SOFTWARE DEVELOPMENT:
DRIVING SAN DIEGO'S TECH ECOSYSTEM

AN ECONOMIC IMPACT ANALYSIS AND COMPARISON OF US METROS

PRODUCED BY

SAN DIEGO REGIONAL EDC

SOFTWARE DEVELOPMENT: DRIVING SAN DIEGO'S TECH ECOSYSTEM

Software development is infused throughout the region's diverse tech and innovation ecosystem – providing the building blocks behind the technology revolutionizing our world today. This study seeks to capture the economic impact of software development across a wide variety of industries critical to San Diego's growth.
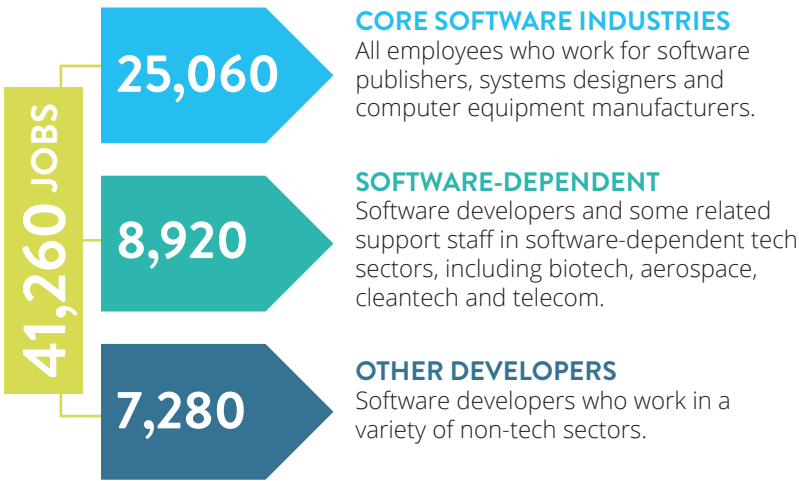
SOFTWARE DEVELOPMENT= **$12.2B**
TOTAL ECONOMIC IMPACT

100K+
TOTAL JOBS IMPACTED

SOFTWARE ECOSYSTEM BREAKDOWN

41,260 JOBS

25,060

CORE SOFTWARE INDUSTRIES
All employees who work for software publishers, systems designers and computer equipment manufacturers.

8,920

SOFTWARE-DEPENDENT
Software developers and some related support staff in software-dependent tech sectors, including biotech, aerospace, cleantech and telecom.

7,280

OTHER DEVELOPERS
Software developers who work in a variety of non-tech sectors.
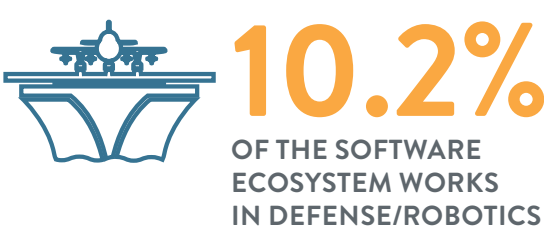
21,600 SOFTWARE DEVELOPERS
There are 21,600 software developers in San Diego who work across the software ecosystem.

WHY SAN DIEGO?

San Diego's software ecosystem offers its workforce diverse career opportunities.
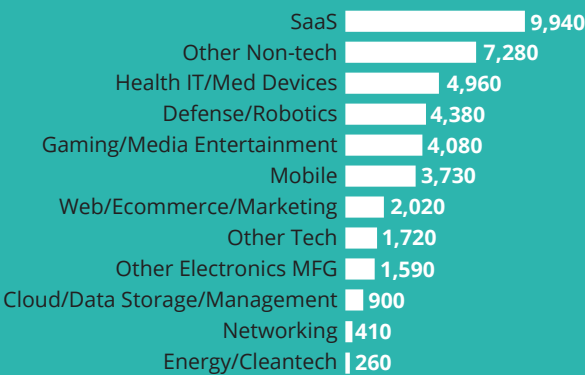
INNOVATION-DRIVEN INDUSTRIES

2X AS LIKELY FOR A SOFTWARE DEVELOPER TO WORK IN SCIENTIFIC R&D THAN THE REST OF CA

10.2% OF THE SOFTWARE ECOSYSTEM WORKS IN DEFENSE/ROBOTICS

STRONG JOB PROSPECTS

3X THE PACE OF TOTAL EMPLOYMENT GROWTH IN SAN DIEGO FROM 2010-2015

18.1% EMPLOYER-PROJECTED SOFTWARE JOB GROWTH OVER NEXT 12 MONTHS

1 in 6 INNOVATION ECONOMY JOBS IN SAN DIEGO ARE IN SOFTWARE DEVELOPMENT

WHERE THE TALENT IS

Category	Value
SaaS	9,940
Other Non-tech	7,280
Health IT/Med Devices	4,960
Defense/Robotics	4,380
Gaming/Media Entertainment	4,080
Mobile	3,730
Web/Ecommerce/Marketing	2,020
Other Tech	1,720
Other Electronics MFG	1,590
Cloud/Data Storage/Management	900
Networking	410
Energy/Cleantech	260

San Diego has a great ecosystem of companies that recruit and hire some of the nation's best software talent. At ViaSat, we are continuing to rapidly grow our software development workforce here in San Diego. These highly-skilled professionals enable ViaSat to provide increasingly better global connectivity for the Department of Defense and commercial customers like Virgin America.

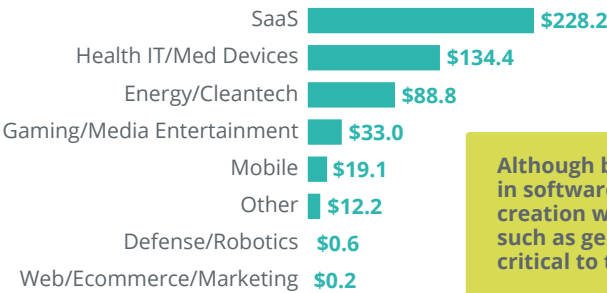**Nik Devereaux,** engineering program manager, ViaSat

AN ATTRACTIVE MARKET FOR CAPITAL INVESTMENT

Capital drives growth in software and tech-related industries. While San Diego has traditionally commanded a large share of biotech funding, in 2015, nearly half of San Diego's total VC investment was in software and related industries – **a 38% increase from the previous year.**

CONCENTRATION OF INVESTMENT

$517M

SOFTWARE AND RELATED VC INVESTMENT

BY PRODUCT VERTICAL IN 2015

SaaS	**$228.2**
Health IT/Med Devices	**$134.4**
Energy/Cleantech	**$88.8**
Gaming/Media Entertainment	**$33.0**
Mobile	**$19.1**
Other	**$12.2**
Defense/Robotics	**$0.6**
Web/Ecommerce/Marketing	**$0.2**

HEALTH IT/DEVICES

2X
US AVERAGE

ENERGY/CLEANTECH

6.6X
US AVERAGE

BIOTECH/GENOMICS

3.9X
US AVERAGE

Although biotech is not captured in software VC verticals, software creation within key biotech fields such as genomics is increasingly critical to the industry.

CAPITAL FLOW AND DEAL TYPE, 2010-2015

SAN DIEGO COMPANIES RELY ON DIVERSIFIED CAPITAL TO MEET THEIR NEEDS.
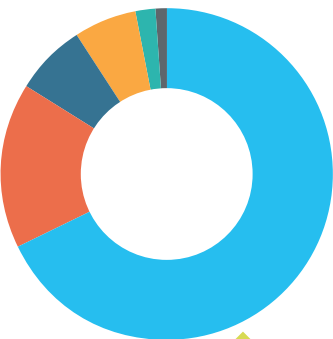
68% **Merger/Acquisition**
16% **VC/Angel/Seed**
7% **Leveraged Buyout**
6% **Other**
2% **IPO**
1% **Recapitalization**

On average, US metros receive 42% of capital investment through M&A deals.

$750M

SOFTWARE-DRIVEN M&A DEALS IN 2015

- Entropic Communications
- MaintenanceNet
- Lumedyne Technologies
- HealthLine Systems
- DR Systems
- DivX
- Bretelon, Inc.
- Detectent

HOW SAN DIEGO STACKS UP

The **software power index*** combines data on the concentration of software developers, employee retention, computer science degrees per capita, computer/math degree attainment among the 25+ population, job/wage growth, average wage adjusted for cost of living and VC dollars per capita to compare the top 50 US metros.

TOP 10 AMONG 50 US METROS

#2 Seattle
#4 Boston
#10 Washington DC
#6 Baltimore
#3 San Francisco
#5 Raleigh
#1 San Jose
#9 Atlanta
#7 SAN DIEGO
#8 Austin

SAN DIEGO RANKS

#10	#8	#7	#4
CONCENTRATION	TALENT	PROSPERITY	CAPITAL
CONCENTRATION OF SOFTWARE DEVELOPERS	EMPLOYEE RETENTION, CS DEGREES PER CAPITA, COMPUTER/MATH DEGREE ATTAINMENT	JOB GROWTH, WAGE GROWTH, WAGE ADJUSTED FOR COST OF LIVING	VC DOLLARS PER CAPITA

*The software power index was calculated using a weighted ranking system reflecting each metric's relative importance with input from industry partners.

> *San Diego is a great place to build a company and recruiting talent has been relatively easy. Our staff stays with us, on average, two to three times longer than industry averages found in Silicon Valley. We recruit from both the local talent and universities, as well as other tech hubs like Seattle, Boston and the Bay Area. MindTouch has found it easy to attract interest from venture and growth capital from outside the region."*
>
> **Aaron Fulkerson,** founder & CEO, MindTouch

TABLE OF CONTENTS

TECH

Software development is disrupting the global marketplace like never before. Mobile apps, cloud computing, cybersecurity, big data, digital health, genomics, contextual robotics and the internet of things (IoT) are rapidly changing the way people live their lives and do business. At the core of these tools and technologies is sop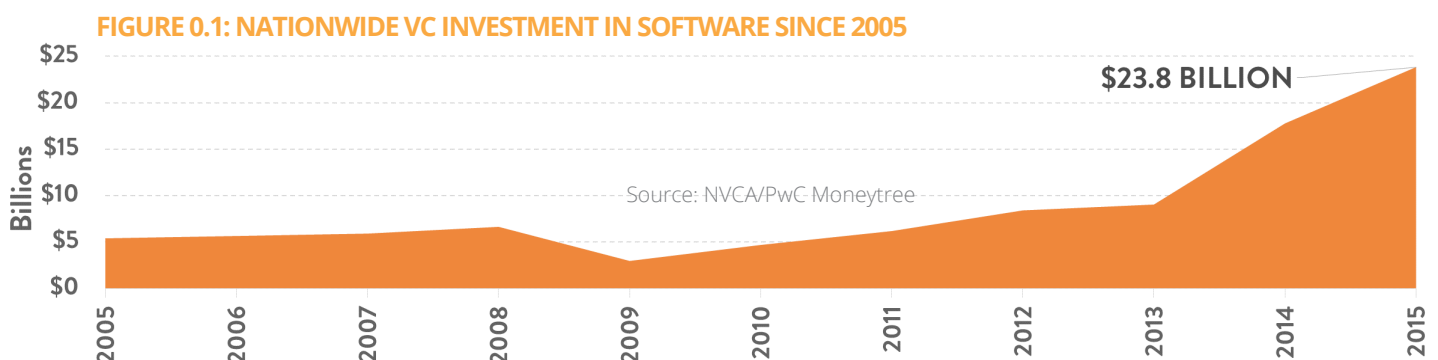histicated software developed by talented professionals working in a variety of industries, and San Diego has long been one of the global centers of software and technology development.
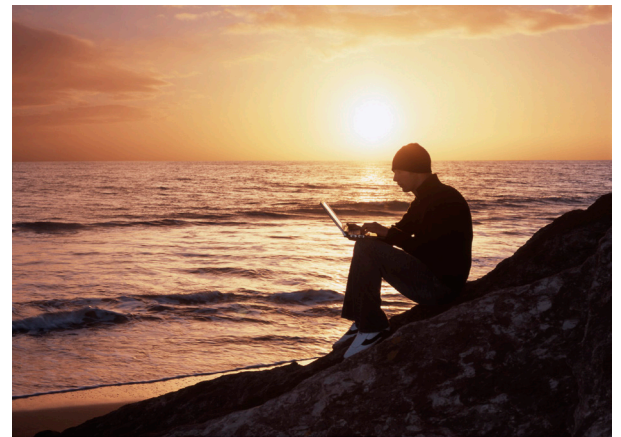
Recently, investment in software has exploded. In 2015, software firms received $23.8 billion in venture capital—a 400% increase in investment since 2010 (see figure 0.1). This figure does not even account for the growth in software-dependent fields like health IT, genomics, medical devices, communications and clean technology. While the region has no shortage of companies and entrepreneurs working on new consumer apps and software platforms, the region has a particular advantage in the sciences, health and communications. For example, a software developer in San Diego is two times more likely to work in scientific research and development—including life sciences, cleantech and defense—than a developer elsewhere in California. As a result, software development—a crucial component of the a tech ecosystem—is driving startup and job growth and the convergence of new industries.

Therefore, software development is not so much an industry as it is a tool and skill that permeates many corners of the region's economy; most importantly, San Diego's innovation economy. This study deconstructs software in San Diego beyond the region's software publishers and IT firms, and displays how the technology is changing the landscape of all types of innovation in San Diego.

FIGURE 0.1: NATIONWIDE VC INVESTMENT IN SOFTWARE SINCE 2005

$23.8 BILLION

Source: NVCA/PwC Moneytree

This study is broken down into five main components with the goal of better understanding and communicating the region's position and strengths in software development. This study focuses on the universe of companies that sell a software product, platform or service to external customers, as well as those companies that develop software as an integral part of a product or device that they sell.

- **THE SOFTWARE ECOSYSTEM**: This study details the skilled software professionals and unique assets that make up the software development ecosystem in San Diego.

- **ECONOMIC IMPACTS**: This study assesses the economic impacts of software development activity on the region's economy, employment and wages.

- **SOFTWARE POWER INDEX**: This study places San Diego among the 50 largest US metros through a comprehensive software power index, using metrics on talent, concentration, prosperity and capital to rank regions and draw comparisons.

- **CAPITAL**: This study demonstrates how capital flows to the region catalyze software development and innovation, identifying strengths and weaknesses, and highlighting the region's unique capital attraction.

- **NEXT STEPS**: In order to remain an attractive market for software development companies and investments, the region will need to collaborate to address key weaknesses and reinforce strengths. This study offers recommendations for next steps on how the region can work together to maximize the software ecosystem in San Diego.

KEY TAKEAWAYS

- **San Diego is one of the premier US markets for software development.**

- **Software development has an immense economic impact on the region's economy.**

- **San Diego's software development ecosystem is unique, with employment and investment dispersed throughout many product verticals and innovation sectors.**

- **Software development offers an immense opportunity for growth in the region, and local collaboration can help ensure that the region will capitalize.**

1

THE SOFTWARE ECOSYSTEM

HIGHLIGHTS

3X Software developer jobs have grown 3x faster than total jobs in San Diego from 2010-15.

18.1% Employers expect software jobs to grow by 18.1% in the coming year.

2X San Diego software developers are twice as likely to work in scientific R&D than their CA counterparts.

21.6% More than one-fifth of all software development jobs are in life sciences, defense and robotics.

KEY TAKEAWAY

San Diego's software ecosystem consists of 21,600 software developers and an additional 19,660 related workers. These 41,260 employees span more than 60 different industries in San Diego, mostly in the region's innovation economy, and are growing at a very high rate.

1.1 DEFINING THE ECOSYSTEM

Approximately 21,600 applications developers, systems developers, computer programmers and web developers work in 64 industries throughout San Diego's economy. To determine San Diego's software ecosystem, this study determined which industries were most heavily concentrated with software developers, breaking them down into three categories.

CORE

Core software industries are those in which software development jobs make up more than 20% of the total employment in that industry. Given that these industries are so heavily dependent on developers, all employment from these industries is included in the software ecosystem.

SOFTWARE-DEPENDENT

Because core industries only account for 39% of all software developers, this study accounted for software-dependent industries—those that have a relatively high share of developers (3%-19.9%). This study determined how many employees were working in a support role for software development in addition to the software developers in those industries.

OTHER NON-TECH DEVELOPERS

The remaining software developers work in a total of 52 different non-tech industries (e.g. government, education). Includes only software developers (no support).

FIGURE 1.1

THE SOFTWARE DEVELOPMENT ECOSYSTEM

TALENT

SOFTWARE DEVELOPERS
APPLICATIONS, SYSTEMS, WEB & COMPUTER PROGRAMMERS

SOFTWARE SUPPORT
ACCOUNTING, MARKETING, IT, MANAGEMENT, ETC.

TECH

INDUSTRIES

CORE SOFTWARE 3 INDUSTRIES	SOFTWARE-DEPENDENT 9 INDUSTRIES	OTHER NON-TECH 52 INDUSTRIES

COMPANIES (examples)

INTUIT ESET MITCHELL CYMER	QUALCOMM VIASAT ILLUMINA GENERAL ATOMICS	CITY OF SAN DIEGO JACK IN THE BOX BANK OF AMERICA SHARP

SCENARIOS

INCLUDED
- Applications developer at Intuit
- Computer programmer at Illumina
- Web developer at Jack in the Box
- Sales rep at ESET
- Program manager for a software project at VIASAT

NOT INCLUDED
- Research scientist at Illumina
- Finance manager at Bank of America
- Sales rep for Cox Communications selling cable packages

1.1 DEFINING THE ECOSYSTEM

Core industries account for 61% of all software development employment, but only 39% of software developers, due to the many support positions within these companies

FIGURE 1.2: SOFTWARE ECOSYSTEM BREAKDOWN

Category (Developer Share)	Software Developers	Support/ Related	Total Software
Core (>20%)	8,430	16,630	25,060
Dependent (3%-19.9%)	5,890	3,030	8,920
Other Non-Tech (<3%)	7,280	-	7,280
Total	21,600	19,660	41,260

Source: California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

FIGURE 1.3: STAFFING PATTERN DISPERSION

INDUSTRY TITLE	% of Industry Employment from Software Developers	% of Industry Employment from Software Developers
CORE	**>20%**	**39.0%**
Software Publishers	37.2%	28.5%
Computer Systems Design	29.7%	7.7%
Computer Mfg.	23.2%	2.9%
SOFTWARE-DEPENDENT	**3%-19.9%**	**27.3%**
ISPs, Web Search and Data Processing	14.7%	1.4%
Communications Equipment Mfg.	9.2%	4.5%
Nav/Measuring/Electromedical Instruments Mfg.	7.7%	1.8%
Scientific R&D Services	5.8%	10.0%
Aerospace Product and Parts Mfg.	5.3%	2.9%
Equipment and Supplies Wholesalers	4.8%	1.4%
Semiconductor/Electronic Component Mfg.	4.0%	3.7%
MGMT, Scientific and Technical Consulting	3.8%	1.1%
Electronic Shopping	3.1%	0.4%
OTHER NON-TECH DEVELOPERS	**<3%**	**33.7%**

Source: California Employment Development Department, Industry Staffing Patterns

TECH

1.2 DEVELOPMENT DISPERSED

San Diego's software development ecosystem is rapidly evolving. As industries continue to innovate and adopt new technologies, software developers are increasingly finding employment in other tech-related verticals. Sectors in the life sciences, clean technologies and telecommunications are becoming increasingly dependent on software development professionals.

RAPID GROWTH

Software developers are growing at a faster rate than the jobs being added in core software industries. From 2010-15, software developers grew by 30% compared to 4.7% growth in core software industries and 12.9% in software-dependent (figure 1.4).

FIGURE 1.4: EMPLOYMENT GROWTH INDEX BY TYPE
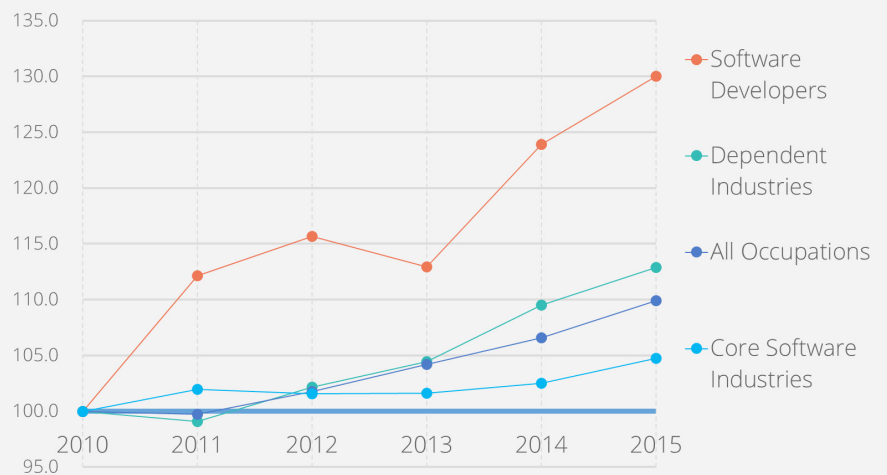
Source: Bureau of Labor Statistics, OES, QCEW, 2010-14
2015 data based on simple extrapolation from CES data.

> **Employers** surveyed for this study indicated that they expect **software employment to grow by 18.1%** in the next year

FIGURE 1.5: JOBS ADDED BY TYPE, 2010-15
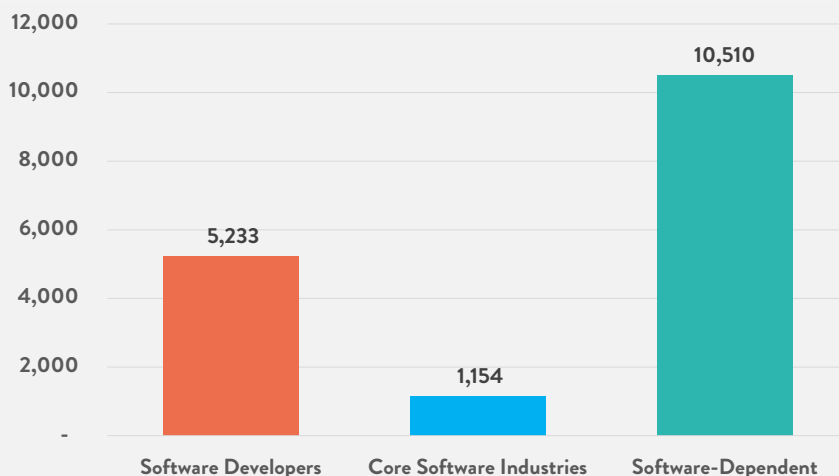
Source: Bureau of Labor Statistics, OES, QCEW, 2010-14
2015 data based on simple extrapolation from CES data.

MORE DISPERSION

San Diego employers added approximately 4,100 software developers from 2010 to 2015, but only about 1,150 jobs were added in the core software industries (figure 1.5). This trend indicates that software-dependent and other industries are hiring more software developers as software development becomes a more important part of their business or function.

When compared to California as a whole, software developers in San Diego are far more likely to work in industries outside of the core. Software developers in San Diego are roughly 21% less likely to work in core industries, while 43% more likely to work in tertiary industries lik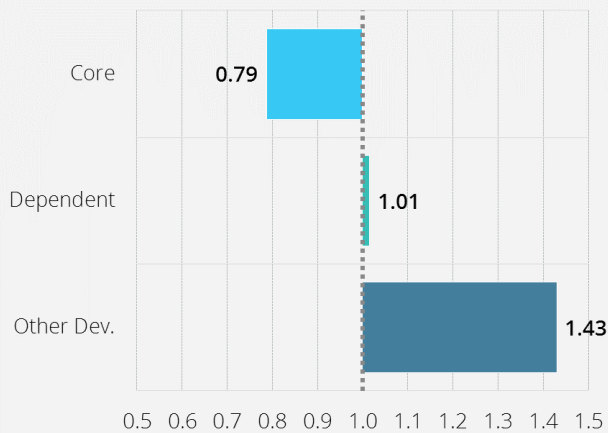e government, finance, law, engineering and medicine (figure 1.6). Within secondary industries, developers are far more likely to work in scientific firms.

FIGURE 1.6: SOFTWARE DEVELOPMENT SPECIALIZATION VS. CALIFORNIA
(1.0 = AVERAGE CONCENTRATION)

Core — 0.79
Dependent — 1.01
Other Dev. — 1.43

Source: California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

A **software developer** in San Diego is approximately **1.9 times** more likely to work in **scientific research and development (R&D)** services than developers in the **rest of California**

FIGURE 1.7: DETAILED SOFTWARE DEVELOPMENT SPECIALIZATION VS. CALIFORNIA
(1.0 = AVERAGE CONCENTRATION)
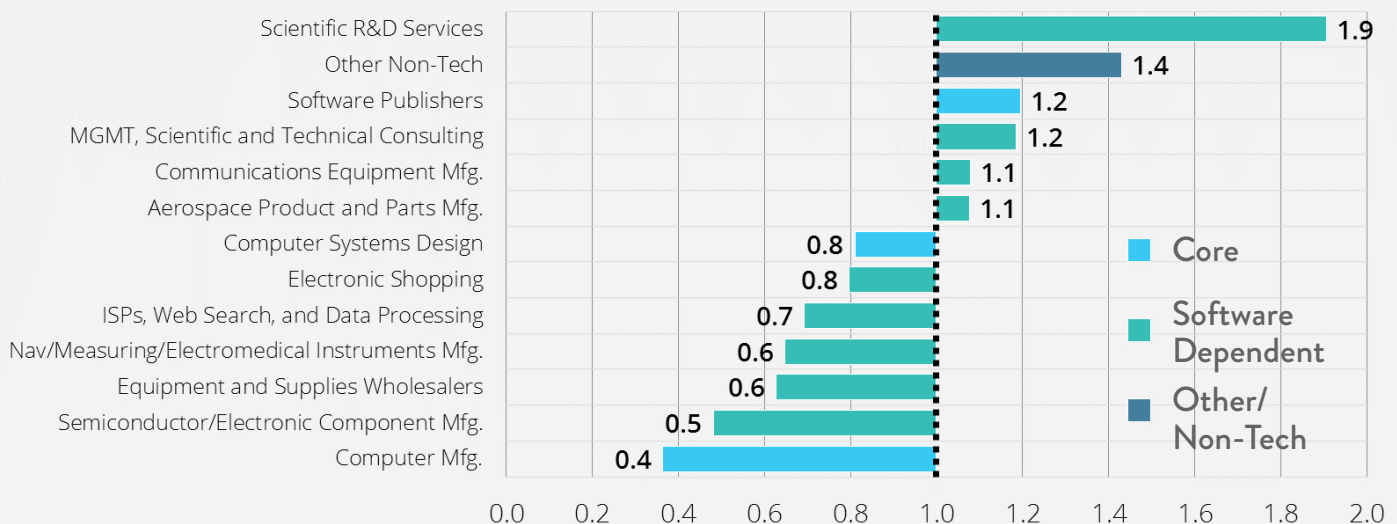
Scientific R&D Services — 1.9
Other Non-Tech — 1.4
Software Publishers — 1.2
MGMT, Scientific and Technical Consulting — 1.2
Communications Equipment Mfg. — 1.1
Aerospace Product and Parts Mfg. — 1.1
Computer Systems Design — 0.8
Electronic Shopping — 0.8
ISPs, Web Search, and Data Processing — 0.7
Nav/Measuring/Electromedical Instruments Mfg. — 0.6
Equipment and Supplies Wholesalers — 0.6
Semiconductor/Electronic Component Mfg. — 0.5
Computer Mfg. — 0.4

Legend:
■ Core
■ Software Dependent
■ Other/Non-Tech

Source: California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

TECH

1.4 PRODUCT VERTICALS

This study sampled nearly 400 technology and related companies out of a database of more than 1,600 to determine their roles in the software development ecosystem. SaaS companies make up nearly a quarter of all software development employment, followed by health IT/med devices and defense/robotics. To clarify, health IT, medical device, defense and cleantech companies employ far more people in the region's economy than shown here, but not all of those employees work in software development.

EXAMPLES

SAAS
EdgeWave
ESET
Intuit
Mitchell
MindTouch

MOBILE
Huawei
Kyocera
LG
Qualcomm
ViaSat

HEALTH IT / MED DEVICES
BD/Carefusion
Illumina
Thermo Fisher Scientific
VM Racks
VisionTree

DEFENSE / ROBOTICS
Booz Allen Hamilton
Cubic
General Atomics
Kratos Defense
Leidos
Lockheed Martin Corp

FIGURE 1.8: SOFTWARE DEVELOPMENT EMPLOYMENT BY PRODUCT VERTICAL

Product Vertical	Employment
SaaS	9,940
Other Non-Tech	7,280
Health IT/Med Devices	4,960
Defense/Robotics	4,380
Gaming/Media Entertainment	4,080
Mobile/Communications Tech	3,730
Web/Ecommerce/Marketing	2,020
Other Tech	1,720
Other Electronics MFG	1,590
Cloud/Data Storage	900
Networking	410
Energy/Clean Tech	260
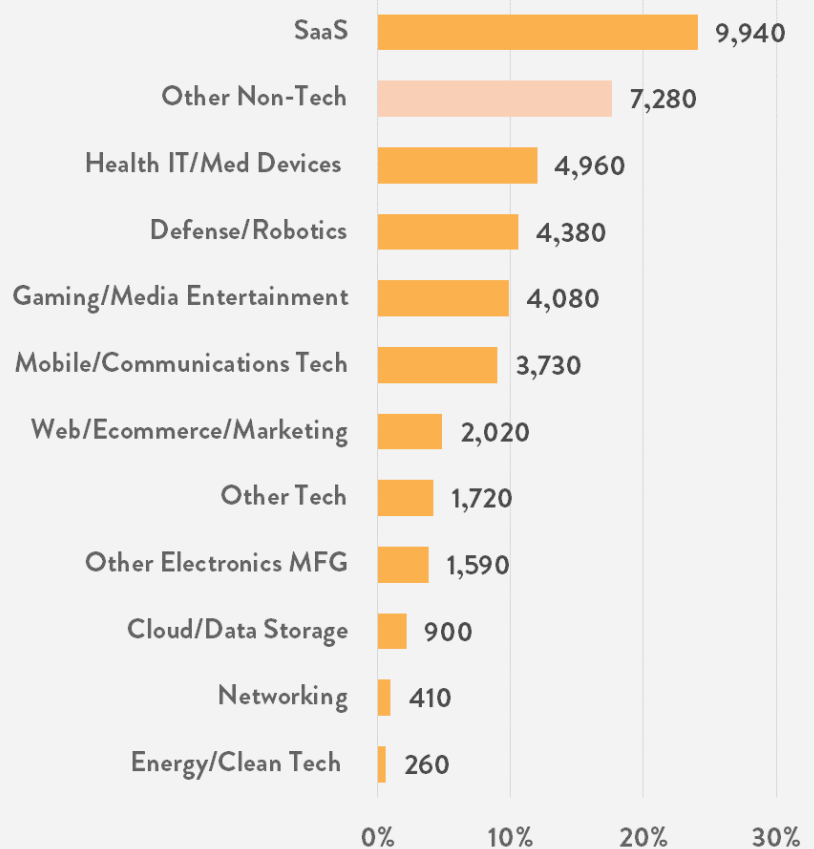
Source: ReferenceUSA; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research
Detailed methodology in Appendix

GAMING/MEDIA ENTERTAINMENT
Rockstar San Diego
Sony Electronics
Sony Online Gaming
Verance Corp.

WEB/ECOMMERCE/MARKETING
Hibu
Mirum
Provide Commerce (FTD)
Underground Elephant

1.5 THE GROWTH OF WEB

Even within the software developer category, occupations and programming languages are evolving[1]. Networking, database, web and mobile languages are most important to San Diego firms, with SQL and JavaScript languages being the most important factor for firms with a software development component. More firms are engaging in web and mobile development than ever before and the labor market is adjusting to that trend.

A SHIFT TOWARD WEB/SYSTEMS

Web and Systems Developers are largely driving the growth in software development. Web Developer jobs more than doubled in San Diego from 2010 to 2015. Computer Programmers were the only occupation to decline, but this trend is reflect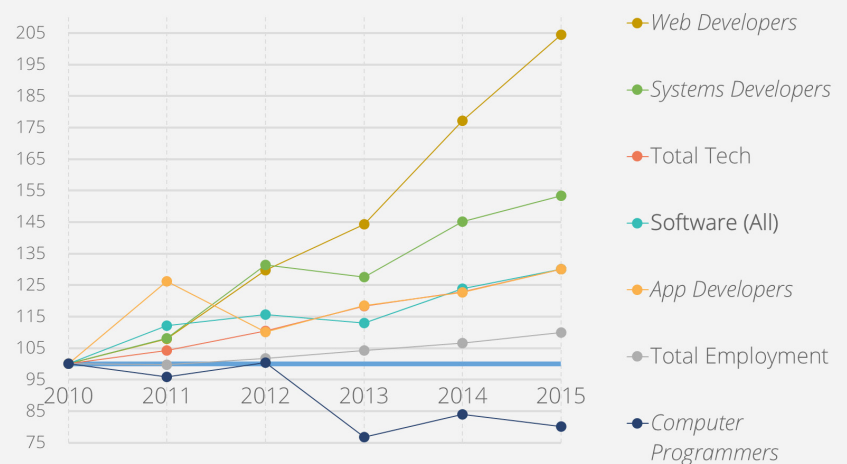ed in both state and national data. It is likely that many computer programmers either switched occupations or were reclassified to Web or Systems Developer, rather than indicating job loss.

FIGURE 1.9: SOFTWARE DEVELOPMENT OCCUPATION GROWTH INDEX

Source: Bureau of Labor Statistics, OES, QCEW, 2010-14
2015 data based on simple extrapolation from CES data.

FIGURE 1.10: IMPORTANCE OF PROGRAMMING LANGUAGES WHEN CONSIDERING A CANDIDATE FOR A POSITION, SAN DIEGO FIRMS
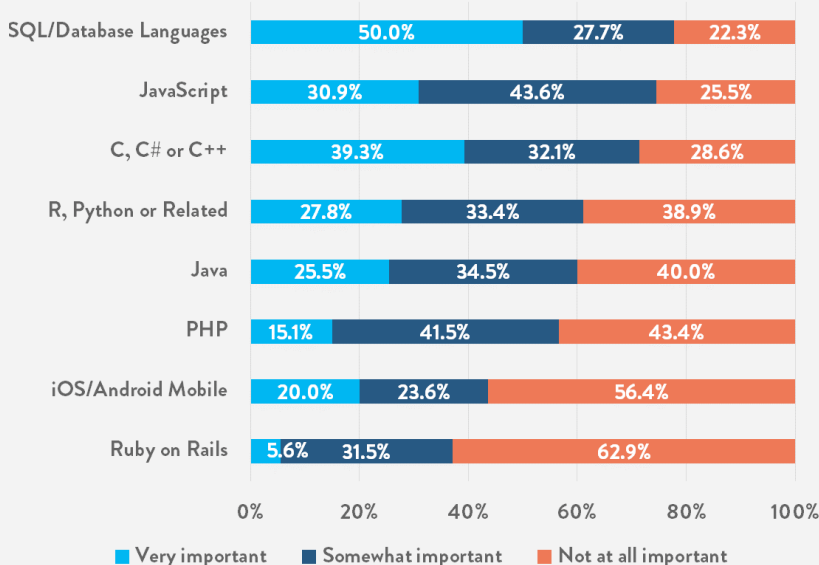
	Very important	Somewhat important	Not at all important
SQL/Database Languages	50.0%	27.7%	22.3%
JavaScript	30.9%	43.6%	25.5%
C, C# or C++	39.3%	32.1%	28.6%
R, Python or Related	27.8%	33.4%	38.9%
Java	25.5%	34.5%	40.0%
PHP	15.1%	41.5%	43.4%
iOS/Android Mobile	20.0%	23.6%	56.4%
Ruby on Rails	5.6%	31.5%	62.9%

SQL, JavaScript, Java and PHP are among the most common **web programming languages** and **important to San Diego companies** that develop software

Source: San Diego Regional EDC; Survey performed by BW Research, depends and not sure removed. n=57

TECH
1.6 OTHER EMPLOYER FEEDBACK

San Diego employers provided responses to a variety of questions about their software skill needs and current workforce. Employers were generally favorable about their ab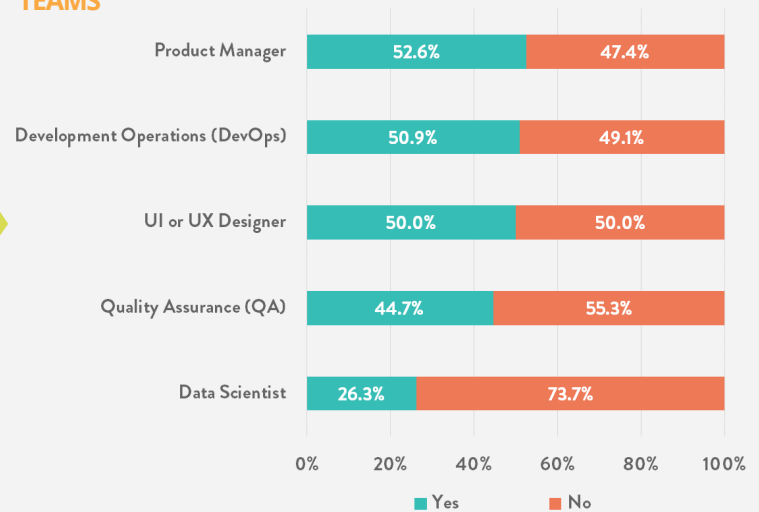ility to find and attract talent to the region. Only 10% of employers reported dissatisfaction with their ability to recruit experienced high level talent and only 5% reported dissatisfaction with their ability to retain valued employees. Below are responses about their workforce and hiring preferences.

FIGURE 1.11: GENERAL TITLES OF PEOPLE ON SOFTWARE TEAMS

	Yes	No
Product Manager	52.6%	47.4%
Development Operations (DevOps)	50.9%	49.1%
UI or UX Designer	50.0%	50.0%
Quality Assurance (QA)	44.7%	55.3%
Data Scientist	26.3%	73.7%

Source: San Diego Regional EDC; Survey performed by BW Research, depends and not sure removed. n=57

> **Majority of companies surveyed have product managers, DevOps staff and UI/UX designers on their software development teams**

FIGURE 1.12: IMPORTANCE WHEN CONSIDERING A CANDIDATE FOR A POSITION, SAN DIEGO FIRMS
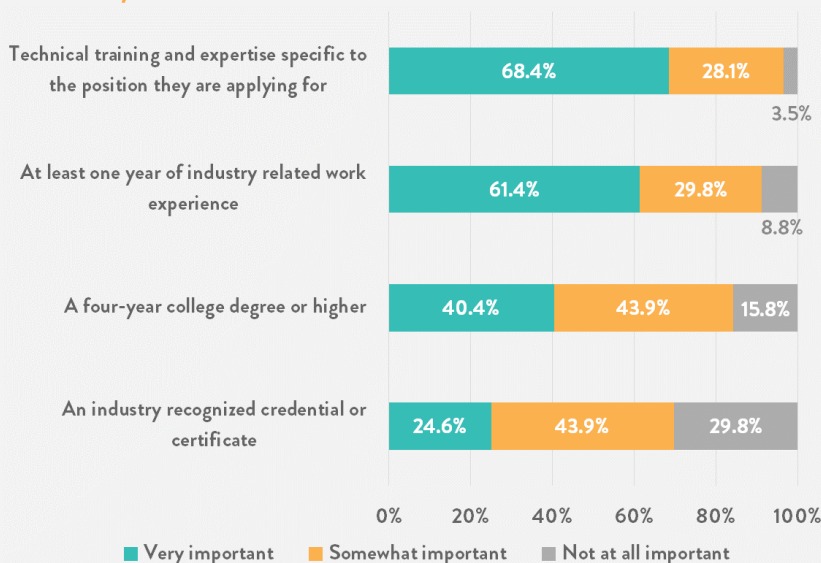
	Very important	Somewhat important	Not at all important
Technical training and expertise specific to the position they are applying for	68.4%	28.1%	3.5%
At least one year of industry related work experience	61.4%	29.8%	8.8%
A four-year college degree or higher	40.4%	43.9%	15.8%
An industry recognized credential or certificate	24.6%	43.9%	29.8%

> **Technical training and experience were identified as the most important aspects when considering a candidate**

Source: San Diego Regional EDC; Survey performed by BW Research, depends and not sure removed. n=57

San Diego has many local assets that help the region compete for software development jobs, including world-class universities, successful incubators and accelerators, and local trade organizations dedicated to helping software development companies and employers grow. The survey of firms performed for this study showed that employers have generally favorable views of these assets and the software ecosystem at large (see appendix for full results).

UNIVERSITIES

San Diego's five major Universities, Cal State San Marcos, Point Loma Nazarene, San Diego State University, University of California San Diego and the University of San Diego each offer computer science degrees[1]. The students from the programs, as well as the professors who teach them, are an asset to the community. These universities are not only a source of future talent for the industry but can provide regional companies with highly-skilled interns before graduation.

> **79% of companies** surveyed for this studied indicated that they were **satisfied** or **very satisfied** with **education and training institutions** that help **develop software talent**

INCUBATORS/ACCELERATORS

The San Diego region has 27 incubators and accelerators[2]. Successful incubators like EvoNexus have been able to support tech startups with the mentorship, space and access to capital necessary to succeed. EvoNexus alone has helped companies since 2010 with funding outcomes that have totaled nearly a billion dollars at $974 million to date[3].

DEDICATED LOCAL TRADE ORGS

Software companies in San Diego have access to a wide variety of non-profits who offer customized services to support entrepreneurs. Some of those include Connect, Cyber Center of Excellence (CCOE), CyberHive and Tech San Diego. Connect is one of San Diego's most well-recognized non-profits with several programs designed to help students and businesses create lasting enterprises[4]. A new wave of tech-focused non-profits are also developing to meet more specialized sectors of the software ecosystem from cybersecurity to IoT[5].

2

ECONOMIC IMPACTS

HIGHLIGHTS

$12.2B — Economic impact of software development on San Diego's Gross Domestic Product.

100K+ — Software development impacts more than 100,000 jobs (7.2% of all jobs) due to indirect and induced impacts.

2.4X — For every 100 software development jobs created, 244 total jobs are added through indirect and induced impacts.

$8.1B — More than $8 billion in wages are paid to workers in San Diego as a result of software development activity.

KEY TAKEAWAY

Software development generates large and demonstrable impacts on the region's economy. This activity generates substantial wages for employees in nearly all industries in San Diego, while also generating millions in new local and state tax revenues.

TECH

When jobs are created in software development, it results in many more jobs created throughout the economy due to indirect and induced impacts. Industries like staffing, commercial real estate, and wholesale trade add employees in order to supply the requisite services for these new employees. Additionally, these added jobs mean more spending on retail, food service, health care and other services, increasing demand for more employees in those industries.

FIGURE 2.1: EMPLOYMENT IMPACTS OF SOFTWARE DEVELOPMENT

CATEGORY	DIRECT	INDIRECT/ INDUCED	TOTAL	MULTIPLIER
CORE	25,060	36,500	61,800	2.47
DEPENDENT	8,920	15,700	25,000	2.80
OTHER DEVELOPERS	7,280	7,000	13,700	1.88
TOTAL	41,200	59,200	100,500	2.44

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

100K+
TOTAL JOBS IMPACTED

Software-dependent industries generate the **largest multiplier,** mostly due to the high wages in **scientific R&D, cleantech** and **aerospace**

FOR EVERY
100 SOFTWARE JOBS CREATED
244 TOTAL JOBS ARE IMPACTED

FIGURE 2.2: EMPLOYMENT IMPACTS OF SOFTWARE DEVELOPMENT

	DIRECT	INDIRECT / INDUCED	TOTAL
Core	25,060	36,500	61,900
Software-Dependent	8,920	15,700	24,900
Other Development	7,280	7,000	13,700

0   10,000   20,000   30,000   40,000   50,000   60,000   70,000

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

2.2 GROSS DOMESTIC PRODUCT

Software development generates substantial value for the region's economy, totaling more than $12.2 billion in gross domestic product (GDP) per year. Core software industries alone generate more than $7.2 billion dollars in economic activity. Like employment, software-dependent industries generate a higher multiplier effect, due to high wages and the high value of manufacturing industries like communications equipment and aerospace.

FIGURE 2.3: VALUE ADDED IMPACTS OF SOFTWARE DEVELOPMENT

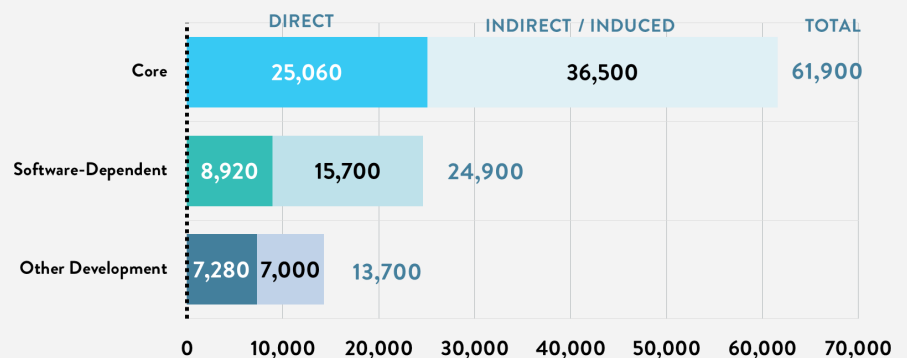| CATEGORY	DIRECT ($MIL)	INDIRECT/ INDUCED ($MIL)	TOTAL ($MIL)	MULTIPLIER
CORE	$4,046.9	$3,223.6	$7,270.5	1.80
DEPENDENT	$1,750.4	$1,507.8	$3,258.2	1.86
OTHER DEVELOPERS	$1,079.3	$616.8	$1,696.1	1.57
TOTAL	$6,876.6	$5,348.3	$12,224.9	1.78

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

$12.2B
TOTAL ECONOMIC IMPACT

TOTAL SOFTWARE IMPACTS ACCOUNT FOR **5.9%** OF ALL LOCAL GDP

FIGURE 2.4: VALUE ADDED IMPACTS OF SOFTWARE DEVELOPMENT
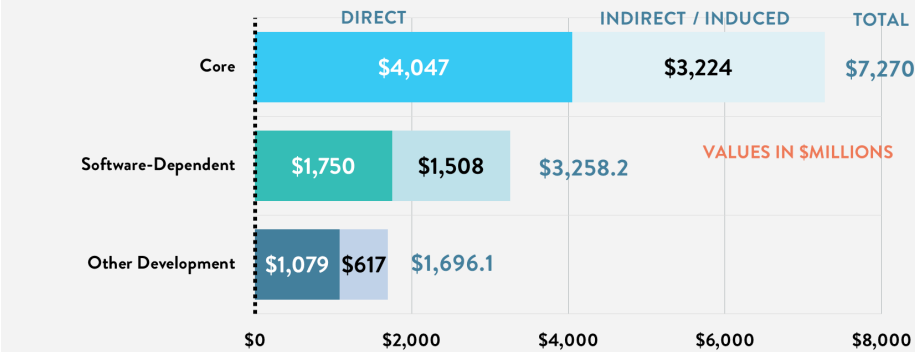
	DIRECT	INDIRECT / INDUCED	TOTAL
Core	$4,047	$3,224	$7,270
Software-Dependent	$1,750 $1,508	$3,258.2	
Other Development	$1,079 $617	$1,696.1	

VALUES IN $MILLIONS

$0 $2,000 $4,000 $6,000 $8,000

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

2.3 OTHER IMPACTS

Impacts generated by software development also mean more money for San Diegans and their government. More than $8 billion in wages and more than $820 million in state and local taxes are generated by software development each year. The vast majority of revenue is generated through taxes on income, property, sales and licensing.

Employees in software development alone earn more than **$4.9B in wages,** which is about **$120k per employee** per year

FIGURE 2.5: WAGE IMPACTS OF SOFTWARE DEVELOPMENT

CATEGORY	DIRECT ($MIL)	INDIRECT/ INDUCED ($MIL)	TOTAL ($MIL)	MULTIPLIER
CORE	$2,919.4	$1,921.8	$4,841.2	1.66
DEPENDENT	$1,120.8	$887.2	$2,008.1	1.79
OTHER DEVELOPERS	$884.0	$356.0	$1,240.0	1.40
TOTAL	$4,924.2	$3,165.0	$8,089.2	1.64

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

$8B
TOTAL WAGES IMPACTED

$820M
IN ANNUAL STATE AND LOCAL TAXES

FIGURE 2.6: STATE AND LOCAL TAX IMPACTS OF SOFTWARE DEVELOPMENT
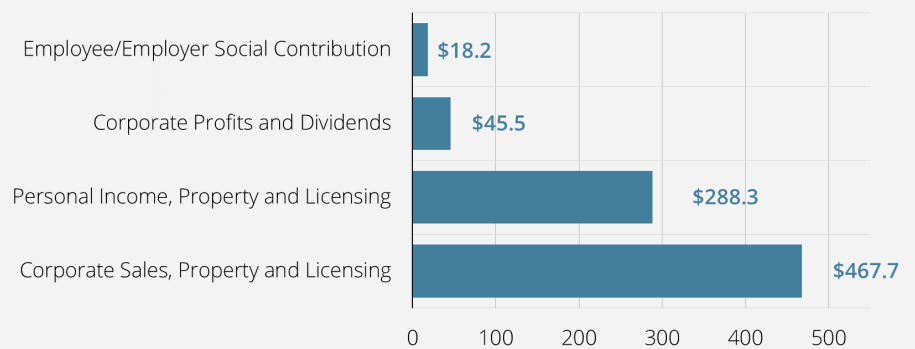
Employee/Employer Social Contribution	$18.2
Corporate Profits and Dividends	$45.5
Personal Income, Property and Licensing	$288.3
Corporate Sales, Property and Licensing	$467.7

0   100   200   300   400   500

Source: IMPLAN Group, LLC; California Employment Development Department, Industry Staffing Patterns; BW Research; CBRE Research

3

SOFTWARE POWER INDEX

HIGHLIGHTS

#7 San Diego is ranked the seventh best metro for software development according to the index.

3.1% Companies in core software industries in San Diego enjoy lower replacement rates for talent.

$97K San Diego software developers receive higher than average cost-of-living-adjusted pay.

$1.16B San Diego received more than $1 billion in VC investment in 2015, which ranks 4th in the US on a per capita basis.

KEY TAKEAWAY

The Software Power Index demonstrates that San Diego is one of the top metro areas for software development in the US. San Diego has unique competitive advantages over many regions, scoring above average in every measure.

TECH

3.1 COMPOSITE SCORE

The Software Power Index combines a variety of factors to score San Diego's software development activity relative to other major metro areas in the US. The findings show that San Diego is a premier region for software development. The region has many unique advantages, as demonstrated on the following pages, but the high composite score is in large part due to the region's well-roundedness, scoring high in nearly every measure studied.

An index was developed to take a more holistic look at a region's software development capacity. Rather than focusing simply on one category, like size or talent base, this study analyzed the 50 largest US metros by looking at the concentration of software developers, the ability to attract, retain and develop talent, the continued growth and prosperity for developers, and the region's attractiveness for capital investment.

San Diego ranked in the **top ten** in every category measured

FIGURE 3.1

#7
COMPOSITE

#10 CONCENTRATION	#8 TALENT	#7 PROSPERITY	#4 CAPITAL
CONCENTRATION OF SOFTWARE DEVELOPERS	EMPLOYEE RETENTION, CS DEGREES PER CAPITA, COMPUTER/MATH DEGREE ATTAINMENT	JOB GROWTH, WAGE GROWTH, WAGE ADJUSTED FOR COST OF LIVING	VC DOLLARS PER CAPITA
30%	30%	30%	10%

FIGURE 3.2

COMPOSITE SCORE
114.3   #7 / 50

		Score
1	San Jose	144.2
2	Seattle	134.3
3	San Francisco	120.5
4	Boston	119.7
5	Raleigh	118.4
6	Baltimore	115.3
7	San Diego	114.3
8	Austin	111.5
9	Atlanta	110.7
10	Washington	110.2

100   110   120   130   140   150

Source: San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS; US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree
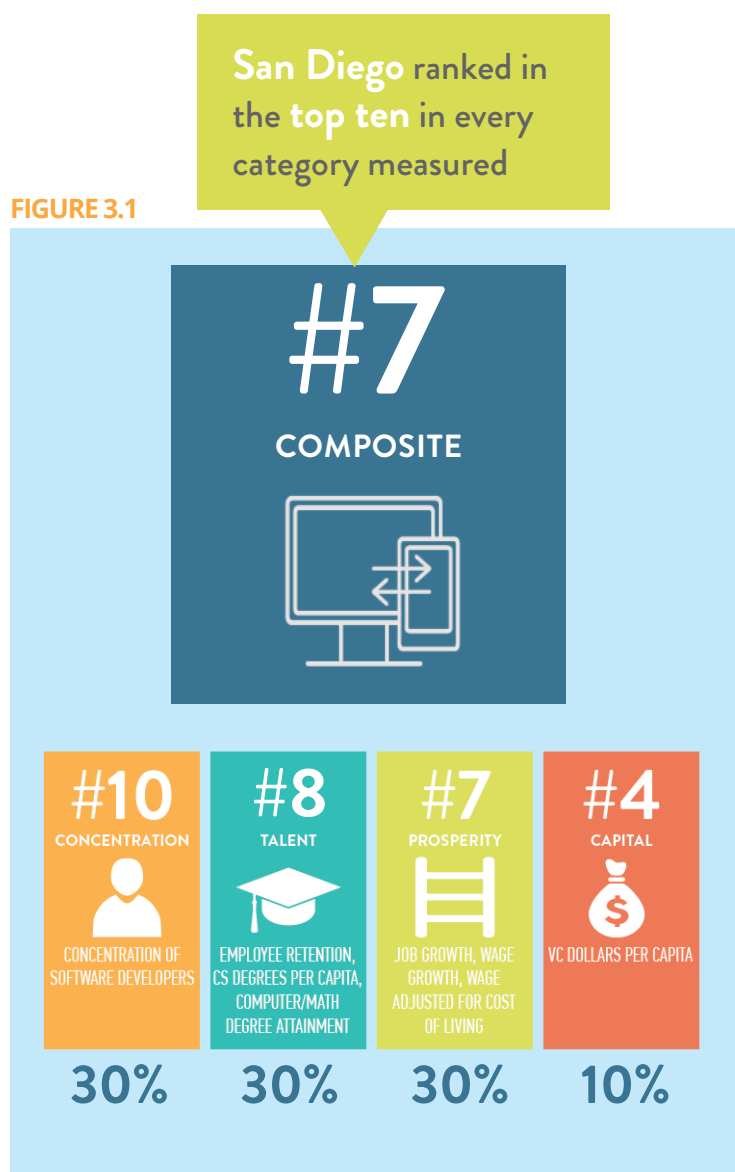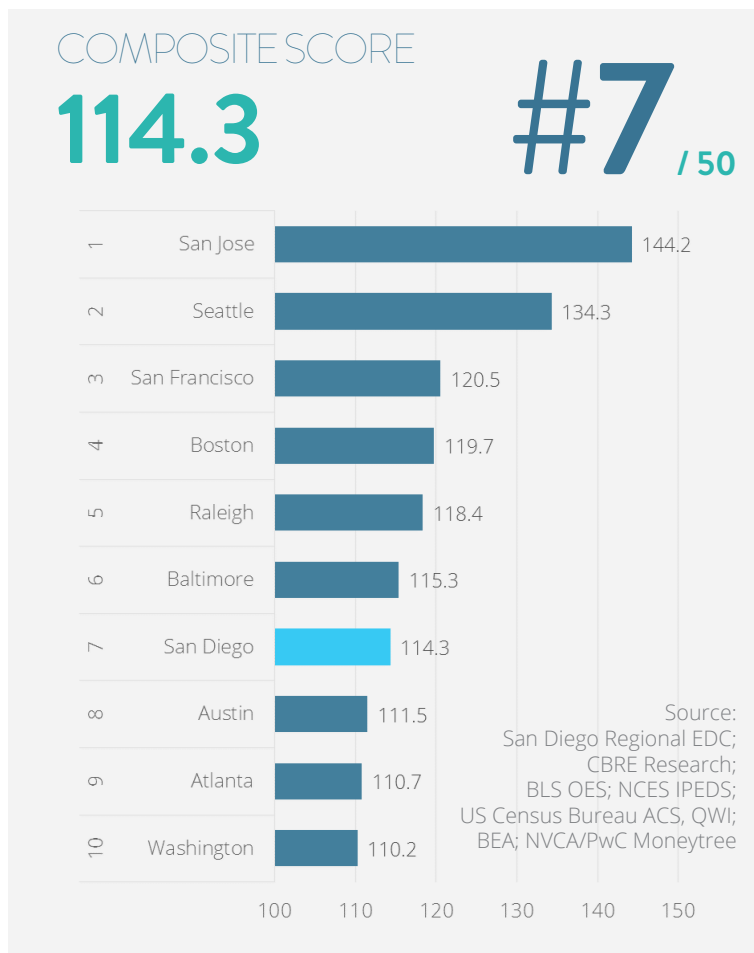
SAN DIEGO SOFTWARE DEVELOPMENT STUDY // 18

3.2 CONCENTRATION

Concentration of software development workers was the most impactful single metric used in the index, accounting for 30% of the composite score. Without the requisite number of app developers, systems developers and computer programmers, a region is unlikely to compete for business or investment in software development. In this measure, San Diego ranked 10th, the lowest of any category in the index.

FACTORS
(30% OF TOTAL)

SAN DIEGO / TOP 50 AVG.	RANK
14.9 / 13.1	**#10**

SOFTWARE DEVELOPERS PER 1,000 WORKERS
(BLS OES 2014)

"San Diego has a great ecosystem of companies that recruit and hire some of the nation's best software talent. At ViaSat, we are continuing to rapidly grow our software development workforce here in San Diego. These highly-skilled professionals enable ViaSat to provide increasingly better global connectivity for the Department of Defense and commercial customers like Virgin America."

NIK DEVEREAUX, ENGINEERING PROGRAM MANAGER, VIASAT

FIGURE 3.3

CONCENTRATION SCORE

110.2   **#10** / 50

		Score
1	San Jose	168.2
2	Seattle	144.8
3	San Francisco	130.0
4	Washington DC	128.8
5	Boston	126.7
6	Raleigh	123.7
7	Austin	123.4
8	Denver	118.1
9	Atlanta	110.8
10	San Diego	110.2

Source: San Diego Regional EDC; CBRE Research; BLS OES
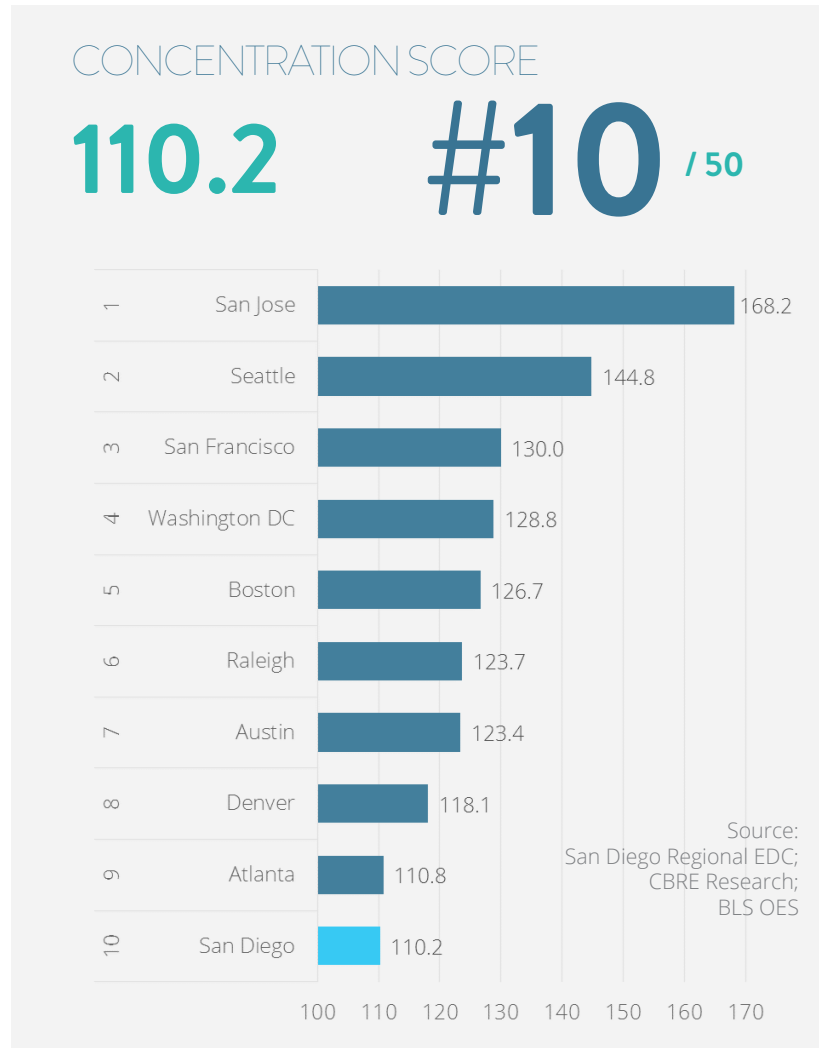
FIGURE 3.4: SOFTWARE DEVELOPER CONCENTRATION (TOP 50 US METROS)

San Jose 69.7 — San Diego 14.9 — Average 13.1 — New Orleans 2.4

Source: San Diego Regional EDC; CBRE Research; BLS OES
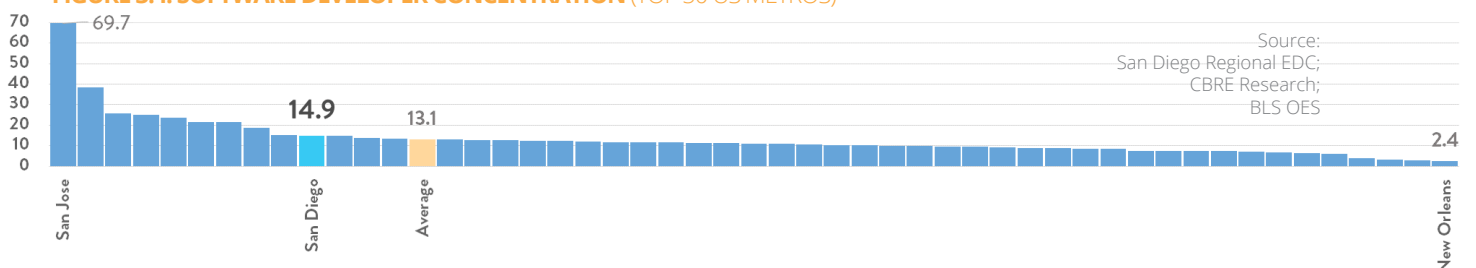
TECH

3.3 TALENT

Talent is the lifeblood of any technology ecosystem and San Diego is a top location for software development talent. The region scores particularly high in developing a pipeline of software developer talent, due in large part to UC San Diego's Jacobs School of Engineering, which conferred the **third most undergraduate computer science degrees in 2014**, behind only Arizona State and Georgia Tech[1].

FACTORS
(WEIGHTED EQUALLY AT 10% OF TOTAL)
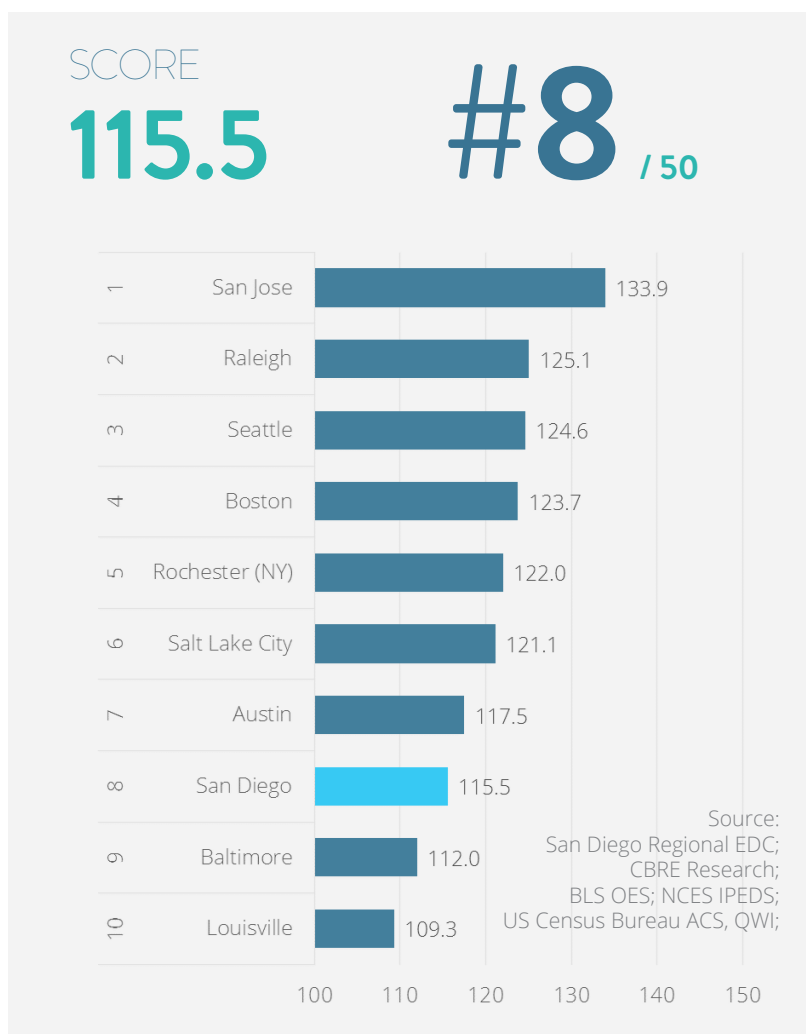
SAN DIEGO / TOP 50 AVG.	RANK

PIPELINE

4.0 / 2.3   **#7**

COMPUTER SCIENCE DEGREES AWARDED PER 10,000 WORKERS
(NCES IPEDS 2014)

TALENT POOL

2.0% / 1.8%   **#14**

% OF 25+ POPULATION WITH COMPUTER OR MATH DEGREE
(US CENSUS ACS 2014 1-YR ESTIMATES)

RETENTION

3.1% / 3.4%   **#13**

% OF TOTAL DEGREE-HOLDING IT WORKERS REPLACED IN 2014
(US CENSUS QWI 2014 AVERAGE)

San Diego is one of only five metros with above average concentration of developers and better than average retention

FIGURE 3.5

SCORE **115.5**   **#8** / 50

Rank	City	Score
1	San Jose	133.9
2	Raleigh	125.1
3	Seattle	124.6
4	Boston	123.7
5	Rochester (NY)	122.0
6	Salt Lake City	121.1
7	Austin	117.5
8	San Diego	115.5
9	Baltimore	112.0
10	Louisville	109.3

Source:
San Diego Regional EDC;
CBRE Research;
BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI;

"San Diego is a great place to build a company and recruiting talent has been relatively easy. Our staff stays with us, on average, two to three times longer than industry averages found in Silicon Valley. We recruit from both the local talent and universities, as well as other tech hubs like Seattle, Boston and the Bay Area."

AARON FULKERSON, FOUNDER & CEO, MINDTOUCH

3.4 PROSPERITY

Whether or not a professional will earn enough money and continue to see growth in their career are major parts of attracting and retaining software development talent to a region. In this regard, San Diego performed well above average in all metrics and ranked seventh overall. San Diego pays developers more than average, even after adjusting for cost of living, and experienced outstanding wage growth from 2010 to 2014.

FACTORS
(WEIGHTED EQUALLY AT 10% OF TOTAL)

	SAN DIEGO / TOP 50 AVG.	RANK

WAGES

$97K / $92K   **#12**

REGIONAL PRICE PARITY-ADJUSTED AVERAGE SALARY FOR SOFTWARE DEVELOPERS
(BLS OES 2014, BEA RPP PRICE DEFLATOR 2014)

WAGE GROWTH

16.6% / 9.8%   **#7**

GROWTH OF AVERAGE WAGES FROM 2010 TO 2014 FOR SOFTWARE DEVELOPERS
(BLS OES 2010 -14)

JOB GROWTH

20.3% / 13.4%   **#18**

GROWTH OF SOFTWARE DEVELOPERS FROM 2010 TO 2014
(BLS OES 2010 -14)

Despite a lower job growth ranking, **San Diego still greatly outpaced the top 50 average** from 2010-14 by **1.7 percentage points per year**

FIGURE 3.6

PROSPERITY SCORE

114.7   **#7** / 50

		Score
1	Seattle	138.6
2	San Jose	131.7
3	Baltimore	129.4
4	San Francisco	126.0
5	San Antonio	116.4
6	Nashville	115.1
7	San Diego	114.7
8	Atlanta	113.9
9	Providence (RI)	113.8
10	Oklahoma City	112.1

Source: San Diego Regional EDC; CBRE Research; BLS OES; BEA

TECH
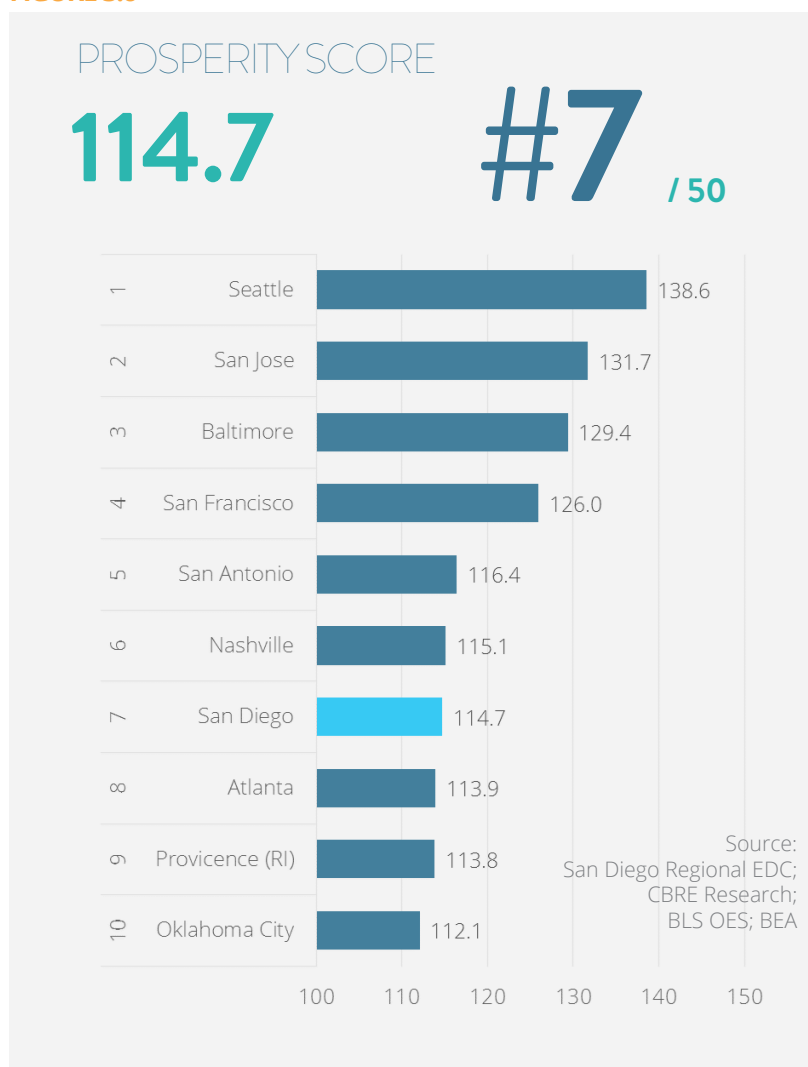
The ability to attract capital is integral to the growth and prosperity of a software development ecosystem. Companies need financing to grow and startups need seed capital to get their ideas off the ground. San Diego is one of the top markets for VC investment. The region ranks 6th overall in total dollars among US metros and 4th when accounting for the size of the market[1].

Part 4 of this study details the many types of capital that flow into the region for software development and provides insight into the region's advantages compared to the rest of the state and nation.

FACTORS
(10% OF TOTAL)

SAN DIEGO / TOP 50 AVG.   **RANK**

$883 / $550   **#4**

VENTURE CAPITAL INVESTMENT PER EMPLOYEE IN 2015
(NVCA, PwC MoneyTree, BLS)
NOTE: Includes all VC funding

73% of tech companies that responded to the survey for this study indicated that **they were satisfied with access to capital in San Diego,** with only 14% indicating that they were dissatisfied

FIGURE 3.7

CAPITAL SCORE

121.8   **#4** / 50

Rank	City	Score
1	San Francisco	144.9
2	San Jose	140.7
3	Boston	130.3
4	San Diego	121.8
5	Austin	121.2
6	New York	120.9
7	Los Angeles	120.9
8	Seattle	119.1
9	Salt Lake City	114.5
10	Denver	114.4

Source:
San Diego Regional EDC;
CBRE Research;
BLS OES;
NVCA/PwC Moneytree
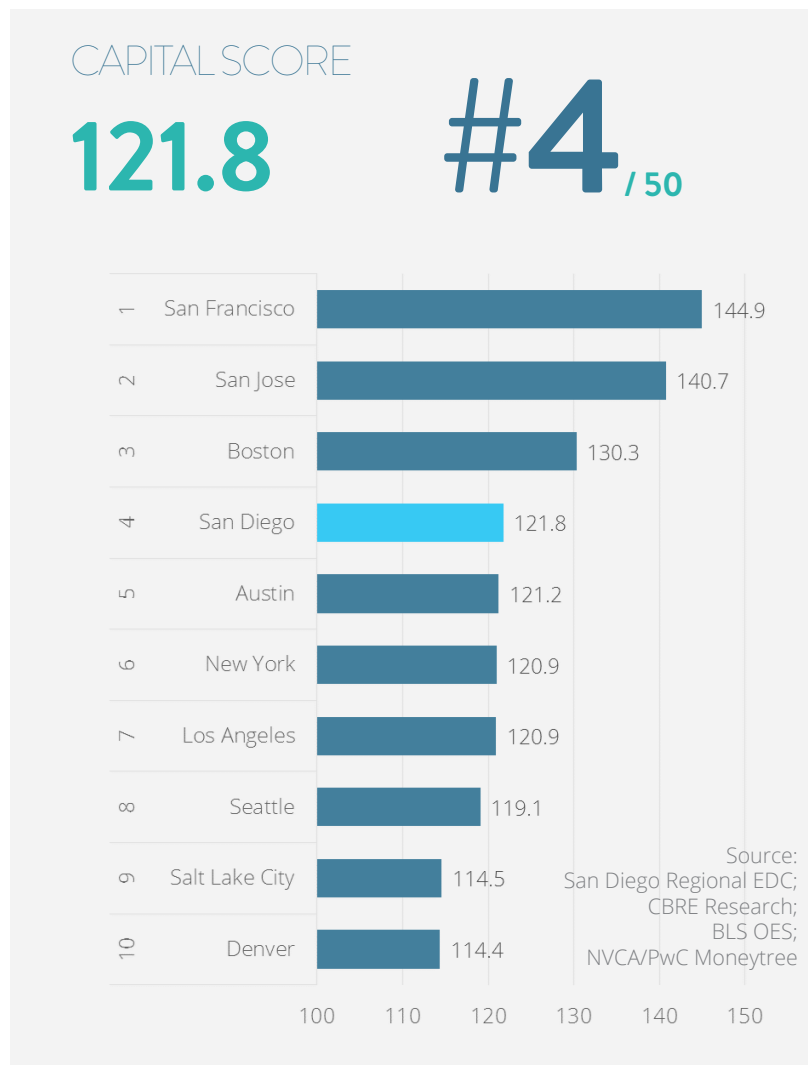
TECH
3.6 PEER COMPARISONS

MAJOR TECH CENTERS NOT IN TOP 10

Los Angeles (LA) and New York City (NYC) are two major US regions that may surprise many to see out of the top ten in the composite score. Both regions have gone through concerted branding efforts to demonstrate their tech prowess. New York has taken the nickname "Silicon Alley" to reflect the booming tech activities in Manhattan[1], while Los Angeles-area leaders have branded the western part of the region "Silicon Beach" to emphasize its large and growing tech scene[2]. While these regions are two of the largest tech centers, they score low on multiple important metrics.
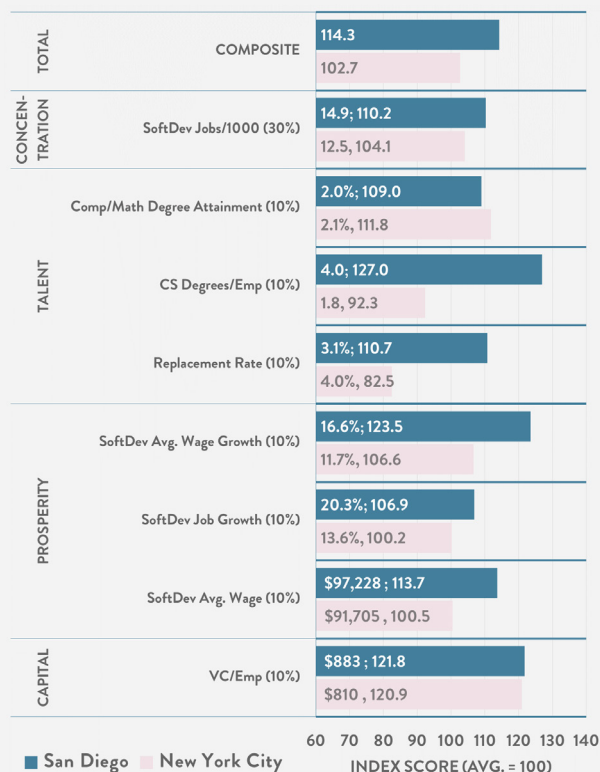
Los Angeles suffers in large part due to the size and complexity of the region's economy, depressing its concentration score below the average, but the region also exhibits slow job growth and talent shortcomings according to the index. LA has a relatively low share of computer and math degree holders age 25 and older, and their replacement rate of degree-holding workers in core software firms is below average, indicating that firms have challenges attracting and retaining top talent.

Despite its size and economic complexity, NYC actually has a higher than average concentration of software developers, but lacks a concentrated pipeline of talent coming out of the region's universities. The region also ranked 40th in replacement rate, resulting in a 32nd place ranking in talent.
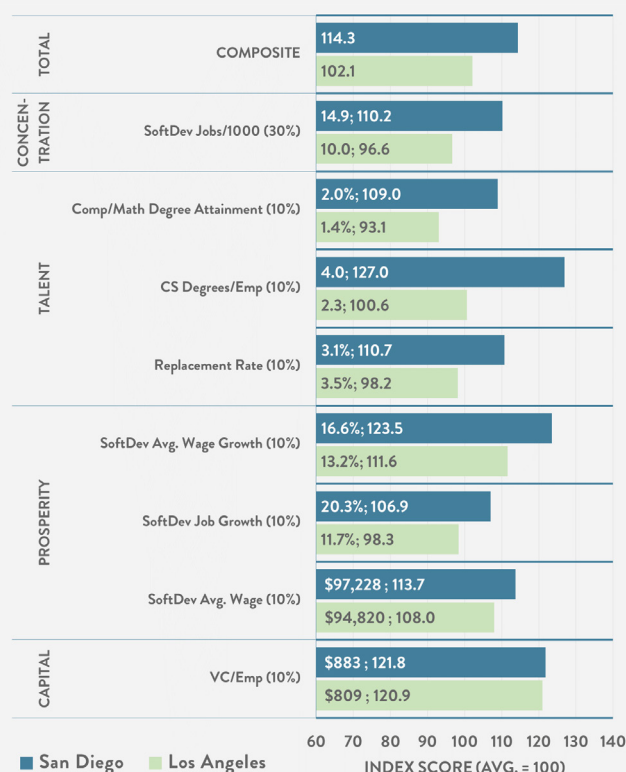
SD VS. NYC (RANK 15)

FIGURE 3.8: SD/NYC COMPARISON OF ALL FACTORS

		San Diego	New York City
TOTAL	COMPOSITE	114.3	102.7
CONCEN-TRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	12.5, 104.1
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	2.1%, 111.8
	CS Degrees/Emp (10%)	4.0; 127.0	1.8, 92.3
	Replacement Rate (10%)	3.1%; 110.7	4.0%, 82.5
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	11.7%, 106.6
	SoftDev Job Growth (10%)	20.3%; 106.9	13.6%, 100.2
	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$91,705 , 100.5
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$810 , 120.9

INDEX SCORE (AVG. = 100)

Source: San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS; US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree

SD VS. LA (RANK 16)

FIGURE 3.9: SD/LA COMPARISON OF ALL FACTORS

		San Diego	Los Angeles
TOTAL	COMPOSITE	114.3	102.1
CONCEN-TRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	10.0; 96.6
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	1.4%; 93.1
	CS Degrees/Emp (10%)	4.0; 127.0	2.3; 100.6
	Replacement Rate (10%)	3.1%; 110.7	3.5%; 98.2
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	13.2%; 111.6
	SoftDev Job Growth (10%)	20.3%; 106.9	11.7%; 98.3
	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$94,820 ; 108.0
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$809 ; 120.9

INDEX SCORE (AVG. = 100)

Source: San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS; US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree
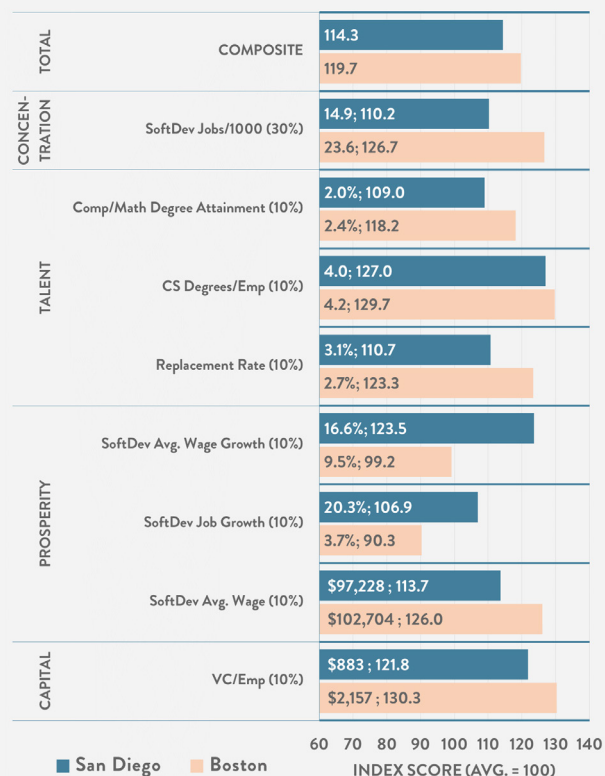
3.6 PEER COMPARISONS

OTHER TOP 10 PEERS

San Diego peers Austin and Boston both unsurprisingly ranked in the top 10 with many scores similar to San Diego. Austin has received a lot of attention in the past several years as a booming Southwest tech hub[3], while Boston has long been known as a center of innovation surrounding several of the world's top universities[4]. Both regions have a large talent pool of computer and math degree holders and generate a large pipeline of graduates coming out of local universities, most notably at University of Texas at Austin and MIT. Both regions are also already significantly more concentrated with developers.

Although Boston and Austin are competitive with San Diego, both regions experienced weak recent growth compared to San Diego and other major metros, especially when looking at wage growth in Austin. In addition, employers in Austin already pay a lower adjusted wage than in San Diego and these negative figures place Austin 36th in prosperity. These negatives, along with a low employee retention rate, are enough to drive Austin slightly below San Diego in the rankings.
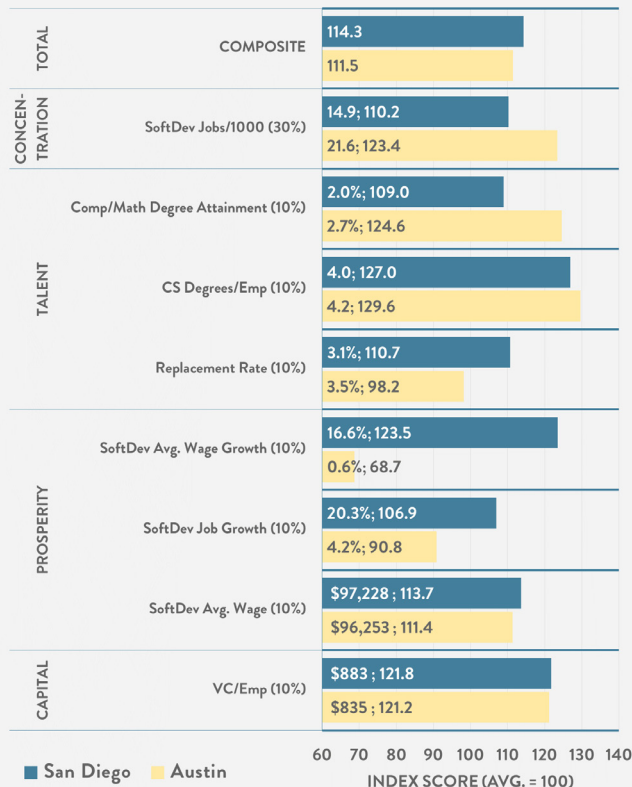
SD VS. BOSTON (RANK 4)

FIGURE 3.10: SD/BOSTON COMPARISON OF ALL FACTORS

		San Diego	Boston
TOTAL	COMPOSITE	114.3	119.7
CONCENTRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	23.6; 126.7
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	2.4%; 118.2
TALENT	CS Degrees/Emp (10%)	4.0; 127.0	4.2; 129.7
TALENT	Replacement Rate (10%)	3.1%; 110.7	2.7%; 123.3
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	9.5%; 99.2
PROSPERITY	SoftDev Job Growth (10%)	20.3%; 106.9	3.7%; 90.3
PROSPERITY	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$102,704 ; 126.0
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$2,157 ; 130.3

■ San Diego   ■ Boston

INDEX SCORE (AVG. = 100)
60 70 80 90 100 110 120 130 140

Source:
San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree

SD VS. AUSTIN (RANK 8)

FIGURE 3.11: SD/AUSTIN COMPARISON OF ALL FACTORS

		San Diego	Austin
TOTAL	COMPOSITE	114.3	111.5
CONCENTRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	21.6; 123.4
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	2.7%; 124.6
TALENT	CS Degrees/Emp (10%)	4.0; 127.0	4.2; 129.6
TALENT	Replacement Rate (10%)	3.1%; 110.7	3.5%; 98.2
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	0.6%; 68.7
PROSPERITY	SoftDev Job Growth (10%)	20.3%; 106.9	4.2%; 90.8
PROSPERITY	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$96,253 ; 111.4
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$835 ; 121.2

■ San Diego   ■ Austin

INDEX SCORE (AVG. = 100)
60 70 80 90 100 110 120 130 140

Source:
San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree
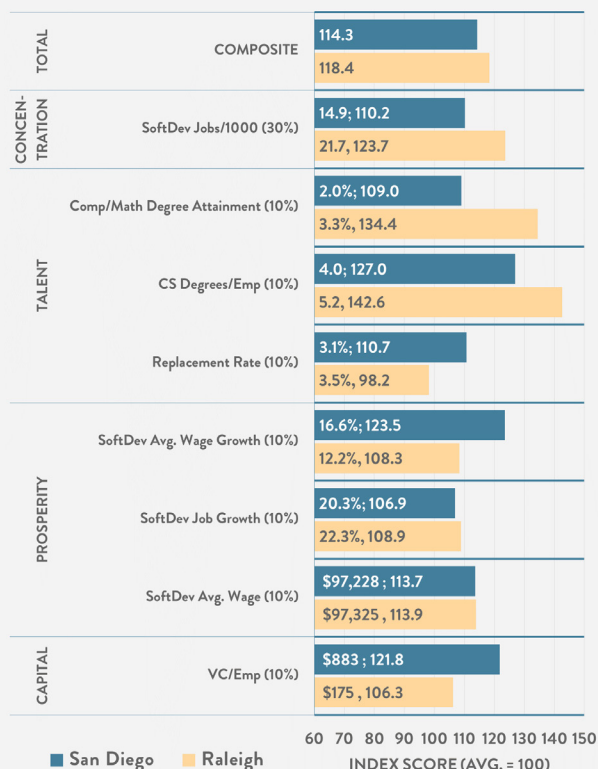
3.6 PEER COMPARISONS

SURPRISINGLY HIGH

People who are unfamiliar with the tech scenes in Raleigh and Baltimore are likely to be surprised to see the two regions ranked in the top ten and ahead of San Diego, but both regions have dense and growing tech scenes. Raleigh's tech scene is anchored by North Carolina State, with nearby UNC—Chapel Hill and Duke University rounding out the Research Triangle region[5]. This dense core of top research universities makes Raleigh the number two location for talent, most notably in pipeline and degree attainment. The region has a relatively high replacement rate (ranked 25th) and low capital attraction (20th), but very high concentration and talent scores make it one of the top software development regions.

Like San Diego, the Baltimore region benefits from a large federal military presence[6]. The area is home to Fort Meade, which includes the US Cyber Command, National Security Agency (NSA) and Defense Information Systems Agency (DISA). These defense assets likely attract top talent to the region, which is reflected in its high degree attainment score and rank (6th). Software developers in the region also receive the third highest wages and have experienced the largest wage growth in recent years.
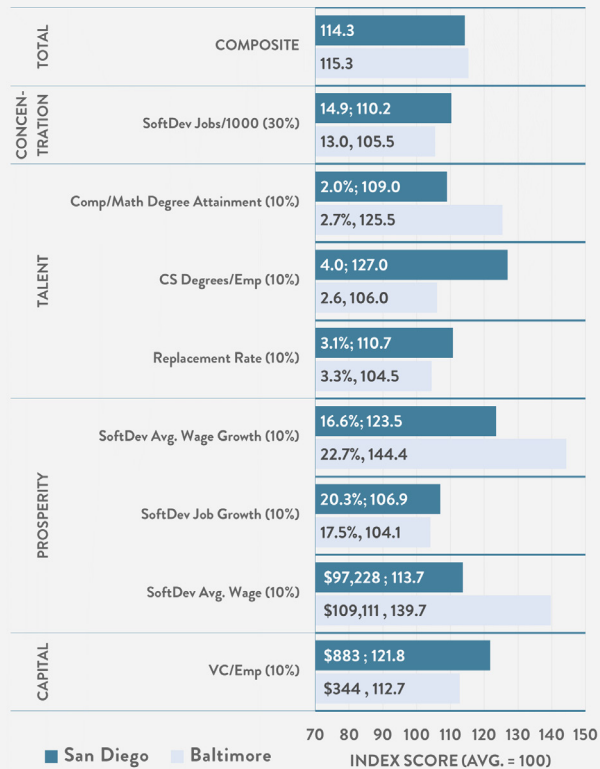
SD VS. RALEIGH (RANK 5)

FIGURE 3.12: SD/RALEIGH COMPARISON OF ALL FACTORS

		San Diego	Raleigh
TOTAL	COMPOSITE	114.3	118.4
CONCEN-TRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	21.7, 123.7
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	3.3%, 134.4
TALENT	CS Degrees/Emp (10%)	4.0; 127.0	5.2, 142.6
TALENT	Replacement Rate (10%)	3.1%; 110.7	3.5%, 98.2
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	12.2%, 108.3
PROSPERITY	SoftDev Job Growth (10%)	20.3%; 106.9	22.3%, 108.9
PROSPERITY	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$97,325 , 113.9
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$175 , 106.3

■ San Diego ■ Raleigh

INDEX SCORE (AVG. = 100)

Source:
San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree

SD VS. BALTIMORE (RANK 6)

FIGURE 3.13: SD/BALTIMORE COMPARISON OF ALL FACTORS

		San Diego	Baltimore
TOTAL	COMPOSITE	114.3	115.3
CONCEN-TRATION	SoftDev Jobs/1000 (30%)	14.9; 110.2	13.0, 105.5
TALENT	Comp/Math Degree Attainment (10%)	2.0%; 109.0	2.7%, 125.5
TALENT	CS Degrees/Emp (10%)	4.0; 127.0	2.6, 106.0
TALENT	Replacement Rate (10%)	3.1%; 110.7	3.3%, 104.5
PROSPERITY	SoftDev Avg. Wage Growth (10%)	16.6%; 123.5	22.7%, 144.4
PROSPERITY	SoftDev Job Growth (10%)	20.3%; 106.9	17.5%, 104.1
PROSPERITY	SoftDev Avg. Wage (10%)	$97,228 ; 113.7	$109,111 , 139.7
CAPITAL	VC/Emp (10%)	$883 ; 121.8	$344 , 112.7

■ San Diego ■ Baltimore

INDEX SCORE (AVG. = 100)

Source:
San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree

TECH
3.7 COMPARISON TABLE

RANK 1-25

FIGURE 3.14

COMPOSITE RANK	MSA	COMPOSITE	CONCENTRATION		TALENT		PROSPERITY		CAPITAL	
1	SAN JOSE-SUNNYVALE-SANTA CLARA, CA	144.2	168.2	1	133.9	1	131.7	2	140.7	2
2	SEATTLE-TACOMA-BELLEVUE, WA	134.3	144.8	2	124.6	3	138.6	1	119.1	8
3	SAN FRANCISCO-OAKLAND-FREMONT, CA	120.5	130.0	3	97.4	24	126.0	4	144.9	1
4	BOSTON-CAMBRIDGE-QUINCY, MA-NH	119.7	126.7	5	123.7	4	105.2	16	130.3	3
5	RALEIGH-CARY, NC	118.4	123.7	6	125.1	2	110.4	12	106.3	20
6	BALTIMORE-TOWSON, MD	115.3	105.5	14	112.0	9	129.4	3	112.7	12
7	SAN DIEGO-CARLSBAD-SAN MARCOS, CA	114.3	110.2	10	115.5	8	114.7	7	121.8	4
8	AUSTIN-ROUND ROCK-SAN MARCOS, TX	111.5	123.4	7	117.5	7	90.3	36	121.2	5
9	ATLANTA-SANDY SPRINGS-MARIETTA, GA	110.7	110.8	9	106.8	13	113.9	8	112.9	11
10	WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV	110.2	128.8	4	105.0	15	96.3	28	111.9	13
11	SALT LAKE CITY, UT	110.1	107.1	13	121.1	6	100.6	23	114.5	9
12	DENVER-AURORA-BROOMFIELD, CO	108.0	118.1	8	99.8	21	103.9	20	114.4	10
13	CHARLOTTE-GASTONIA-ROCK HILL, NC-SC	104.6	107.6	12	93.6	34	110.5	11	110.8	14
14	PROVIDENCE-FALL RIVER-WARWICK, RI-MA	103.1	91.2	38	108.4	11	113.8	9	90.6	40
15	NEW YORK-NORTHERN NEW JERSEY-LONG ISLAND, NY-NJ-PA	102.7	104.1	17	95.5	32	102.4	22	120.9	6
16	LOS ANGELES-LONG BEACH-SANTA ANA, CA	102.1	96.6	30	97.3	25	106.0	14	120.9	7
17	ROCHESTER, NY	100.7	101.0	23	122.0	5	81.8	48	92.5	39
18	PORTLAND-VANCOUVER-HILLSBORO, OR-WA	100.5	105.3	15	98.3	23	96.6	27	105.0	22
19	MINNEAPOLIS-ST. PAUL-BLOOMINGTON, MN-WI	100.1	104.0	18	104.4	17	89.2	38	107.7	16
20	ORLANDO-KISSIMMEE-SANFORD, FL	99.9	91.7	37	104.1	18	104.0	19	99.8	27
21	PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD	99.7	102.4	20	107.1	12	87.0	42	107.1	18
22	COLUMBUS, OH	99.6	104.9	16	102.9	19	92.2	34	95.9	29
23	HARTFORD-WEST HARTFORD-EAST HARTFORD, CT	99.1	100.9	24	97.0	26	97.8	25	104.3	23
24	OKLAHOMA CITY, OK	98.9	86.8	41	99.3	22	112.1	10	94.1	36
25	SACRAMENTO--ARDEN-ARCADE--ROSEVILLE, CA	98.4	102.8	19	105.9	14	87.9	41	94.4	35

Source:
San Diego Regional EDC; CBRE Research; BLS OES; NCES IPEDS;
US Census Bureau ACS, QWI; BEA; NVCA/PwC Moneytree

TECH

3.7 COMPARISON TABLE

RANK 26-50

FIGURE 3.15

COMPOSITE RANK	MSA	COM-POSITE	CONCENTRATION		TALENT		PROSPERITY		CAPITAL	
26	PITTSBURGH, PA	98.3	94.9	33	104.8	16	92.4	33	106.4	19
27	INDIANAPOLIS-CARMEL, IN	96.9	98.0	28	90.0	41	103.0	21	95.8	31
28	ST. LOUIS, MO-IL	96.6	97.0	29	96.0	30	93.3	31	107.3	17
29	DALLAS-FORT WORTH-ARLINGTON, TX	96.2	110.0	11	83.5	48	94.8	29	97.1	28
30	HOUSTON-SUGAR LAND-BAYTOWN, TX	96.1	93.5	34	86.9	44	108.1	13	95.5	32
31	SAN ANTONIO-NEW BRAUNFELS, TX	95.6	81.9	45	88.2	43	116.4	5	95.8	30
32	CHICAGO-JOLIET-NAPERVILLE, IL-IN-WI	95.5	102.4	21	96.6	27	82.9	46	109.7	15
33	DETROIT-WARREN-LIVONIA, MI	95.5	100.0	25	90.6	39	97.0	26	92.6	38
34	KANSAS CITY, MO-KS	95.3	102.2	22	89.9	42	94.0	30	94.8	33
35	PHOENIX-MESA-GLENDALE, AZ	94.6	99.7	26	85.9	45	98.1	24	94.8	34
36	VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC	94.3	92.3	36	90.2	40	104.7	17	80.9	44
37	NASHVILLE-DAVIDSON--MURFREESBORO--FRANKLIN, TN	93.2	83.2	44	77.1	49	115.1	6	105.8	21
38	CINCINNATI-MIDDLETOWN, OH-KY-IN	92.7	93.2	35	93.1	35	89.0	39	100.5	26
39	LOUISVILLE-JEFFERSON COUNTY, KY-IN	91.8	86.5	42	109.3	10	80.9	49	88.0	43
40	BUFFALO-NIAGARA FALLS, NY	91.3	87.3	40	100.5	20	92.7	32	72.1	46
41	TAMPA-ST. PETERSBURG-CLEARWATER, FL	90.4	96.2	31	83.6	47	91.5	35	89.8	41
42	MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL	90.0	80.9	46	96.5	28	88.1	40	103.3	24
43	MILWAUKEE-WAUKESHA-WEST ALLIS, WI	89.1	95.0	32	95.6	31	80.2	50	79.0	45
44	CLEVELAND-ELYRIA-MENTOR, OH	89.1	87.5	39	92.2	38	83.4	45	101.6	25
45	RICHMOND, VA	88.6	98.3	27	92.6	37	85.9	43	56.1	48
46	RIVERSIDE-SAN BERNARDINO-ONTARIO, CA	86.1	57.7	49	93.7	33	104.2	18	93.9	37
47	LAS VEGAS-PARADISE, NV	83.9	66.4	47	83.9	46	105.4	15	71.9	47
48	JACKSONVILLE, FL	83.5	85.5	43	92.8	36	85.4	44	43.7	49
49	NEW ORLEANS-METAIRIE-KENNER, LA	75.6	52.5	50	96.3	29	89.5	37	40.8	50
50	MEMPHIS, TN-MS-AR	73.3	61.5	48	71.7	50	81.8	47	88.2	42

4

CAPITAL

HIGHLIGHTS

44.3% Software development and related investment accounted for nearly half of all VC in San Diego in 2015.

$517M More than a half billion dollars in venture capital flowed to San Diego companies in 2015.

2X San Diego receives two times the national average of VC invested in health IT and medical devices.

**68%** From 2010-15, M&A activity accounted for more than two-thirds of software-related investment.

KEY TAKEAWAY

San Diego has long been one of the top markets for VC investment in the US, but the region is often considered only a biotech town, despite receiving large sums of software investment. This study dissects recent investments to show that the region has unique advantages compared to California and the US within the software development ecosystem.

TECH

4.1 RECENT TRENDS

Software VC investment took off in 2015 after nearly a decade of flat growth in San Diego, despite a national boom in software investment since 2009 (figure 4.1). However, software investment has likely been historically undercounted in San Diego, as investment in platforms integrated with health systems or mobile devices have often been categorized as medical devices, health care, or ICT.

FIGURE 4.1: SOFTWARE VC HISTORY SAN DIEGO/US
ACCORDING TO NVCA/PWC, 1995-2015 (INDEXED TO 1995)

Source: CBRE Research; NVCA/PwC MoneyTree
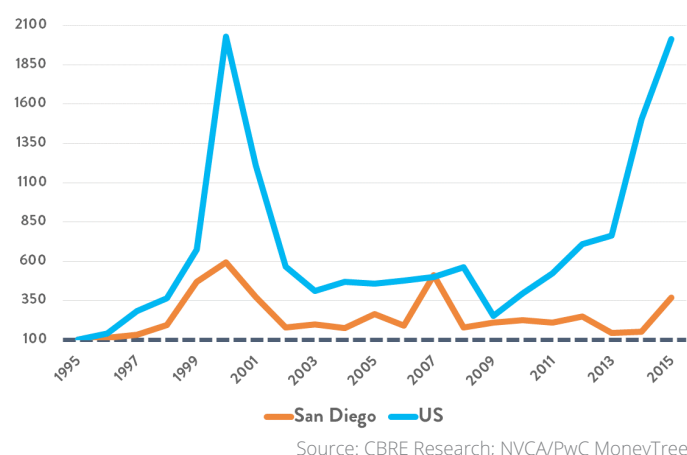
San Diego has yet to fully capitalize on the software VC boom seen across the US, but the region experienced substantial growth in 2015

$1.16B +**40%**
TOTAL VC INVESTMENT (ALL INDUSTRIES) 2014-15

When including software dependent verticals like health IT, med devices and related hardware, software investment has kept up with biotech in San Diego

$517M +**38%**
SOFTWARE & RELATED VC INVESTMENT 2014-15

FIGURE 4.2: VC INVESTMENT HISTORY IN SAN DIEGO, BY TYPE

Source: CBRE Research NVCA/PwC MoneyTree; Pitchbook Data Inc. used for classification and weighting only See appendix for full code/category list

SaaS   Health IT/Devices   Other Software/Related   Bitoech/Pharma   Other Investment
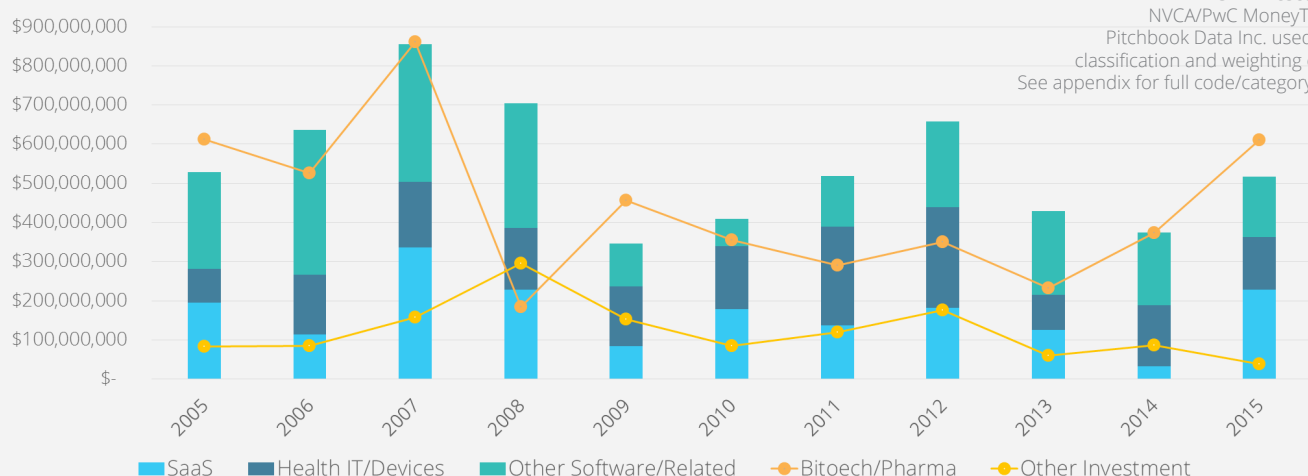
San Diego has a unique specialization in software development that lives within the universe of heatlhcare and energy. San Diego receives roughly two times the investment in health IT and medical devices when compared to the US average, and more than six times the average cleantech investment. These two industries rely heavily on software for product development.

San Diego is also one of the largest recipients of biotech funding, an industry that is becoming increasingly reliant on bioinformatics—software platforms that are revolutionizing the analysis and editing of DNA, genetics and neuroscience[1]. While these deals may often fall under biotech and thus are not counted as part of the software universe, San Diego is poised to capitalize on the growing wave bioinformatics.

In 2015, **VC investment in SaaS dominated**. In past years, SaaS investment was more on par with investments in **health IT/devices** and **energy/cleantech**

FIGURE 4.3: VC INVESTMENT IN SAN DIEGO BY PRODUCT VERTICAL

Product Vertical	2015
SaaS	$228.2
Health IT/Devices	$134.4
Energy/Clean Tech	$88.8
Gaming/Media Entertainment	$33.0
Mobile	$19.1
Other	$12.2
Defense/Robotics	$0.6
Web/ Ecommerce/ Marketing	$0.2

■ 2015
■ 2010-15 Avg

0%   10%   20%   30%   40%   50%

Source: CBRE Research NVCA/PwC MoneyTree; Pitchbook Data Inc. used for classification and weighting only
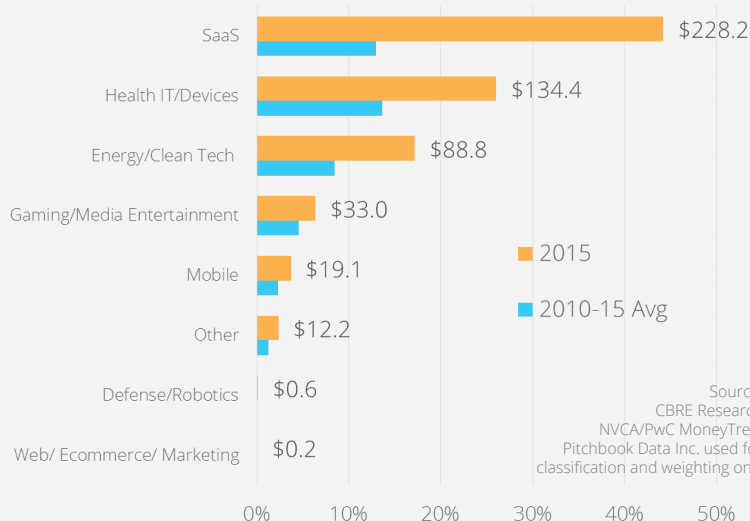
HEALTH IT/DEVICES

2X

US AVERAGE

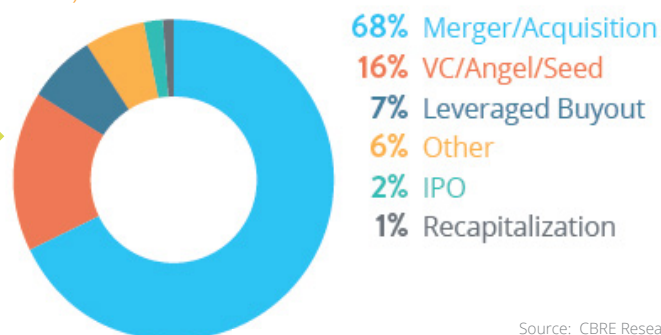**BIOTECH/GENOMICS**

3.9X

US AVERAGE

ENERGY/CLEANTECH

6.6X

US AVERAGE

While venture capital deals tend to dominate the dialogue around capital, they only make up a small amount of the total capital invested into San Diego. Mergers and acquisitions (M&A) dominate investment into San Diego's software companies. M&A deals can sometimes come with concerns over whether or not it will result in a firm downsizing or leaving the area altogether, but these deals often provide the financial and institutional support for companies to grow in San Diego. Recent examples like BD's acquisition of Carefusion show that M&A deals can result in significant investment in the San Diego community beyond the acquisition of assets and intellectual property[1].

FIGURE 4.4: TOTAL INVESTMENT IN SAN DIEGO BY TYPE (2010-15)

68% Merger/Acquisition
16% VC/Angel/Seed
7% Leveraged Buyout
6% Other
2% IPO
1% Recapitalization

Source: CBRE Research
Pitchbook Data Inc. used for classification and weighting

On average, **US metros receive only 42%** of capital investment in software and related companies through M&A deals versus **68% in San Diego**

FIGURE 4.5: TOTAL INVESTMENT IN SAN DIEGO BY GROUP (2010-15)

Software and Related — 29.6%
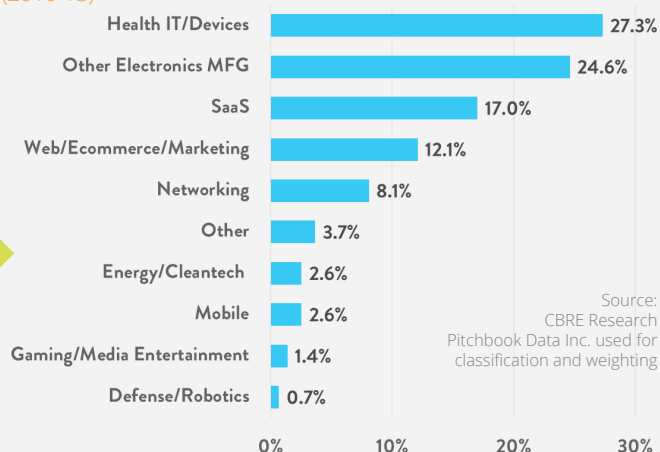Biotech/Pharma — 29.4%
REITs — 24.6%
Other — 16.4%
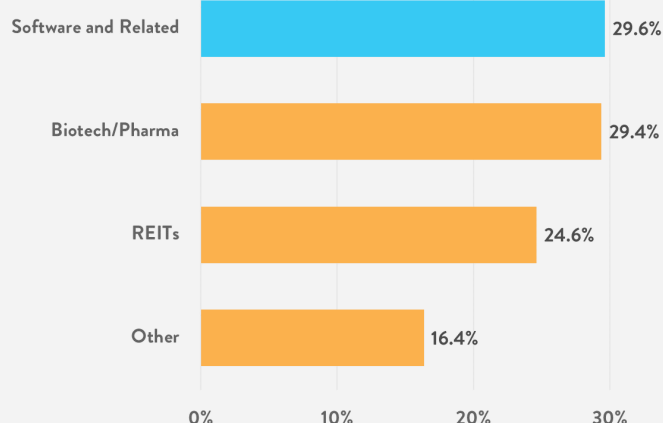
Source: CBRE Research
Pitchbook Data Inc. used for classification and weighting

Software and related investment represented 29.6% of all investment from 2010-15, compared to **biotech/ pharma, which accounted for 29.4%**

FIGURE 4.6: TOTAL INVESTMENT IN SAN DIEGO BY VERTICAL (2010-15)

Health IT/Devices — 27.3%
Other Electronics MFG — 24.6%
SaaS — 17.0%
Web/Ecommerce/Marketing — 12.1%
Networking — 8.1%
Other — 3.7%
Energy/Cleantech — 2.6%
Mobile — 2.6%
Gaming/Media Entertainment — 1.4%
Defense/Robotics — 0.7%

Source: CBRE Research
Pitchbook Data Inc. used for classification and weighting

When looking at **total investment, including IPOs and M&A deals, most software and related investment** went to **health IT, med devices and electronics manufacturers**

5

NEXT STEPS

HIGHLIGHTS

Prime the talent pipeline and create workforce opportunities

Support infrastructure for tech hubs

Strengthen industry/university partnerships

Expand access to capital

Build upon regional branding efforts

KEY TAKEAWAY

This study has demonstrated that San Diego is one of the top software development markets in the US. In order to remain a competitive software development market, the region will need to come together to address key challenges to capitalize on forthcoming opportunities.

While San Diego's software ecosystem is competitive, if the region wants to continue to attract talent and investment it should amplify and replicate tools, programs, and systems that have strengthened its position as a software and tech hub.

PRIME THE TALENT PIPELINE AND CREATE WORKFORCE OPPORTUNITIES. San Diego is home to numerous universities and community colleges that offer computer science and related degrees. Additionally, school districts and other programs engage students in software-centric careers from an early age. Alternative programs also cater to individuals who want to explore software and related careers.

- **FOCUS EFFORTS TO PROMOTE AND EXPAND EXISTING CODE ACADEMIES**. Code academies and highly specialized programs are training for individuals who may have no previous coding experience. With demand for these programs skyrocketing, San Diego must help scale these models.
- **SCALE THINKABIT LAB FOR SAN DIEGO EMPLOYERS**. Qualcomm's Thinkabit Lab is a lab, makers' space and classroom for 6th through 8th grade students to spur interest in STEM and programming. Its success has inspired San Diego Mayor Kevin Faulconer, San Diego Regional EDC and San Diego Unified School District to establish new labs at San Diego companies interested in replicating the model.
- **DEVELOP PATHWAYS AND JOB SHADOW PROGRAMS FOR HIGH SCHOOL STUDENTS.** California Career Pathways Trust has funded a regional consortium of high school and community college districts in San Diego County to support career pathway development and work-based learning opportunities. The grant encourages students to pursue educational opportunities and employment in software development and other tech sectors.

SUPPORT INFRASTRUCTURE FOR TECH HUBS. Companies and entrepreneurs need both hard (e.g. transit, fiber connectivity, space) and soft (e.g. mentoring) infrastructure to grow the ecosystem. Expanding existing programs will catalyze San Diego's tech hub.

- **FOCUS ON INCUBATORS AND ACCELERATORS**. Since 2010, non-profit incubator EvoNexus has helped its companies by providing mentorship, space and access to capital, helping their companies raise more nearly a billion dollars in capital. San Diego should continue to support EvoNexus and other San Diego incubators and accelerators, including JLabs, HERA LABS and Plug and Play.
- **EXPAND EXISTING CO-WORKING OPTIONS**. Co-working spaces offer flexible workspace, competitive pricing, access to talent and spur creativity. San Diego must continue to scale these programs and offer resources for tenants to grow their companies.
- **WIRE SAN DIEGO WITH FIBER CONNECTIVITY**. Fiber connectivity – super high-speed internet connectivity – increases productivity of the data-dependent tech ecosystem. San Diego's cities should continue to pursue fiber opportunities.
- **INVEST IN SMART GROWTH AND PUBLIC TRANSIT**. Continue developing walkable neighborhoods and infrastructure that supports alternative modes of transportation to attract a younger workforce across all sectors.

STRENGTHEN INDUSTRY/UNIVERSITY PARTNERSHIPS. Universities provide both talent and ideas that are crucial to building a tech ecosystem. The business community and universities must continue to work together to support software development jobs.

- **COORDINATE HACKATHONS**. In 2015, UC, San Diego students with the TESC Engineering Council launched the largest student-run Hackathon in San Diego with more than 1,000 student competitors. Support regional hackathons and encourage software development companies to participate in these competitions.
- **EXPAND LINK2 INDUSTRY SERIES**. Link2 Industries tech executives onto campuses to speak about industry trends and showcase opportunities for employment across the region. Link2 has also been leveraged as way to bring students off campus into the heart of tech hubs like downtown San Diego. Coalitions will scale this program by focusing on a variety industries, from cybersecurity to digital marketing, with strong student interest.
- **DEVELOP INDUSTRY/UNIVERSITY CURRICULUM ALIGNMENT**. Encouraging open channels of communication between industry and university leadership is key to responding to evolving workforce needs. Tech San Diego's and Cyber Center of Excellence (CCOE) have both launched programs to evaluate existing curriculum and provide industry feedback directly to the leadership of universities across San Diego County.
- **SUPPORT TECH TRANSFER**. Regional universities and research labs including Systems Center Pacific (SSC-Pac) for the Navy are tremendous sources of intellectual capital. Initiatives like the iDEA Hub provide a mechanism for a coalition of business and non-profit partners to establish better communications channels to support tech transfer missions.

EXPAND ACCESS TO CAPITAL. While San Diego has strengthened its ability to attract venture capital (vc) to the region in the past year, it will need to redouble its efforts and cater to its strengths if it wants to help software companies grow.

- **ENGAGE EXISTING VC AND ANGEL NETWORKS IN SAN DIEGO**. San Diego is home to prominent vc firms and angel investors including Qualcomm Venture and others. Through San Diego Venture Group and other partners, continue to engage these firms in the community and provide intros to capital-ready companies.
- **DEVELOP SAN DIEGO-SPECIFIC FUNDS AND SUPPORT NETWORKS**. San Diego-specific funds provide companies with heightened access to resources. San Diego-based Analytic Ventures is responding by raising funds to invest exclusively in San Diego companies. CONNECT and other organizations also have established venture capital programs and provide linkages for entrepreneurs to seasoned mentors.
- **CONVENE M&A SUPPORT NETWORKS**. Since San Diego software companies receive a significant percentage of capital from M&A activity, entrepreneurs and leadership must be better equipped to deal with mergers. Economic developers and regional partners are developing protocol network to support companies through acquisitions.

BUILD UPON REGIONAL BRANDING EFFORTS. Given the region's standing as a tech hub, San Diego is still "under the radar" when it comes to its global tech ecosystems. Communicating San Diego's competitive advantages helps solidify the region as an attractive place to invest and build a software company.

- **CREATE A DEDICATED DIGITAL PRESENCE**. Cities like Denver and NYC have established centralized online resources to highlight activities/support services for tech companies. San Diego should develop a website and interactive startup map that will showcase concentrations of companies and create a road map to financial, legal, real-estate, and non-profit resources within the region.
- **UNIFY PARTNERS THROUGH A BRAND ALLIANCE**. Communicating San Diego's competitive advantages for the sector helps solidify the region as an attractive place to build a software company. Local champions should create a brand alliance and consistent messaging about the sector.
- **LEVERAGE EXISTING EVENTS TO PROMOTE INTERNAL AWARENESS FOR ECOSYSTEM**. Celebrate and promote San Diego Startup Week which showcases leading innovators in software, consumer, Internet, mobile tech, hardware and defense tech. Participants include entrepreneurs, top-tier regional and national investors, strategic advisors, and high profile community and political supporters raising the profile of San Diego's thriving startup ecosystem.

APPENDIX

CITATIONS

ACKNOWLEDGMENTS

METHODOLOGY

FULL DATA TABLES

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ACKNOWLEDGMENTS

EMPLOYMENT / ECOSYSTEM METHODOLOGY

DEFINING THE ECOSYSTEM

To define the software development ecosystem, the research team used a multi-layered methodology, starting with occupation data from the Bureau of Labor Statistics and the California Employment Development Department. The research team determined employment for software developers, web developers and computer programmers (all referred to as software developers) as a base.

However, the goal of this research was to not only understand the number of developers, but determine where these developers were working and how many total people in total work in the software development ecosystem. To do this, the team used statewide Industry Staffing Patterns data developed by the California Employment Development Department to determine which industries were most heavily concentrated with software developers. The following diagram demonstrates this process.

SOFTWARE DEVELOPERS
APPLICATIONS, SYSTEMS, WEB & COMPUTER PROGRAMMERS

Research started with determining who the people are that develop software in the region. We did this by looking through occupational definitions from the Bureau of Labor Statistics. The following occupation codes were used: 15-1131, 15-1132, 15-1133 and 15-1134.

INDUSTRY STAFFING PATTERNS MATRIX
All 4-digit NAICS

The team then determined which industries were most concentrated with developers, based on their employment concentration within every 4-digit industry.

CORE, DEPENDENT & OTHER DETERMINED
Select 4-digit NAICS

Clean breaks emerged and 20% concentration was determined to be a good threshold for those industries that are in the core. All employment in these industries was used, since we determined that software development was inextricable from the core, due to the high presence of developers.

Dependent industries were those with more than 3% employment from software developers, but below the 20% threshold. The remaining developers were considered part of the ecosystem, but their industries were not heavily dependent on software development. Nearly all of these leftover industries were non-technical.

NON-SOFTWARE REMOVED FROM DEPENDENT
Dependent 4-digit NAICS

We determined that dependent industries had a share of employment dedicated to development beyond the software developers, but not all of it. We weighted employment in these industries based the developer share of technical occupations, those in occupation codes beginning with 11 to 27, which consists of scientists, managers, designers, engineers and other technical occupations. Those beginning with 29 and higher were considered supporting jobs.

For example, there were 34,771 people working in NAICS 5417 (scientific R&D services). We know from staffing patterns that 2,158 were developers and 27,239 were other technical positions like research scientists and lab technicians, for example. We took the developer share of those positions [2,158 / (27,239 + 2,158) = 7.9%] and applied that share to the total number of non-technical employees [7.9% * 4,979 = 395] to get the number of support positions. See the table on the following page for all calculations.

FINAL COUNT DETERMINED
Dependent 4-digit NAICS

Finally, we summed all core employment, the software share of dependent employment, and the remaining developers not in core or dependent industries to get a final 41,260 number.

EMPLOYMENT / ECOSYSTEM METHODOLOGY

STAFFING PATTERNS USED TO DETERMINE EMPLOYMENT BREAKDOWN

NAICS	Industry/Category	Total Industry Employment	Total Software in Industry Employment in Industry	Software Developers in Industry	Software Support Employees in Industry	Technical Non-Software Employment in Industry	Support Non-Software Employment in Industry	Software Share of Industry	Non-Software Share of Industry
	Core Software Industries (20% or greater industry employment from software development occupations)	25,060	25,060	8,430	16,630	N/A	N/A	100.0%	0.0%
5415	Computer Systems Design and Related Services	18,586	18,586	6,146	12,439	N/A	N/A	100.0%	0.0%
5112	Software Publishers	4,047	4,047	1,652	2,395	N/A	N/A	100.0%	0.0%
3341	Computer and Peripheral Equipment Manufacturing	2,427	2,427	631	1,796	N/A	N/A	100.0%	0.0%
	Software-Dependent Industries (3.0%-19.9% of industry employment in software development occupations)	92,586	8,920	5,890	3,030	58,532	25,134	9.6%	90.4%
518	Internet Service Providers, Web Search Portals, and Data Processing Services	1,846	452	306	146	943	451	24.5%	75.5%
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	11,049	1,587	981	606	5,851	3,612	14.4%	85.6%
3342	Communications Equipment Manufacturing	3,649	604	385	218	1,943	1,102	16.5%	83.5%
5417	Scientific Research and Development Services	34,771	2,553	2,158	395	27,239	4,979	7.3%	92.7%
3364	Aerospace Product and Parts Manufacturing	10,137	1,115	628	486	5,087	3,935	11.0%	89.0%
4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers	4,983	749	299	450	1,692	2,542	15.0%	85.0%
5416	Management, Scientific, and Technical Consulting Services	18,544	1,109	790	319	12,420	5,014	6.0%	94.0%
3344	Semiconductor and Other Electronic Component Manufacturing	5,254	432	247	185	2,754	2,068	8.2%	91.8%
4541	Electronic Shopping and Mail-Order Houses	2,352	320	95	225	603	1,429	13.6%	86.4%
N/A	Other Software Developers (Developers in industries with less than 3.0% employment from software development occupations)	N/A	7,280	7,280	0	N/A	N/A	N/A	N/A
	All Industries	N/A	41,260	21,600	19,660	N/A	N/A	N/A	N/A

EMPLOYMENT / ECOSYSTEM METHODOLOGY

PRODUCT VERTICALS

In order to understand how software developers and related industries break down by product vertical, this study compiled a database of known software and software-dependent firms using data from ReferenceUSA by InfoGroup and the San Diego Business Journal Book of Lists. We searched for firms that matched any of the core software NAICS codes as a primary, secondary or tertiary NAICS code in the ReferenceUSA listing, and populated the database with any additional relevant firms from the Book of Lists.

This study then sampled 386 technology and related companies out of a database of more than 1,600 to determine their roles in the software development ecosystem and confirm their employment size and primary NAICS. We sampled 100 firms with 1-4 employees, 100 firms with 5-9 employees, 100 firms with 10-99 employees, and all firms (86) with 100 or more employees.

We called and e-mailed sampled companies as well as investigated their web sites to place them in a product vertical. We also confirmed if they are still in operation and if they belong in the database at all. We also attempted to verify their employment and primary NAICS code.

Once we had categorized our sample of 386 companies, we had to determine their effective employment based on their NAICS code. This is because not all employees in a non-core company work in software development. For example, we know that a scientific R&D firm in defense or biotech (NAICS 5417) has some portion of their employment in software development, but we know that it is not all of their employment. They have many other types of engineers and scientists, as well as their respective support staff, who work on projects unrelated to software development. Using the employment weights determined through our staffing patterns analysis (see previous page), we applied a standard weight to employment in these firms outside of the core. Using our previous example, this would mean a defense contractor or scientific R&D company (NAICS 5417) is assumed to have about 7.3% of employment in software development. On the contrary, there are a few large firms that we were able to confirm have more than 20% of their employment in software development. These firms were marked special and 100% of their employment was deemed in software development.

Finally, we multiplied these percentage shares from each sample class to the total employment in those classes in our database, and summed them by product vertical to determine the total employment in each product vertical as according to our database. We then calculated a final percentage share from our database and applied it to the 41,200 employee number from our staffing patterns data, minus those employees that we knew were in non-tech industries (7,280). This is because our database of firms do not have as accurate of total employment since we know some small firms in particular are missing, unlike the total number determined from the staffing patterns. Therefore, we simply applied percentage weights from our database to give us our final estimated breakdown of the software ecosystem by product vertical, rather than using the counts.

EFFECTIVE EMPLOYMENT BRIDGE

NAICS	WEIGHT
5415	100.0%
5112	100.0%
3341	100.0%
5181	24.5%
5182	24.5%
3342	16.5%
4234	15.0%
3345	14.4%
4541	13.6%
3364	11.0%
3344	8.2%
5417	7.3%
5416	6.0%
5171	5.9%
2211	4.2%
2212	4.2%
3254	3.0%
4431	2.4%
3391	1.1%
OTHER	0.0%
SPECIAL	100.0%

EMPLOYMENT / ECOSYSTEM METHODOLOGY

$$C_{\text{(weight shares)}} * D_{\text{(total for weight)}} = E_{\text{(each value)}}$$

$$A_{\text{(each weight)}} * B_{\text{(class \#)}} = C_{\text{(each value)}}$$

A: WEIGHTS FROM SAMPLE

PRODUCT VERTICAL	1 TO 4	5 TO 9	10 TO 99	100+
Cloud/Data Storage/Data Management	4.0%	0.8%	1.6%	2.8%
Defense/Robotics	0.0%	0.0%	0.1%	17.3%
Energy/Clean Tech	0.0%	0.0%	0.0%	1.0%
Gaming/Media Entertainment	0.0%	0.0%	3.4%	15.1%
Health IT/Med Devices	1.7%	3.5%	1.9%	18.7%
Mobile	0.0%	0.4%	0.7%	14.5%
Networking	3.4%	1.6%	0.0%	1.3%
NO FIT	30.4%	11.1%	21.1%	0.1%
Other	21.0%	18.6%	11.8%	0.8%
Other Electronics MFG	0.2%	0.2%	0.7%	6.1%
SaaS	15.9%	43.5%	43.1%	21.8%
Web/Ecommerce/Marketing	23.2%	20.3%	15.5%	0.5%

B: TOTAL DATABASE EMPLOYMENT BY

PRODUCT VERTICAL	1 TO 4	5 TO 9	10 TO 99	100+	TOTAL	EFF. TOTAL*
Total Database Employment	866	1,847	6,455	21,204	30,372	28,517

C: VALUES FROM DATABASE BY PRODUCT VERTICAL

PRODUCT VERTICAL	1 TO 4	5 TO 9	10 TO 99	100+	TOTAL	WEIGHT*
Cloud/Data Storage/Data Management	35	15	104	600	754	2.6%
Defense/Robotics	-	-	5	3,668	3,673	12.9%
Energy/Clean Tech	-	-	-	215	215	0.8%
Gaming/Media Entertainment	-	1	219	3,200	3,420	12.0%
Health IT/Med Devices	15	65	120	3,963	4,163	14.6%
Mobile	-	8	47	3,073	3,128	11.0%
Networking	30	30	3	283	345	1.2%
NO FIT	264	204	1,364	23	1,856	N/A
Other	182	344	759	161	1,446	5.1%
Other Electronics MFG	2	3	46	1,286	1,338	4.7%
SaaS	138	802	2,785	4,619	8,344	29.3%
Web/Ecommerce/Marketing	201	374	1,003	113	1,691	5.9%

D: VALUES FROM STAFFING PATTERNS

PRODUCT VERTICAL	EMPLOYMENT
Staffing Patterns Total	41,263
Other Non-Tech	7,280
Total for Weight Application	33,983

E: FINAL COUNTS

PRODUCT VERTICAL	EMP	%TOT
Cloud/Data Storage/Data Management	898	2.2%
Defense/Robotics	4,377	10.6%
Energy/Clean Tech	257	0.6%
Gaming/Media Entertainment	4,075	9.9%
Health IT/Med Devices	4,961	12.0%
Mobile	3,727	9.0%
Networking	411	1.0%
Other	1,723	4.2%
Other Electronics MFG	1,594	3.9%
SaaS	9,943	24.1%
Web/Ecommerce/Marketing	2,015	4.9%
Other Non-Tech	7,280	17.6%
Total	41,263	100.0%

*Minus No Fit

TECH

ECONOMIC IMPACT
METHODOLOGY

IMPLAN

The research team used MIG IMPLAN, a widely accepted tool for economic impact assessment, to asses the indirect and induced impacts on employment, value added (gross regional product), labor income (wages) and taxes. Indirect impacts are the effects of local industries buying goods and services from other industries. For instance, management consultants, law firms, market research, and other establishments generate local impacts through their buying and selling activities with software development firms or divisions. Induced impacts are a result of employees at these firms spending their dollars in the local economy, usually on food services, medical services, housing, and leisure.

The inputs for the model came from the results of the JAWS extrapolation detailed in Part I. The team used the total employment for each NAICS code and converted these to IMPLAN codes using the built-in code bridge in the IMPLAN software. Because wages for specific divisions within firms are unknown for software-dependent employees, we used the model input for wages generated by IMPLAN. For the 3rd-tier or non-tech inputs, we input any industry that accounted for more than 3% of software developers to further refine the model. We were able to use the average wage from the staffing patterns data, since we knew that these employees were strictly software developers in those industries. For the remaining employees, we simply used the multipliers and factors output from the 3rd-tier data to calculate the remaining impacts of the 2,178 unaccounted software developers.

The final results were rounded for reporting purposes.

IMPLAN MODEL INPUTS

IMPLAN CODE	NAICS CODE	NAICS DESCRIPTION	EMPLOY-MENT INPUT	TOTAL WAGE INPUT
451	5415	COMPUTER SYSTEMS DESIGN AND RELATED SERVICES	18,842	MODEL
422	5112	SOFTWARE PUBLISHERS	4,055	MODEL
303	3341	COMPUTER AND PERIPHERAL EQUIPMENT MANUFACTURING	2,487	MODEL
432	518	INTERNET SERVICE PROVIDERS, WEB SEARCH PORTALS, AND DATA PROCESSING SERVICES	466	MODEL
315	3345	NAVIGATIONAL, MEASURING, ELECTROMEDICAL, AND CONTROL INSTRUMENTS MANUFACTURING	1,669	MODEL
305	3342	COMMUNICATIONS EQUIPMENT MANUFACTURING	631	MODEL
456	5417	SCIENTIFIC RESEARCH AND DEVELOPMENT SERVICES	2,471	MODEL
358	3364	AEROSPACE PRODUCT AND PARTS MANUFACTURING	1,194	MODEL
395	4234	PROFESSIONAL AND COMMERCIAL EQUIPMENT AND SUPPLIES MERCHANT WHOLESALERS	848	MODEL
455	5416	MANAGEMENT, SCIENTIFIC, AND TECHNICAL CONSULTING SERVICES	1,128	MODEL
309	3344	SEMICONDUCTOR AND OTHER ELECTRONIC COMPONENT MANUFACTURING	462	MODEL
407	4541	ELECTRONIC SHOPPING AND MAIL-ORDER HOUSES	374	MODEL
531	9992	STATE GOVERNMENT, EXCLUDING EDUCATION AND HOSPITALS	726	$94,901,288
533	9993	LOCAL GOVERNMENT, EXCLUDING EDUCATION AND HOSPITALS	717	$93,684,605
473	6113	COLLEGES, UNIVERSITIES, AND PROFESSIONAL SCHOOLS	652	$85,167,823
461	5500	MANAGEMENT OF COMPANIES AND ENTERPRISES	596	$77,867,724
449	5413	ARCHITECTURAL, ENGINEERING, AND RELATED SERVICES	586	$76,651,041
464	5613	EMPLOYMENT SERVICES	410	$53,534,060
437	5241	INSURANCE CARRIERS	289	$37,717,179
423	5121	MOTION PICTURE AND VIDEO INDUSTRIES	261	$34,067,129
433	5221	DEPOSITORY CREDIT INTERMEDIATION	223	$29,200,396
N/A	MULTI	REMAINDER	2,178	N/A

OVERVIEW/CONCEPT

In order to more accurately and clearly compare metros, this study used an indexing approach. The goal of the index approach was to take complicated or difficult to quantify metrics (e.g. replacement rate) and use a more familiar scale, with a common average of 100. The study used a common indexing methodology based on standardized values, and weighted metrics based on the judgment of a panel of advisors. The result is eight metrics with an average score of 100. For a detailed description of each measure, see the input table on the following page.

WEIGHTING

This study applied unequal weights to one of the eight metrics, with the remaining seven weights being equal. Weighting of variables in an index is always a challenge and is always subjective. This study panel decided an equal weight should be the default, but that one metric in particular, employment density of software developers, should receive more weight (30%). The remaining seven metrics all received 10%. The reasoning for this is rooted in the absolute necessity of developers (talent) to a software ecosystem. Without a requisite share of developers, a software development ecosystem would not be able to develop software. The other factors, while important, are less absolutely necessary to the core function. We also grouped these measures into four categories (see index table on following page). Concentration and VC/Employee (renamed Capital for simplicity) data sets were not grouped with any others, therefore carrying weights of 30% and 10%. Conversely, the remaining six index scores were combined into two categories, talent and prosperity, with three sets in each category. Since these sets are all worth 10% each toward the final score, combined, they equal 30% of the total score. Categorizing these sets does not affect the final score, as no additional weight is applied to any data set. It is meant to simply better communicate the data to a broader audience.

STANDARDIZATION TO 100

In order to index around an average, this study had to first standardize the values. Standardization is a simple formula based on the mean and standard deviation of a data set. Standard Value = (Base Value - Mean)/Standard Deviation. This makes every value in the data set a reflection of how many standard deviations it is from the mean, with the new mean set to zero. Standard values are typically very small numbers, generally ranging from -2.5 to +2.5. The size of these values make it challenging to draw meaningful comparisons. Therefore, in order to make a more intelligible comparison, we multiplied standard values by 20 and added 100. The mean thus became 100, and every standard deviation from the mean became worth 20 points, positive or negative. In a normally distributed data set, values would range from 50 to 150. Since these data sets aren't normally distributed, some metrics have values above 150 and below 50, but only in a few extreme cases.

SKEWNESS/LOGARITHM

As noted, these data sets are not normally distributed. Some data sets were highly skewed due to very high or low outliers, distorting the differences between the bulk of the metros in the data set (see input table for data sets in which the log function was applied). In order to make more meaningful comparisons and make the data sets more normal, we transformed several data sets logarithmically. We then standardized these values and applied the same standardization method described above.

PRICE DEFLATION

Wages carry different purchasing powers depending on where the employee is located. In order to account for the differences in prices or buying power in each region, this study deflated wages using the Bureau of Economic Analysis's Implicit Regional Price Deflator (IRPD), the essential deflator for their Regional Price Parities Index (RPP). These values are reported as an index, similar to our indexing methodology, with higher values indicating a higher cost. We standardized and flipped these values, in order to make the standard deviations valuable and make higher costs negative as opposed to positive. As the index is reported by the BEA, the values are meaningless in terms of application to a wage. Therefore, we had to make them meaningful. We decided that every negative standard deviation away from the mean meant a 5% deflation in wages, and the inverse being true for lower cost metros. For example, San Diego was -1.93 standard deviations from the mean, meaning wages were deflated by 9.65%.

TECH

INDEX METHODOLOGY

INPUT MATRIX

METRIC	DESCRIPTION	CATEGORY	INPUTS	SOURCES	COMMENTS
Software Developer Concentration (30%)*	The number of software developers per 1,000 jobs	Concentration	Occupation Employment per 1,000	Bureau of Labor Statistics, Occupation Employment Survey, 2014	Includes software developers (applications), software developers (systems) and computer programmers. Excludes web developers due to insufficient data going back to 2010. A per 1,000 employees measure was used to compare metros of varying size.
Talent Pool (10%)*	Computer and math degree bachelor's degree attainment as a share of the 25 and older population	Talent	Computer and Math Degree Holders, 25+ population	United States Census Bureau, American Community Survey, 1-Year Estimates, 2014	The American Community Survey does not provide data more granular than computer/math degrees. A share of 25+ measure was used to compare metros of varying size.
Pipeline (10%)*	Undergraduate Computer Science (CS) degrees conferred by education institutions in the MSA per employee	Talent	Computer Science Degrees Conferred, Total Employees in MSA	National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2014 Bureau of Labor Statistics, Occupation Employment Survey, 2014	See table below for a complete list of degree titles included. A per employee measure was used to compare metros of varying size.
Retention (10%)	Number of replacement hires as a percentage of average employment in an industry	Talent	Replacement rate as calculated by QWI Explorer	United States Census Bureau, Quarterly Workforce Indicators, 1-Year Estimates, 2014	Industries included: Software publishers, Computer systems design and related services, and Computer and peripheral equipment manufacturing. Includes degree holders only.
Wages (10%)*	Average wage of a software developer adjusted for regional price parities	Prosperity	Wages for computer programmers and software developers, Price deflator calculation.	Bureau of Labor Statistics, Occupation Employment Survey, 2014 Bureau of Economic Analysis, Implicit Regional Price Deflator (IRPD), 2013	Total wages were calculated for each occupation, then summed, then divided by the total number of all software development occupations.
Wage Growth (10%)	Percentage change in average wage for software developers from 2010 to 2014	Prosperity	Wages for computer programmers and software developers	Bureau of Labor Statistics, Occupation Employment Survey, 2010, 2014	Nominal wages, not IRPD-adjusted wages, were used.
Job Growth (10%)	Percentage change in number of software developers from 2010 to 2014	Prosperity	Software developer jobs	Bureau of Labor Statistics, Occupation Employment Survey, 2010, 2014	Includes software developers (applications), software developers (systems) and computer programmers. Excludes web developers due to insufficient data going back to 2010.
Capital (10%)*	Total venture capital dollars received by MSA per employee in the region	Capital	Total VC Dollars, Total Employment	National Venture Capital Association, 2015 Bureau of Labor Statistics, Current Employment Survey, 2015	Total VC used due to the unavailability of software VC by MSA. A per employee measure was used to compare metros of varying size.

*A logarithm was applied to values to account for outliers/skewness.

CLASSIFICATION OF INSTRUCTIONAL PROGRAM (CIP) CODES USED FOR SOFTWARE DEVELOPMENT DEGREES (NCES, IPEDS)

CIP NAME	CIP CODE	CIP NAME	CIP CODE
Accounting and Computer Science	30.1601	Computer Programming, Specific Applications	11.0202
Computational Science	30.3001	Computer Programming/Programmer, General	11.0201
Computer and Information Sciences and Support Services, Other	11.9999	Computer Science	11.0701
Computer and Information Sciences, General	11.0101	Computer Software and Media Applications, Other	11.0899
Computer and Information Sciences, Other	11.0199	Computer Software Engineering	14.0903
Computer Engineering Technology/Technician	15.1201	Computer Technology/Computer Systems Technology	15.1202
Computer Engineering, General	14.0901	Mathematics and Computer Science	30.0801

TECH CAPITAL METHODOLOGY

DATA SOURCES

This study relied on three main data sources for capital, the National Venture Capital Association (NVCA), Price Waterhouse Coopers (PwC) MoneyTree Report and PitchBook Data. NVCA and PwC work together to produce the MoneyTree report, generally the most widely used and cited US VC database. PitchBook Data is a subscription-based data provider, and also a very commonly cited, though there are restrictions to the use and reporting of their data. This study uses the NVCA/PwC data as much as possible for two reasons: first, to not violate any terms of use with PitchBook, and second, to report total figures that can be tracked and verified by anyone—not just those with a subscription.

WEIGHTING METHOD

NVCA/PwC does not provide very much detail on the industry or product vertical of a VC deal. Categories like software, biotechnology, healthcare and medical devices are useful, but do not allow us to differentiate between types of software products. In addition, deals are sometimes miscategorized based on their industry instead of their product code. For instance, a company who developed a healthcare information system or medical records system may be categorized under healthcare alongside a company who is providing laboratory services. While these can both be considered healthcare, this categorization makes it challenging to distinguish the software component of the former.

PitchBook Data, on the other hand, reports deals by industry product code. This study looked at 204 industry product codes in all, and recategorized them by product vertical (e.g. SaaS, Mobile) based on if they matched the software ecosystem as defined in this study. We then calculated how much of the total capital invested, as reported by PitchBook, was across these categories, going back to 2005. In order to not disclose any specific deal information or total numbers from PitchBook, we applied these weights/shares to the total numbers reported by NVCA/PwC to report an estimate of how much capital was being invested into San Diego. Therefore, sums of dollars will reflect the NVCA/PwC figure, and no detailed dollar or deal information from PitchBook is reported. We used this method for all types of capital to show how San Diego's capital infrastructure breaks down by product vertical and deal type.

See tables on the following pages for a list of which industry codes were included and excluded from the analysis.

CAPITAL METHODOLOGY

PITCHBOOK INDUSTRY CODES INCLUDED BY CATEGORY

CATEGORY	PRIMARY INDUSTRY CODE
DEFENSE/ROBOTICS	Aerospace & Defense
ENERGY/CLEAN TECH	Alternative Energy Equipment
ENERGY/CLEAN TECH	Energy Production
GAMING/MEDIA ENTERTAINMENT	Entertainment Software
GAMING/MEDIA ENTERTAINMENT	Media & Information Services (B2B)
GAMING/MEDIA ENTERTAINMENT	Movies, Music & Entertainment
GAMING/MEDIA ENTERTAINMENT	Other Media
LIFE SCIENCES/HEALTH	Diagnostic Equipment
LIFE SCIENCES/HEALTH	Discovery Tools (Healthcare)
LIFE SCIENCES/HEALTH	Medical Records Systems
LIFE SCIENCES/HEALTH	Monitoring Equipment
LIFE SCIENCES/HEALTH	Other Healthcare Technology Systems
LIFE SCIENCES/HEALTH	Practice Management (Healthcare)
LIFE SCIENCES/HEALTH	Surgical Devices
LIFE SCIENCES/HEALTH	Therapeutic Devices
MOBILE	Application Specific Semiconductors
MOBILE	Communication Software
MOBILE	Wireless Communications Equipment
MOBILE	Wireless Service Providers
NETWORKING	Connectivity Products
NETWORKING	Fiberoptic Equipment
NETWORKING	Internet Service Providers
NETWORKING	Other Communications & Networking
NETWORKING	Telecommunications Service Providers
OTHER	Information Services (B2C)
OTHER	Other Hardware
OTHER	Other Information Technology
OTHER	Other IT Services
OTHER	Other Services (B2C Non-Financial)
OTHER	Security Services (B2B)
OTHER	Social Content
OTHER	Systems & Information Management

CATEGORY	PRIMARY INDUSTRY CODE
OTHER ELECTRONICS MFG	Computers, Parts & Peripherals
OTHER ELECTRONICS MFG	Electrical Equipment
OTHER ELECTRONICS MFG	Electronic Components
OTHER ELECTRONICS MFG	Electronic Equipment & Instruments
OTHER ELECTRONICS MFG	Electronics (B2C)
OTHER ELECTRONICS MFG	General Purpose Semiconductors
OTHER ELECTRONICS MFG	Other Semiconductors
OTHER ELECTRONICS MFG	Production (Semiconductors)
SAAS	Application Software
SAAS	Automation/Workflow Software
SAAS	Business/Productivity Software
SAAS	Database Software
SAAS	Decision/Risk Analysis
SAAS	Educational Software
SAAS	Enterprise Systems (Healthcare)
SAAS	Financial Software
SAAS	Internet Software
SAAS	Multimedia & Design Software
SAAS	Network Management Software
SAAS	Operating Systems Software
SAAS	Other Software
SAAS	Social/Platform Software
SAAS	Software Development Applications
SAAS	Vertical Market Software
WEB/ECOMMERCE/MARKETING	Internet Retail

CAPITAL METHODOLOGY

PITCHBOOK INDUSTRY CODES EXCLUDED BY CATEGORY

CATEGORY	PRIMARY INDUSTRY CODE
BIOTECH	Biotechnology
BIOTECH	Drug Delivery
BIOTECH	Drug Discovery
BIOTECH	Other Pharmaceuticals & Biotechnology
BIOTECH	Pharmaceuticals
ENERGY/CLEAN TECH	Energy Storage
ENERGY/CLEAN TECH	Environmental Services (B2B)
ENERGY/CLEAN TECH	Other Energy
ENERGY/CLEAN TECH	Other Energy Services
ENERGY/CLEAN TECH	Electric Utilities
ENERGY/CLEAN TECH	Energy Exploration
ENERGY/CLEAN TECH	Energy Marketing
ENERGY/CLEAN TECH	Energy Refining
ENERGY/CLEAN TECH	Energy Infrastructure
ENERGY/CLEAN TECH	Energy Traders & Brokers
ENERGY/CLEAN TECH	Energy Transportation
ENERGY/CLEAN TECH	Gas Utilities
GAMING/MEDIA ENTERTAINMENT	Broadcasting, Radio & Television
LIFE SCIENCES/HEALTH	Clinics/Outpatient Services
LIFE SCIENCES/HEALTH	Laboratory Services (Healthcare)
LIFE SCIENCES/HEALTH	Medical Supplies
LIFE SCIENCES/HEALTH	Other Healthcare
LIFE SCIENCES/HEALTH	Other Healthcare Services
OTHER	Agricultural Chemicals
OTHER	Automotive
OTHER	Beverages
OTHER	Clothing
OTHER	Construction & Engineering
OTHER	Consumer Finance
OTHER	Education & Training Services (B2B)
OTHER	Educational & Training Services (B2C)
OTHER	Elder & Disabled Care
OTHER	Food Products
OTHER	Government
OTHER	Horticulture
OTHER	Human Capital Services
OTHER	Industrial Chemicals
OTHER	Legal Services (B2C)
OTHER	Machinery (B2B)
OTHER	Multi-line Chemicals
OTHER	Other Business Products & Services
OTHER	Other Chemicals & Gases
OTHER	Other Consumer Durables
OTHER	Other Containers & Packaging
OTHER	Other Devices & Supplies
OTHER	Other Financial Services
OTHER	Other Commercial Services
OTHER	Other Commercial Products

CAT	PRIMARY INDUSTRY CODE
OTHER	Personal Products
OTHER	Real Estate Services (B2C)
OTHER	Recreational Goods
OTHER	Restaurants & Bars
OTHER	Specialty Chemicals
OTHER	Footwear
OTHER	Animal Husbandry
OTHER	Accessories
OTHER	Accounting, Audit & Tax Services (B2B)
OTHER	Accounting, Audit & Tax Services (B2C)
OTHER	Air
OTHER	Air
OTHER	Aluminum Mining
OTHER	Aquaculture
OTHER	Asset Management
OTHER	Automotive Insurance
OTHER	BPO/Outsource Services
OTHER	Brokerage
OTHER	Building Products
OTHER	Buildings & Property
OTHER	Business Equipment & Supplies
OTHER	Cable Service Providers
OTHER	Casinos & Gaming
OTHER	Catalog Retail
OTHER	Coal & Consumable Fuels Equipment
OTHER	Commercial/Professional Insurance
OTHER	Commodity Chemicals
OTHER	Consulting Services (B2B)
OTHER	Cruise Lines
OTHER	Cultivation
OTHER	Department Stores
OTHER	Distributors/Wholesale
OTHER	Distributors/Wholesale (B2C)
OTHER	Distributors (Healthcare)
OTHER	General Merchandise Stores
OTHER	Gold Mining
OTHER	Holding Companies
OTHER	Home Furnishings
OTHER	Hospitals/Inpatient Services
OTHER	Hotels & Resorts
OTHER	Household Appliances
OTHER	Household Products
OTHER	Industrial Supplies & Parts
OTHER	Infrastructure
OTHER	Insurance Brokers
OTHER	Investment Banks
OTHER	IT Consulting & Outsourcing
OTHER	Legal Services (B2B)

CAT	PRIMARY INDUSTRY CODE
OTHER	Leisure Facilities
OTHER	Life & Health Insurance
OTHER	Logistics
OTHER	Luxury Goods
OTHER	Managed Care
OTHER	Marine
OTHER	Marine
OTHER	Metal Containers & Packaging
OTHER	Mineral Textiles
OTHER	Multi-line Insurance
OTHER	Multi-Utilities
OTHER	National Banks
OTHER	Office Electronics
OTHER	Office Services (B2B)
OTHER	Oil & Gas Equipment
OTHER	Other Apparel
OTHER	Other Capital Markets/Institutions
OTHER	Other Consumer Non-Durables
OTHER	Other Consumer Products & Services
OTHER	Other Equipment
OTHER	Other Insurance
OTHER	Other Materials
OTHER	Other Metals, Minerals & Mining
OTHER	Other Retail
OTHER	Other Textiles
OTHER	Other Utilities
OTHER	Other Agriculture
OTHER	Other Commercial Banks
OTHER	Other Restaurants, Hotels & Leisure
OTHER	Other Transportation
OTHER	Other Transportation
OTHER	Outcome Management (Healthcare)
OTHER	Paper Containers & Packaging
OTHER	Plastic Containers & Packaging
OTHER	Precious Metals & Minerals Mining
OTHER	Printing Services (B2B)
OTHER	Private Equity
OTHER	Property & Casualty Insurance
OTHER	Publishing
OTHER	Raw Materials (Non-Wood)
OTHER	Real Estate Investment Trusts (REITs)
OTHER	Regional Banks
OTHER	Re-Insurance
OTHER	Road
OTHER	Specialized Finance
OTHER	Specialty Retail
OTHER	Synthetic Textiles
OTHER	Thrifts & Mortgage Finance
OTHER	Water Utilities
OTHER	Wood/Hard Products

POWER INDEX DATA TABLES

PROSPERITY INPUTS (A-M)

MSA	AVG. WAGE (RAW)		WAGE GROWTH 2010-14	RPP DEFLATOR	ADJUSTED WAGE 2014	TOTAL SOFTWARE JOBS		JOB GROWTH 2010-14	INDEX SCORE			
	2010	2014				2010	2014		WAGE GROWTH	ADJ. WAGE	JOB GROWTH	CAT. INDEX
ATLANTA-SANDY SPRINGS-MARIETTA, GA	$89,207	$95,334	6.9%	3.3%	$98,436	24,280	36,080	48.6%	90.1	116.4	135.2	113.9
AUSTIN-ROUND ROCK-SAN MARCOS, TX	$94,476	$95,059	0.6%	1.3%	$96,253	18,350	19,120	4.2%	68.7	111.4	90.8	90.3
BALTIMORE-TOWSON, MD	$93,223	$114,408	22.7%	-4.6%	$109,111	14,290	16,790	17.5%	144.4	139.7	104.1	129.4
BOSTON-CAMBRIDGE-QUINCY, MA-NH	$99,612	$109,111	9.5%	-5.9%	$102,704	58,810	61,000	3.7%	99.2	126.0	90.3	105.2
BUFFALO-NIAGARA FALLS, NY	$72,518	$79,704	9.9%	4.1%	$82,943	3,590	4,060	13.1%	100.5	77.8	99.7	92.7
CHARLOTTE-GASTONIA-ROCK HILL, NC-SC	$89,831	$94,763	5.5%	4.3%	$98,819	8,850	12,570	42.0%	85.4	117.3	128.7	110.5
CHICAGO-JOLIET-NAPERVILLE, IL-IN-WI	$86,335	$85,158	-1.4%	-3.3%	$82,319	42,210	52,330	24.0%	61.9	76.1	110.6	82.9
CINCINNATI-MIDDLETOWN, OH-KY-IN	$75,725	$81,000	7.0%	6.0%	$85,823	8,730	9,130	4.6%	90.4	85.5	91.2	89.0
CLEVELAND-ELYRIA-MENTOR, OH	$74,248	$76,209	2.6%	6.5%	$81,199	6,690	7,700	15.1%	75.6	73.0	101.7	83.4
COLUMBUS, OH	$80,217	$88,872	10.8%	4.2%	$92,628	14,750	12,370	-16.1%	103.5	102.7	70.5	92.2
DALLAS-FORT WORTH-ARLINGTON, TX	$93,547	$95,992	2.6%	0.0%	$96,005	42,040	46,790	11.3%	75.5	110.8	97.9	94.8
DENVER-AURORA-BROOMFIELD, CO	$91,776	$101,604	10.7%	-2.3%	$99,260	23,770	24,630	3.6%	103.2	118.3	90.2	103.9
DETROIT-WARREN-LIVONIA, MI	$79,611	$85,753	7.7%	1.9%	$87,386	16,870	20,550	21.8%	93.0	89.6	108.4	97.0
HARTFORD-WEST HARTFORD-EAST HARTFORD, CT	$82,281	$90,223	9.7%	0.2%	$90,430	5,840	6,410	9.8%	99.6	97.3	96.4	97.8
HOUSTON-SUGAR LAND-BAYTOWN, TX	$88,931	$97,821	10.0%	0.1%	$97,941	21,330	25,900	21.4%	100.8	115.3	108.0	108.1
INDIANAPOLIS-CARMEL, IN	$74,397	$82,562	11.0%	4.1%	$85,962	7,370	9,760	32.4%	104.1	85.9	119.1	103.0
JACKSONVILLE, FL	$81,622	$85,477	4.7%	2.7%	$87,797	4,460	4,290	-3.8%	82.8	90.6	82.8	85.4
KANSAS CITY, MO-KS	$80,288	$87,232	8.6%	4.1%	$90,824	11,750	11,870	1.0%	96.2	98.3	87.6	94.0
LAS VEGAS-PARADISE, NV	$75,207	$83,871	11.5%	0.9%	$84,652	2,400	3,390	41.3%	106.0	82.4	127.9	105.4
LOS ANGELES-LONG BEACH-SANTA ANA, CA	$92,857	$105,075	13.2%	-9.8%	$94,820	49,620	55,430	11.7%	111.6	108.0	98.3	106.0
LOUISVILLE-JEFFERSON COUNTY, KY-IN	$72,084	$74,138	2.8%	5.5%	$78,232	3,970	4,570	15.1%	76.3	64.6	101.7	80.9
MEMPHIS, TN-MS-AR	$72,395	$82,585	14.1%	5.0%	$86,744	3,510	1,970	-43.9%	114.8	87.9	42.7	81.8
MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL	$74,538	$83,515	12.0%	-2.5%	$81,407	15,060	14,520	-3.6%	107.8	73.6	83.0	88.1
MILWAUKEE-WAUKESHA-WEST ALLIS, WI	$75,965	$80,273	5.7%	3.2%	$82,841	8,640	7,820	-9.5%	86.0	77.5	77.1	80.2
MINNEAPOLIS-ST. PAUL-BLOOMINGTON, MN-WI	$86,797	$91,110	5.0%	-1.1%	$90,139	22,500	22,690	0.8%	83.6	96.6	87.5	89.2
TOP 50 MEAN	$84,189	$92,364	9.8%	0.0%	$91,886	N/A	N/A	13.4%	100.0	100.0	100.0	100.0
STANDARD DEVIATION	$10,109	$12,070	5.8%	5.0%	$8,414	N/A	N/A	20.0%	20.0	20.0	20.0	12.9

POWER INDEX DATA TABLES

MSA	AVG. WAGE (RAW) 2010	AVG. WAGE (RAW) 2014	WAGE GROWTH 2010-14	RPP DEFLATOR	ADJUSTED WAGE 2014	TOTAL SOFTWARE JOBS 2010	TOTAL SOFTWARE JOBS 2014	JOB GROWTH 2010-14	WAGE GROWTH	ADJ. WAGE	JOB GROWTH	CAT. INDEX
NASHVILLE-DAVIDSON–MURFREESBORO–FRANKLIN, TN	$69,137	$82,099	18.7%	4.1%	$85,436	3,790	5,440	43.5%	130.7	84.5	130.2	115.1
NEW ORLEANS-METAIRIE-KENNER, LA	$65,961	$79,775	20.9%	2.7%	$81,897	1,910	1,310	-31.4%	138.3	74.9	55.2	89.5
NEW YORK-NORTHERN NEW JERSEY-LONG ISLAND, NY-NJ-PA	$93,726	$104,693	11.7%	-12.4%	$91,705	94,520	107,390	13.6%	106.6	100.5	100.2	102.4
OKLAHOMA CITY, OK	$67,383	$77,490	15.0%	4.8%	$81,225	2,830	4,490	58.7%	117.9	73.1	145.3	112.1
ORLANDO-KISSIMMEE-SANFORD, FL	$73,708	$87,807	19.1%	1.7%	$89,290	9,400	9,290	-1.2%	132.0	94.4	85.5	104.0
PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD	$90,335	$92,068	1.9%	-4.1%	$88,302	29,380	32,150	9.4%	73.1	91.9	96.1	87.0
PHOENIX-MESA-GLENDALE, AZ	$87,814	$90,718	3.3%	1.3%	$91,857	15,550	20,030	28.8%	77.9	100.8	115.4	98.1
PITTSBURGH, PA	$73,899	$80,060	8.3%	3.8%	$83,141	9,170	10,740	17.1%	95.1	78.3	103.7	92.4
PORTLAND-VANCOUVER-HILLSBORO, OR-WA	$89,732	$91,812	2.3%	0.1%	$91,875	10,670	13,620	27.6%	74.5	100.9	114.3	96.6
PROVIDENCE-FALL RIVER-WARWICK, RI-MA	$82,817	$95,237	15.0%	0.8%	$96,022	3,730	4,700	26.0%	117.9	110.8	112.6	113.8
RALEIGH-CARY, NC	$84,186	$94,456	12.2%	3.0%	$97,325	9,690	11,850	22.3%	108.3	113.9	108.9	110.4
RICHMOND, VA	$85,406	$88,587	3.7%	2.7%	$90,943	6,950	6,480	-6.8%	79.3	98.6	79.9	85.9
RIVERSIDE-SAN BERNARDINO-ONTARIO, CA	$82,965	$96,112	15.8%	-3.0%	$93,271	3,600	3,630	0.8%	120.8	104.3	87.5	104.2
ROCHESTER, NY	$77,946	$80,614	3.4%	2.1%	$82,279	5,400	5,640	4.4%	78.3	76.0	91.1	81.8
SACRAMENTO–ARDEN-ARCADE–ROSEVILLE, CA	$90,175	$93,229	3.4%	-1.1%	$92,235	10,600	10,310	-2.7%	78.2	101.8	83.9	87.9
SALT LAKE CITY, UT	$81,676	$89,247	9.3%	0.7%	$89,838	7,430	9,000	21.1%	98.3	95.8	107.8	100.6
SAN ANTONIO-NEW BRAUNFELS, TX	$81,073	$98,167	21.1%	3.8%	$101,944	5,870	5,840	-0.5%	138.7	124.4	86.1	116.4
SAN DIEGO-CARLSBAD-SAN MARCOS, CA	$92,260	$107,615	16.6%	-9.7%	$97,228	16,340	19,660	20.3%	123.5	113.7	106.9	114.7
SAN FRANCISCO-OAKLAND-FREMONT, CA	$102,639	$116,466	13.5%	-11.3%	$103,338	36,080	54,530	51.1%	112.7	127.4	137.8	126.0
SAN JOSE-SUNNYVALE-SANTA CLARA, CA	$118,458	$135,958	14.8%	-11.9%	$119,825	51,980	67,850	30.5%	117.1	160.9	117.2	131.7
SEATTLE-TACOMA-BELLEVUE, WA	$97,666	$117,193	20.0%	-3.6%	$112,969	46,100	67,530	46.5%	135.0	147.5	133.1	138.6
ST. LOUIS, MO-IL	$83,096	$89,655	7.9%	6.4%	$95,380	14,650	13,220	-9.8%	93.6	109.3	76.9	93.3
TAMPA-ST. PETERSBURG-CLEARWATER, FL	$81,034	$85,631	5.7%	0.8%	$86,291	10,130	11,670	15.2%	86.0	86.7	101.8	91.5
VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC	$78,614	$89,461	13.8%	1.2%	$90,537	5,520	6,410	16.1%	113.8	97.6	102.7	104.7
WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV	$100,057	$107,207	7.1%	-10.9%	$95,470	72,330	73,570	1.7%	91.0	109.5	88.3	96.3
TOP 50 MEAN	$84,189	$92,364	9.8%	0.0%	$91,886	N/A	N/A	13.4%	100.0	100.0	100.0	100.0
STANDARD DEVIATION	$10,109	$12,070	5.8%	5.0%	$8,414	N/A	N/A	20.0%	20.0	20.0	20.0	12.9

POWER INDEX DATA TABLES

TALENT INPUTS (A-M)

MSA	REPLACEMENT RATE 2014	CS DEGREES/ EMPLOYEE 2014	COMP/MATH DEGREE% 2014	INDEX SCORE			
				RETENTION	PIPELINE	DEGREE ATTAINMENT	CATEGORY INDEX
ATLANTA-SANDY SPRINGS-MARIETTA, GA	3.8%	3.19	2.31%	88.8	114.8	117.0	106.8
AUSTIN-ROUND ROCK-SAN MARCOS, TX	3.5%	4.20	2.69%	98.2	129.6	124.6	117.5
BALTIMORE-TOWSON, MD	3.3%	2.64	2.73%	104.5	106.0	125.5	112.0
BOSTON-CAMBRIDGE-QUINCY, MA-NH	2.7%	4.20	2.37%	123.3	129.7	118.2	123.7
BUFFALO-NIAGARA FALLS, NY	3.0%	2.37	1.25%	113.9	101.6	86.0	100.5
CHARLOTTE-GASTONIA-ROCK HILL, NC-SC	4.4%	3.14	1.56%	69.9	114.0	97.0	93.6
CHICAGO-JOLIET-NAPERVILLE, IL-IN-WI	3.7%	1.70	1.93%	91.9	90.0	107.9	96.6
CINCINNATI-MIDDLETOWN, OH-KY-IN	3.3%	1.24	1.43%	104.5	82.3	92.7	93.1
CLEVELAND-ELYRIA-MENTOR, OH	3.2%	1.10	1.32%	107.6	80.1	88.8	92.2
COLUMBUS, OH	3.5%	2.58	1.84%	98.2	105.0	105.4	102.9
DALLAS-FORT WORTH-ARLINGTON, TX	4.8%	1.35	1.97%	57.4	84.2	108.9	83.5
DENVER-AURORA-BROOMFIELD, CO	3.4%	1.21	2.27%	101.3	81.9	116.1	99.8
DETROIT-WARREN-LIVONIA, MI	3.3%	1.09	1.28%	104.5	79.9	87.3	90.6
HARTFORD-WEST HARTFORD-EAST HARTFORD, CT	3.9%	2.11	1.95%	85.6	97.1	108.3	97.0
HOUSTON-SUGAR LAND-BAYTOWN, TX	3.6%	0.84	1.35%	95.0	76.0	89.7	86.9
INDIANAPOLIS-CARMEL, IN	3.6%	1.30	1.40%	95.0	83.4	91.6	90.0
JACKSONVILLE, FL	3.4%	1.65	1.30%	101.3	89.2	87.8	92.8
KANSAS CITY, MO-KS	4.0%	1.49	1.67%	82.5	86.5	100.6	89.9
LAS VEGAS-PARADISE, NV	3.1%	0.71	0.85%	110.7	74.3	66.7	83.9
LOS ANGELES-LONG BEACH-SANTA ANA, CA	3.5%	2.32	1.44%	98.2	100.6	93.1	97.3
LOUISVILLE-JEFFERSON COUNTY, KY-IN	1.8%	1.83	1.20%	151.5	92.4	84.0	109.3
MEMPHIS, TN-MS-AR	4.5%	1.19	0.86%	66.8	81.6	66.8	71.7
MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL	2.8%	1.60	1.14%	120.2	88.4	81.0	96.5
MILWAUKEE-WAUKESHA-WEST ALLIS, WI	3.6%	2.40	1.35%	95.0	102.0	89.7	95.6
MINNEAPOLIS-ST. PAUL-BLOOMINGTON, MN-WI	3.6%	2.56	2.15%	95.0	104.7	113.4	104.4
TOP 50 MEAN	3.4%	2.34	1.80%	100.0	100.0	100.0	100.0
STANDARD DEVIATION	0.6%	1.32	0.89%	20.0	20.0	20.0	12.9

POWER INDEX DATA TABLES

TALENT INPUTS (N-Z)

MSA	REPLACEMENT RATE 2014	CS DEGREES/EMPLOYEE 2014	COMP/MATH DEGREE% 2014	INDEX SCORE			CATEGORY INDEX
				RETENTION	PIPELINE	DEGREE ATTAINMENT	
NASHVILLE-DAVIDSON--MURFREESBORO--FRANKLIN, TN	4.4%	3.19	2.31%	88.8	114.8	117.0	77.1
NEW ORLEANS-METAIRIE-KENNER, LA	2.2%	4.20	2.69%	98.2	129.6	124.6	96.3
NEW YORK-NORTHERN NEW JERSEY-LONG ISLAND, NY-NJ-PA	4.0%	2.64	2.73%	104.5	106.0	125.5	95.5
OKLAHOMA CITY, OK	2.7%	4.20	2.37%	123.3	129.7	118.2	99.3
ORLANDO-KISSIMMEE-SANFORD, FL	2.8%	2.37	1.25%	113.9	101.6	86.0	104.1
PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD	3.0%	3.14	1.56%	69.9	114.0	97.0	107.1
PHOENIX-MESA-GLENDALE, AZ	4.5%	1.70	1.93%	91.9	90.0	107.9	85.9
PITTSBURGH, PA	3.3%	1.24	1.43%	104.5	82.3	92.7	104.8
PORTLAND-VANCOUVER-HILLSBORO, OR-WA	3.0%	1.10	1.32%	107.6	80.1	88.8	98.3
PROVIDENCE-FALL RIVER-WARWICK, RI-MA	2.7%	2.58	1.84%	98.2	105.0	105.4	108.4
RALEIGH-CARY, NC	3.5%	1.35	1.97%	57.4	84.2	108.9	125.1
RICHMOND, VA	4.1%	1.21	2.27%	101.3	81.9	116.1	92.6
RIVERSIDE-SAN BERNARDINO-ONTARIO, CA	2.6%	1.09	1.28%	104.5	79.9	87.3	93.7
ROCHESTER, NY	3.1%	2.11	1.95%	85.6	97.1	108.3	122.0
SACRAMENTO--ARDEN-ARCADE--ROSEVILLE, CA	3.1%	0.84	1.35%	95.0	76.0	89.7	105.9
SALT LAKE CITY, UT	3.3%	1.30	1.40%	95.0	83.4	91.6	121.1
SAN ANTONIO-NEW BRAUNFELS, TX	3.5%	1.65	1.30%	101.3	89.2	87.8	88.2
SAN DIEGO-CARLSBAD-SAN MARCOS, CA	3.1%	1.49	1.67%	82.5	86.5	100.6	115.5
SAN FRANCISCO-OAKLAND-FREMONT, CA	4.6%	0.71	0.85%	110.7	74.3	66.7	97.4
SAN JOSE-SUNNYVALE-SANTA CLARA, CA	3.5%	2.32	1.44%	98.2	100.6	93.1	133.9
SEATTLE-TACOMA-BELLEVUE, WA	2.1%	1.83	1.20%	151.5	92.4	84.0	124.6
ST. LOUIS, MO-IL	3.7%	1.19	0.86%	66.8	81.6	66.8	96.0
TAMPA-ST. PETERSBURG-CLEARWATER, FL	4.1%	1.60	1.14%	120.2	88.4	81.0	83.6
VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC	4.0%	2.40	1.35%	95.0	102.0	89.7	90.2
WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV	3.9%	2.56	2.15%	95.0	104.7	113.4	105.0
TOP 50 MEAN	3.4%	2.34	1.80%	100.0	100.0	100.0	100.0
STANDARD DEVIATION	0.6%	1.32	0.89%	20.0	20.0	20.0	12.9

POWER INDEX DATA TABLES

CONCENTRATION INPUTS

MSA	SOFTWARE DEVELOPERS PER 1,000 EMPLOYEES 2014	INDEX SCORE
ATLANTA-SANDY SPRINGS-MARIETTA, GA	15.1	110.8
AUSTIN-ROUND ROCK-SAN MARCOS, TX	21.6	123.4
BALTIMORE-TOWSON, MD	13.0	105.5
BOSTON-CAMBRIDGE-QUINCY, MA-NH	23.6	126.7
BUFFALO-NIAGARA FALLS, NY	7.5	87.3
CHARLOTTE-GASTONIA-ROCK HILL, NC-SC	13.8	107.6
CHICAGO-JOLIET-NAPERVILLE, IL-IN-WI	11.9	102.4
CINCINNATI-MIDDLETOWN, OH-KY-IN	9.0	93.2
CLEVELAND-ELYRIA-MENTOR, OH	7.6	87.5
COLUMBUS, OH	12.8	104.9
DALLAS-FORT WORTH-ARLINGTON, TX	14.8	110.0
DENVER-AURORA-BROOMFIELD, CO	18.6	118.1
DETROIT-WARREN-LIVONIA, MI	11.0	100.0
HARTFORD-WEST HARTFORD-EAST HARTFORD, CT	11.3	100.9
HOUSTON-SUGAR LAND-BAYTOWN, TX	9.1	93.5
INDIANAPOLIS-CARMEL, IN	10.4	98.0
JACKSONVILLE, FL	7.1	85.5
KANSAS CITY, MO-KS	11.8	102.2
LAS VEGAS-PARADISE, NV	3.9	66.4
LOS ANGELES-LONG BEACH-SANTA ANA, CA	10.0	96.6
LOUISVILLE-JEFFERSON COUNTY, KY-IN	7.4	86.5
MEMPHIS, TN-MS-AR	3.3	61.5
MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL	6.2	80.9
MILWAUKEE-WAUKESHA-WEST ALLIS, WI	9.5	95.0
MINNEAPOLIS-ST. PAUL-BLOOMINGTON, MN-WI	12.4	104.0
TOP 50 MEAN	13.1	100.0
STANDARD DEVIATION	10.3	20.0

MSA	SOFTWARE DEVELOPERS PER 1,000 EMPLOYEES 2014	INDEX SCORE
NASHVILLE-DAVIDSON–MURFREESBORO–FRANKLIN, TN	6.6	83.2
NEW ORLEANS-METAIRIE-KENNER, LA	2.4	52.5
NEW YORK-NORTHERN NEW JERSEY-LONG ISLAND, NY-NJ-PA	12.5	104.1
OKLAHOMA CITY, OK	7.4	86.8
ORLANDO-KISSIMMEE-SANFORD, FL	8.6	91.7
PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD	11.9	102.4
PHOENIX-MESA-GLENDALE, AZ	11.0	99.7
PITTSBURGH, PA	9.5	94.9
PORTLAND-VANCOUVER-HILLSBORO, OR-WA	12.9	105.3
PROVIDENCE-FALL RIVER-WARWICK, RI-MA	8.5	91.2
RALEIGH-CARY, NC	21.7	123.7
RICHMOND, VA	10.5	98.3
RIVERSIDE-SAN BERNARDINO-ONTARIO, CA	2.9	57.7
ROCHESTER, NY	11.4	101.0
SACRAMENTO–ARDEN-ARCADE–ROSEVILLE, CA	12.0	102.8
SALT LAKE CITY, UT	13.6	107.1
SAN ANTONIO-NEW BRAUNFELS, TX	6.4	81.9
SAN DIEGO-CARLSBAD-SAN MARCOS, CA	14.9	110.2
SAN FRANCISCO-OAKLAND-FREMONT, CA	25.8	130.0
SAN JOSE-SUNNYVALE-SANTA CLARA, CA	69.7	168.2
SEATTLE-TACOMA-BELLEVUE, WA	38.3	144.8
ST. LOUIS, MO-IL	10.1	97.0
TAMPA-ST. PETERSBURG-CLEARWATER, FL	9.9	96.2
VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC	8.8	92.3
WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV	25.0	128.8
TOP 50 MEAN	13.1	100.0
STANDARD DEVIATION	10.3	20.0

POWER INDEX DATA TABLES

CAPITAL INPUTS

MSA	TOTAL VC INVESTMENT PER EMPLOYEE 2015	INDEX SCORE
ATLANTA-SANDY SPRINGS-MARIETTA, GA	$350.11	112.9
AUSTIN-ROUND ROCK-SAN MARCOS, TX	$834.62	121.2
BALTIMORE-TOWSON, MD	$343.88	112.7
BOSTON-CAMBRIDGE-QUINCY, MA-NH	$2,156.95	130.3
BUFFALO-NIAGARA FALLS, NY	$4.91	72.1
CHARLOTTE-GASTONIA-ROCK HILL, NC-SC	$281.50	110.8
CHICAGO-JOLIET-NAPERVILLE, IL-IN-WI	$250.21	109.7
CINCINNATI-MIDDLETOWN, OH-KY-IN	$95.45	100.5
CLEVELAND-ELYRIA-MENTOR, OH	$107.60	101.6
COLUMBUS, OH	$58.83	95.9
DALLAS-FORT WORTH-ARLINGTON, TX	$66.95	97.1
DENVER-AURORA-BROOMFIELD, CO	$407.61	114.4
DETROIT-WARREN-LIVONIA, MI	$41.72	92.6
HARTFORD-WEST HARTFORD-EAST HARTFORD, CT	$142.19	104.3
HOUSTON-SUGAR LAND-BAYTOWN, TX	$56.59	95.5
INDIANAPOLIS-CARMEL, IN	$58.23	95.8
JACKSONVILLE, FL	$0.25	43.7
KANSAS CITY, MO-KS	$52.85	94.8
LAS VEGAS-PARADISE, NV	$4.78	71.9
LOS ANGELES-LONG BEACH-SANTA ANA, CA	$808.81	120.9
LOUISVILLE-JEFFERSON COUNTY, KY-IN	$25.82	88.0
MEMPHIS, TN-MS-AR	$26.35	88.2
MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL	$128.09	103.3
MILWAUKEE-WAUKESHA-WEST ALLIS, WI	$10.08	79.0
MINNEAPOLIS-ST. PAUL-BLOOMINGTON, MN-WI	$202.37	107.7
TOP 50 MEAN	$549.89	100.0
STANDARD DEVIATION	$1,638.17	20.0

MSA	TOTAL VC INVESTMENT PER EMPLOYEE 2015	INDEX SCORE
NASHVILLE-DAVIDSON--MURFREESBORO--FRANKLIN, TN	$165.75	105.8
NEW ORLEANS-METAIRIE-KENNER, LA	$0.19	40.8
NEW YORK-NORTHERN NEW JERSEY-LONG ISLAND, NY-NJ-PA	$810.31	120.9
OKLAHOMA CITY, OK	$48.76	94.1
ORLANDO-KISSIMMEE-SANFORD, FL	$89.20	99.8
PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD	$190.75	107.1
PHOENIX-MESA-GLENDALE, AZ	$52.55	94.8
PITTSBURGH, PA	$176.34	106.4
PORTLAND-VANCOUVER-HILLSBORO, OR-WA	$152.72	105.0
PROVIDENCE-FALL RIVER-WARWICK, RI-MA	$33.82	90.6
RALEIGH-CARY, NC	$175.03	106.3
RICHMOND, VA	$0.91	56.1
RIVERSIDE-SAN BERNARDINO-ONTARIO, CA	$48.03	93.9
ROCHESTER, NY	$41.20	92.5
SACRAMENTO--ARDEN-ARCADE--ROSEVILLE, CA	$50.36	94.4
SALT LAKE CITY, UT	$414.51	114.5
SAN ANTONIO-NEW BRAUNFELS, TX	$58.52	95.8
SAN DIEGO-CARLSBAD-SAN MARCOS, CA	$883.48	121.8
SAN FRANCISCO-OAKLAND-FREMONT, CA	$9,959.80	144.9
SAN JOSE-SUNNYVALE-SANTA CLARA, CA	$6,408.44	140.7
SEATTLE-TACOMA-BELLEVUE, WA	$665.16	119.1
ST. LOUIS, MO-IL	$194.87	107.3
TAMPA-ST. PETERSBURG-CLEARWATER, FL	$31.10	89.8
VIRGINIA BEACH-NORFOLK-NEWPORT NEWS, VA-NC	$12.35	80.9
WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV	$313.80	111.9
TOP 50 MEAN	$549.89	100.0
STANDARD DEVIATION	$1,638.17	20.0

MEMORANDUM

To: **San Diego Regional EDC, Software Advisory Committee**

From: **Josh Williams, BW Research**

Date: **January 26, 2016**

Re: **Analysis of Software Business Surveys in San Diego County (SDC)**

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107 surveys were completed with SDC businesses that are in one of four industries where software occupational employment[1] is highest. These industries include;

- Computer Systems Design & related services (NAICS: 5415)
- Scientific Research & Development services (NAICS: 5417)
- Computer & Peripheral equipment manufacturing (NAICS:3341)
- Architecture & Engineering Services (NAICS:5413)
- Software publishers (NAICS: 5112)

Approximately one-third of SDC firms in these industries engage directly in software development. We also completed surveys with known software development firms to get more detailed feedback on the software development process, their financing experiences as well as their talent needs and expectations.

Here are some of the key findings from the survey research.

- More than half (54%) of SDC software firms expect to grow (number of employees) in the next 12 months, with about 40 percent (37%) expecting to stay the same size, and another 7 percent not sure and only 2 percent expecting to shrink. Current SDC software development firms expect to grow by over 10 percent in the next 12 months. These are strong growth expectations.

- Over the last three years, 42 percent of SDC software development firms have grown, 45 percent have stayed the same size, and only 13 percent have experienced declines in terms of total employment. These figures translate into strong overall growth (15 percent) for software development firms in SDC over the last 36 months.

- In general, software firms were positive about SDC as a place to do business (21% excellent, 48% good, and less than 10% poor or very poor). Software firms with little to no difficulty finding qualified applicants for positions related to software development, were considerably more likely to rate SDC as an excellent (50%) or good (43%) place to

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[1] Software occupations include; Computer programmers, Software Developers (Applications), Software Developers (Systems Software), and Web Developers.

![bw] RESEARCH PARTNERSHIP

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MEMORANDUM

do business compared to those that had great difficulty finding talent (excellent - 8% or good - 33%).

FINANCING ASSESSMENT OF SDC SOFTWARE DEVELOPMENT FIRMS

Just under half (44%) of SDC software development firms had tried to getting financing or funding in the last 5 years, and of those that were seeking funding most received it (96%). Of those that got funding or financing, almost half (48%) were through a traditional bank loan or small business loan, a little over a third (36%) were from an angel investment, 20 percent from grant funding (SBIR or STTR), and 16 percent from a venture capital investment. About a quarter (24%) of SDC software development firms that were seeking financing indicated they had little to no difficulty getting financed, while the majority (64%) indicated some difficulty, but only twelve percent stated they had great difficulty getting financed.

SATISFACTION/DISSATISFACTION WITH KEY ISSUES

Of the 8 issues we tested, software firms were most satisfied[2] with San Diego County's:
- Access to relevant vendors and suppliers (88% satisfaction)
- Ability to retain valued employees (84% satisfaction)
- Education & training institutions that help develop software talent (79% satisfaction)
- Access to clients and customers (78% satisfaction)

Of the 8 issues we tested, software firms were most dissatisfied with San Diego County's:
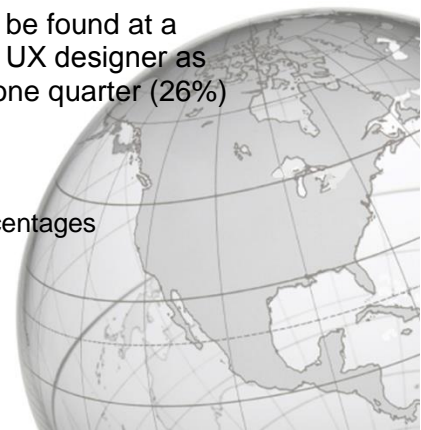- Ability to find qualified entry to mid-level software developers (25% dissatisfaction)
- Ability to recruit experienced, high-level software developers (18% dissatisfaction)
- Access to capital (14% dissatisfaction)

WORKFORCE ASSESSMENT

Over seventy percent of SDC software development firms are having some (51%) or great (21%) difficulty finding qualified applicants for positions related to software development and the results of the survey show that this questions is strongly correlated with their ranking of doing business in San Diego County.

Positions like Product Manager and Development Operations (or DevOps) can be found at a majority of SDC's software development firms, while over 40 percent hire UI or UX designer as well as Quality Assurance or QA positions. Data Scientists are found at about one quarter (26%) of SDC software development firms.

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[2] DK/NA Responses have been factored out of the satisfaction and dissatisfaction percentages

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MEMORANDUM

Technical training and expertise as well as industry work experience was very important to over 60 percent of SDC software development firms. A 4 year college degree (40%), or an industry credential or certificate (25%) were important to employers, but not at the same level as experience and technical skills.

Programming languages that were more important to SDC software development firms included;

- Programming in SQL and related database languages (47% very important)

- Programming in C, C sharp or C ++ (39% very important & 32% primary coding language)

- Programming in Javascript (30% very important)

- Programming in R, or Python or related data mining & analytics languages (26% very important)

- Programming in PHP (16% primary coding language)

In general, SDC firms in software industries or more specifically those businesses directly engaged in software development are tough to connect with and tend to be relatively secretive regarding talent, financing and larger regional economic development issues. This is seen in the relatively low cooperation rates on the survey and the 56 percent of firms that did not want to be contacted by researchers, even after completing the survey.

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### Introduction:

Hello, my name is _____. May I speak to _____ [IF NO NAME IS DETERMINED USE] May I please speak to a manager or a decision maker who is involved in planning, research or budgeting at [firm name]?

I am calling on behalf of BW Research, an independent research organization working on behalf of the San Diego Regional Economic Development Corporation.

The survey will take a few minutes of your time and will help us better understand how to support businesses in our region.

**(If needed):** This survey has been commissioned by the San Diego Regional Economic Development Corporation, which is committed to supporting the businesses in the County.

**(If needed):** The survey is being conducted by BW Research, an independent research organization, and should take approximately ten minutes of your time.

**(If needed):** Your individual responses will **not** be published; only aggregate information will be used in the reporting of the survey results.


``````````````````````````````````````````````````````````````````````````````````````````````````````````````````````````````````

Screener Questions

A. Are you involved or leading the hiring, planning, or budgeting at your firm?

      100.0% **Yes [CONTINUE]**

        0.0% **No [TERMINATE]**

        0.0% **Not sure [TERMINATE]**

B. How many business locations does your company or organization have in San Diego County?

      93.5% **One business location**

       6.5% **Two or more business locations**

C. Is your company involved in any type of software or applications development or does your firm employ, software developers, programmers or engineers?

      53.3% **Yes [CONTINUE ON LONG SURVEY]**

      46.7% **No [CONTINUE ON SHORT SURVEY]**

       0.0% **Not sure [TERMINATE]**

[PART 1 – BUSINESS PROFILE AND CUSTOMER AND SUPPLIER CONNECTIONS]

1. How many years have you had at least one business location in San Diego County?

     9.3%   **0 to 2 years**
    14.0%   **More than 2 up to 5 years**
    17.8%   **More than 5 up to 10 years**
    36.4%   **More than 10 years up to 20 years**
    22.4%   **More than 20 years**

Next I would like to ask about the industries that are most important to your firm.

2. What industry or industries best describes the work that your firm is involved in and connected to? (DO NOT READ, ALLOW MORE THAN ONE RESPONSE)

    26.2%   **Construction, architecture & engineering**
    11.2%   **Web design, web hosting & web marketing**
    10.3%   **Software**
     7.5%   **Biotech & life sciences**
     7.5%   **Manufacturing**
     6.5%   **Government**
     6.5%   **Healthcare & medical**
     5.6%   **Defense**
     4.7%   **Aerospace**
     2.8%   **Non-profit**
     2.8%   **Energy & environment**
     2.8%   **Finance & legal**
     2.8%   **Transportation**
     2.8%   **Agriculture**
     2.8%   **Electronics**
     1.9%   **Trade**
     1.9%   **Research & development**
     1.9%   **IT consulting & support**
    10.3%   **Other –** *no single category more than one response*
     0.0%   **DK/NA**

3. Are your customers primarily local - within San Diego County, regional - within Southern California, Statewide – within California, national – within the Country, or international - outside the Country? [ALLOW MULTIPLE RESPONSES]

> **29.0%   Local - San Diego County**
> **21.5%   Regional - Within Southern California**
> **11.2%   Statewide - Within California**
> **43.9%   National - Within the United States**
> **27.1%   International - Outside the United States**
> **0.0%   (DON'T READ) Don't know**

4. Next, I would like to ask if your firm is primarily focused on serving customers in other businesses, a b2b focus, or primarily focused on serving consumers directly or a combination of both b2b and consumers?

> **68.2%   Primarily businesses or B2B**
> **5.6%   Primarily consumers directly**
> **23.4%   A combination of both businesses and consumers**
> **2.8%   (DON'T READ) Don't know**

5. What industry or industries are your customers primarily found in? (DO NOT READ, ALLOW MORE THAN ONE RESPONSE)

> **18.7%   Construction, architecture & engineering**
> **15.0%   Government**
> **10.3%   Trade**
> **7.5%   Biotech & life sciences**
> **7.5%   Manufacturing**
> **7.5%   Energy & environment**
> **7.5%   Finance & legal**
> **6.5%   Higher education**
> **5.6%   Defense**
> **5.6%   Healthcare & medical**
> **3.7%   Research & development**
> **3.7%   Aerospace**
> **2.8%   Web design, web hosting & web marketing**
> **2.8%   Electronics**
> **1.9%   Software**
> **1.9%   Transportation**
> **1.9%   Agriculture**
> **12.1%   Wide variety of industries**
> **15.0%   Other -** *no single category more than one response*

[PART 2 – SOFTWARE PROFILE AND FUNDING]

For this survey, we will just be asking about the employees that work from or directly report to your San Diego County location(s). [CONFIRM ZIP CODE OF THE CURRENT LOCATION/S]

6. Including all full-time and part-time employees, including permanent, contract and contingent workers, how many work at or from your San Diego County location(s)? (n=57)

38.6%	**Less than 5**
22.8%	**Between 5 and 9**
19.3%	**Between 10 and 24**
14.0%	**Between 25 and 49**
3.5%	**Between 50 and 99**
1.8%	**100 or more**

7. If you currently have [TAKE Q1 #] full-time and part-time employees, including permanent, contract and contingent workers, how many more or less employees do you expect to have at your San Diego County location(s) 12 months from now? (n=57)

Breakdown:

54.4%	**More**
1.8%	**Fewer**
36.8%	**Same number of employees**
7.0%	**DK/NA**

Expected Employment in 12 months
(Calculated by only examining businesses with both current and projected data)

	Current	12 months
n	52	52
Mean	17.08	19.79
Median	5.00	7.00
Total Employees	888	1,029
Change		141
% Growth		**15.9%**

[If amount differs by 10% or more in either direction, ask:]
Just to confirm, you currently have _____ employees and you expect to have _____ (more/less) employees, for a total of _____ employees 12 months from now.

[IF Q1>1 THEN ASK Q8, OTHERWISE SKIP]

8. Over the last three years, has your company grown, declined or stayed about the same in terms of permanent, contract and contingent employment at your San Diego County location(s)? [If it has grown or declined, ask] By about how many people? (n=53)

> Breakdown:

41.5%	**Grown**
45.3%	**Stayed the same**
13.2%	**Declined**
0.0%	**DK/NA**

Growth in Employment over last 36 months
(Calculated by only examining businesses with both current and past data)

	36 months ago	Current
n	50	50
Mean	15.20	17.40
Median	4.50	5.50
Total Employees	760	870
Change		110
% Growth		**14.5%**

Next I want you to think about the people at your work that are directly involved in developing software or related applications, this could include software developers, programmers and engineers as well as those individuals that are web developers and/or creating mobile applications. [REMIND AND REPEAT SOFTWARE EMPLOYMENT DEFINITION AS NEEDED]. – CONFIRM DEFINITION

9. If you currently have [TAKE Q6 #] full-time and part-time **permanent, contract & contingent** employees at your San Diego County location(s), how many of these employees are directly engaged in developing software or related applications? (n=57)

35.1%	**Less than 3**
56.1%	**Between 3 and 10**
3.5%	**Between 11 and 24**
3.5%	**Between 25 and 99**
1.8%	**DK/NA**

10. If you currently have [TAKE Q9 #] full-time and part-time **permanent, contract & contingent** employees at your San Diego County location(s) who are directly engaged in developing software or related applications, how many more or less software employees do you expect to have at your location 12 months from now?

> Breakdown:
>
> **43.9%** **More**
>
> **1.8%** **Fewer**
>
> **50.9%** **Same number of employees**
>
> **3.5%** **DK/NA**

Expected Software Employment in 12 months (outliers removed)
(Calculated by only examining businesses with both current and projected data)

	Current	12 months
n	51	51
Mean	4.45	5.26
Median	3.00	4.00
Total Employees	227	268
Change		41
% Growth		**18.1%**

PART 3 - Location and Overall Rating for Economic Development

Next I want to ask about San Diego County as a place to do business for firms engaged in software development

11. How would you rate San Diego County as a place to do business for firms that are engaged in software development?

> **20.6%** **Excellent**
>
> **47.7%** **Good**
>
> **19.6%** **Fair**
>
> **7.5%** **Poor**
>
> **0.9%** **Very poor**
>
> **3.7%** **(DON'T READ) DK/NA**

12. Please tell me how satisfied your company is with the following issues and attributes regarding the business climate in San Diego County.

Is your company satisfied, dissatisfied, or neither satisfied nor dissatisfied with San Diego County's: _____? (GET ANSWER AND THEN ASK:) Would that be very (satisfied/dissatisfied) or somewhat (satisfied/dissatisfied)?

RANDOMIZE

	Very satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Very dissatisfied	(DON'T READ) DK/NA
A. Access to capital	21.5%	33.6%	10.3%	7.5%	2.8%	24.3%
B. Access to clients and customers	32.7%	35.5%	13.1%	4.7%	1.9%	12.1%
C. Ability to recruit experienced, high-level software developers	20.6%	42.1%	11.2%	9.3%	6.5%	10.3%
D. Ability to find qualified entry to mid-level software developers	24.3%	36.4%	8.4%	13.1%	9.3%	8.4%
E. Access to relevant vendors and suppliers	41.1%	40.2%	7.5%	1.9%	1.9%	7.5%
F. Ability to retain valued employees over time	41.1%	37.4%	8.4%	4.7%	1.9%	6.5%
G. Access to other firms you can partner with that provide similar products or services	28.0%	41.1%	10.3%	6.5%	3.7%	10.3%
H. Education and training institutions that help develop software talent	31.8%	39.3%	7.5%	8.4%	2.8%	10.3%

Q12 w/ DK/NA removed

	Very satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Very dissatisfied
A. Access to capital (n=81)	28.4%	44.4%	13.6%	9.9%	3.7%
B. Access to clients and customers (n=94)	37.2%	40.4%	14.9%	5.3%	2.1%
C. Ability to recruit experienced, high-level software developers (n=96)	22.9%	46.9%	12.5%	10.4%	7.3%
D. Ability to find qualified entry to mid-level software developers (n=98)	26.5%	39.8%	9.2%	14.3%	10.2%
E. Access to relevant vendors and suppliers (n=99)	44.4%	43.4%	8.1%	2.0%	2.0%
F. Ability to retain valued employees over time (n=100)	44.0%	40.0%	9.0%	5.0%	2.0%
G. Access to other firms you can partner with that provide similar products or services (n=96)	31.3%	45.8%	11.5%	7.3%	4.2%
H. Education and training institutions that help develop software talent (n=96)	35.4%	43.8%	8.3%	9.4%	3.1%

Next, I would like to ask you about financing or funding that your firm may have considered or sought after.

13. Has your firm tried to get financing or funding in [IF NEEDED THIS COULD INCLUDE TRADITIONAL BANK LOANS, VENTURE CAPITAL INVESTING AND/OR CROWDFUNDING] the last five years [IF NEEDED FROM 2011 THROUGH 2015]? (n=57)

    43.9%   Yes

    50.9%   No

    5.3%   (DON'T READ) DK/NA

[IF Q13="No" OR "Don't know/ Refused" SKIP TO Q17 – ASK Q14 IF Q13 =1]

14. Over that 5 year time period, did your firm receive financing or funding? [IF NEEDED FROM 2010 THROUGH 2015]? (n=25)

96.0% **Yes**

4.0% **No**

0.0% **Currently or still in the process of trying to get funding**

0.0% **(DON'T READ) DK/NA**

[ASK Q15 IF Q14="Yes", "No" OR "Currently or still in the process of trying to get funding"]

15. What type of financing or funding did your firm receive (Q15="Yes") / try to get (Q15="No" OR "Currently or still in the process of trying to get funding")? (n=25)

48.0% **Traditional bank loan or small business loan**

36.0% **Angel investment**

20.0% **Grant funding, such as SBIR of STTR**

16.0% **Venture capital investment**

8.0% **(DON'T READ) Not sure**

16. How much difficulty has (did) your firm had (have) getting financing? (n=25)

24.0% **Little to no difficulty**

64.0% **Some difficulty**

12.0% **Great difficulty**

0.0% **(DON'T READ) DK/NA**

PART 4 – Workforce Development & Skills Assessment

Now I would like to ask about your organization's need for new employees.

17. Thinking about the ***positions related to software development*** you hire at your San Diego County location(s), how much difficulty does your company have finding qualified applicants who meet the organization's hiring standards? (n=57)

24.6% **Little to no difficulty**

50.9% **Some difficulty**

21.1% **Great difficulty**

3.5% **(DON'T READ) DK/NA**

18. Please tell me if you employ individuals in your software team that generally meet the following position titles. (n=57)

RANDOMIZE

	Yes	No	(DON'T READ) Not sure
A. Product manager	52.6%	47.4%	0.0%
B. Data scientist	26.3%	73.7%	0.0%
C. UI or UX designer	49.1%	49.1%	1.8%
D. Development operations or DevOps	50.9%	49.1%	0.0%
E. Quality assurance or QA	43.9%	54.4%	1.8%

19. Please tell me how important the following items are when considering candidates for available software development positions at your firm: very important, somewhat important, or not at all important. (n=57)

RANDOMIZE

	Very important	Somewhat important	Not at all important	(DON'T READ) It depends	(DON'T READ) Not sure
A. An industry recognized credential or certificate	24.6%	43.9%	29.8%	0.0%	1.8%
B. At least one year of industry related work experience	61.4%	29.8%	8.8%	0.0%	0.0%
C. A four-year college degree or higher	40.4%	43.9%	15.8%	0.0%	0.0%
D. Technical training and expertise specific to the position they are applying for	68.4%	28.1%	3.5%	0.0%	0.0%

20. Please tell me how important the following skills are when considering candidates for available software development positions at your firm: very important, somewhat important, or not at all important. (n=57)

RANDOMIZE

	Very important	Somewhat important	Not at all important	(DON'T READ) It depends	(DON'T READ) Not sure
A. Programming in SQL and related database languages	47.4%	26.3%	21.1%	0.0%	5.3%
B. Programming in Java	24.6%	33.3%	38.6%	0.0%	3.5%
C. Programming in iOS/Android mobile	19.3%	22.8%	54.4%	0.0%	3.5%
D. Programming in Php	14.0%	38.6%	40.4%	1.8%	5.3%
E. Programming in C, C sharp or C plus plus	38.6%	31.6%	28.1%	0.0%	1.8%
F. Programming in Javascript	29.8%	42.1%	24.6%	0.0%	3.5%
G. Programming in Ruby on Rails	5.3%	29.8%	59.6%	0.0%	5.3%
H. Programming in R, or Python or related data mining & analytics languages	26.3%	31.6%	36.8%	0.0%	5.3%

21. What is the primary coding language used by your software developers or engineers? (n=57)

31.6%	C, C++
15.8%	PHP
10.5%	Java
8.8%	HTML
7.0%	SQL
5.3%	Python
5.3%	Javascript
3.5%	Swift
17.5%	Other
17.5%	DK/NA/None

22. What city is your firm headquartered in?

Verbatim responses to be provided

23. Would you be willing to be contacted by researchers and/or educators who are developing new strategies and regional plans to support the San Diego County business community?

43.9%	Yes
54.2%	No
1.9%	(DON'T READ) Not sure

Since it sometimes becomes necessary for the project manager to call back and confirm responses to certain questions, I would like to verify your contact information.

A. First and Last Name_____

B. Position_____

C. Phone_____

D. Email _____

E. Company Name_____

**Those are all of the questions I have for you.
Thank you very much for participating!**

F. Company Name _____

G. Company location_____

H. Date and time of Interview_____

I. Name of Interviewer _____

J. PRIMARY NAICS CODE (ACCORDING TO DATA FILE)_____

K. SECONDARY NAICS CODE (ACCORDING TO DATA FILE)_____

L. NUMBER OF EMPLOYEES (ACCORDING TO DATA FILE)_____

Executive Interview Discussion Guide
Software – San Diego County

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**INTRODUCTION:**

Hello, my name is _____ and I'm with BW Research, an independent research firm. I am part of a research team that is working with the San Diego Regional EDC to better understand the needs and priorities of San Diego County's software development related businesses.

**(If needed):** Depending on your input, this discussion could take anywhere from 10 to 15 minutes of your time.

Let's go ahead and begin.

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SHORT PROFILE ON EACH RESPONDENT

Name of Individual:

Name of Company:

Contact information
phone:
Email:

Date & Time of Interview:

I. Profile & General Information [FILL OUT IN ADVANCE AS INFORMATION IS AVAILABLE]

Let me begin by asking a few general questions about [NAME OF ORGANIZATION]

1. What is your title or position within the firm?

    [Record title] _____

2. How long have you been with the organization?

    [Record years / months] _____

3. What industry would you say your firm is in?

    _____
    _____
    _____

4. What industry or industries are your customers primarily in?

    _____
    _____
    _____

5. What location(s) does your firm have in San Diego County?

    _____
    _____
    _____

6. Does your firm have location(s) outside of San Diego County and is yes, where (where are your Headquarters)?

    _____
    _____
    _____

7. Over the next 12 months do you expect to be increasing, decreasing or maintaining about the same number of employees in San Diego County?

    [IF MORE OR LESS, ASSESS HOW MANY]

    1   Increasing → How many?   _____

    2   Decreasing → How many?   _____

    3   Maintaining about the same number

II. Access to Capital

I would like to ask you about financing or funding that your firm may have considered or sought after.

8. Has your firm tried to get financing or funding, if yes, did you end up getting funded, how (traditional loan, angel, VC, Grant funding…), and what was the funding for?

_____
_____
_____

9. [IF THEY RECEIVED FUNDING FOLLOW UP WITH] Was the firm that funded or financed your organization in San Diego, if not what City, and what role does location play in getting funded, if at all?

_____
_____
_____

10. Is getting funding a challenge or difficulty for firms like yours, and if it is why and what can be done to improve the situation?

_____
_____
_____

Know I want to ask you about those positions related to software and software development, this could include software engineers, developers, programmers and web developers or any other position at your firm that requires programming or working knowledge of software development (systems or applications).

III. Talent & Workforce

11. Over the next 12 months do you expect to be increasing, decreasing or maintaining about the same number of software development employees in San Diego County?

    [IF MORE OR LESS, ASSESS HOW MANY]

    1   Increasing → How many?   _____

    2   Decreasing → How many?   _____

    3   Maintaining about the same number

Next I want to briefly ask you about recruiting and evaluating new software and/or software development employees.

12. What are the most immediate workforce or talent needs related to software develop at your firm? [WAIT FOR INITIAL RESPONSE AND THEN PROBE ON – SHORT TERM NEEDS 6 to 24 MONTHS]
    a. Key occupations
    b. Skills and abilities
    c. Deficiencies among current job applicants
    d. Key areas of education & training
    e. Key computer programming languages or software/hardware that is important
    f. New emerging employment opportunities

13. What are the key characteristics and/or attributes you are looking for when hiring someone in these positions? [WAIT FOR INITIAL RESPONSE AND THEN PROBE ON]

    a. Nontechnical skills (attitude and attributes)
    b. Technical skills (Certificates, programming languages, applications.,)
    c. Academic background (Degree level and type)

_____

_____

14. What would you recommend to current High School or College students who want to work in the software development in the next 3 to 5 years, in terms of skills, training and education they should focus on? [WAIT FOR INITIAL RESPONSE AND THEN PROBE ON- LONG TERM NEEDS 3 to 5 YEARS]

_____

_____

15. Are there any education, training, or degree/certificate programs that you would like to see offered in the region to prepare workers who are engaged or moving into software development?

_____

_____

PROBE 1 – Are there any programs that are already in existence that you think should be copied or expanded?

_____
_____

PROBE 2 – Are there any technologies, applications or programming languages that you think students and job-seekers should focus on if they want to work in software development?
_____
_____

IV. Regional Assessment

16. What are the strengths or advantages and weaknesses or disadvantages of software development in San Diego? [WAIT FOR INITIAL RESPONSE AND THEN PROBE ON]

      a. Key resources or programs in San Diego County that are a strength in the region in software development
      b. Obstacles or challenges in San Diego County for firms engaged in software development and/or creating new software products/applications.

17. Have you done any work in Software development outside of San Diego County?

      a. Yes (continue to Q14)
      b. No (Thank and Finish)

18. What do you see as the key regions for software development and how do they compare to San Diego County? [WAIT FOR INITIAL RESPONSE AND THEN PROBE ON]

      a. Key Strengths & Weaknesses in
          i. Bay Area (Silicon Valley, San Francisco, Oakland)
          ii. Seattle
          iii. Boston
          iv. Austin
          v. North Carolina Research Triangle

On behalf of SDREDC Thank you very much for your time and expertise in this discussion.

If you have any interest in seeing the findings of this research, please let us know and when it is completed we will make sure you get a copy.

Thank you for your time!

A. Name of Respondent _____

B. Position _____

C. Date and time of Interview _____

D. Relevant Contact Information

        Phone: _____

        Email: _____

E. Organization _____

F. Segment _____

For a copy of the complete study, please visit
sandiegobusiness.org/research

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