

From West to the Rest:

Growing Geographic Dispersion of AI Jobs in America



UMD-LinkUp AIMaps

In collaboration with Outrigger Group

Tracking where AI jobs are being created

White Paper #1 January 2024

About

UMD-LinkUp AI Maps is the world's first attempt to map the creation of AI jobs. To date, the handful of research papers in academia and industry have used keywords to identify which jobs require AI skills and which do not. Our analysis indicates that this is an extremely flawed approach, with up to 70% false positives. In contrast, we use a fine-tuned large language model (LLM), powered by cutting-edge AI technologies, to differentiate jobs requiring AI skills from others. In short, we use AI to do research on AI.

Maryland Smith

The Robert H. Smith School of Business is a global leader in management education and research. One of 12 colleges and schools at the University of Maryland at College Park, the school offers undergraduate, MS, MBA, PhD, and executive education programs. Several of the school's departments rank among the top 10 in the world for research in their respective fields.

LinkUp

LinkUp combines more than 20 years of experience in human capital management and employment data with proprietary technology that indexes millions of job listings daily directly from employer websites around the world. From this unique jobs dataset, LinkUp provides clients with actionable insights into the global labor market at the macroeconomic to individual company level or across themes, skills, products, and technologies.

Outrigger Group

Outrigger Group provides fractional executives to fast-growing startups and established businesses. Outrigger's team of experienced executives and entrepreneurs helps companies accelerate growth through the most challenging phases of building a business, from inception through liquidity events.

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Methodology

The term “AI Job” refers to a job posting that requires AI skills. We use a fine-tuned large language model (LLM), powered by cutting-edge AI technologies, to differentiate jobs requiring AI skills from others. When compared against manual checks by multiple AI researchers, this LLM approach has an accuracy above 90%. In contrast, a dictionary-based approach has a much less than 50% accuracy-level when compared against manual checks.

As is the case with most data including employment numbers, accounting statements, and GDP figures, keep in mind that our data represent estimates, albeit what we believe to be very good estimates and better than any other data on AI job creation that we have come across.

We exclude jobs that would be based outside the United States.

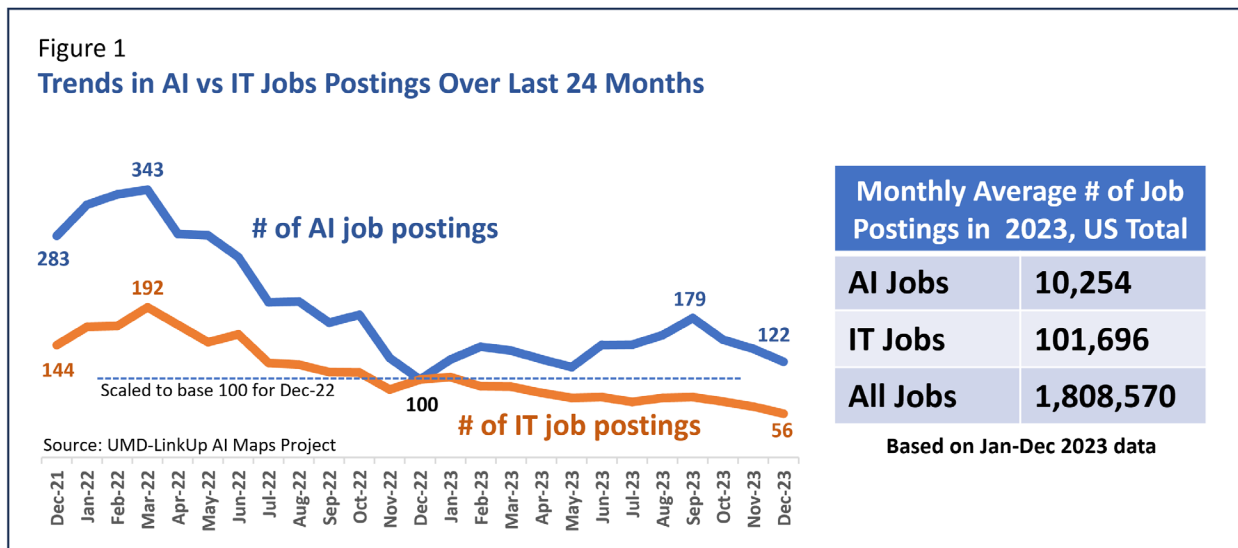
Executive Summary

1. During 2023, there has been a stabilization and upswing in AI job postings, even as the number of job postings for IT jobs in general has continued to decline since the start of layoffs in early 2022.
2. There is unmistakable evidence of greater geographic dispersion in both AI and IT job postings during the 5-year period 2018-2023. While geographic dispersion is more sharply evident in the case of AI job postings in recent years, it is consistent with the longer-term trend of increasing IT jobs dispersion across the nation over the last 20-30 years. Given the productivity increases associated with adoption of AI technologies, this is very promising news for the U.S. economy.
3. In looking at changes in a state's geographic share of all AI job postings in the US over the 5-year period from CY 2018 to CY 2023, there are some big winners and some big losers. The 5 biggest share gainers include VA, TX, MD, FL, and GA. The 5 biggest share losers include WA, CA, NY, MI, and OR.
4. Reflecting Silicon Valley's long-held role as the world's epicenter of digital technologies, California continues to dominate AI job postings.
5. Stripping out the effects of sheer size, AI Jobs Intensity (ratio of AI to all job postings) yields a different picture. Compared to the aggregated US-level AI Jobs Intensity of 0.56%, Washington DC ranks #1 at 1.75%, followed by VA at 1.36%, with MD not too far behind at 0.83%.
6. California's national share of all AI job postings far exceeds the state's national share of IT or all job postings. That said, California's share of AI and IT jobs declined from 2018 to 2023, reflecting geographic dispersion to the rest of the country.
7. The National Capital Region, encompassing MD-DC-VA, has emerged as the second biggest hub for AI jobs in the country after California. The key driver of this development is an all-out embrace of AI by federal government agencies (including DoD) and private sector

- suppliers of defense and aerospace equipment, software, and services.
8. The New York-New Jersey region remains a major hub for AI job postings. In 2018, it was the second biggest hub after California. With the ascendance of the National Capital Region, NY-NJ is now the third biggest hub. Even then, the share of AI job postings for NY-NJ meaningfully exceeds the region's share of IT or all job postings.
 9. New England presents a steady-state picture with regards to job postings of all types – AI, IT, and all jobs. Notwithstanding MIT and Harvard, over the last 30 years, the Cambridge-Boston area has become more biotech rather than Big Tech focused.
 10. Along with the National Capital Region, Texas has increased its share of AI job postings significantly during 2018-2023.
 11. Florida has meaningfully increased its share of AI job postings during 2018-2023. That said, Florida's national share of AI job postings lags behind the state's share of IT and all job postings.
 12. The Midwest region comprising 12 states and about one-fifth of the U.S. population accounts for an expected 22% of all job postings. While the region's national share of AI and IT job postings lags its share of all job postings, both shares have increased meaningfully during 2018-2023. As with the rest of the nation, Mid-West economies are also becoming significantly more AI and IT centric.

Observation #1

During 2023, there has been a stabilization and upswing in AI job postings, even as the number of job postings for IT jobs in general has continued to decline since the start of layoffs in early 2022 (Figure 1).

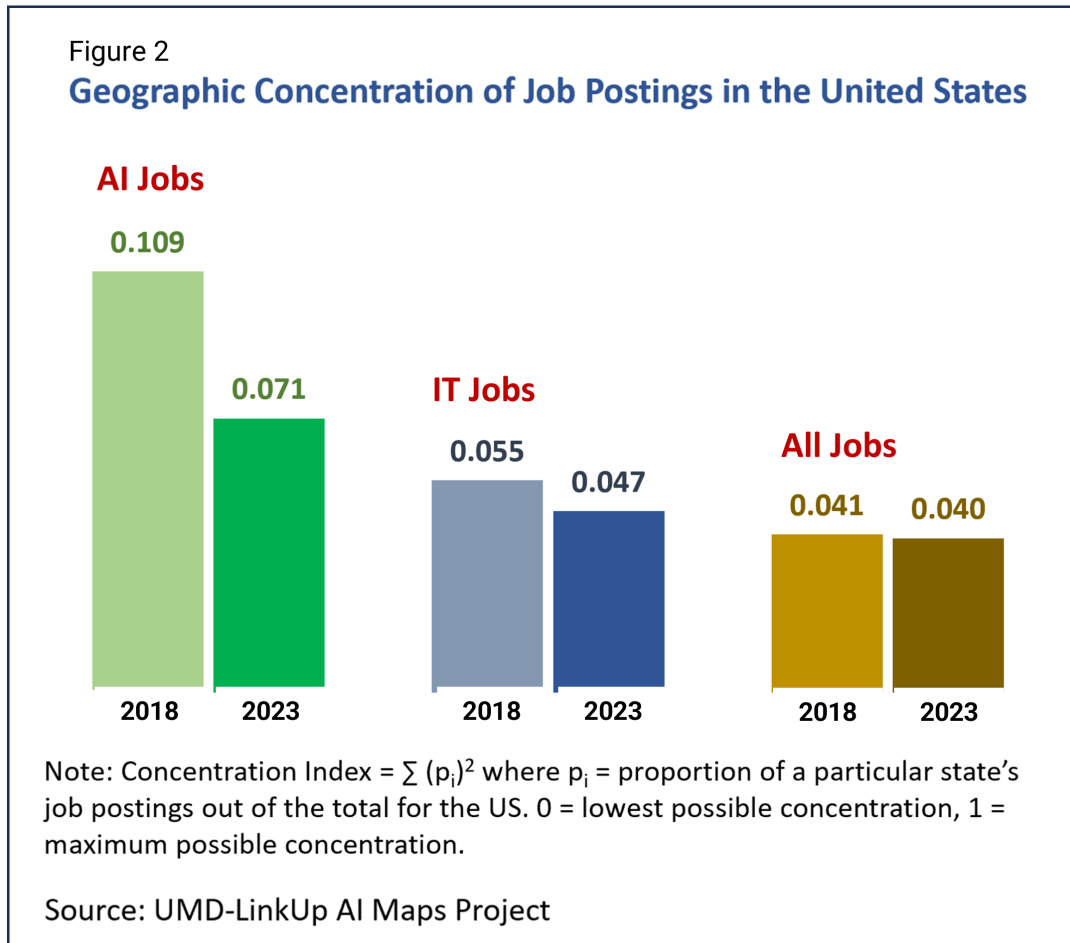


- Job postings data echo the AI fervor kicked off by OpenAI's launch of ChatGPT in late November 2022. Since the start of the tech layoffs in early 2022, there had been a steady and sharp decline in both IT and AI job postings throughout 2022. Compared with the low point in December 2022, however, the number of AI job postings were 79% higher in September 2023. Even after a seasonal slowdown towards the end of 2023, AI job postings in December 2023 were 22% higher than in December 2022.
- In contrast, the number of IT job postings has continued its steady decline and in December 2023 was 44% lower than in December 2022.
- Employers are making a clear distinction between AI jobs and IT jobs in general.
- For the January-December 2023 period, US-based employers posted a monthly average of 10,254 AI job openings.

Observation #2

There is unmistakable evidence of greater geographic dispersion in both AI and IT job postings during the 5-year period 2018-2023 (Figure 2). While geographic dispersion is more sharply evident in the case of AI job

postings in recent years, it is consistent with the longer-term trend of increasing IT jobs dispersion across the nation over the last 20-30 years. Given the productivity increases associated with adoption of AI technologies, this is very promising news for the U.S. economy.

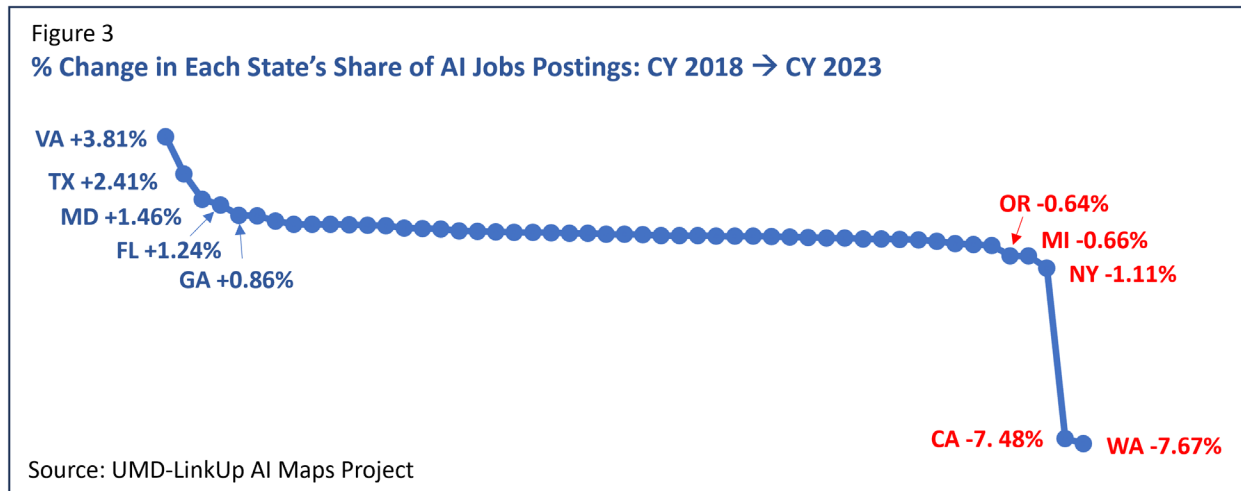


- The data indicate that job postings across “All Jobs” are the most geographically dispersed and exhibit hardly any change from 2018 to 2023. This is exactly what we would expect.
- Compared to all jobs, IT jobs are somewhat less dispersed and show an increase in dispersion from 2018 to 2023.
- In contrast, AI jobs remain the least dispersed, even after the decline in geographic concentration from 2018 to 2023. Given the specialized nature of AI skills and the fact that deployment of AI technologies is still largely confined to larger companies, we believe that it will take some time for the dispersion of AI jobs to come close to that of IT jobs.

- From the lens of America's economy, rapid dispersion of AI job postings should be viewed as an extremely positive development. Academic as well as industry research indicates that the use of AI can boost productivity for both blue as well as white collar intensive firms. At the level of the entire country, future increases in productivity would be difficult without a greater and faster diffusion of AI skills.

Observation #3

In looking at changes in a state's geographic share of all AI job postings in the US over the 5-year period from CY 2018 to CY 2023, there are some big winners and some big losers. The 5 biggest share gainers include VA, TX, MD, FL, and GA. The 5 biggest share losers include WA, CA, NY, MI, and OR (Figure 3).



- Virginia's share jumped from 4.18% in 2018 to 7.99% in 2023. Neighboring state Maryland's share increased from 1.51% in 2018 to 2.97% in 2023. We attribute this rise largely to the heavy push from the US Department of Defense for AI-driven products and services supplied by companies in the defense and aerospace sector as well as Fed-Gov focused consulting firms such as Deloitte, Accenture, and Booz Allen Hamilton. This region is also home to the AI powerhouses Amazon HQ2 and Capitol One.
- During 2018-2023, the share of Texas increased from 6.11% to 8.52%, that of Florida from 2.23% to 3.47%, and of Georgia from 2.29% to 3.15%. We attribute these increases to the growing deployment of AI technology outside of the traditional sectors such as software, finance, and media to many more sectors. Keep in mind that many of these other sectors rely on IT services firms such as Accenture, Deloitte, IBM, HP Enterprises and others for AI-focused services as well.

- Of the two biggest share losers, California’s share declined from a whopping 26.51% to a still dominant 19.03%. In absolute terms, the number of AI job postings in California did grow significantly during this 5-year period. However, on a relative basis, the growth was greater in several of the other states.
- The other big geographic share loser has been Washington state, whose share tumbled from 12.64% to 4.97%. We attribute this long-term decline to the increased geographic dispersion in hiring by the state’s largest technology employers. A more recent contributing factor is the dramatic slowdown in Washington-based recruitment from 2022 to 2023 by Amazon and Microsoft.

Observation #4

Reflecting Silicon Valley’s long-held role as the world’s epicenter of digital technologies, California continues to dominate AI job postings (Figures 4 and 5).

Figure 4

Average Monthly AI Jobs Postings During Jan-Dec 2023

Rank	State	Value
1	CA	1969
2	TX	882
3	VA	827
4	NY	769
5	MA	557
6	WA	514
7	IL	389
8	FL	359
9	PA	343
10	NJ	323
11	GA	326
12	MD	308
13	NC	298
14	OH	239
15	CO	213
16	MI	188
17	DC	172
18	MN	170
19	AZ	151
20	CT	119
21	MO	115
22	TN	101
23	IN	90
24	UT	84
25	OR	85
26	AL	77

Rank	State	Value
27	WI	67
28	AR	67
29	SC	45
30	NV	42
31	IA	40
32	KY	40
33	LA	39
34	DE	37
35	OK	33
36	NE	31
37	RI	30
38	KS	29
39	NM	27
40	ID	24
41	HI	21
42	NH	19
43	MS	16
44	WV	14
45	ME	13
46	MT	12
47	VT	10
48	SD	8
49	ND	8
50	WY	3
51	AK	3

U.S. Total, Monthly Average = 10,254

Source: UMD-LinkUp AI Maps Project

Figure 5
State's Share of AI Jobs Postings During Jan-Dec 2023

Rank	State	Share (%)
1	CA	19.03%
2	TX	8.52%
3	VA	7.99%
4	NY	7.44%
5	MA	5.39%
6	WA	4.97%
7	IL	3.76%
8	FL	3.47%
9	PA	3.32%
10	NJ	3.12%
11	GA	3.15%
12	MD	2.97%
13	NC	2.88%
14	OH	2.31%
15	CO	2.06%
16	MI	1.81%
17	DC	1.66%
18	MN	1.65%
19	AZ	1.46%
20	CT	1.15%
21	MO	1.11%
22	TN	0.98%
23	IN	0.87%
24	UT	0.81%
25	OR	0.82%
26	AL	0.75%
27	WI	0.65%
28	AR	0.65%
29	SC	0.43%
30	NV	0.40%
31	IA	0.39%
32	KY	0.39%
33	LA	0.37%
34	DE	0.36%
35	OK	0.32%
36	NE	0.30%
37	RI	0.29%
38	KS	0.28%
39	NM	0.26%
40	ID	0.23%
41	HI	0.21%
42	NH	0.18%
43	MS	0.16%
44	WV	0.14%
45	ME	0.13%
46	MT	0.12%
47	VT	0.09%
48	SD	0.08%
49	ND	0.07%
50	WY	0.03%
51	AK	0.03%

U.S. Total, Monthly Average = 10,254

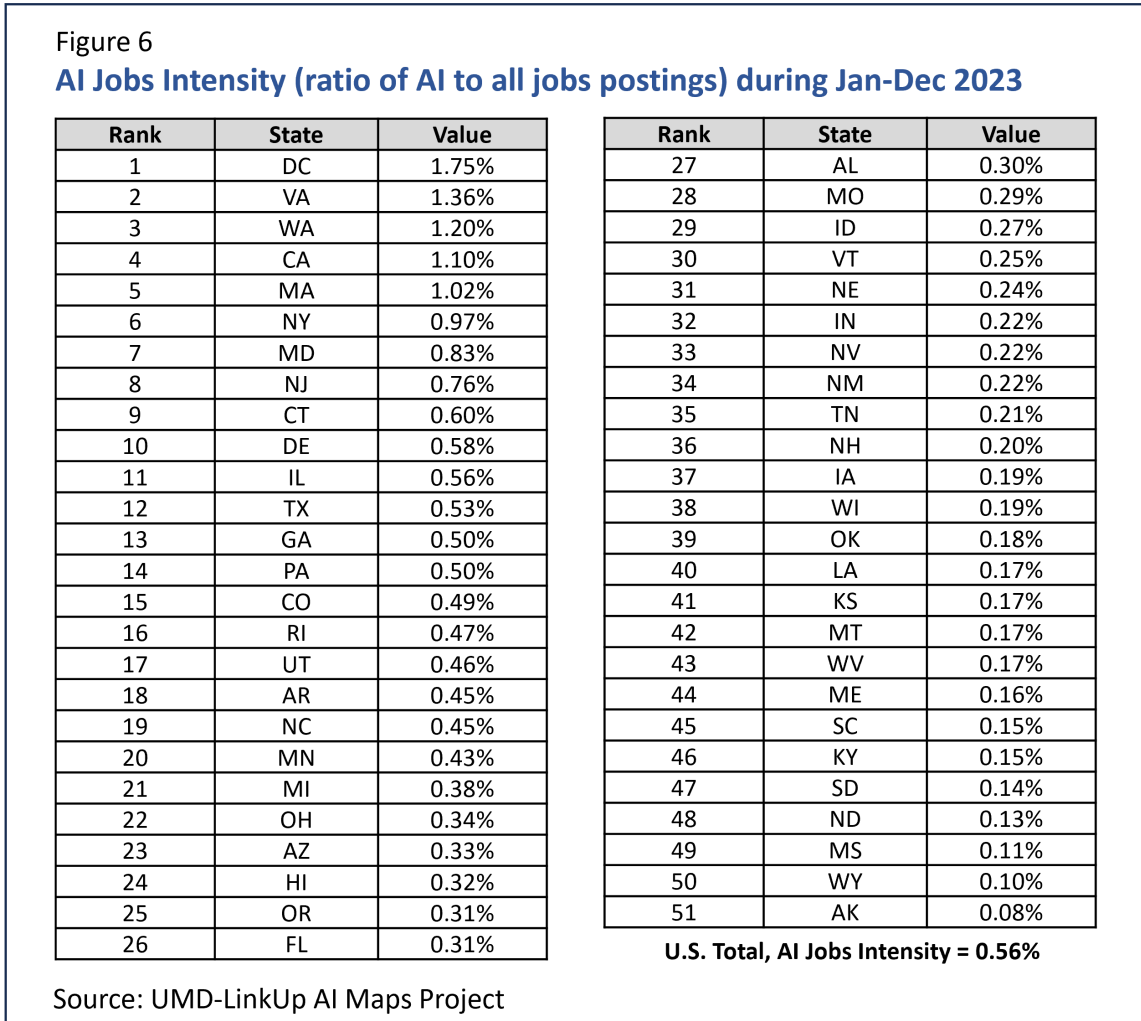
Source: UMD-LinkUp AI Maps Project

- California accounted for almost one-fifth of all AI job postings in 2023.
- A small number of the states dominate AI job postings. In 2023, the Top 10 states (CA, TX, VA, NY, MA, WA, IL, FL, PA, NJ) accounted for two-thirds (67.0%) share of all AI job postings. In contrast, the Bottom 10 states accounted for only 1.24% share of all AI job postings.
- Three factors appear to drive a state's share of AI job postings: (a) the state's size in terms of population and economy (e.g., CA, TX, FL, NY, IL, PA); (b) the state being the domicile for some of the world's leading AI universities (e.g., CA, MA, NY); and (c) the state's role as host to major AI-driven industries (e.g., CA: information services, semiconductors, biotech; NY: finance and media; and VA: defense and aerospace).

Observation #5

Stripping out the effects of sheer size, AI Jobs Intensity (ratio of AI to all

job postings) yields a different picture. Compared to the aggregated US-level AI Jobs Intensity of 0.56%, Washington DC ranks #1 at 1.75%, followed by VA at 1.36%, with MD not too far behind at 0.83% (Figure 6).



- During 2023, for the US as a whole, the number of AI job postings were 0.56% of all job postings.
- Only 11 states or regions (including Washington DC) match or exceed the aggregated US-level AI Jobs Intensity of 0.56%.
- On this size-adjusted measure, states on the two coasts (including two relatively small states Connecticut and Delaware) exhibit higher AI Jobs Intensity than the big southern states of Texas and Florida.
- With some differences, these broad patterns are evident also in AI-to-IT Jobs Intensity (i.e., the ratio of AI job postings to IT job postings). During 2023, for the US

as a whole, the number of AI job postings were 9.91% of all IT job postings. 11 states or regions (including Washington DC) exceed the figure for the aggregated US-level (Figure 7).

Figure 7

AI-to-IT Jobs Intensity (ratio of AI to IT jobs postings) during Jan-Dec 2023

Rank	State	Value	Rank	State	Value
1	MA	17.06%	27	CO	6.96%
2	CA	16.71%	28	FL	6.84%
3	NY	16.04%	29	ID	6.83%
4	WA	15.89%	30	TN	6.26%
5	DC	10.91%	31	MO	6.21%
6	VA	10.82%	32	LA	5.80%
7	CT	10.79%	33	ME	5.33%
8	DE	10.10%	34	AL	5.24%
9	NJ	10.02%	35	WI	5.17%
10	PA	9.95%	36	VT	5.14%
11	IL	9.94%	37	NM	5.11%
12	AR	9.67%	38	SC	5.10%
13	MN	8.92%	39	KY	4.96%
14	TX	8.91%	40	OK	4.95%
15	GA	8.51%	41	NE	4.90%
16	RI	8.46%	42	NH	4.68%
17	UT	7.99%	43	IA	4.57%
18	NC	7.95%	44	WV	4.49%
19	OR	7.85%	45	KS	4.48%
20	MD	7.47%	46	MS	4.46%
21	IN	7.44%	47	SD	4.40%
22	OH	7.36%	48	MT	3.49%
23	AZ	7.05%	49	ND	3.28%
24	NV	6.99%	50	WY	2.68%
25	HI	6.98%	51	AK	2.32%
26	MI	6.96%			

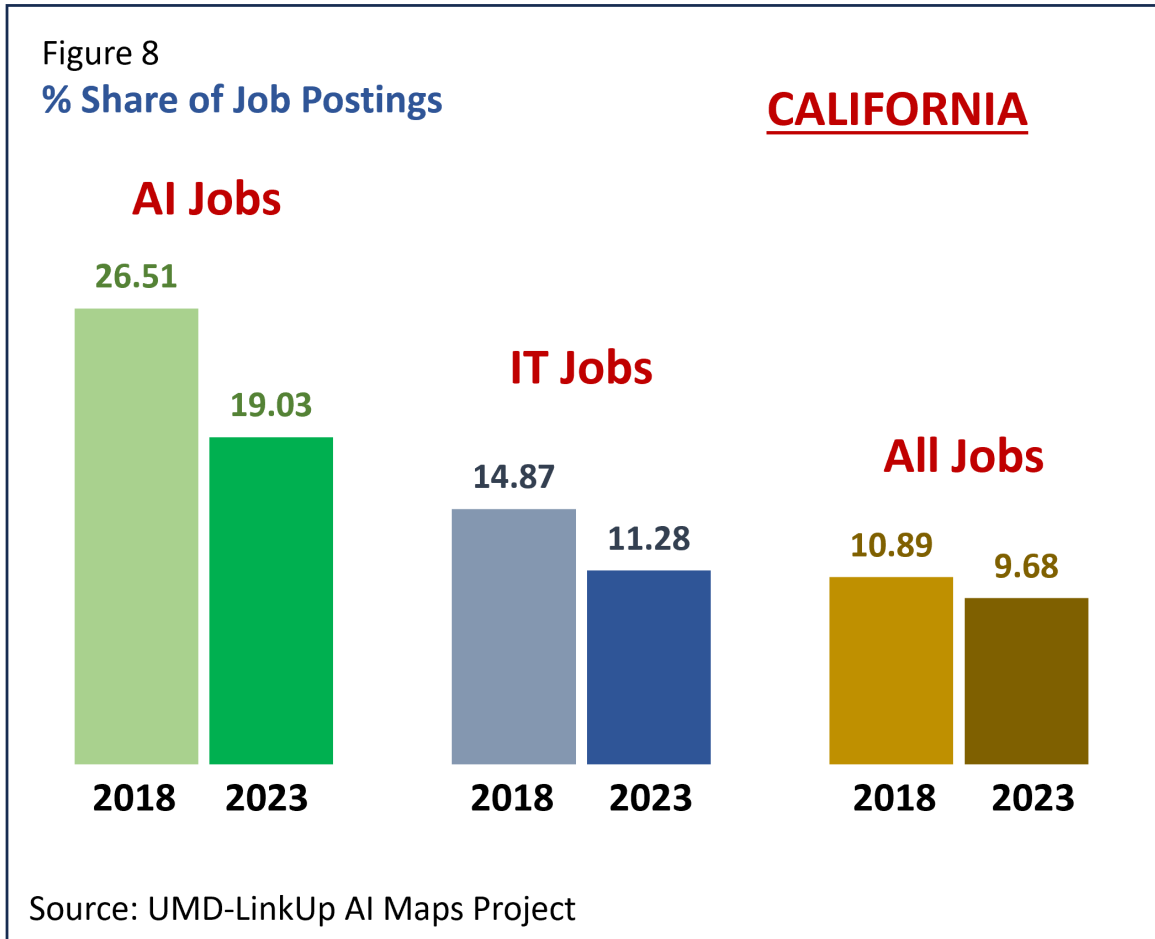
U.S. Total, AI-to-IT Jobs Intensity = 9.91%

Source: UMD-LinkUp AI Maps Project

Observation #6

California’s national share of all AI job postings far exceeds the state’s national share of IT or all job postings. That said, California’s share of AI and IT jobs declined from 2018 to 2023, reflecting geographic dispersion to the rest of the country (Figure 8).

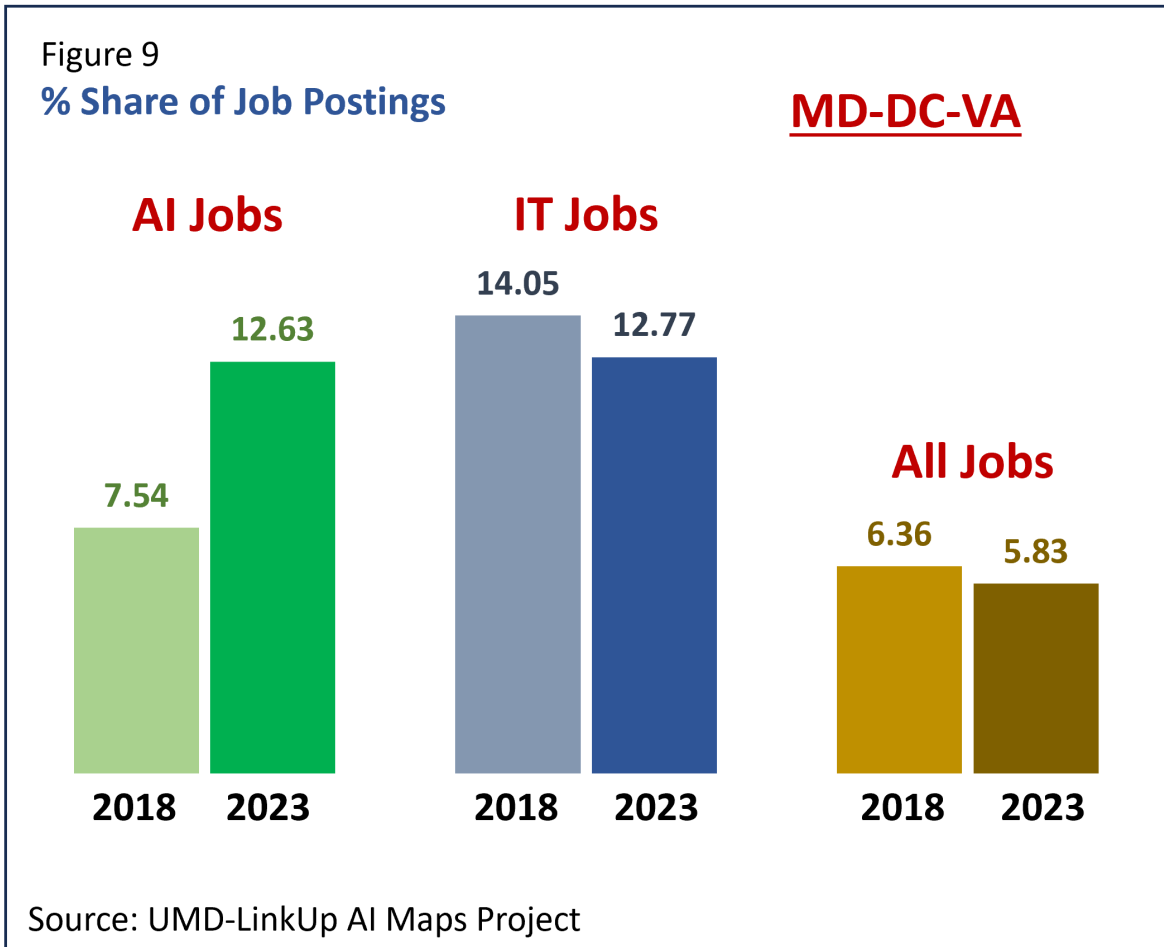
- In 2023, California accounted for nearly 1 out of 5 AI job postings in the US, as compared with about 1 out of 10 postings for IT jobs or all jobs. In short, California remains the country’s dominant state for AI jobs postings.



- However, California’s national share of AI job postings dropped sharply from 2018 to 2023. In absolute numbers, the number of AI job postings in California did grow significantly during this 5-year period. However, on a relative basis, the growth was greater in several of the other states. California’s share loss is due largely to a diffusion in the deployment of AI technology from a few information-intensive sectors to the rest of the economy.

Observation #7

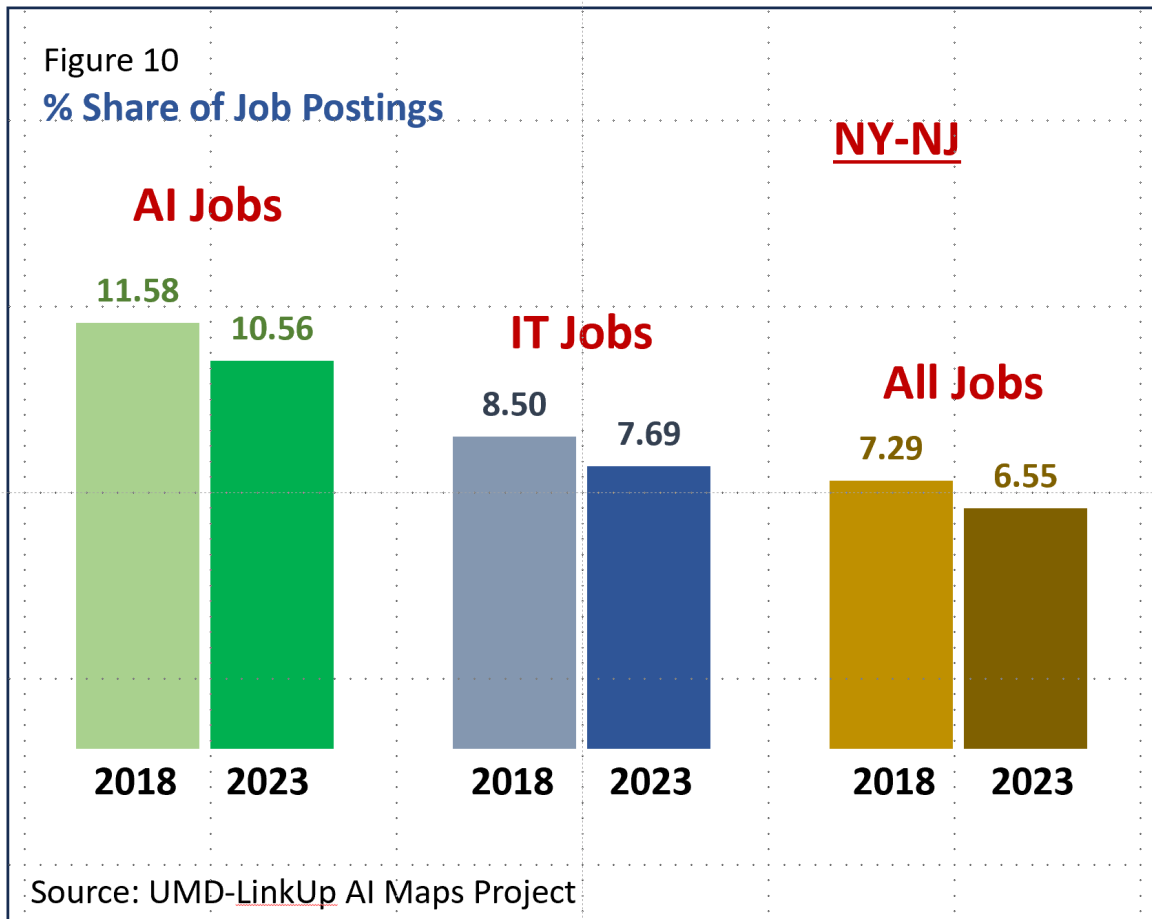
The National Capital Region, encompassing MD-DC-VA, has emerged as the second biggest hub for AI jobs in the country after California (Figure 9). The key driver of this development is an all-out embrace of AI by federal government agencies (including DoD) and private sector suppliers of defense and aerospace equipment, software, and services.



- In 2018, the National Capital Region’s share of AI job postings (7.54%) was about half that of the region’s share of IT job postings (14.05%) and not much more than its share of all job postings (6.36%).
- By 2023, the picture has been transformed. At 12.63%, the region’s share of AI job postings is second only to California’s at 19.03%. This share is now at parity to the region’s share of IT job postings (12.77%) and more than double that of all job postings (5.83%).
- Driving this growth is an all-out embrace of AI by various agencies of the U.S. federal government, including the Department of Defense. As a direct correlate, many of the major equipment, software, and services suppliers to federal agencies and DoD are based in the MD-DC-VA region. These include, among others, Northrop Grumman, Lockheed Martin, Huntington Ingalls, Booz Allen Hamilton, Accenture, and Deloitte. The region is also home to Amazon HQ2 and Capitol One’s corporate HQ.

Observation #8

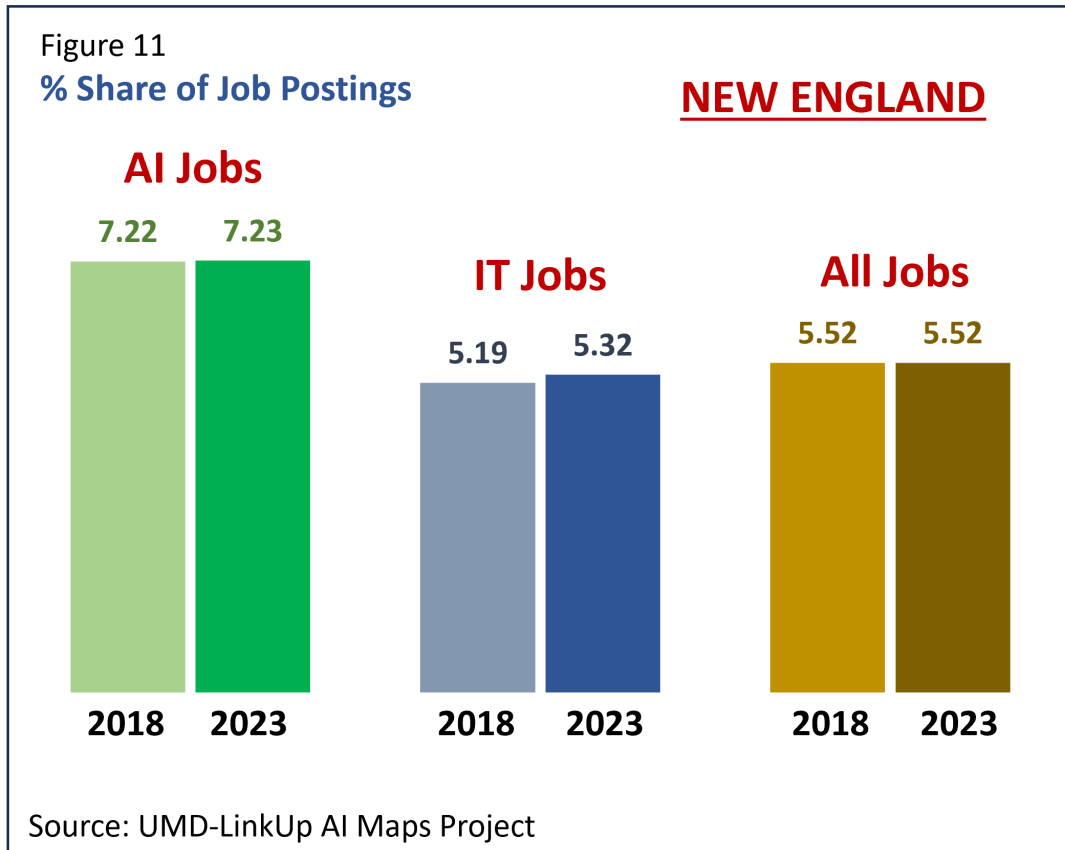
The New York-New Jersey region remains a major hub for AI job postings (Figure 10). In 2018, it was the second biggest hub after California. With the ascendance of the National Capital Region, NY-NJ is now the third biggest hub. Even then, the share of AI job postings for NY-NJ meaningfully exceeds the region's share of IT or all job postings.



- The NY-NJ region is the nation's dominant hub for finance and media. It is also a major hub for engineering centers of Big Tech including Google, Meta, and Microsoft. These and other employers are deepening their commitment to the development and deployment of AI technologies.
- The AI centricity of the NY-NJ region is reflected in the fact that the share of AI job postings for this region (10.56%) meaningfully exceeds its share of IT or all job postings (7.69% and 6.55% respectively).

Observation #9

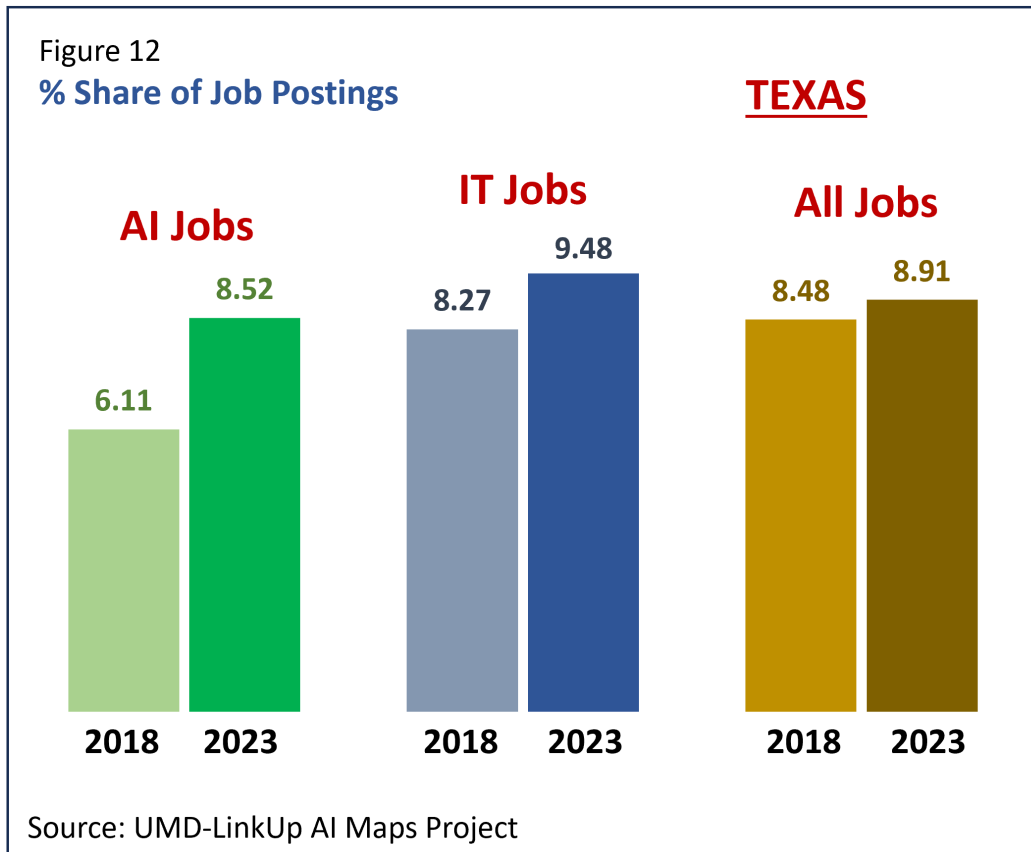
New England presents a steady-state picture with regards to job postings of all types – AI, IT, and all jobs (Figure 11). Notwithstanding MIT and Harvard, over the last 30 years, the Cambridge-Boston area has become more biotech rather than Big Tech focused.



- Similar to California, the National Capital Region, and New York-New Jersey, New England is highly AI-centric. The share of AI job postings for this region (7.23%) meaningfully exceeds its share of IT or all job postings (5.32% and 5.52% respectively)
- In addition to pharma companies such as Takeda and Moderna, Cambridge-Boston is also home to important engineering centers of Big Tech such as Google, Microsoft, and Amazon.

Observation #10

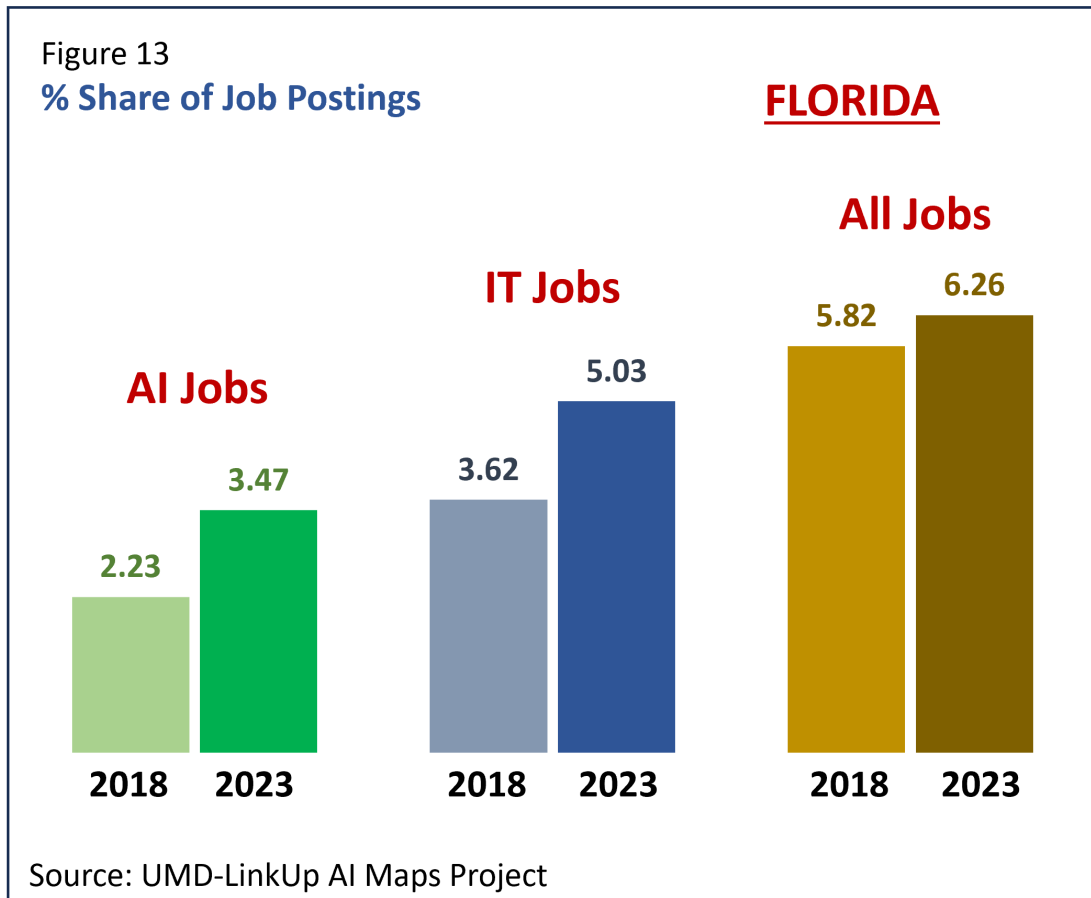
Along with the National Capital Region, Texas has increased its share of AI job postings significantly during 2018-2023 (Figure 12).



- In addition to its role as one of the world’s major oil and gas hubs, Texas is emerging as a major state for both AI and IT jobs. Texas is second only to Virginia in terms of increase in the state’s national share of AI jobs.
- In 2018, Texas’s share of AI jobs meaningfully lagged behind the state’s share of IT jobs as well as all jobs. By 2023, however, Texas’s share of AI jobs had closed much of the gap between this share and share of IT and all jobs.
- We believe that the primary driver of the growth in Texas’s share of AI jobs is the diffusion of such jobs across all several economic sectors instead of concentration in just a few sectors.
- The “Professional, Scientific, and Technical Services” sector (comprising consulting firms such as Accenture, Deloitte, HPE, IBM and others) accounted for 35.5% of the growth in number of AI job postings from CY 2018 to CY 2023. The “Information” sector accounted for another 21.5% of the growth. These data lead us to conclude that consulting firms now play an outsized role in the diffusion of AI technologies to large swaths of the U.S. economy.

Observation #11

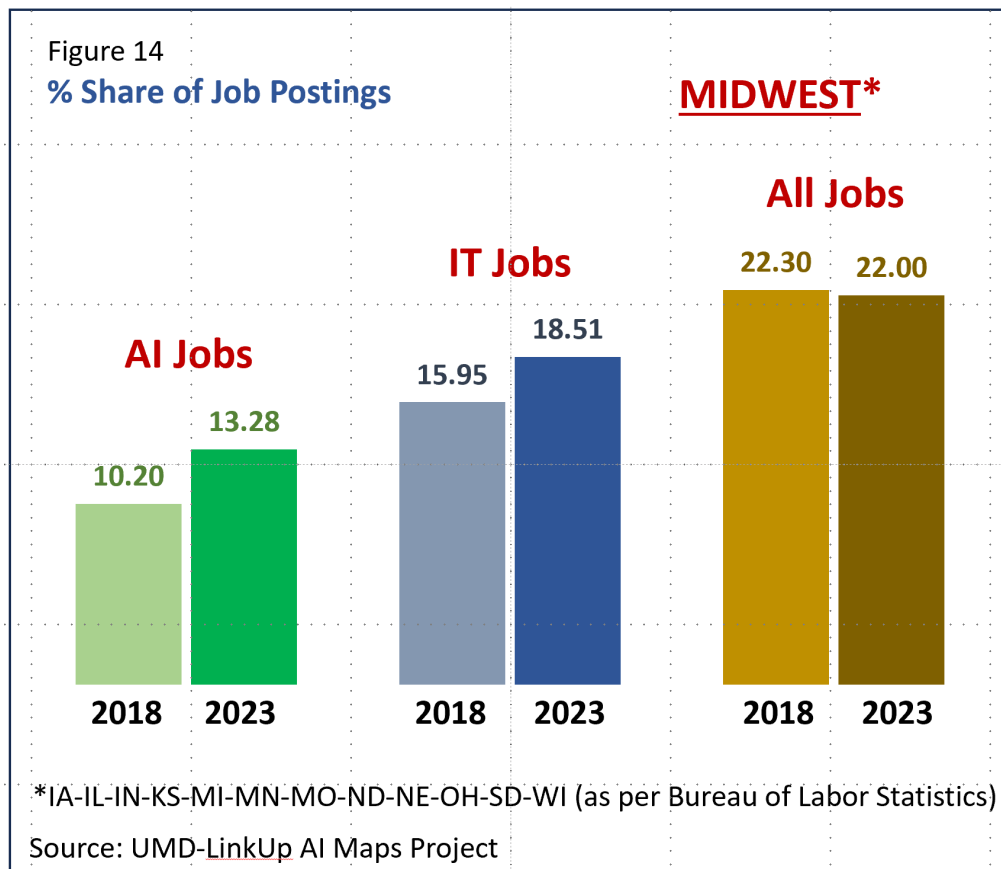
Florida has meaningfully increased its share of AI job postings during 2018-2023. That said, Florida's national share of AI job postings lags behind the state's share of IT and all job postings (Figure 13).



- Florida's share of "All Jobs" postings increased from 5.82% in 2018 to 6.26% in 2023, a reflection of the state's robust economic growth during this period.
- At the same time, Florida's share of both AI and IT job postings increased by even larger percentages. These numbers suggest that, along with the rest of the nation, Florida employers have become more AI and IT centric during this period.
- That said, Florida's national share of AI job postings (3.47%) remains well below the state's national share of IT or all job postings (5.03% and 6.26% respectively).

Observation #12

The Midwest region comprising 12 states and about one-fifth of the U.S. population accounts for an expected 22% of all job postings. While the region’s national share of AI and IT job postings lags its share of all job postings, both shares have increased meaningfully during 2018-2023. As with the rest of the nation, Midwest economies are also becoming significantly more AI and IT centric (Figure 14).



- Midwest’s share of AI jobs increased meaningfully from 10.20% in 2018 to 13.28% in 2023. The share of IT jobs also increased meaningfully from 15.95% in 2018 to 18.51% in 2023. Both sets of numbers are clear indicators of growing IT and AI adoption by employers in the Mid-West.
- That said, Midwest’s national share of AI job postings (13.28%) remains well below the state’s national share of IT or all job postings (18.51% and 22.00% respectively).

Conclusions

The entire body of evidence presented in this White Paper leads us to the following broad-brush conclusions:

1. During 2023, there has been a stabilization and upswing in AI job postings, even as the number of job postings for IT jobs in general has continued to decline since the start of layoffs in early 2022.
2. AI technologies are rapidly becoming embedded in many more sectors of the U.S. economy than was true five years ago. Correspondingly, geographic dispersion in AI and IT jobs is much greater in 2023 than in 2018. For the U.S. economy, this is a very promising development.
3. Given the specialized nature of AI skills, AI job postings nonetheless remain far more geographically concentrated than is the case with IT job postings, which in turn remain more concentrated than all job postings.
 - a. California remains the epicenter of AI job postings, accounting for about a fifth of all such postings in the nation.
 - b. The National Capital Region has emerged as the second biggest hub for AI job postings after California. This development has been driven largely by a full-bore embrace of AI by various agencies of the U.S. government, including most notably the Department of Defense and the suppliers of equipment, software, and services to DoD.
4. Consulting firms play an outsized role in the deployment of AI technologies by firms in sectors that have historically not been regarded as High Tech.



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