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## SAN FRANCISCO AND THE TECH/INFO BOOM:

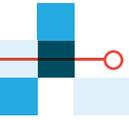
*MAKING THE TRANSITION TO A  
BALANCED AND GROWING ECONOMY*

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## EXECUTIVE SUMMARY

As encapsulated by the sight of young tech workers moving into long-empty buildings not far from the city's downtown financial district, the main phenomenon underlying San Francisco's economy is the rise of a vibrant tech sector to accompany San Francisco's long-dominant finance sector.

Even after the Great Recession, San Francisco is still the financial hub of the West; the financial/legal/accounting sector is still the largest portion of the city's economy, measured either by jobs or by wages. Yet the promise of the tech/info sector is twofold. First, the tech/info sector has far more dynamism and offers many more potential economic opportunities for all of the city's residents. Second, the rise of another strong economic sector is good for San Francisco's economy and helps the city in the long-term as it will bring about a balanced economy in which not one sector dominates.

Rapid and strong economic growth, however, creates its own challenges, the biggest of which is the affordability of housing. Mayor Ed Lee's multi-pronged programs to cut red tape for housing construction; help more loans to first-time, low- and moderate-income homebuyers; and stimulate affordable housing are all good first steps to addressing this challenge. However, the affordability crisis persists and may for some time.

This study will explain how San Francisco has been making the transition from an economy dominated by finance to a balanced economy, led by tech, in which both the tech/information sector and non-tech jobs are growing.

Some key findings:

- Since 2010, San Francisco private-sector employers have added more than 67,000 jobs for a 15 percent gain. That made San Francisco the second fastest-growing large county in the U.S. as measured by private sector employment.
  - » Tech/info companies accounted for 21,000 of the new jobs according to new estimates in this report.

- » The strength of the tech/info sector helped contribute to a gain of 46,000 private-sector non-tech jobs, or 12 percent, over the same period. The new jobs came in a wide variety of non-tech industries, such as construction, manufacturing, health and education, arts and recreation, and restaurants and bars.
- » 2014 has brought an acceleration of demand in San Francisco and nearby areas for a wide variety of non-tech occupations such as accountants and auditors, customer service representatives, dental assistants and hygienists, truck drivers, industrial engineers, maintenance workers, receptionists, and social and community service managers.

→ By any measure, San Francisco has far outperformed the rest of the country since the Great Recession started in 2007. Between 2007 and 2013, the number of private sector jobs in the city rose by about 11 percent, compared to a decline of 1 percent nationally.

- » Since the Great Recession started in 2007, San Francisco itself—a city of 825,000—has generated more private sector jobs than 47 out of 50 states.

→ There are an estimated 68,000 workers in the San Francisco tech/information sector comprising 13 percent of the private sector jobs.

- » In 2012, the tech/info sector contributed roughly \$9.2 billion in wages to the local economy, or roughly 22 percent of the total. That makes the tech/info sector second to the financial/legal/accounting sector in terms of economic impact in San Francisco.

→ The tech-driven growth helped generate total business tax revenues of \$480 million in the 2012–2013 fiscal year, exceeding 2009–10 levels by \$126 million, or 36 percent. These gains helped to maintain and grow services.

→ Gains in the tech/info sector are beginning to be made among groups previously under-represented in the field. Government data show that tech growth is creating economic opportunities for black and Hispanic workers. Starting from a low base, Hispanic employment in computer and mathematical occupations in the Bay Area is up 45 percent since 2010, while black employment is up 32 percent.

A note: The term “tech/information” is used rather than simply “tech” to emphasize the convergence between technology and content that is helping driving the success of San Francisco-based companies such as Twitter, Yelp, Trulia, and Pinterest (which moved into the

city from Palo Alto in 2012). The concept of a tech/information sector was first introduced in the 2013 study on New York City, “Building the Digital City”, but it applies even better to San Francisco.<sup>1</sup>

As in New York the San Francisco tech/information sector includes tech start-ups and established tech companies headquartered locally such as Twitter, Salesforce.com, Dropbox, and Square, as well as the San Francisco offices of tech companies headquartered elsewhere. It also includes the broadband providers and wireless telecom operators who provide the essential infrastructure; pure content generators such as video companies; IT equipment and biotech research and manufacturers.

## INTRODUCTION

From 2007, when the Great Recession started, to 2013, the San Francisco economy generated more private jobs than 47 out of 50 states (Figure 1).

FIGURE 1

### SAN FRANCISCO JOB GROWTH BEATS ALL BUT THREE STATES

States (ranked by private sector job growth)	Change in private sector jobs 2007-2013 (thousands)
1 Texas	717.5
2 New York	241.6
3 North Dakota	81.6
<b>San Francisco</b>	<b>51.8</b>
4 Louisiana	50.3
5 Massachusetts	49.5

Data: Bureau of Labor Statistics, South Mountain Economics LLC  
 State figures based on SAE data.  
 San Francisco 2013 data is estimated, based on QCEW data through 2013III

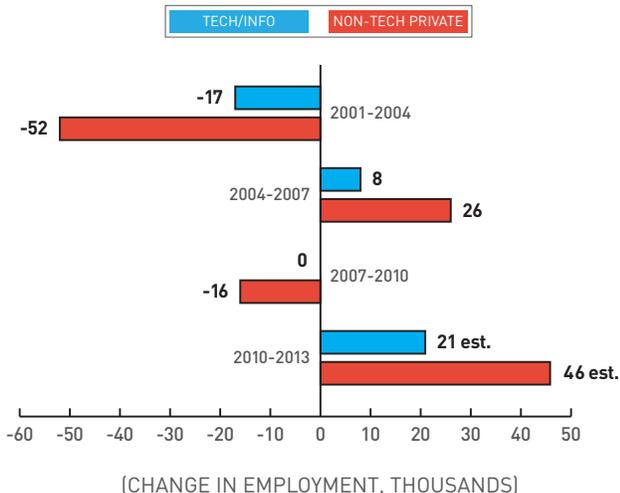
From 2010 to 2013, San Francisco private-sector employers added roughly 67,000 jobs, two-thirds of them in non-tech industries such as construction, manufacturing, health and education, and arts, recreation, and entertainment (Figure 2).

San Francisco's tech/info sector has grown by an astonishing 45 percent since 2010. This type of rapid growth brings challenges of its own, specifically, the affordability of housing, increased cost of living, and a strain on city services including transportation. But under Mayor Ed Lee, San Francisco's government has taken steps to address these problems, including starting workforce development programs to train residents for tech jobs and initiatives to encourage the construction of affordable housing.

From the California gold rush days through the dot-com era, San Francisco has experienced the ups and downs of booms and busts. However, the city may be on the verge of achieving the most elusive of goals: a balanced and growing economy. A balanced economy means that there is job growth across a wide range of industries and occupations, both tech and non-tech. A balanced economy means that there are opportunities for local workers with a wide variety of skills. And most of all, a balanced San Francisco economy is less subject to the roller-coaster cycles that the city has experienced in recent years.

FIGURE 2

### SF NON-TECH JOBS HAVE SURGED SINCE 2010



Data: Bureau of Labor Statistics(QCEW), South Mountain Economics LLC  
 2013 data is estimated based on QCEW data through 2013III

## UNDERSTANDING THE SAN FRANCISCO ECONOMY

Today, there are two forces at work in the San Francisco economy: a dynamic tech/info sector, and a once dominant finance/legal/accounting sector that is contending with the after-effects of the biggest financial crisis since the Great Depression.

During the dot-com boom that ended in 2000–2001, tech startups received the attention. Overlooked was the finance/legal/accounting sector (as defined in the appendix), which was responsible for 20 percent of the private sector jobs in the city and fully 35 to 40 percent of the private sector wages (figure 3). Perhaps the most visible manifestation of this was that, until 2005, the tallest building in the city was named after an insurance company, and the second largest was named after a bank. Placed in a national context, San Francisco's dependence on the finance/legal/accounting sector was exceeded only by New York City.

**FIGURE 3**  
**SECTOR EMPLOYMENT, 2001 AND 2013**

	2001	2013	
Tech/info	56.0	68.4	thousands of jobs
	11%	13%	share of total private employment
Finance/legal/accounting	103.2	77.4	thousands of jobs
	21%	15%	share of total private employment

Data: Bureau of Labor Statistics (QCEW), South Mountain Economics LLC  
2013 data is estimated based on QCEW data through 2013III

By comparison, the tech/info sector in San Francisco was roughly half the size of the finance/legal/accounting sector, even through the peak. Some dot-com companies were headquartered in San Francisco, but the bulk of the growth—Yahoo, eBay, Amazon, Google—took place in Silicon Valley or elsewhere.

In 2000, at the height of the boom, the finance/legal/accounting sector accounted for roughly 41 percent of the wages paid in San Francisco.<sup>2</sup> Figure 4 reports on the wage payments made in 2001 and 2013.

**FIGURE 4**  
**SECTOR WAGE PAYMENTS, 2001 AND 2012**

	2001	2012	
Tech/info	5.9	9.3	billions of 2012 dollars
	15%	22%	share of total private wages
Finance/legal/accounting	15.6	12.6	billions of 2012 dollars
	40%	31%	share of total private wages

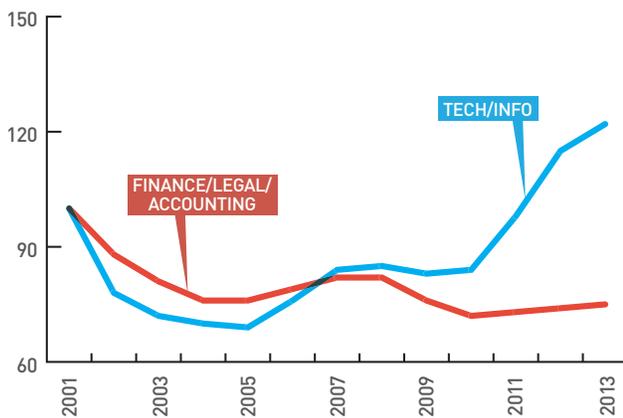
Data: Bureau of Labor Statistics (QCEW), South Mountain Economics LLC  
2013 data is estimated based on QCEW data through 2013III

Yet after the dot-com bust, the finance sector was significantly impacted. Between 2001 and 2005, the finance/legal/accounting sector lost 25 percent of its employment, amounting to 25,000 well-paying jobs and \$1.4 billion in wages and salaries, compared to a decline of 17,000 jobs and \$800 million in wages in the tech/info sector.

In addition, tech-related jobs started rebounding strongly after bottoming out in 2005, but finance-related jobs were hit by the national financial crisis (figure 5). Today, employment in the finance-accounting-legal sector in the city is still 25 percent below its 2001 level. If San Francisco had just matched the national average growth rate in finance-related industries since 2001, the city would have 30,000 more jobs, \$6 billion more in wages, much higher tax revenues, and a much better fiscal situation.

FIGURE 5

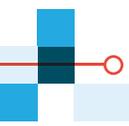
**TECH BOOM FIGHTS FINANCE JOB SLUMP**  
(EMPLOYMENT, 2001=100)



Data: Bureau of Labor Statistics(QCEW), South Mountain Economics LLC  
2013 data is estimated based on QCEW data through 2013III

The lost jobs and wages in finance and related industries did not just hurt bankers. Many of the missing jobs would have been in clerical and back-office positions accessible to medium-skilled workers.

San Francisco is still the financial hub of the West, and even after the shrinkage, the financial/legal/accounting sector is still the largest portion of the city's economy, measured either by jobs or by wages. But the tech/info sector has far more dynamism and growth and offers many more potential economic opportunities for all of its residents.



## DEFINING THE TECH/ INFORMATION SECTOR

The San Francisco government undertook a concentrated and motivated effort to create jobs across the economy, including the tech sector. A turning point was the Lee Administration's use of targeted tax breaks to encourage tech firms, such as Twitter, to locate in struggling areas of the city.

However, tax policy by itself would not have worked if startups had not already been leaning toward the urban areas of San Francisco rather than the office parks and campuses of Silicon Valley. Since 2007, San Francisco's private sector grew by 11 percent compared to the approximately 5 percent for San Mateo and Santa Clara counties. This is very much the opposite of the earlier dot-com boom where the tech sector in Silicon Valley was much bigger and grew much faster than in San Francisco.

The San Francisco story parallels that of other digital cities such as New York City where Manhattan and Brooklyn have grown much faster than New Jersey and other surrounding areas, and Boston where the innovative activity has focused on the urban hubs of Cambridge and Boston. A similar phenomenon is also occurring in London and other digital cities globally.

These digital cities are emerging because the maturation of Internet has brought about a convergence between technology and content. For example, a company such as Yelp has to both develop and maintain a strong technology platform and manage enormous numbers of user-generated reviews. Along these same lines, many of the recent, innovative services are focused on the user experience, and thus, design—and not just engineering—is also particularly important.

These types of companies thrive in urban environments, where they can connect with other industries and draw on the culture and diversity of the city. By contrast, the previous generation of tech companies thrived with their headquarters located in suburban areas located mainly near other tech companies that had the engineers they needed. There was no possibility of cross-industry diversity.

For this reason, it is more accurate to use the term “tech/information” rather than simply “tech” to emphasize the transformations in the industry that have helped create the thriving tech hubs in San Francisco, New York and other urban centers. First introduced and definition in the 2013 report on New York City, “Building a Digital City,” the term ‘tech/information’ reminds us that the creation and management of content is an essential part of the success of San Francisco-based companies such as Twitter, Yelp, Trulia, and Pinterest. The tech/information sector in San Francisco also includes such prominent firms as Salesforce.com, Dropbox, and Square, as well as a diverse set of set of companies ranging from Industrial Light and Magic to new media enterprises such as CBS Interactive and Popsugar, games companies such as Zynga, and content management companies such as Inkling. In addition, the sector includes the broadband providers and wireless companies that provide essential services and infrastructure; offices of tech companies headquartered elsewhere, such as Google, Amazon, and Sony; as well as scientific research in biotech and other areas.

The dimensions of the tech/info sector, as used in this report, are based very closely on analysis done for the earlier New York City report (see the appendix for an explanation of the differences). Using this analysis, as of 2013, the San Francisco tech/information sector employed an estimated 67,000 workers, comprising 13 percent of the city's private sector jobs.<sup>3</sup> The tech/info sector contributed roughly \$9.2 billion in wages to the local economy in 2012, or roughly 22 percent of the total wages. That makes the tech/info sector second to the financial/legal/accounting sector in terms of economic impact in San Francisco, which contributed \$12.6 billion in wages to the local economy.

Between 2010 and 2013, the tech/info sector added 21,000 jobs for a 45 percent gain. This is a slightly lower estimate than others have found, because the tech/info sector includes some slow-growth industries such as publishing.

Still, the tech/info boom has enabled San Francisco to out-perform the rest of the country. From 2010 to 2013, San Francisco's overall private sector employment rose by 15 percent. By comparison, private sector employment in King County (Seattle) rose by 8 percent over the same stretch, while Los Angeles County (Los Angeles) and Fulton County (Atlanta) saw a 7 percent gain, and Cook Country (Chicago) a 5 percent gain. Since 2010, San Francisco has been the second-fastest growing large county in the country, behind only Travis County (Austin).<sup>4</sup>

## A BALANCED ECONOMY

While the tech/info sector has been the main force behind the economic boom in San Francisco, the gains have not been limited to those who work in that sector. Between 2010 and 2013, San Francisco's economy generated roughly 46,000 private-sector non-tech jobs to go along with the 21,000 tech/info jobs already mentioned. These jobs are being created in a wide range of industries, from construction and manufacturing, to health and education, arts and recreation, and restaurants and hotels.

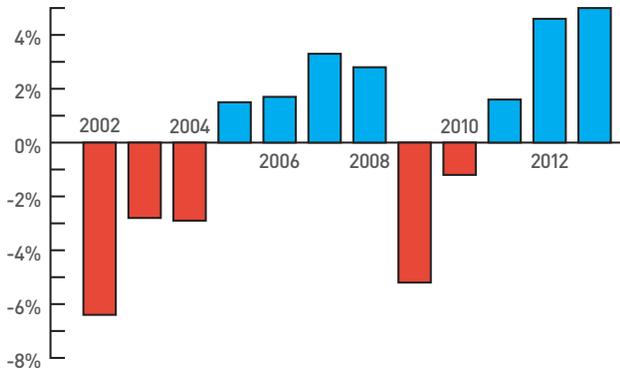
It's worth noting that this boom in non-tech jobs is relatively recent. From 2001 to 2010, the city's economy actually lost a substantial number of non-tech jobs. But since then, the growth of non-tech jobs has been accelerating (figure 6).

An analysis of recent want ads suggests that demand in San Francisco and nearby areas is up over the past year for a wide range of non-tech occupations.<sup>5</sup> Employers are advertising for an increasing number of accountants and auditors, dental assistants and hygienists, customer service representatives, chefs and head cooks, industrial engineers, truck drivers, maintenance workers and mechanics, fitness trainers, hairdressers, and social and community service managers, among others.

FIGURE 6

### SAN FRANCISCO NON-TECH SECTOR PICKS UP SPEED

(ANNUAL GROWTH RATE OF NON-TECH PRIVATE JOBS)



Data: Bureau of Labor Statistics (QCEW), South Mountain Economics LLC  
2013 data is estimated based on QCEW data through 2013III

## SPILLOVERS: JOBS AND TAX REVENUES

The previous section noted the large number of non-tech jobs created in San Francisco in recent years. How many of these can be attributed to the spillover effects of the current tech/info boom?

The answer to this question is not easy. Economists differ widely on their estimate of the 'multiplier'—that is, the number of additional non-tech jobs generated by a new tech job.<sup>6</sup>

For example, one well-done 2012 study from the Bay Area Council Economic Institute estimated that "the creation of one job in the high-tech sector of a region is associated with the creation of 4.3 additional jobs in the local goods and services economy of the same region in the long run."<sup>7</sup> This figure is at the upper end of the range of multipliers.

At the lower end of the range, two earlier studies done on App Economy jobs used a very conservative multiplier of 0.5.<sup>8</sup> That is, each job in the tech/info sector in San Francisco would create another 0.5 jobs in the city itself over several years.

The implication is that at a minimum, the 21,000 job growth in the tech/info sector since 2010 is responsible for at least another 10,500 jobs in the private non-tech sector. That figure comes from multiplying the number of new tech jobs (21,000) by the 0.5 multiplier. So at a minimum, the tech/info sector since 2010 has driven, directly and indirectly, about half of the total private-sector job growth in San Francisco.

Moreover, the tech/info boom is having additional spillover effects on the local economy through its effect on tax revenues. More people working in the city mean more money raised by the sales tax and the payroll tax (and the gross receipts tax, as San Francisco gradually shifts over from the payroll tax).

How does it all add up? Figure 7 below shows revenues figures for fiscal years 2009–10 and 2012–13 for some key taxes where the business tax figure includes payroll taxes. In addition, the figure shows the increase over that three-year period.<sup>9</sup>

FIGURE 7

### A STRONG ECONOMY REVIVES SAN FRANCISCO TAX REVENUES FOR FISCAL YEARS 2009–10 AND 2012–13

Selected taxes	FY 2009–10	FY 2012–13	Percent change
Property tax	1,060.3	1114.1	5%
Business taxes	353.5	479.6	36%
Sales tax	96.6	122.3	27%
Hotel room tax	135.5	182.4	35%
All local tax revenues	1,934.5	2,350.1	21%

Data: San Francisco Controller's Office. General fund only

Business taxes for 2012–2013 were about \$126 million higher, or 36 percent higher, than they were in fiscal year 2009–10. That is the gain to the city from the tech/info boom, net of the effect of the tax breaks. To put that in perspective, \$126 million is larger than the \$100 million budget for the entire public library system.

## WILL THE TECH BOOM CONTINUE?

Many San Francisco residents still have searing memories of the dot-com collapse, which sent the unemployment rate soaring. The worry is that when the current tech boom ends, it will leave empty buildings, shuttered restaurants, and vacant streets.

That worry is unrealistic, for two reasons. First, as shown in the report, the San Francisco slump in the first half of the 2000s was due to a combined short-term tech bust and a long-term shrinkage of the financial/legal/accounting sector. By itself, the dot-com bust would have been far less harmful.

The second reason is that this tech boom, unlike the previous one, is not being driven by debt. The dot-com boom should have been better called the fiber-telecom boom. Companies such as WorldCom and Global Crossing borrowed massive amounts of money to lay fiber cable, buy network routers, hire software developers, construct buildings, and so forth. When the boom ended, all that borrowing and spending smashed to a halt. Because companies such as Twitter are not being primarily fueled by debt, they are much less susceptible to a sudden halt.

Michael Mandel, "The Threat Is Small, the Opportunities Are Great," December 2, 2013, [Nytimes.com](http://www.nytimes.com/roomfordebate/2013/12/02/is-wall-street-too-giddy/the-threat-of-a-bubble-is-small-the-opportunities-are-great), <http://www.nytimes.com/roomfordebate/2013/12/02/is-wall-street-too-giddy/the-threat-of-a-bubble-is-small-the-opportunities-are-great>

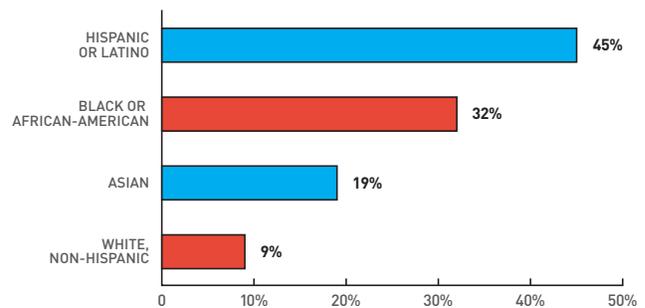
## HOW TECH GROWTH CREATES ECONOMIC OPPORTUNITY

One of the biggest criticisms of the tech/info boom is the perception of a bright line between the tech-enabled and everyone else. There is no mistaking that tech jobs, on average, pay more than other sectors—in San Francisco, the average annual income of workers in the tech/info sector is about \$145,000 per year, including bonuses and stock options. That's significantly higher than the average income of \$75,000 per year for all non-tech private sector workers. Moreover, the employment of minorities by tech/info firms, especially in the Bay Area, lags significantly behind the majority.

However, government surveys suggest that the number of black and Hispanic workers in tech occupations is rising quickly, both in the Bay Area and nationally.<sup>10</sup> These conclusions may seem counter-intuitive, but they are supported by drawing on several different data sources. First, the American Community Survey, done by the Census Bureau, enables one to track occupation by ethnic and racial breakdown for individual geographic areas. Looking at the broad Bay Area, including both San Francisco and Silicon Valley, employment of blacks and Hispanics in computer/math occupations has soared over the past

couple of years (figure 8). For example, between 2010 and 2012 the number of Hispanic and Latino workers in computer/math occupations rose by 45 percent. By comparison, the number of non-Hispanic whites in computer/math occupations in the Bay Area only rose by 9 percent.

**FIGURE 8**  
**BAY AREA TECH GROWTH CREATES ECONOMIC OPPORTUNITY**  
PERCENTAGE CHANGE, 2010–12  
EMPLOYMENT IN COMPUTER AND MATHEMATICAL OCCUPATIONS, BAY AREA\*

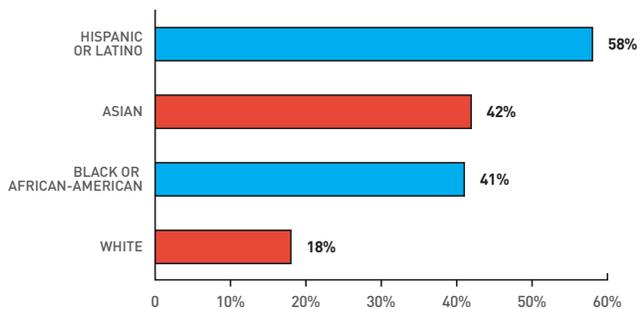


Data: American Community Survey  
\*San Jose-San Francisco Consolidated Statistical Area

Two important caveats should be applied to these statistics. First, they are based on relatively small sample sizes so they contain a lot of statistical “noise”. Second, even after the gains, Hispanics and blacks still hold only 4.6 percent and 2.8 percent, respectively, of computer/math jobs in the Bay Area.

However, the trends are encouraging, especially since the gains made by blacks and Hispanics in the Bay Area mirror the national picture over the past few years. Nationally, a different data set, the Current Population Survey, also shows a rising number of blacks and Hispanics in tech-related occupations. For example, Hispanic employment in computer and mathematical occupations is up 58 percent since 2006, and black employment is up 41 percent (see Figure 9).

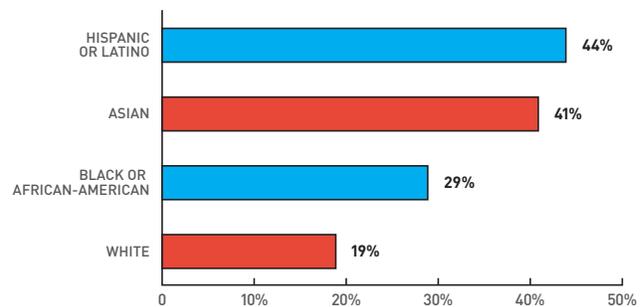
**FIGURE 9**  
**NATIONAL TECH WORKFORCE BECOMES MORE DIVERSE**  
 PERCENTAGE CHANGE, 2006–13  
 EMPLOYMENT IN COMPUTER AND MATHEMATICAL OCCUPATIONS



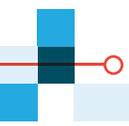
Data: Current Population Survey

Moreover, it should be noted that the education pipeline is filling up as well as an increasing number of minorities are getting degrees in computer and information sciences in recent years. (See figure 10) This suggests that the tech/info workforce will continue to become increasingly diverse.

**FIGURE 10**  
**TECH EDUCATION PIPELINE IS FILLING**  
 PERCENT CHANGE, ACADEMIC YEAR 2008–09 TO 2011–12  
 NEW COMPUTER AND INFORMATION SCIENCES BACHELOR'S DEGREES



Data: National Center for Education Statistics  
 Note: In this chart, 'Hispanic' does not overlap race categories. Chart includes reallocation of 'two or more races' category to individual race and ethnic categories.



## CONCLUSION

Along with New York and London, San Francisco is a leading example of how dynamic tech/info companies are now being attracted to high-density, urban environments. It also demonstrates how a city can help facilitate that growth through smart policies and help bring about a more balanced economy. In San Francisco's case, it is adding a growing tech/info sector to a contracting, and still dominant, finance sector.

The transition in San Francisco from a finance-dominated economy to one where the tech/info sector takes the lead role has not always been easy. Difficulties still remain, such as housing affordability, the rising cost of living, and the need to retrain local residents for the new jobs.

Ultimately, the result has been a booming economy with both tech and non-tech jobs increasing at a rapid rate, creating economic opportunities for San Francisco residents, and adding tax revenue to the city's coffers.



## APPENDIX

### THE TECH/INFORMATION SECTOR

Identifying the boundaries of the tech sector is always a difficult proposition.<sup>11</sup> The 2013 report on the New York City economy developed a new definition of the “tech/information” sector reflecting the realities of the convergence between technology and content. This report basically uses the same definition fine-tuned for San Francisco’s particular situation.

The data for the industry-based approach comes from the Bureau of Labor Statistics QCEW program. This program provides annual figures on jobs and wages by county and by detailed industry. For example, the QCEW program tells us that the number of people working in the industry “Internet publishing and web search portals” in San Francisco went from 1541 in 2007 to 6712 in 2012.

So it seems like the question is a simple one: Which industries belong in the tech/information sector? The first issue is that in the age of convergence, many traditional media companies have extensive online operations, and many Internet companies are extensive producers of content. Moreover, it’s clear that publishing and media companies are part of the same ecosystem as smaller digital media, social networking, and e-commerce startups. It no longer makes sense to make a sharp distinction between publishing and Internet publishing, or broadcast and Internet broadcast.

The second issue is that there is no publicly available list of which companies or establishments are assigned to which industries by government statisticians. Indeed, the Bureau of Labor Statistics and the Census Bureau maintain separate industry-company lists, and by law they are not allowed to exchange these lists. A 2006 study found that 33 percent of firms examined were classified in different industries by the two agencies.<sup>12</sup> This means that figuring out which industry corresponds to which company is occasionally difficult. For example, it’s not obvious whether Salesforce.com would be assigned to the packaged software industry, to the Internet publishing industry, or to the custom computer programming industry. The same problem comes up for Twitter.

The third issue is that many temporary tech jobs are actually reported on the books of employment firms rather than the industry where they are actually working. The size of this “outsourcing” is unknown but could be enormous.

Keeping these problems in mind, this report developed a list of industries to cover the tech/information sector in San Francisco. The list starts with the information sector, which includes everything from Internet publishing and web search to wireless telecom to traditional media companies (which typically have large online operations). Next, the tech/info industry list includes the computer systems design industry, which includes custom computer programming, computer facilities management, and other computer-related services. This broad category could conceivably include everybody from Salesforce.com to Zynga to Dropbox.

The tech/info sector, as defined for San Francisco, includes pharmaceutical and medicine manufacturing, and computer and electronic product manufacturing, because of the importance of tech manufacturing for the Bay Area. Another issue arises because the large accounting and consulting firms such as Deloitte and PriceWaterhouseCoopers are among the largest advertisers for tech workers in San Francisco, as reported in The Conference Board HWOL database. After careful examination, the conclusion was that these workers, used for IT consulting and implementation, were probably showing up in the management consulting industry.

Taking all these factors into account, the list of industries for the tech/information sector in San Francisco included:

NAICS codes:

- 32541 Pharmaceutical and medicine manufacturing
- 334 Computer and electronic product manufacturing
- 51 Information
- 54133 Engineering services
- 54142 Industrial design services

- 5415 Computer systems design and related services
- 5417 Scientific research and development services
- 54161 Management consulting (30 percent)

Several notes are important here.

- The information sector (NAICS 51) includes publishing, packaged software companies (such as Microsoft), movie and recording companies, broadcasting, telecom, web search, internet publishing and information services such as news syndicates.
- The tech/info industry list omitted the electronic shopping industry (NAICS454111) because the data wasn't available for every year and because it wouldn't have made much difference to the final results. Moreover, remember that the BLS allocates establishment rather than company, so Amazon's software development in San Francisco would likely be allocated to computer systems design than to electronic shopping.
- Computer systems design and related services includes custom computer programming ser-

vices. Therefore, many app developers, web developers, and virtually any type of software-intensive tech startup could justifiably be assigned to this industry.

- The methodology for estimating tech/info jobs takes 30 percent of management consulting as reflecting IT consulting and implementation. The final results are not very sensitive to this percentage.
- The BLS QCEW data used by this report, leaves out the self-employed and proprietors. Consequently, the report's totals will undercount the true employment in industries with lots of startups. The wage figures include total compensation paid during the year, including bonuses and stock options.

One final note: This definition yields an estimated 68,400 workers in the tech/info sector in 2013, and 64,400 workers in 2012. If this report used the exact same definition as for the New York City study, the 2012 number would have been 63,900 workers, a very small difference. By comparison, New York City had 262,000 workers in its tech/info sector in 2012.

### THE FINANCE/LEGAL/ACCOUNTING SECTOR

San Francisco has traditionally been the finance center for the Western part of the United States, so clearly it makes sense to look at local employment and wages for financial and insurance. The next step is to add in legal and accounting firms as well, because many of these jobs are linked to the financial sector, especially in financial hubs such as San Francisco. The industry "Management of Companies and Enterprises" includes bank holding companies, as well as other types of headquarters.

So we define the finance/legal/accounting sector to include these NAICS codes:

- 52 Finance and insurance
- 5411 Legal
- 5412 Accounting
- 55 Management of Companies and Enterprises

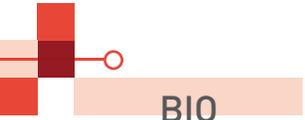
Here is how employment in these industries has changed over time in San Francisco, compared to the United States.

### PERCENTAGE CHANGE IN EMPLOYMENT, 2001–2013

	San Francisco	United States
Finance and Insurance	-29.0%	0.3%
Legal	-8.0%	3.9%
Accounting	-12.0%	6.6%
Management of Companies	-31.2%	17.6%

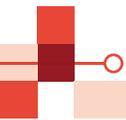
Data: BLS, South Mountain Economics (2013 estimates for San Francisco)

It's important to note that the QCEW data on jobs is based on payments of unemployment insurance. As a result, it may not include partners in venture capital firms, for example. However, it will include the rest of the workers in those firms. In addition, QCEW data on wage payments include bonuses, but may understate the total income generated by the finance sector, since they do not include interest and other types of return on capital.



## BIO

Dr. Michael Mandel, president of South Mountain Economics LLC, is one of the country's leading experts in emerging occupations and emerging industries. In the 1990s, he was one of the first economists to identify the emergence of the tech-driven New Economy. In the 2010s, Mandel has focused on the emergence of the data-driven economy and the app economy, with more than 700,000 new jobs created. Mandel is also chief economic strategist at the Progressive Policy Institute (PPI) in Washington, where he supervises PPI's research and policy work across a wide range of topics, including state and local policies to achieve a high-growth economy, the impact of regulation on innovation, and policies to improve production, investment and job growth. He is currently Senior Fellow at the Mack Institute for Innovation Management at the Wharton School at the University of Pennsylvania. Mandel, who received a PhD in economics from Harvard University, formerly served as chief economist at *BusinessWeek* (now *Bloomberg BusinessWeek*), where he directed the magazine's coverage of the domestic and global economies. While there, Mandel was named one of the top 100 business journalists of the 20th century for his writings on innovation and growth. He received multiple awards for his work, including the Gerald Loeb Award for Business and Financial Journalism. He is the author of four books including *Rational Exuberance: Silencing the Enemies of Growth and Why the Future Is Better Than You Think*.



## ENDNOTES

- 1 Michael Mandel, "Building the Digital City," South Mountain Economics LLC, September 2013.
- 2 This data is drawn from County Business Patterns for 2000, so it does not completely match the QCEW data.
- 3 Other estimates of the tech sector produce roughly similar results. For example, a recent Bloomberg story reports that the tech sector in San Francisco totaled 59,683 jobs in 2013. See Alison Vekshin, "San Francisco Beating Silicon Valley With Growth in Jobs" Bloomberg News, March 25, 2014. <http://www.bloomberg.com/news/2014-03-25/san-francisco-beating-silicon-valley-with-growth-in-jobs.html>
- 4 Large counties have private sector employment of 400,000 or more.
- 5 The analysis is based on the three months ending March 18, 2014, compared to the three-month period a year earlier. The geographic region includes San Francisco and surrounding areas. We thank The Conference Board for the use of its HWOL database. The Conference Board bears no responsibility for any mistakes or errors in this paper.
- 6 Indeed, the whole question of multipliers became a political football during the Washington debate over fiscal stimulus in the early years of the Obama Administration.
- 7 Ian Hathaway, "Technology Works: High-Tech Employment and Wages in the United States," Bay Area Council Economic Institute, December 2012. It is unclear whether that 4.3 multiplier can be directly applied to recent events in San Francisco, for two reasons. First, it's a long-term estimate of job creation, taken over a decade or more. Second, it was estimated based on data for entire metro areas, rather than cities or counties. Thus, those 4.3 jobs created by a tech job in San Francisco could include new positions created outside the city, such as in San Mateo or Oakland.
- 8 See, for example, Michael Mandel, "Where the Jobs Are: The App Economy," Technet, February 2012.
- 9 "Three-Year Budget Projection for General Fund Supported Operations, FY 2011–12 through FY 2013–14," Joint Report by the Controller's Office, Mayor's office, and Board of Supervisors' Budget Analyst, updated April 11, 2011.
- 10 This section draws heavily on research done for an upcoming report from the Progressive Policy Institute.
- 11 For an early analysis of the dimensions of the tech sector, see Michael Mandel, "Just How Big is High Tech?" *BusinessWeek*, March 31, 1997.
- 12 This well-known "data synchronization problem" arises because Census Bureau lists are partly based on tax return data, which cannot be shared with other agencies without legislation. See, for example, "General Explanations of the Administration's Fiscal Year 2014 Revenue Proposals," Department of Treasury, April 2013, p.235. See also Adrienne Pilot, "Data Synchronization: Leveraging Existing Business Data to Better Measure the Economy," Amstatnews, November 2011. <http://magazine.amstat.org/blog/2011/11/01/data-synchronizationscipolicy/>