The Tech Industry in California and Los Angeles

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September 2018

The tech industry is doing very well these days in the U.S. Over the past eight years, while the S&P 500 stock index has increased by 154%, the NASDAQ index, which consists of about 50% of tech companies, has increased by 275%. Many of the most valuable companies are tech companies, such as Apple, Amazon, Google, or Facebook. Tech employees are compensated nicely due to this tech boom. For example, in 2017, while the annual median wage for all occupations was $37,700 in the U.S., it was $84,600 for the computer occupations, second only to $102,600 of the management occupations as shown in Table 1.

Table 1 2017 Median and Mean Wages and Employment in Major Occupations in the U.S.

Code	Title	Median wage ($)	Mean Wage ($)	Employment
11-0000	Management Occupations	102,590	119,910	7,280,330
15-0000	**Computer and Mathematical Occupations**	84,560	89,810	4,261,460
23-0000	Legal Occupations	80,080	107,370	1,095,770
17-0000	**Architecture and Engineering Occupations**	79,180	86,190	2,516,780
13-0000	Business and Financial Operations Occupations	67,710	76,330	7,472,750
29-0000	Healthcare Practitioners and Technical Occupations	64,770	80,760	8,506,740
19-0000	Life, Physical, and Social Science Occupations	64,510	74,370	1,148,300
25-0000	Education, Training, and Library Occupations	48,740	55,470	8,727,710
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	48,230	58,950	1,925,140
47-0000	Construction and Extraction Occupations	44,730	49,930	5,728,460
49-0000	Installation, Maintenance, and Repair Occupations	44,520	47,870	5,528,390
21-0000	Community and Social Service Occupations	43,840	48,050	2,096,740
33-0000	Protective Service Occupations	39,550	47,190	3,408,680
43-0000	Office and Administrative Support Occupations	34,740	37,950	21,965,480
51-0000	Production Occupations	33,990	38,070	9,024,560
53-0000	Transportation and Material Moving Occupations	31,600	37,070	9,978,390
31-0000	Healthcare Support Occupations	28,710	31,310	4,113,410
41-0000	Sales and Related Occupations	27,020	40,680	14,522,580
37-0000	Building and Grounds Cleaning and Maintenance Occupations	25,620	28,930	4,424,440
45-0000	Farming, Fishing, and Forestry Occupations	24,390	28,840	470,920
39-0000	Personal Care and Service Occupations	23,610	27,270	5,159,100
35-0000	Food Preparation and Serving Related Occupations	21,910	24,710	13,193,090
00-0000	All Occupations	37,690	50,620	142,549,250

Source: Occupational Employment Statistics

The Tech Industry and Employment in Six California Regions

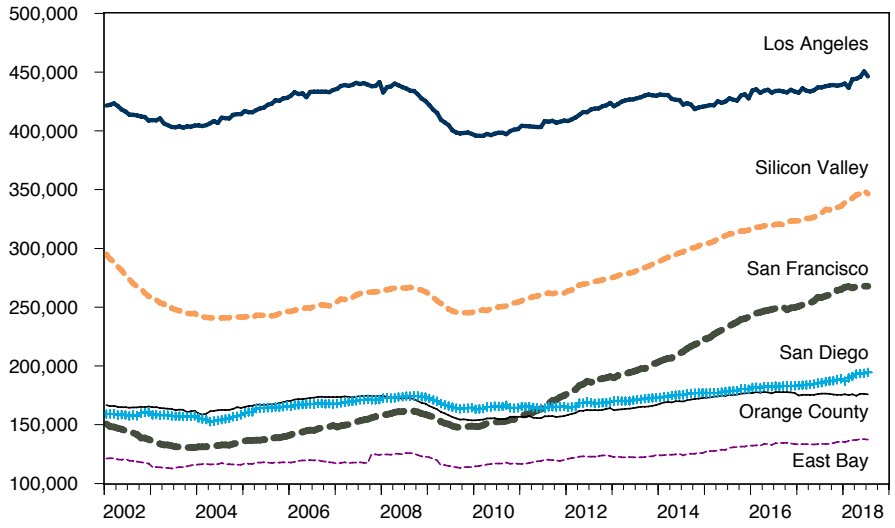
California is the center of high-tech and innovation in the world. Let's take a closer look at how well the tech industry and tech employment are doing in its six major metro regions. Note that there is no strict definition of a high-tech firm. To simplify the analysis, we use two ways to examine the growth of the tech industry for the six regions. We use the major industry categories defined by NAICS (North American Industry Classification System) as the first method. We assume the following three industries include tech industry employment: (1) Computer and electronic product manufacturing (NACIS: 334000) and the aerospace product and parts manufacturing (NACIS: 336400) in the durable manufacturing sector, (2) Information sector excluding publishing industries, and (3) Professional, scientific, and technical services sector.

These three categories are not exclusively tech industry positions, however. For instance, law, accounting, and architectural firms (professional, scientific, and technical services) are not high-tech. It is difficult to distinguish those from the whole category from monthly payroll data released by the California Employment Development Department. This is why we will introduce the second method with more refined categories to analyze the tech industry later on.

Figure 1 shows the total jobs in the three categories we are using to get an idea of tech industry growth since 2002 for the six regions: Los Angeles (County), Silicon Valley (Santa Clara County), San Francisco (San Francisco, San Mateo and Marin Counties), Orange County, San Diego (County), and the East Bay (Alameda and Contra Costa Counties). With the largest economy size (total jobs of 4,494,000) , L.A. has the largest tech workforce (446,000) followed by Silicon Valley's 346,000, and San Francisco's 268,000 in July 2018.

From Figure 1, we see that tech employment in all regions has recovered since 2010. Among them, two regions have outstanding growth over the past 8 years: Silicon Valley and San Francisco. In particular for San Francisco, the current tech job level has surpassed the peak (191,000) of

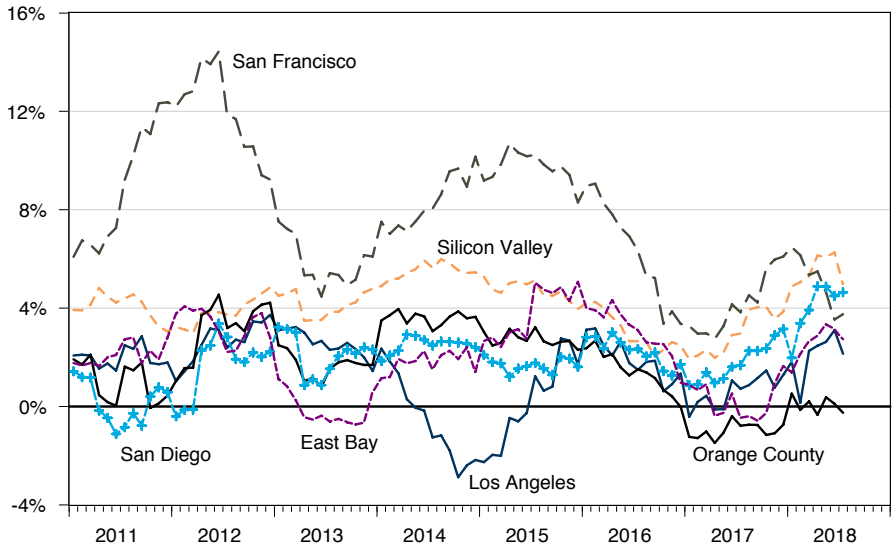
Figure 1 Tech Jobs in 6 California Metros from 2002 to 2018



Source: California Employment Development Department

1. *L.A. has a prominent film and broadcasting industry. Therefore, when we calculate the tech jobs, we only assume 20% of employment are in the tech sector.*

Figure 2 Monthly Year-over-year Growth Rate of Tech Jobs in 6 California Metros from 2011 to 2018



Sources: California Employment Development Department

the Internet bubble in November 2000. Figure 2 displays the monthly year-over-year growth rate of tech employment for these 6 regions. Tech employment growth rates are higher in the Bay area and San Diego than those in L.A. and Orange County.

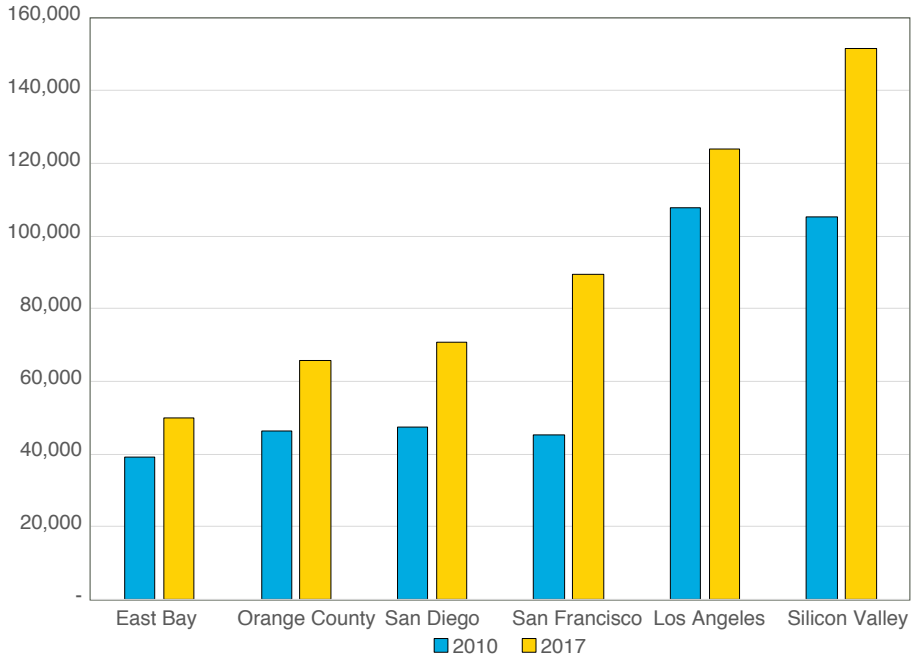
A Closer Look at Tech Occupation in 6 California Regions

Now, let's use Occupational Employment Statistics to examine the trend of tech jobs by a more precise method. As shown in Table 1, we suggest part of the positions in Computer and Mathematical Occupations and Architecture and Engineering Occupations belong to the core of the tech industry. Here we assume that the median wages should be at least $77,000 in L.A. to qualify as a tech job given its definition of high-skill and high-compensation. Table 2 displays 23 positions we suggest as tech jobs, with median wage ranging from $77,000 to $135,000.

With a more refined definition of tech, Figure 3 shows the core tech workforce for the six California regions in 2010 and 2017. Consistent with Figure 1, we can see two regions -- San Francisco (99%) and Silicon Valley (44%) -- having the largest growth in jobs. And it is not surprising to see Silicon Valley with the biggest tech workforce (152,000) followed by Los Angeles's 124,000 and San Francisco's 90,000. For most regions, their tech job growth rates are higher than their overall job growth rates.

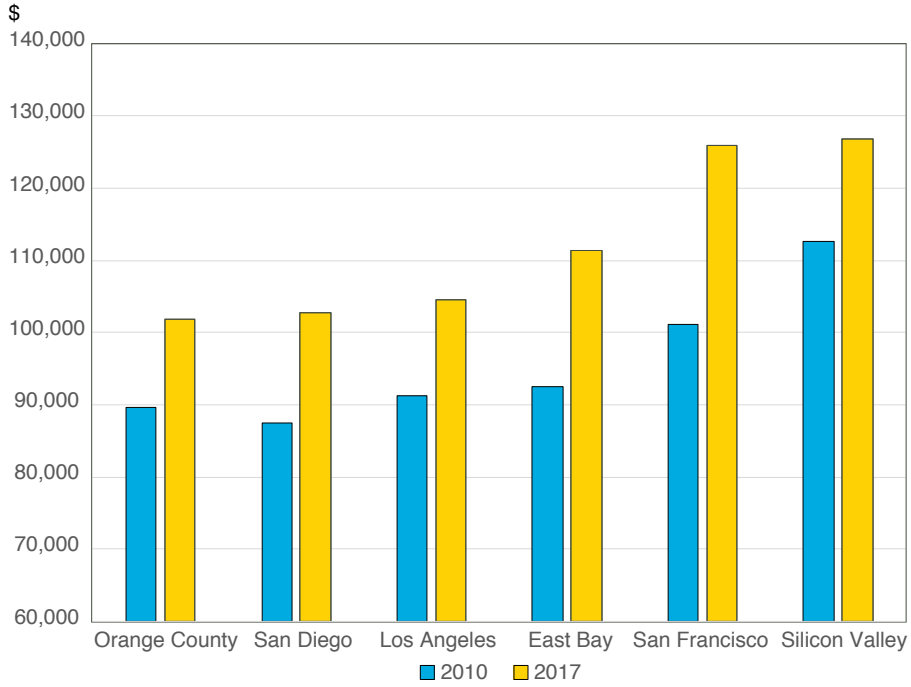
Figure 4 presents the annual median wage for these core tech positions in 6 regions in 2010 and 2017. We see across-the-board wage growth between 2010 and 2017 from 12% in Silicon Valley to 25% in San Francisco. In 2017, median wages are around $100,000 in the Southern California regions, lower than Northern California's (East Bay's $110,000 and $120,000 plus for San Francisco and Silicon Valley) where the cost of housing is also higher.

Figure 3 The Number of Core Tech Jobs in 2010 and 2017 for 6 California Regions



Sources: Occupational Employment Statistics

Figure 4 The Annual Median Wage for Core Tech Jobs in 2010 and 2017 for 6 California Regions



Source: Occupational Employment Statistics

Table 2 2017 Annual Median Wage and Employment in Tech Position in L.A.

Code	Title	Annual Median Wage ($)	Employ-ment
15-1111	Computer and Information Research Scientists	119,850	1,040
15-1121	Computer Systems Analysts	92,170	14,450
15-1131	Computer Programmers	88,100	6,740
15-1132	Software Developers, Applications	109,960	16,970
15-1133	Software Developers, Systems Software	122,180	14,610
15-1141	Database Administrators	97,670	2,500
15-1142	Network and Computer Systems Administrators	89,470	9,850
15-1143	Computer Network Architects	114,520	3,100
15-1199	Computer Occupations, All Other	77,760	9,970
17-2011	Aerospace Engineers	130,690	3,250
17-2031	Biomedical Engineers	92,860	550
17-2041	Chemical Engineers	96,570	230
17-2051	Civil Engineers	108,890	8,060
17-2061	Computer Hardware Engineers	125,490	1,840
17-2071	Electrical Engineers	115,450	5,400
17-2072	Electronics Engineers, Except Computer	135,800	5,510
17-2081	Environmental Engineers	101,500	2,040
17-2111	Health and Safety Engineers	108,630	870
17-2112	Industrial Engineers	101,700	6,150
17-2131	Materials Engineers	104,830	530
17-2141	Mechanical Engineers	94,330	5,870
17-2171	Petroleum Engineers	123,850	660
17-2199	Engineers, All Other	105,970	3,550

Sources: Occupational Employment Statistics

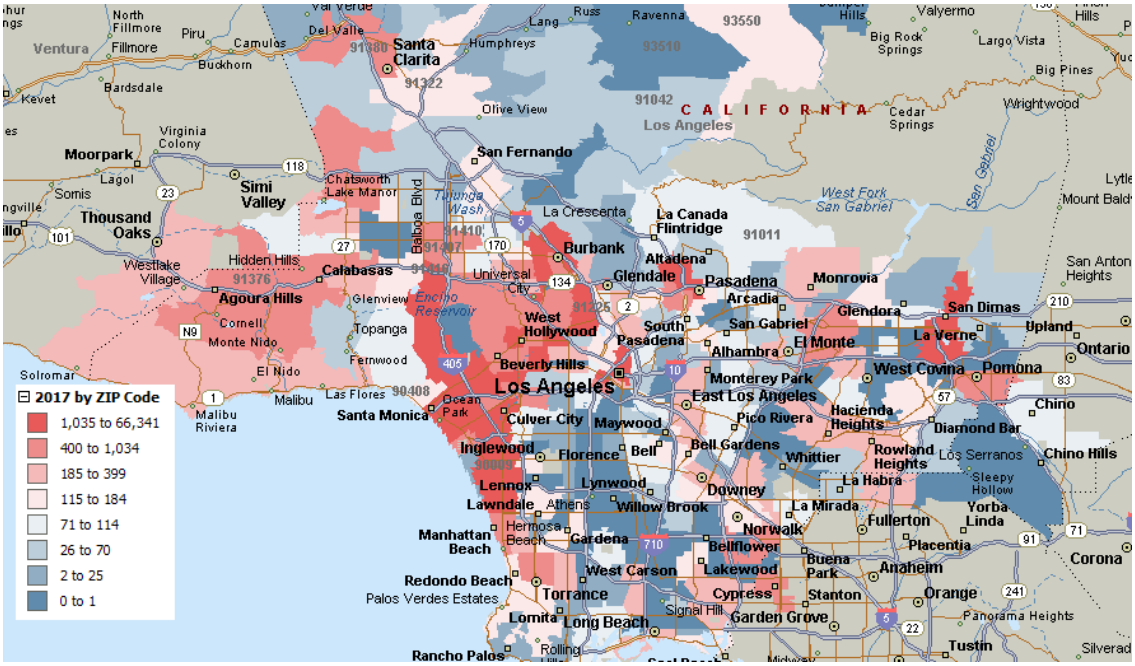
The Tech Industry in Los Angeles

Let's go back to the first definition of tech jobs (durable manufacturing, information, and professional, scientific, and technical services) in order to look at the geographic focus within L.A. County. Because we don't have the data for durable manufacturing (only for total manufacturing), we only discuss the current state and the change of the information sector and professional, scientific, and technical services sector. As a whole, the average wage was $111,800 in the information sector and $93,000 in the professional, scientific, and technical services sector in 2017.

Figure 5 shows the number of employment in the information sector by zip code in L.A. in 2017. Darker red means more employment as opposed to darker blue meaning less employment. It is clear to see the information sector is clustered in West L.A., Culver City, and through West Hollywood to Burbank.

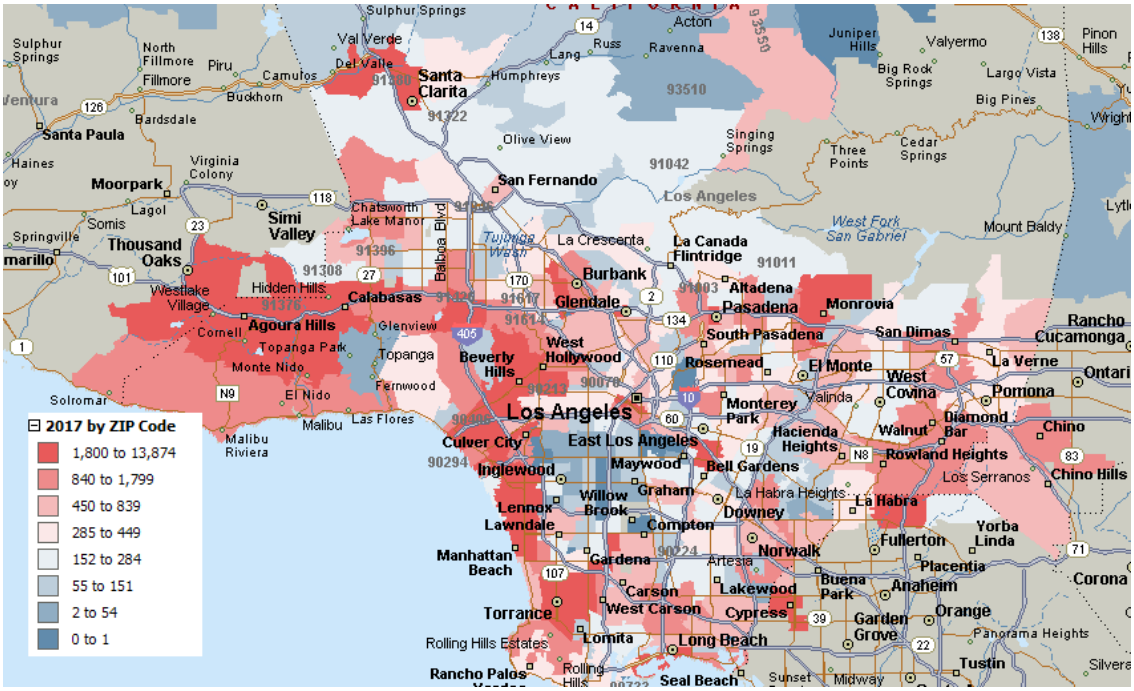
Figure 6 displays the number of employees in the professional, scientific, and technical sector by zip code in L.A. in 2017. This sector is less concentrated than the information sector and ranges from West L.A., Westlake, South Bay, West Hollywood, Downtown L.A., Burbank, and Monrovia up to Santa Clarita. Table 3 lists the top 10 zip codes for employment in these two sectors in L.A. County in 2017. For the information sector, they are in Burbank, University City, Santa Monica, West L.A. Hollywood, Culver City and Venice. For the professional, scientific, and technical services, they are in Downtown L.A., El Segundo, Century City, West L.A. Warner Center, Santa Monica, etc.

Figure 5 Employment in the Information Sector by Zip Codes in L.A. in 2017



Source: California Employment Development Department

Figure 6 Employment in the Professional, Scientific, and Technical Services Sector by Zip Codes in L.A. in 2017



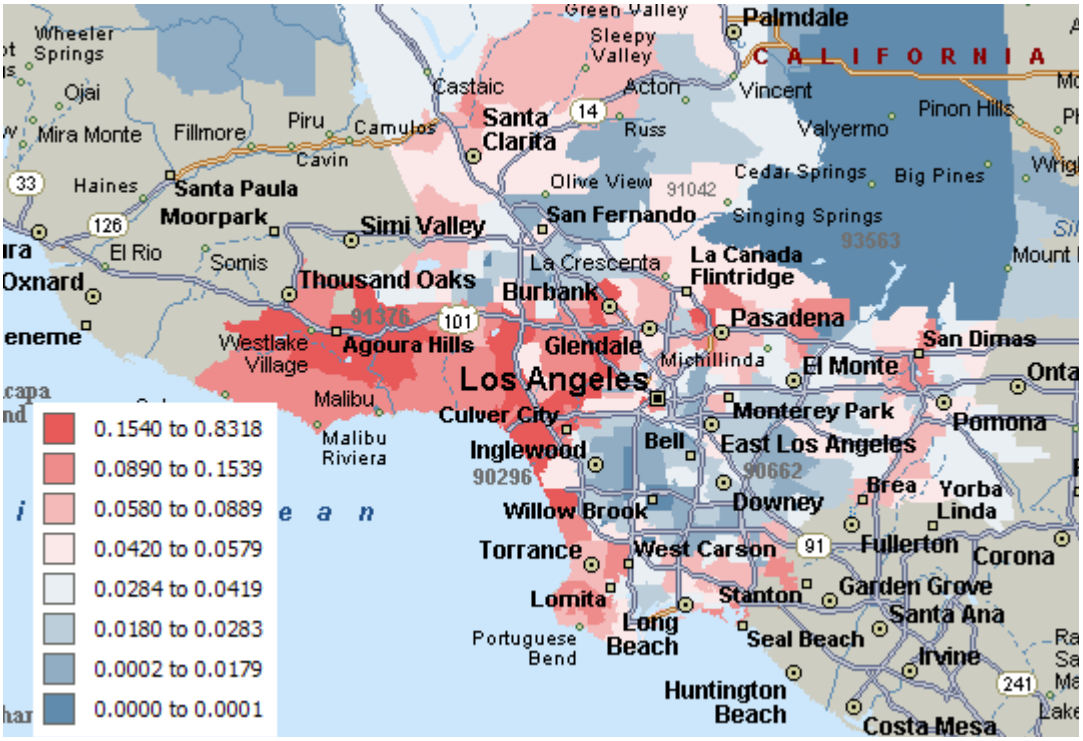
Source: California Employment Development Department

Table 3 The Top 10 Zip Codes for Employment in Tech in L.A. in 2017

Information			Professional, Scientific, and Technical Services		
Zip Code	Region	Employment	Zip Code	Region	Employment
91504	Burbank	66,341	90017	DTLA	13,874
91608	University City	14,012	90071	DTLA	12,650
90404	Santa Monica	8,751	90245	El Segundo	11,426
91505	Burbank	7,067	90067	Century City	9,543
90064	West L.A.	6,178	91505	Burbank	7,965
90028	Hollywood	5,558	90025	West L.A.	5,657
90245	El Segundo	5,273	91367	Warner Center	5,298
91521	Burbank	5,009	90404	Santa Monica	5,013
90232	Culver City	4,771	90010	Wilshire Center	4,559
90291	Venice	4,585	90064	West L.A.	4,460

Source: California Employment Development Department

Figure 7 Percentage of Jobs in the Information and the Professional, Scientific, and Technical Services Sectors Over the Total Jobs, by Zip Codes in L.A., 2017



Source: California Employment Development Department

Figure 7 presents the percentage of jobs in the information and professional, scientific, technical services sectors over the total jobs by zip code in L.A. in 2017. Similar to Figures 5 and 6, the high density of tech jobs (shown in dark red) occurs in the West L.A., West Hollywood, Burbank, Westlake, and Pasadena areas.

Table 4 Financing of Startups in 5 California Regions, 2011 to 2018 (January to September)

Year	# of Financing	Total Amounts ($ Billion)	# of Exits
San Francisco (including East Bay)			
2011	558	9.2	10
2012	633	6.88	13
2013	753	8.07	17
2014	948	18.6	19
2015	970	28.7	21
2016	860	24.5	8
2017	909	22.2	12
2018	638	22.2	12
Los Angeles			
2011	152	2.75	9
2012	179	3.25	1
2013	197	2.54	6
2014	244	4.03	10
2015	319	6	7
2016	258	7.46	9
2017	307	9.13	9
2018	230	9.04	11
San Diego			
2011	100	1	1
2012	109	1.49	4
2013	111	1.34	6
2014	130	1.64	7
2015	137	2.04	5
2016	140	1.79	2
2017	126	1.7	4
2018	86	3.58	3

Year	# of Financing	Total Amounts ($ Billion)	# of Exits
Silicon Valley			
2011	635	10.2	10
2012	625	7.17	16
2013	664	9.1	17
2014	741	12.8	19
2015	702	12.3	18
2016	628	9.5	11
2017	643	18.3	15
2018	451	13.8	14
Orange County			
2011	67	1.01	
2012	82	1.22	1
2013	95	1.27	5
2014	118	1.55	6
2015	111	4.04	4
2016	95	1.88	2
2017	112	2.13	9
2018	78	1.53	2

Source: CB Insights

Startups Investments

In addition to the tech industry, the startups activities are another indicator to present the vibrancy of innovation and entrepreneurship of local economies. Table 4 lists the number of financing and total funding amounts for startups or private companies. The funding includes seed/angel, venture capital (Series A to E+), private equity, debt, grant, M&A, and IPO. We also show the number of exits, meaning the successful outcome of the startups by either becoming public company (IPO) or acquired/merged by other companies. The industry includes all kinds of businesses, ranging from health care, internet, consumer products, to software.

We can see that San Francisco (including East Bay) region has the most active startup investments. In 2017, there were 909 funding deals, amount to $22.2 billion with 12 exits. Silicon Valley comes as second with 643 funding deals totaling $18.3 billion with 15 exits in 2017. Los Angeles is the third with 307 funding deals totaling $9 billion with 11 exits. San Diego ($1.7 billion) and Orange County ($2 billion) come last with much lower startup funding investments. It is worth noting that startup investments in Los Angeles has been accelerating in recent years, from $2.75 billion in 2011 to $9 billion for the first 9 months in 2018.

Forecast

Using the growth rate of tech employment in Figure 2, we forecast the tech job growth over the next year for these 6 California regions: Los Angeles: 2%, San Francisco: 2.2%, Silicon Valley: 2.5%, Orange County: 1%, San Diego: 2.5%, and East Bay: 2%. We suggest that exceptionally high growth in San Francisco and Silicon Valley we saw in the past several years will slow down, partly due to rising cost of housing, and will converge to a normal growth range of 2% similar to Southern California.

Conclusions

The takeaways of the report are as follows:

- By and large, tech industry and jobs remain robust in major California metro areas. They are the main driver of a strong California economy because of their high productivity, high income, and high purchasing power.

- In terms of core tech jobs, Silicon Valley has the largest number: 152,000, followed by L.A.'s 124,000, San Francisco's 90,000, San Diego's 71,000, Orange County's 66,000, and East Bay's 50,000.

- Silicon Beach (the region from West L.A. and West Hollywood to Burbank) enjoyed a higher growth of tech jobs than the surrounding areas, in particular for the information sector with high skills and high wages in the past few years. In recent years, we also see rising startup investments in Silicon Beach due to its vibrant environment for innovation and entrepreneurship.