- 1990 - China opens the first securities exchange in Shenzhen.
- 1992 - The Shenzhen stock exchange has opened. It's the second one of China's mainland stock exchanges. In 2017 it had a Volume of \$3,622 trillion and thus was the eighth biggest stock market in the world. [9]

But china had to justify this transformation, because in the 1980s making profit was still politically incorrect in China. So they wanted to sell Shenzhen as an reform city and advertise the process with the slogan "Time Is Money, Efficiency Is Life" [10] and placed this text on a billboard in the city to found the reinvention of the political economy there. [7]



Figure 2: Shenzhen comparison 1980 vs 2011. [11]

## 2.2 Strengths

Shenzhen is the address if you want to prototype something in the electronic hardware sector. Mostly, because of its good tech items and its tax policy. Furthermore, Shenzhen has some geographic advantages that can be seen in Figure 3. It has good road access over the whole province into the land and good access to the sea for ship exports. Through its adjacency to Hongkong, Shenzhen has gained some extra economical boost, due to the reason that Hongkong also is a very strong economic zone. Also Beijing granted many preferential policies to Shenzhen. Local officials adopted many business practices from neighboring Hong Kong, which also preformed well.

Another important strength of Shenzhen is the massive support from the government mentioned above. Some examples by Fac [7] on how the government complies with Shenzhen's economy are:

- For software/hardware companies which develop different technological artifacts, it is possible to avoid paying corporate taxes in the first two years, depending on various variables.
- With good educational background in specific sectors, the government gives extra advantages in terms of accommodation and taxes.

- In Shenzhen's free trade zone in general, people have a lot of privileges, e.g the lowest taxes rates in china and very flexible regulations.

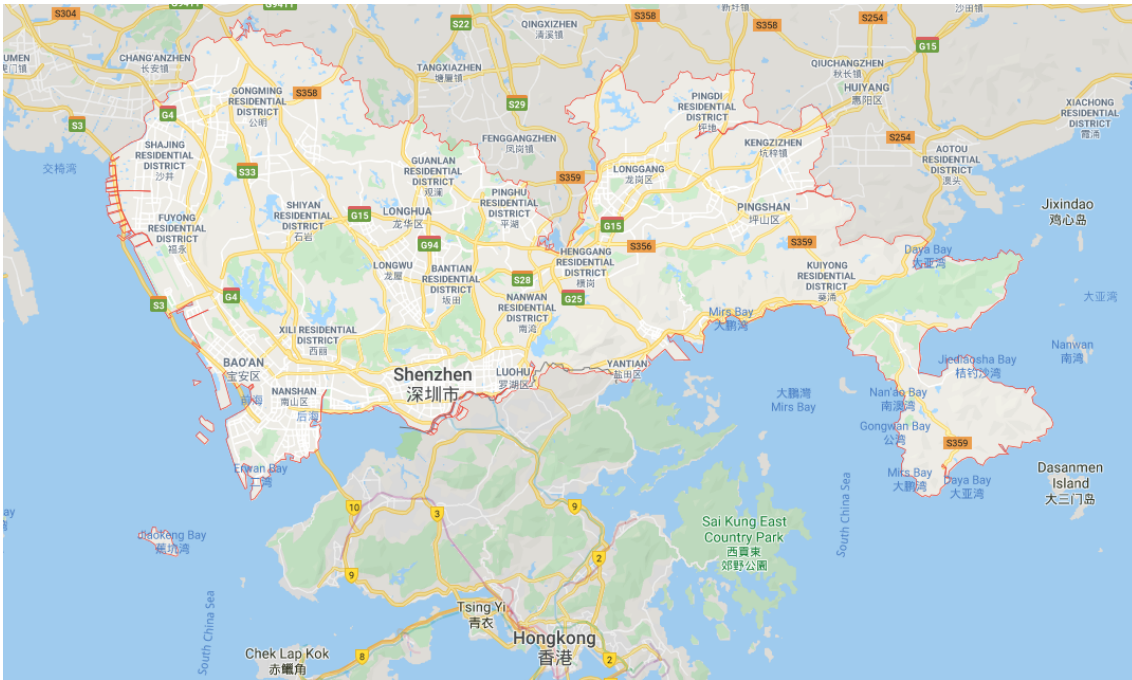


Figure 3: Shenzhen's economically good location

Huaqiangbei is a sub-district of Futian, which is one district in Shenzhen. This area is mainly known for its electronics manufacturing hub and a lot of electronics marketplaces. [12] Furthermore, the biggest tech market in the world is located there. You can do almost everything in terms of prototyping your ideas and innovations. It has many different floors with miscellaneous technological parts (Figure 4). Many artifacts can be created on the fly or a building plan is turned in and the product is built shortly after. Its not a classic show room where one goes around and shops, its more like a live demonstration area. The people who work there are an open community with the maxim of sharing ideas instead of creating patents.

In [13] it is explained why a lot of the tech markets there are reputed as copycat communities. E.g the designs of Samsung and Apple are constantly imitated and modified and sold for a significantly lower price. Furthermore, one of the biggest problems there is that intellectual property rights are practically nonexistent, which often leads to conflicts between China and the USA. But basically it isn't criminal energy of people that leads to the patent issues, but rather an approach to take some technology that already exists and improve it and create a better version of the original. These imitations are often called "Shanzhai".

One of the biggest benefits of a prototyping in Shenzhen is that they can be finished very quickly. A western company needs an average of a 12-18 months schedule to get from the idea to the prototype. In Shenzhen the same work can be done in 4-6 weeks. [14]



Figure 4: Various deals in the Huaqiangbei tech market.

### 3 Silicon Valley

The widely known term 'Silicon Valley' refers to a region around the southern San Francisco Bay area, and is one of the most important centres for high tech and information technology. Many notable companies like Google, Apple, Hewlett-Packard and co were founded in this area or are headquartered there and it is 'home to 2,000 tech companies, the densest concentration in the world' [15]. But what factors drive companies from start-ups to tech giants to settle in the Silicon Valley, making it the centre of the tech world?

#### 3.1 History

San Francisco already became integrated into technological progress in the late 1800s. Through its port it became a centre for the early telegraph and radio industry, and one of the US's first radio stations in 1909. 'In 1933, the Navy purchased Moffett Field to dock and maintain the USS Macon. This made Moffett Field a major hub for the early days of the aerospace industry.' [16] With the beginning of World War II in 1939, the Ames Research Center was founded, followed by the world largest wind tunnel ten years later. Of course, all of this attracted many scientists and researchers, since it meant attractive jobs to sustain their families. At the same time in 1939 the well known company Hewlett-Packard was founded in Palo Alto, originally developing oscilloscopes and then radar & artillery technology during the war.

In the late 1940s, William B. Shockley together with Walter H. Brattain invented the transistor - in parallel to but independent from Herbert F. Mataré and Heinrich J. Welker in Germany. However, Shockley left Bell Labs in 1956 and founded his own company - Shockley Semiconductor Labs. This was possible thanks to the California Civil Code of 1872, which voids non-compete clauses and makes it possible for individuals to leave a

company and pursue their own goals and ideas. At Shockley Semiconductor Labs the first transistor out of silicon instead of the until then used germanium was developed, where the valley later derived its name from due to a 3-part report by journalist Don Hoefler on the semiconductor industry.

Many graduates from the nearby Stanford University got employed at the Shockley Semiconductor Labs. However, in 1957, eight former employees - which Shockley called the 'Traitorous Eight' - left the company and founded Fairchild Semiconductor, which developed some of the technical equipment for the Apollo program. Most of these employees left the company a few years later to become co-founders of notable companies like Intel (Robert Noyce and Gordon Moore) and Teledyne Technologies (Sheldon Roberts, Jean Hoerni and Jay Last). 'Soon after, other ex-Fairchild employees and "Traitorous Eight" members helped found AMD, Nvidia, and venture fund Kleiner Perkins.' [16]

In the year 1969, the Stanford Research Institute was chosen as one of the four nodes of the Advanced Research Projects Agency NETwork (ARPANET). The other three nodes were located in the University of California, U.C. Santa Barbara and the University of Utah. The ARPANET should later become the internet, one of the most important inventions of modern society.

After Xerox' PARC lab in 1970, many of today's tech companies like Apple, Atari or Oracle were founded or settled in the Silicon Valley, making it 'the widely accepted center of the computer industry' [16].

### 3.2 Strengths

Today, the Silicon Valley still enjoys the position of a global hot spot of technology. 18 out of the Fortune 500 [17] - a ranking which lists the 500 most valuable companies in the United States - are headquartered in the San Francisco Bay Area, with Apple on number three on the list. An interactive map by Go [18] with an example image in Figure 5 shows many notable tech companies and start-ups located in the Silicon Valley.

As per Seth [19], there are multiple factors that promote this concentration of tech companies:

At first, the local laws of the Silicon Valley are an essential benefit, especially for start-ups. 'Tech startups may not actually produce a tangible physical product. They rather bank on successfully developing a business based on ideas, applications or services, which constitute intellectual property.' [19]

Furthermore, these small business get easy access to financing opportunities and other kinds of resources. With a great idea in the valley, they are ensured financial support and established partners.

Another reason for its success is the possibility for networking and availability of specialists in this field. 'It is easy to find and connect with experienced and supportive mentors belonging to the same field, to seek expert guidance in moving forward with one's entrepreneurial venture.' [19]

In the end, Seth [19] mentions that the close proximity of all these tech companies makes synergy in different aspects easy and promotes the cooperation in these fields. This leads to an enhanced infrastructure, not only for the employees through for example improved transport services, but also for the companies themselves.

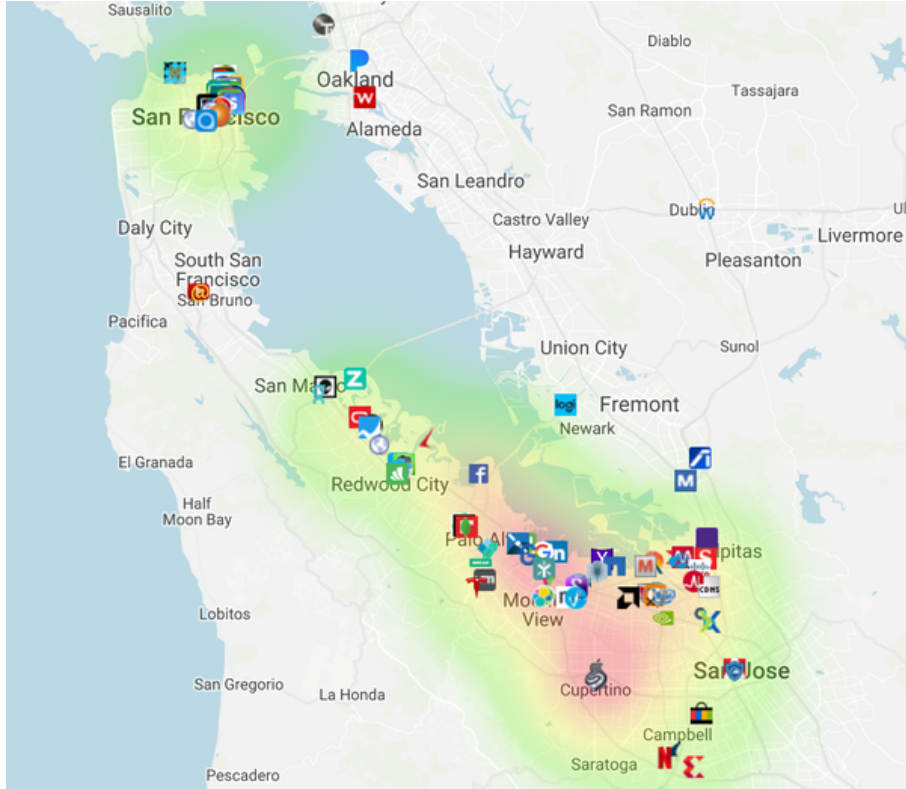


Figure 5: A map of notable tech companies and start-ups located in the Silicon Valley. [18]

## 4 Comparison

This section shall give a brief overview of some statistical facts for both tech hot spots, Shenzhen as well as the Silicon Valley. However, trying to get some precise numbers for both of them turns out to be a difficult task. The Valley for example does not have explicit borders. Its boundaries are rather defined by the high tech companies settled around the San Francisco Bay area forming this great community.

As it can be seen in Table 1 however, the estimated numbers state that the Valley has about 3.1 million residents on around  $1,854\text{km}^2$ , whereas Shenzhen has over 4 times the inhabitants on nearly the same area. Furthermore, over 85% of Shenzhen count as urban area, explaining this high density of population. However, it should be noted that the population of 12.5 million is more of an approximate value. Since a high percentage of the inhabitants of Shenzhen are not registered, the actual population count could significantly deviate from these numbers.

With a Gross Domestic Product of \$29,217 per capita (GDP/c), Shenzhen is one of the wealthiest cities in whole China, even though this is still rather little for American standards. The GDP/c of the Silicon Valley however is about \$128,308, making it the third wealthiest city in the world, right after Zurich and Oslo. [20]

Table 1: Estimated number of inhabitants, area and Gross Domestic Product per capita for Shenzhen as well as Silicon Valley.

	Shenzhen	Silicon Valley
inhabitants	12.5 million	3.1 million
area	$1,991\text{ km}^2$	$1,854\text{ km}^2$
GDP/c	\$29,217	\$128,308

Comparing the infrastructural strengths relevant for tech companies of both cities, some of the biggest differences or deviations are:

- The **technological infrastructure** is just more present in Shenzhen's markets, since all over the city tech markets spread out, where one can look and buy demanded items. In the Silicon Valley it's more handled in a traditionally way where items are acquired by ordering out of a catalog or sticking to the ones you used before.
- On the other side the **social infrastructure** is much better in the Silicon Valley, because of its networking attitude and many benefits for the employees. Also there are many famous and good universities nearby and working for a famous company is still a prestigious achievement. In Shenzhen due to the high amount of people and the growing speed it's hard to supply people with the demanded and suitable know-how, because the current amount of educational institutions is just too low.
- Also the interpretation of **prototyping** is very different. In Shenzhen a lot of prototyping stations are already combined in the tech-markets, so one can test the different parts on the spot and evaluate if they fit together. In addition, there are so many people which are specialists for different processes and have the suitable equipment for the individual steps. In the Silicon Valley, the overall process is much slower. They focus more on a solid research basis and outsource most of the work or actual building steps somewhere else, which leads to higher prototyping times (3-4 months). In Shenzhen on the other hand, prototyping can be done significantly faster (4-6 weeks). For this reason many companies are prototyping in Shenzhen, since the initial planning to market production can be reached in under 3 months.
- The aspect of cheaper **labour costs** is often mentioned and has its origin in the Silicon Valley, since many of the American companies there shifted a lot of the technological production work into China. The general conditions for production are much better in China, especially in Shenzhen with its status as a special economic zone. The working conditions and costs for example are significantly lower in Shenzhen compared to the Silicon Valley. But even though Shenzhen is in the financial aspects lower rated as the Silicon Valley, it counts as one of the wealthiest cities of whole China.
- In both of these areas it is possible under certain circumstances to get **funding** or **subvention** in solid amounts, often very easily. Also the bureaucratic obstacles to get something founded or created are rather low. The only difference is that the Silicon Valley is more focused on researching or improving already existing products, whereas in Shenzhen its more of an open research approach with the goal of creating something new.
- One of the frequently mentioned examples is how these two areas handle **copyright** and patent issues. In Shenzhen it is almost non existent and rarely gets to prosecutions. This open hardware mentality leads to a much quicker acceptance, distribution and customisation. In the US however, copyright issues lead to patent disputes and often move to court.

Shenzhens's intention with this mentality is that they want to promote the positive effect of technological imitation on corporate innovation, since open hardware creates faster and better results. And because the knowledge is also open source based, way more people can work on the artifact and improve it. Many products that have just been released the western world already exist in various versions on the Shenzhen market. As it can be seen in Figure 6, almost every brand and product is copied



and adjusted. This is why companies of the western world are fighting against these imitations with customs checks or even import bans.

- Recently some states blame China to apparently perform **governmental influence** on technology companies like the telecommunication giants ZTE and Huawei. Allegedly they should integrate spy software into their products. This is why many of the bigger companies are punished with import bans in different states (USA, GB).



Figure 6: Examples for various imitated products in Shenzhen [21].

## 5 Conclusion & Prediction

In the end, Shenzhen might not be able to overtake the Silicon Valley in its attractiveness for high tech companies, at least not for now. Unlike in the Valley, venture capital companies in China are still at a startup stage and it will take some time until these scene developed. And since most start-ups rely on financial support from these companies, local government funds or even small amounts of bank loans, it is easier to get funded within the Silicon Valley.

Another reason why the Valley will for now hold its leading position is the availability of higher educational institutions with Stanford University and California Institute of Technology located in proximity.

However, the city government of Shenzhen launched a 1.5-billion-dollar venture capital fund last year, which attracted more than 15 billion dollars from venture companies in 2016. These numbers can already compete with the worst year from the Valley since 2013. The only downside to this is, that a growing and developing tech community can no longer serve as a save space for the small developer who develops for fun and innovation, and will possibly change the attitude of the whole city.

## References

- [1] Shenzhen: The silicon valley of hardware, July 2016. URL <https://www.youtube.com/watch?v=SGJ5cZnoodY>. Accessed: 04.02.2020.
- [2] Silvia Lindtner, Anna Greenspan, and David Li. Designed in shenzhen: Shanzhai manufacturing and maker entrepreneurs. *Aarhus Series on Human Centered Computing*, October 2015.
- [3] Xiangming Chen and Taylor Ogan. China’s emerging silicon valley: How and why has shenzhen become a global innovation centre. *The European Financial Review*, page 55, December 2016.
- [4] Nathan Jansen. 5 shenzhen companies you should know, August 2018. URL <https://www.1421.consulting/2018/08/shenzhen-companies-you-should-know/>. Accessed: 06.02.2020.
- [5] Shenzhen population 2020, December 2019. URL <http://worldpopulationreview.com/world-cities/shenzhen-population/>. Accessed: 27.01.2020.
- [6] Made in shenzhen: The silicon valley of hardware, July 2019. URL <https://www.youtube.com/watch?v=FP1bfrv0LOY>. Accessed: 27.01.2020.
- [7] Facts and figures: Shenzhen vs. silicon valley, April 2018. URL [https://news.cgtn.com/news/31457a4e356b7a6333566d54/share\\_p.html](https://news.cgtn.com/news/31457a4e356b7a6333566d54/share_p.html). Accessed: 06.02.2020.
- [8] Joint-stock bank, 2012. URL <https://financial-dictionary.thefreedictionary.com/Joint-Stock+Banks>. Accessed: 06.02.2020.
- [9] World’s largest stock exchanges, 2018. URL <https://www.relbanks.com/stock-exchanges/largest-stock-exchanges/>. Accessed: 06.02.2020.
- [10] Time is money, efficiency is life, 2015. URL <https://www.oonzen.com/Time-is-Money-Efficiency-is-Life>. Accessed: 06.02.2020.
- [11] Twisted Sifter. Picture of the day: Shenzhen, china, 30 years later, February 2007. URL <https://twistedsifter.com/2012/02/picture-of-the-day-shenzhen-china-30-years-later/>. Accessed: 27.01.2020.
- [12] Huaqiangbei, September 2019. URL <https://en.wikipedia.org/wiki/Huaqiangbei>. Accessed: 06.02.2020.
- [13] Inside china’s silicon valley: From copycats to innovation, November 2018. URL <https://edition.cnn.com/2018/11/22/tech/china-tech-innovation-shenzhen/index.html>. Accessed: 06.02.2020.
- [14] Jan Chipcase An Xiao Mina. Shenzhen, das neue silicon valley, March 2019. URL <https://m.heise.de/tr/artikel/Shenzhen-das-neue-Silicon-Valley-4334850.html?seite=all>. Accessed: 06.02.2020.
- [15] Kimberly Amadeo. Silicon valley, america’s innovative advantage, 2019. URL <https://www.thebalance.com/what-is-silicon-valley-3305808>. Accessed: 30.01.2020.
- [16] Matthew Stuart and Matt Weinberger. Animated timeline shows how silicon valley became a \$2.8 trillion neighborhood, May 2017. URL <https://www.businessinsider.com/>

silicon-valley-history-technology-industry-animated-timeline-video-2017-5?r=DE&IR=T&jwsource=c1. Accessed: 29.01.2020.

- [17] Fortune Media IP Limited. Fortune 500, 2019. URL <https://fortune.com/fortune500/>. Accessed: 03.02.2020.
- [18] Alec Go. Silicon valley map - a map of tech companies and start-ups in silicon valley and san francisco, 2020. URL <http://siliconvalleymap.org/>. Accessed: 01.02.2020.
- [19] Shobhit Seth. Why is silicon valley a startup heaven?, June 2019. URL <https://www.investopedia.com/articles/personal-finance/061115/why-silicon-valley-startup-heaven.asp>. Accessed: 03.02.2020.
- [20] Will Kenton and Troy Segal. Silicon valley, December 2019. URL <https://www.investopedia.com/terms/s/siliconvalley.asp>. Accessed: 05.02.2020.
- [21] Vivian Giang. China also fakes these stores: Disney, nike, d&g, mcdonald's, starbucks and more, August 2011. URL <https://www.businessinsider.com.au/china-fake-stores-2011-8#the-latest-giant-chinese-imitation-a-four-story-10000-square-foot-building-with-a-color-scheme-very-similar-to-the-scandinavian-giant-known-as-ikea-1>. Accessed: 07.02.2020.

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<sup>1</sup><https://free-and-open-technologies.github.io>