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The War for Talent in the Tech Industry:

A Workforce Demand Data Case Study

Authors:

Stephen Weltz,
Workforce Analytics Manager,
Human Capital Management Institute

Jeff Higgins,
Founder & CEO,
Human Capital Management Institute

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1. INTRODUCTION

The pandemic has forever changed the war for talent. The foundations of the economy were shaken, and many companies, initially, had to respond with workforce reductions, furloughs, and hiring freezes. Now, however, we are seeing a surge in job openings that are not being filled, with the Washington Post stating "there are 10 million job openings, yet more than 8.4 million unemployed are still actively looking for work". Employees are reevaluating work and priorities, and companies are trying to meet the challenges of this new competitive environment.[1]

These challenges are further complicated by differing industries, job types, needed skills, and location. For tech talent in India, for example, the market is particularly booming. Tech companies, multinational corporations, and start ups are battling for top talent, and employees with the right skills are at a premium.[2]

How can companies better navigate the resulting wars for talent that such conditions create? By better utilizing both internal and external data on the workforce. Using internal data, companies can assess their workforce productivity, their leadership effectiveness, and their quality of hiring. With the combination of internal and external data, companies can benchmark their performance and pay rates against competitors, and elevate their workforce strategy through workforce planning.

In this report, we take a look at job demand data from Thinknum's "Job Listings" database through HCMI's Job Analysis Framework to assess the current landscape for talent competition within the tech industry. This can provide context for companies seeking tech talent, as well as preview the depth of analysis that such data can provide.

Key Questions that can be addressed by competitive labor data (and relevant sections):
How much are our competitors hiring? Where? (SECTION 2)
Where is the best location to hire, expand, or relocate? (SECTIONS 3 & 4)
What job roles are in highest demand? (SECTION 4)
Will your current labor market meet your expected demand? (SECTION 4)
What talent supply will be available? (SECTION 4)
Which critical job roles will be hardest to fill? (SECTION 4)

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1 Heather Long, Alyssa Fowers, and Andrew Van Dam, "Why America Has 8.4 Million Unemployed When There Are 10 Million Job Openings," The Washington Post (WP Company, September 8, 2021), https://www.washingtonpost.com/business/2021/09/04/ten-million-job-openings-labor-shortage/.
2 "Tech Cos Are on a Hiring Surge, and It's Boom Time for Top Talent," The Economic Times, accessed October 16, 2021, https://economictimes.indiatimes.com/jobs/tech-cos-are-on-a-hiring-surge-and-its-boom-time-for-top-talent/articleshow/86423152.cms?from=mdr.

DATA SAMPLE

Thinknum's Job listings database contains job postings from 10,460 of the top companies across the globe for the last 6 years including facets such as job title, location, and description. For this study, 41 of the top tech companies were chosen for a job demand analysis of the industry.[3] Data was pulled between October 1st and 17th 2021.

Data was analyzed from 2016-2021 by quarter, though the analyses presented here focus primarily on 2021. Unique job listings were each counted once per quarter in which they remained posted.

Job listing data spans 138 unique countries, though the majority, and therefore the focus of this paper, come from the United States followed by India. Listings in the United States are further segmented by State.

Job title and location data was standardized to optimize analyses, though for a significant number of job postings location data was not available (18%), or not included in the posting itself. These job listings are included in analyses where location is irrelevant, but excluded otherwise.

2. WHAT ARE TECH COMPANIES HIRING?

Globally, tech company hiring is higher than it has ever been, with the previous peak being Q3 of 2019, followed by an expected drop as COVID hit. The lowest point was Q2 and Q3 of 2020 with 94663 and 96586 postings, respectively. After which, hiring increased each quarter by a CAGR of 31% until 215442 in Q2 2021. In Q3 listings remained at a similar level, increasing slightly to 220850.
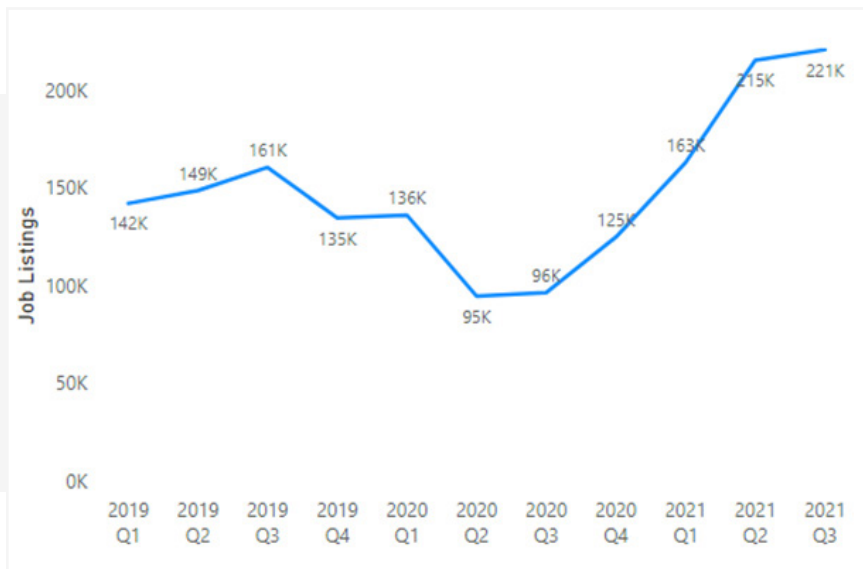

Figure 1.
Total Job Listings Trend

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3 Companies include Adobe, Air BnB, Alphabet, Amdocs, Applied Materials, Baidu, Broadcom Limited, CACI International, CommScope, Corning, Ericsson, Facebook, Fiverr, Gartner, Hewlett-Packard, IBM, Ingram Micro, Insight Enterprises, Leidos Holdings, Lyft, Micron Technology, Microsoft, NCR, Nokia, NVIDIA, NXP Semiconductors, ON Semiconductor, Oracle, Red Hat, Salesforce, SAP SE, Science Applications International, SS&C Technologies, Synnex, Tech Data, Texas Instruments, Uber, Unisys, Vmware, Western Digital, and Workday.

3. WHERE ARE TECH COMPANIES HIRING?

In the United States, this mid 2021 spike is a return to pre-COVID form, as the highest number of listings is actually found in Q3 of 2019, after which job listings were reduced by nearly 50%. Worldwide, excluding the US and India, hiring followed a similar pattern, with a 2019 Q3 peak, followed by a heavy decline and increase to new heights in 2021. India, on the other hand, is seeing a boom in tech job listings more than double anything seen before 2021. Based on the increases in hirings internationally, particularly in India, the actual % of job listings from tech companies based in the United States has decreased from 50% in Q1 2019 to a record low 39% in Q3 2021. India, on the other hand, has increased from 10% to 22% in the same span of time.
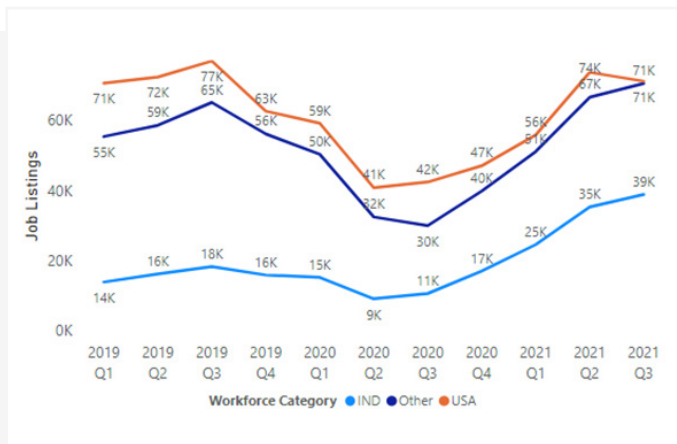

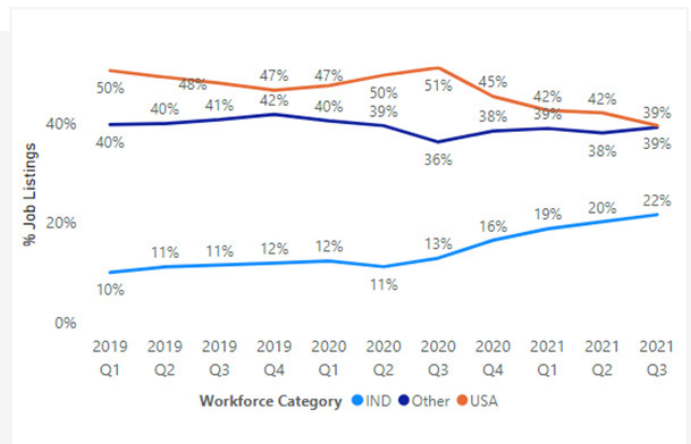Figure 2.
Job Listings Trend by Country

Figure 3.
Job Listings Percent Trend[4]

Within the United States, 85% of the relevant tech company job listings are found in the top 15 states[5] (including one category for listings only marked as "remote"), with 50% found in California, Washington, Virginia and Texas.

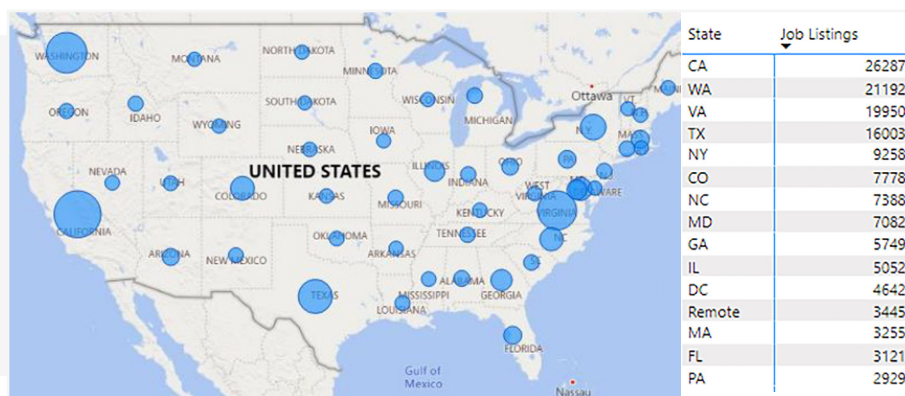| State	Job Listings
CA	26287
WA	21192
VA	19950
TX	16003
NY	9258
CO	7778
NC	7388
MD	7082
GA	5749
IL	5052
DC	4642
Remote	3445
MA	3255
FL	3121
PA	2929

Figure 4.
Job Listings by State - 2021

Table 1.
Job Listings Top 15

4 Listings without location data follow a similar trend to India, rising to around 40366, or 18% of all job listings, in 2021 Q3. When this is included, the USA has 32%, India has 18%, and all other countries have 32% of job listings.
5 Listing location by state, with categories "remote" and "DC" included

4. WHAT ARE TECH COMPANIES HIRING?

The most critical question in any analysis like this is to specify what are the most commonly requested job roles and skills. The simplest way to do this would be by job title provided in the listings themselves. This methodology for the top 10 job titles for both the US and India are shown below.

Title	Job Listings
Senior Software Engineer	2620
Senior Program Manager	1455
Software Engineer	1373
Software Engineer II	1185
Principal Software Engineer	746
Principal Program Manager	626
Software Engineer 2	588
Systems Engineer	442
Program Manager 2	441
Program Manager	420

Table 3.
Job Listings by Job Title - USA

Title	Job Listings
Application Developer: Microservices	2593
Application Developer: Java Full Stack	1599
Application Developer: Java & Web Technologies	1559
Data Engineer: Data Integration	1210
Data Engineer: Big Data	1172
Senior Practitioner - Finance and Administration Delivery	960
Package Consultant: Salesforce	953
Application Developer: Experience Front End	831
Software Developer 3	726
Software Engineer	718

Table 2.
Job Listings by Job Title - India

However, even with the limited scope to 10 titles these tables showcase a problem with this methodology; with many different companies, locations, and job listings, there are limitless possible permutations of job titles. This makes it impossible to get a true assessment of the types of roles and skills being hired. To solve this, we must place the titles into a standardized job framework.

JOB FRAMEWORK ANALYSIS

In a proper job framework, job titles are standardized, then categorized together with other jobs of similar duties into a smaller number of job families, which are in turn categorized into workforce categories. In this analysis 413252 job postings in 2021 had 155,057 unique job titles, which is very unwieldy for analysis. Utilizing HCMI's job framework database and a score matching methodology[6], This was categorized into 167 job families in 11 workforce categories.

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6 HCMI's job framework database has 80,000 unique job titles to match job listings to, and each title in the database is linked to a standardized job title, family and workforce category (which is similar to EEO categorization). Furthermore, this is linked to SOC code information from BLS databases, allowing for better comparison with government labor supply and compensation data. Titles were matched with HCMI's database using fuzzy matching of the titles, followed by review and clean up based on key word categorization.

Analyzing this by different locations can provide additional insight. Figures 5 and 6 below show that both USA and India tech industry job listings prioritize Scientific and Technical Staff, but India's emphasis is heavier, with almost 64% of such jobs fitting that category (e.g. Developers & Engineers). The USA tech industry, however, includes a more prominent mix of other categories such as Professional staff (e.g. business analysts) and Sales Reps.
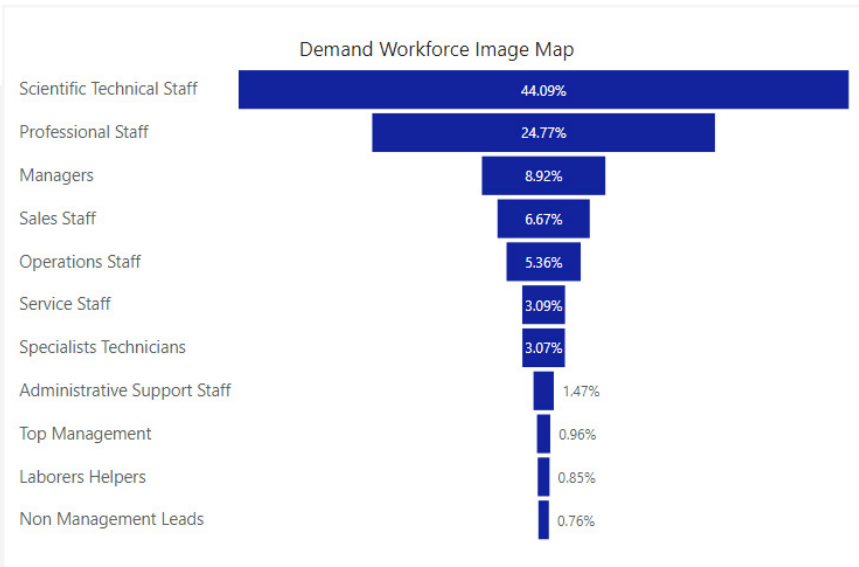

Figure 5.
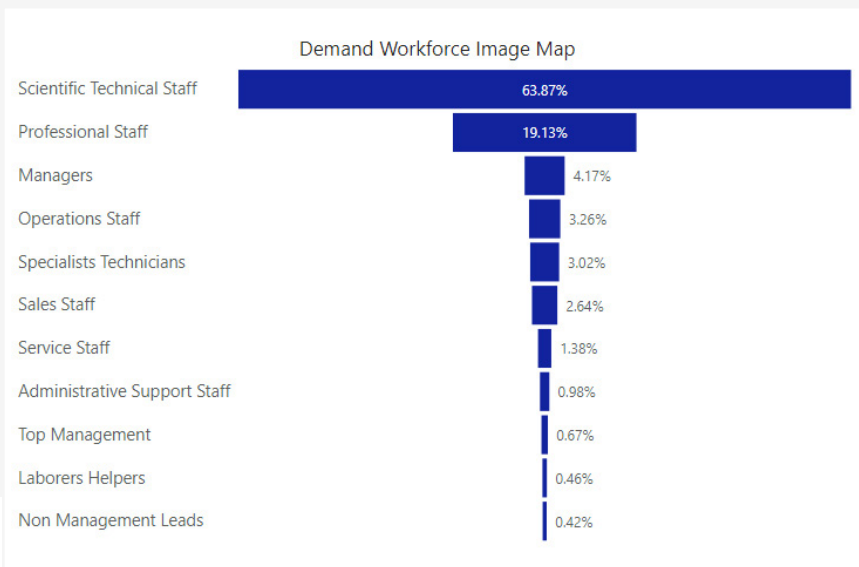Job Listing %
by Workforce Category –
USA 2021

Figure 6.
Job Listing %
by Workforce Category –
India 2021

Most jobs in the Scientific Technical category require university bachelor and post-secondary graduate degrees in multiple areas within STEM (Science, Technology, Engineering, Math), and may also require some form of professional certification. Because of this, these types of jobs are often particularly difficult to fill, and often command a more competitive compensation than most workforce categories aside from certain management and leadership roles. Knowledge of the type of jobs being hired by competitors and the challenges of acquiring that talent inform companies of what kind of talent war to prepare for and how many resources may be needed for it.

Any of these workforce categories could be broken down into their job families and titles for deeper analysis. As an example of this kind of deep dive, we'll look at the most prominent job family in listings, Software Developers.[7]

SOFTWARE DEVELOPER ANALYSIS

In 2021, the 41 tech companies put up 116966 postings requesting, 41782 of which were found in the USA, and of which 80% are found in the following 10 states: Washington, California, Virginia, Texas, Colorado, North Carolina, Maryland, New York, Georgia, and Massachusetts.

In Table 4, we provide some additional data from the Bureau of Labor Statistics occupation labor set.[8] While government sources lack the detail of demand data provided by Thinknum, BLS has very useful data on labor supply, that is, people currently employed in different job roles, as well as average salary.

By connecting the two data sources, we can better evaluate the state of competition for talent within the tech industry. In Table 4 below we show Job listings for software developers next to the total employed in the type of role.[9] Next to that we provide a simple ratio (Employed/Job Listings) as a measure of how tight the competition is for that kind of talent in the area. Finally, we list the average salary and upper end salary (90th percentile) for Software Developers to compare costs.

We can take this information together to assess each state. New York competitors should find it easier to fill these kinds of roles; Salary falls in the midrange of these 10 states, and the total software developers employed is both very plentiful (2nd place) and largely outweighs job listings.

Washington State, on the other hand, is a tighter market for software developer talent. The ratio of working software developers to job postings ranks 8th among these 10 states, and the average cost per employee is the 2nd highest.

State	Job Listings	Employed	Ratio	Average Salary	High End Salary
WA	8637	97440	11.3	$111,079	$163,823
CA	7089	244740	34.5	$115,219	$170,879
VA	4425	17020	3.8	$100,159	$151,850
TX	3390	108560	32.0	$97,524	$145,430
CO	1993	47650	23.9	$102,150	$149,719
NC	1888	44260	23.4	$94,282	$136,988
MD	1813	19290	10.6	$99,206	$155,716
NY	1542	120880	78.4	$101,198	$148,873
GA	1436	45290	31.5	$95,534	$144,365
MA	1035	62500	60.4	$111,049	$161,339

Table 4.
Software Developer -
Top 10 Job Listings Locations 2021[10]

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7 Includes software developers, engineers, and QA testers. "Summary Report for: 15-1252.00 - Software Developers," O*NET OnLine, accessed October 18, 2021, https://www.onetonline.org/link/summary/15-1252.00.
8 www.bls.gov is a public government website with useful data sets on labor supply and turnover, among other things
9 The comparison of these different data sets is another reason for job framework provided earlier. The BLS data set uses a different categorization of jobs than companies do, and therefore the two must be mapped together before they can be combined.
10 BLS latest supply data is dated as of 2020 – it is compared to 2021 job posting data here for illustration, as the directional nature of the salary comparisons and supply demand ratios are likely correct.

This assessment can be further illustrated as shown in Figures 7 and 8. In the first, Total Supply is compared to Tech industry demand; the further to the right and lower a state is the more plentiful supply is in comparison to the demand, and therefore the easier time similar tech companies would expect to fill positions therein.[11]
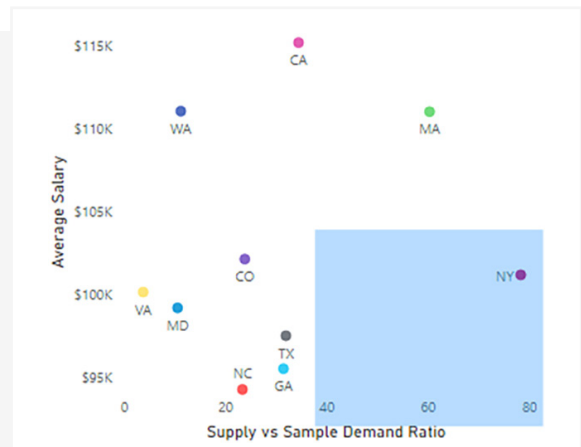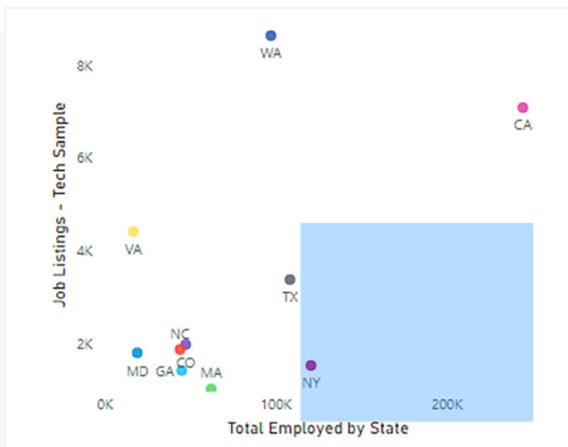

Figure 8.
Job Listings by Total Employed in State

Figure 7.
Average Salary by Supply Demand Ratio

Figure 8 takes this analysis a step further – by comparing the supply demand ratio metric to average salary, we can assess both where supply is more readily available (further to the right) and where average costs are lower (further down). For both charts, the "blue" zone provided is considered the ideal.

For companies seeking to compete for top talent, a full analysis comparing all relevant locations on these measures can help highlight where talent is the most optimal combination of cost effective and plentiful. With the surge in relevance of remote work, this type of data has become even more necessary to both identify where to get talent, and what to offer to bring in the best.

11 A full analysis of supply demand ratio, beyond the scope of this short paper, would expand even further beyond a sample set of companies to all companies that would hire this kind of talent. However, key competitors remains the best starting point for competitive intelligence analysis.

5. CONCLUSION

This paper provides just a taste of the type of analysis that can be done with demand data as plentiful as it is in Thinknum's database. We showed that some of the top tech companies in the world are greatly expanding their hiring in the USA and internationally, that India in particular is experiencing a boom in demand, and what kind of roles are being requested. We then showed the power of putting job listing data into a job framework, allowing for better categorization and comparison with BLS data on salary and supply, along with a deep dive into the software developer job family comparing tech industry demand in comparison to available talent.

So much of a company's value lies in its people and their skill sets. More and more what differentiates the companies that thrive in changing economic times are their ability to consistently attract and retain top talent. And competitive intelligence data remains one of the most powerful tools to help companies do just that.