BENCHMARKING MIAMI'S INNOVATION AND ENTREPRENEURSHIP

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THE MIAMI URBAN FUTURE INITIATIVE

The Miami Urban Future Initiative is a joint initiative with FIU's College of Communication, Architecture + The Arts and the Creative Class Group sponsored in part by The John S. and James L. Knight Foundation, which will lead new research and mapping on economic, occupational, creative and technological assets in Miami, in partnership with renowned experts, to provide necessary data, evidence and strategy to grow a more inclusive, creative economy for a 21st century global Miami. Miami has reached a crossroads. Its economy – historically based on tourism, hospitality, transportation, and real-estate development – has deepened, diversified, and become more creative and idea-based, as banking, media, arts, education, and new technology-based industries have assumed a larger role. The region now finds itself at a critical inflection point.

Through this Initiative, we hope to provide the thought leadership and awareness required to guide Miami's evolution as a global city through data-driven research and assessments of the key trends shaping the region, disseminate this information and inform the broad strategic vision for the region's private and public stakeholders through ongoing local convenings and briefs and bring global thought-leaders and practitioners to bear on thinking about the region's future through high-level events and convenings on issues important to Miami and global cities.

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BENCHMARKING MIAMI'S INNOVATION AND ENTREPRENEURSHIP

The Miami metro—which spans Miami-Dade, Broward, and Palm Beach counties—is an aspiring hub for entrepreneurship and innovation. While Miami has long been a breeding ground for small businesses, the economic value of these businesses has historically trailed behind that of leading tech hubs like the San Francisco Bay Area, Austin, Seattle, and Boston-Cambridge. But the tide appears to be turning in Miami's favor.

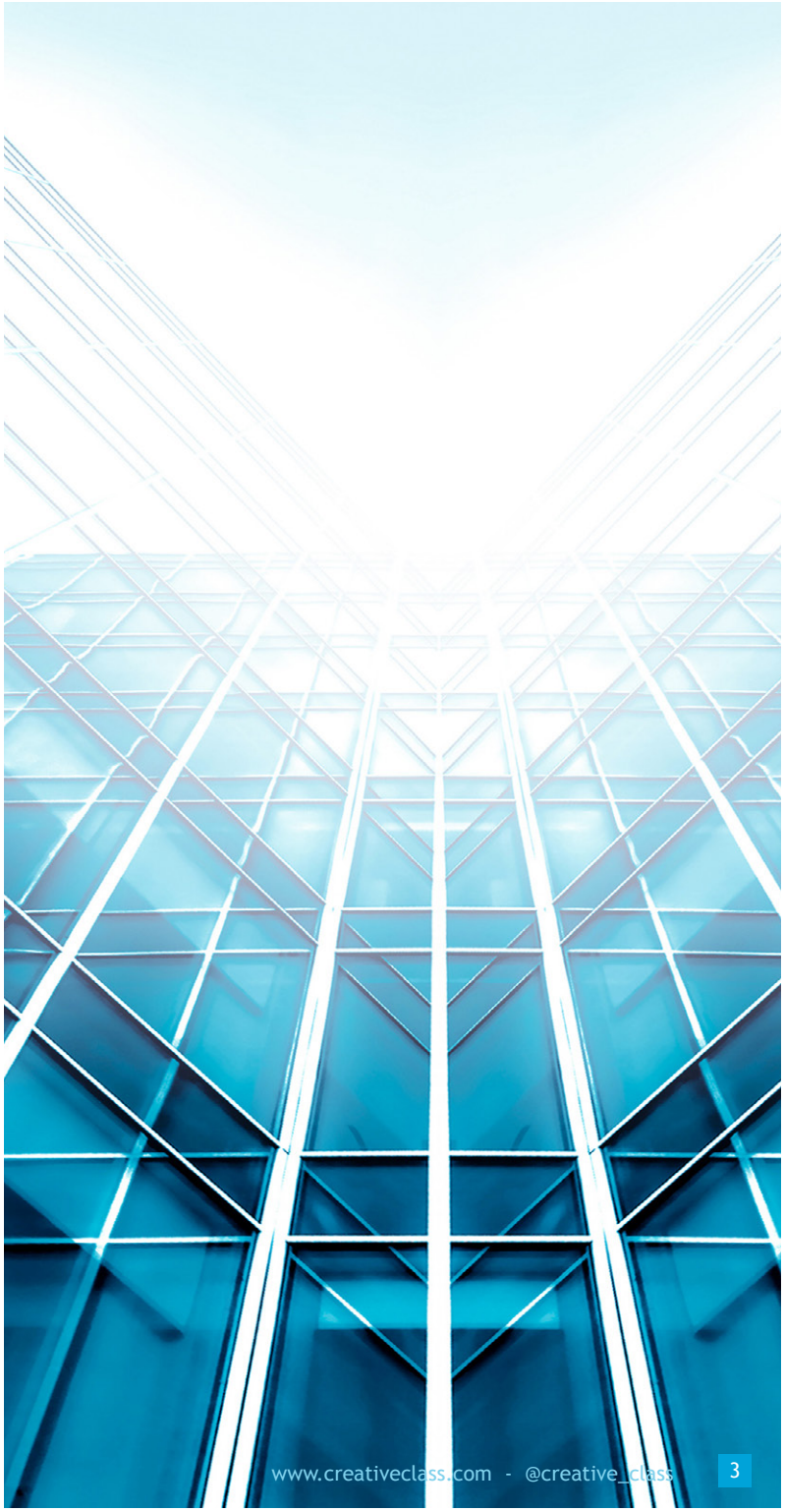
Due to the efforts of local entrepreneurs and significant venture capital investment from the Knight Foundation, among other organizations, the Miami metro has quickly strengthened its entrepreneurial ecosystem. In 2017, the metro ranked first on the Kauffman Index of Startup Activity, which uses metrics such as new companies, business density, and growth rates to measure entrepreneurial activity.[1]

The following research brief from the Miami Urban Future Initiative provides a data-driven assessment of the Miami metro on key indicators of innovation and entrepreneurship, comparing its performance to all 53 of America's large metros with populations of more than one million people.

Figure 1: Miami's Overall Rankings

Metric	Value	Rank among Large U.S. Metros
Venture Capital Investment	$1.3 billion	8
Venture Capital Investment per 100,000 People	$21.4 million	10
Companies Receiving Venture Capital	91	15
Average Venture Capital per Company	$14.2 million	2
High-Tech Businesses	9,679	9
Knowledge Economy Businesses	82,495	4
Knowledge Economy Businesses (LQ)*	1.15	9
Higher Education R&D Expenditures	$565.4 million	23
Higher Education R&D Expenditures per 100,000 People	$9.3 million	43

Note: Location quotient, or LQ, refers to how concentrated an industry is compared to the U.S. as a whole. Definitions and sources for all metrics are listed in the appendix.



KEY FINDINGS

- **Miami ranks eighth on venture capital investment.** Miami attracted $1.3 billion in venture capital investment in 2016, ranking eighth among large metros on this metric. And yet, the metro ranks much lower—31st among large metros—according to the number of companies that received venture capital investment in 2016 (adjusted for population size). This suggests that Miami is dependent on a small group of superstar companies like Magic Leap, which may have skewed its performance.
- **Miami ranks second according to its average investment per company.** On average, Miami's high-tech companies each earned $14.2 million in venture capital investment in 2016—the second-highest share among large metros. Only San Francisco performed better on this metric, with an average investment of $17.7 million per high-tech company.
- **Miami ranks highly according to its number of high-tech and knowledge economy businesses.** Miami ranks ninth among large metros according to its absolute number of high-tech and high-tech services businesses. The metro also ranks 10th according to its number of high-tech manufacturing businesses and fourth according to its knowledge economy businesses.
- **Miami lags in terms of its concentration of high-tech businesses.** Miami ranks 17th among large metros according to its number of high-tech businesses per 100,000 residents and 40th among large metros according to its concentration of high-tech businesses, which is 8 percent below the national average. The metro's concentration of high-tech services and manufacturing businesses also falls below the national average.
- **Small businesses are a key feature of Miami's high-tech sector.** Miami ranks second-to-last (behind Las Vegas) according to the size of its high-tech businesses, which have 11 employees on average. This share is also 44 percent smaller than the U.S. average.
- **Research and development spending must increase.** University research and development spending is vital to the economic performance of leading entrepreneurial regions like Boston-Cambridge, New York, and Seattle. With around $565 million spent on university research and development in 2015, Miami ranks 24th among large metros—far behind superstar metros like New York, Boston, and Los Angeles. This ranking is even lower—43rd among large metros—when adjusted for population size.

MIAMI'S INNOVATION AND ENTREPRENEURSHIP

The following section provides a more detailed, data-driven analysis of how Miami stacks up on key measures of innovation and entrepreneurship.

VENTURE CAPITAL STARTUPS AND INVESTMENT

- **Venture Capital Investment.** Miami ranks eighth among large U.S. metros according to the total amount of venture capital invested in its high-tech startups: roughly $1.3 billion in 2016. While this is better than Chicago and Washington, D.C., it is still less than 2 percent of all U.S. venture capital investment. Overall, Miami's share of venture capital investment is 18 times smaller than San Francisco's and five times smaller than that of New York or San Jose (the Silicon Valley).

  Miami ranks 10th among large U.S. metros according to the amount of venture capital invested for every 100,000 residents. (This metric provides a more accurate depiction of Miami's venture capital investment by controlling for the size of its population.) With around $21 million in high-tech investment per 100,000 residents, Miami ranks ahead of Washington, D.C. but behind New York and Seattle.

- **Companies Receiving Venture Capital.** Miami ranks 15th among large U.S. metros according to the number of its high-tech companies that received venture capital investments in 2016. Miami ranks in between Atlanta and Houston on this metric but far behind San Francisco, New York, and Boston.

  Miami lags even further behind according to the number of companies that received venture capital investments per 100,0000 people, coming in 31st among large U.S. metros. With just two companies receiving venture capital investments for every 100,000 residents, Miami ranks ahead of a number of Rustbelt and Sunbelt metros but behind the majority of superstar metros.

  Miami ranks second among large U.S. metros according to its average venture capital investment per high-tech company. With an average investment of $14.2 million, Miami ranks just behind San Francisco but ahead of all other large metros, including San Jose, Boston, New York, and L.A. These results are likely skewed by Magic Leap, a Miami company that attracted substantial funding last year.[2]

Figure 2: Venture Capital Investment for Large U.S. Metros

Rank	Metro	Venture Capital Investment (billions)	Venture Capital Investment (Share of U.S. Total)
1	San Francisco	$23.4	34.1%
2	New York	$7.6	11.0%
3	San Jose	$6.7	9.8%
4	Boston	$6.0	8.8%
5	Los Angeles	$5.4	7.9%
6	San Diego	$1.5	2.3%
7	Seattle	$1.5	2.2%
8	Miami	$1.3	1.9%
9	Chicago	$1.2	1.8%
10	Washington, D.C.	$1.1	1.6%

Note: Large metros are those with more than one million people.

Source: National Venture Capital Association 2016

Figure 3: Venture Capital Investment per 100,000 Residents for Large U.S. Metros

Rank	Metro	Venture Capital Investment per 100,000 Residents (millions)
1	San Francisco	$500
2	San Jose	$339
3	Boston	$126
4	Salt Lake City	$53
5	Austin	$48
6	San Diego	$47
7	Los Angeles	$41
8	Seattle	$40
9	New York	$38
10	Miami	$21

Note: Large metros are those with more than one million people.

Source: National Venture Capital Association 2016

MIAMI'S INNOVATION AND ENTREPRENEURSHIP (CONTINUED)

Figure 4: Number of Companies Receiving Venture Capital for Large U.S. Metros

Rank	Metro	Companies Receiving Venture Capital	Companies Receiving Venture Capital (Share of U.S. Total)
1	San Francisco	1,323	17.7%
2	New York	888	11.9%
3	Boston	500	6.7%
4	Los Angeles	496	6.6%
5	San Jose	478	6.4%
6	Seattle	265	3.5%
7	Chicago	220	2.9%
8	San Diego	200	2.7%
9	Washington, D.C.	191	2.6%
10	Austin	182	2.4%
11	Philadelphia	149	2.0%
12	Dallas	138	1.8%
13	Denver	124	1.7%
14	Atlanta	111	1.5%
15	Miami	91	1.2%
16	Houston	85	1.1%
17	Minneapolis	77	1.0%
18	Pittsburgh	76	1.0%
19	Portland	74	1.0%
20	Phoenix	73	1.0%

Note: Large metros are those with more than one million people.

Source: National Venture Capital Association 2016

Figure 5: Average Venture Capital per Company Receiving Investment for Large U.S. Metros

Note: Large metros are those with more than one million people.

Source: National Venture Capital Association 2016

HIGH-TECH BUSINESSES

We now turn to the nine major occupations that make up the knowledge, professional, and creative workforce.

- **High-Tech Businesses.** High-tech businesses—consisting of high-tech manufacturing and high-tech services—are an indicator of a region's innovative and entrepreneurial capacity. With around 9,700 high-tech businesses (2.5 percent of the national total), Miami ranks ninth among large U.S. metros, ahead of tech hubs like Houston, Seattle, and San Jose, just behind Dallas, Atlanta, and Boston, and further behind New York, L.A., and Washington, D.C.

  Miami ranks 17th among large U.S. metros according to its number of high-tech businesses, adjusted for population size. With 160 high-tech businesses for every 100,000 residents, Miami ranks ahead of Philadelphia and Chicago but behind Portland and New York.

- **Concentration of High-Tech Businesses.** Miami ranks far lower—40th among large U.S. metros—according to its concentration of high-tech businesses. This figure is based on a "location quotient," or LQ, which shows how concentrated an industry is compared to the U.S. as a whole.[3] With an LQ of 0.92, Miami's share is 8 percent smaller than the national average. By contrast, the two top-ranking metros—New York and Washington, D.C.—have more than double the national share of high-tech businesses.

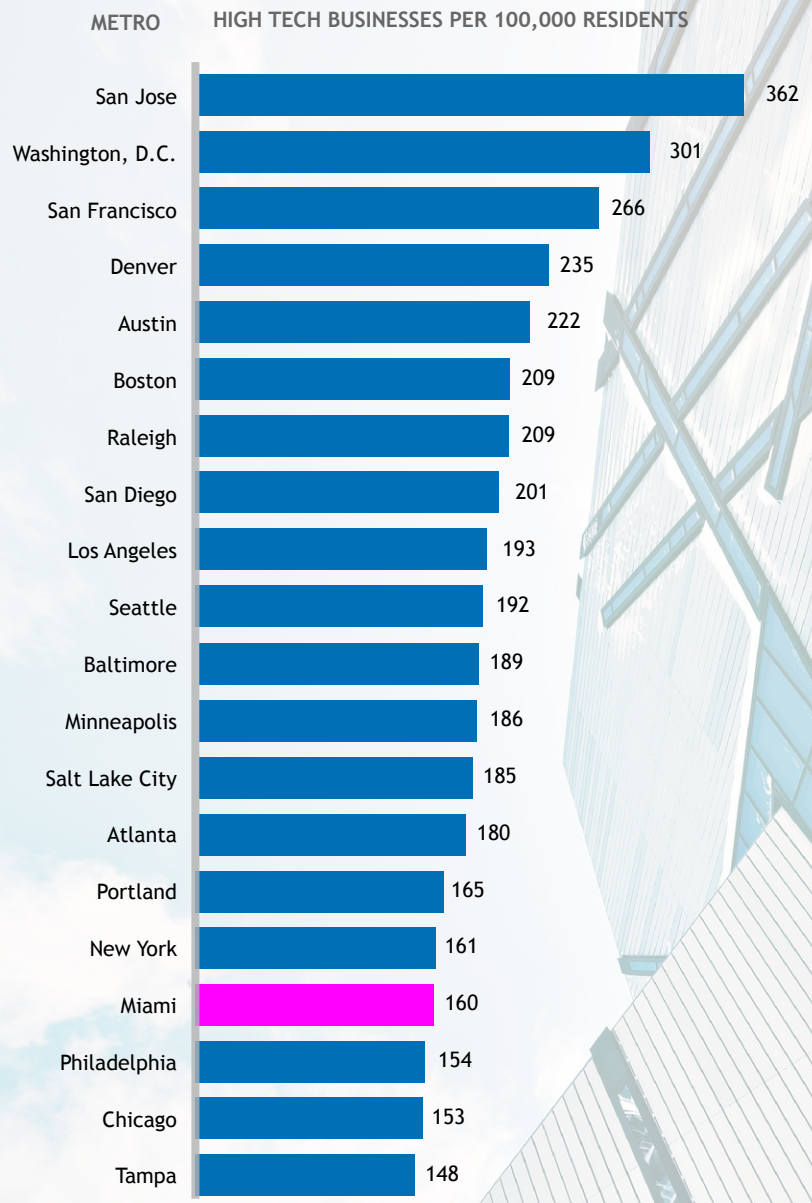
Figure 6: High-Tech Businesses for Large U.S. Metros

Rank	Metro	High-Tech Businesses	High-Tech Businesses (Share of U.S. Total)
1	New York	32,455	8.3%
2	Los Angeles	25,753	6.6%
3	Washington, D.C.	18,454	4.7%
4	Chicago	14,542	3.7%
5	San Francisco	12,431	3.2%
6	Dallas	10,647	2.7%
7	Atlanta	10,430	2.7%
8	Boston	10,026	2.6%
9	Miami	9,679	2.5%
10	Philadelphia	9,345	2.4%

Note: Large metros are those with more than one million people. Milken Institute high-tech business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015

Figure 7: High-Tech Businesses per 100,000 Residents for Large U.S. Metros



Note: Large metros are those with more than one million people. Milken Institute high-tech business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015

MIAMI'S INNOVATION AND ENTREPRENEURSHIP (CONTINUED)

SIZE DISTRIBUTION OF HIGH-TECH BUSINESSES

- **High-Tech Business Size.** Miami ranks second-to-last—52nd among large U.S. metros—according to the average size of its high-tech businesses based on their number of employees. With an average of around 11 employees, Miami's high-tech businesses are a third the size of those in San Jose and Seattle. Only Las Vegas ranks lower on this metric.
- **Concentration of High-Tech Business Size.** Miami again ranks 52nd among large U.S. metros according to the location quotient of its high-tech business size. With an LQ of 0.56, Miami's high-tech businesses are 44 percent smaller than the national average. By contrast, top-ranking metros like San Jose and Seattle have high-tech businesses that are more than 70 percent larger than the national average.

HIGH-TECH SERVICES

- **High-Tech Services.** High-tech services businesses span industries such as telecommunications, computer system design, and internet services. With more than 9,000 high-tech services businesses (2.5 percent of the national total), Miami ranks ninth among large U.S. metros on this metric, in between Dallas and Philadelphia. But, the metro falls behind Washington D.C. and L.A., which have more than double the amount, as well as New York, which has more than triple.

  Miami ranks 17th among large U.S. metros according to its number of high-tech services businesses, adjusted for population size. With more than 150 high-tech services businesses for every 100,000 residents, Miami ranks ahead of Philadelphia and Chicago, but behind Portland and New York.
- **Concentration of High-Tech Services.** Miami ranks far lower—39th among large U.S. metros—according to the location quotient of its high-tech services businesses. With an LQ of 0.93, Miami's share of high-tech services businesses is 7 percent smaller than the national average, placing the metro alongside Rustbelt metros like Detroit and Cincinnati but behind top-ranking metros like San Jose and Washington, D.C., which have more than double the national share.

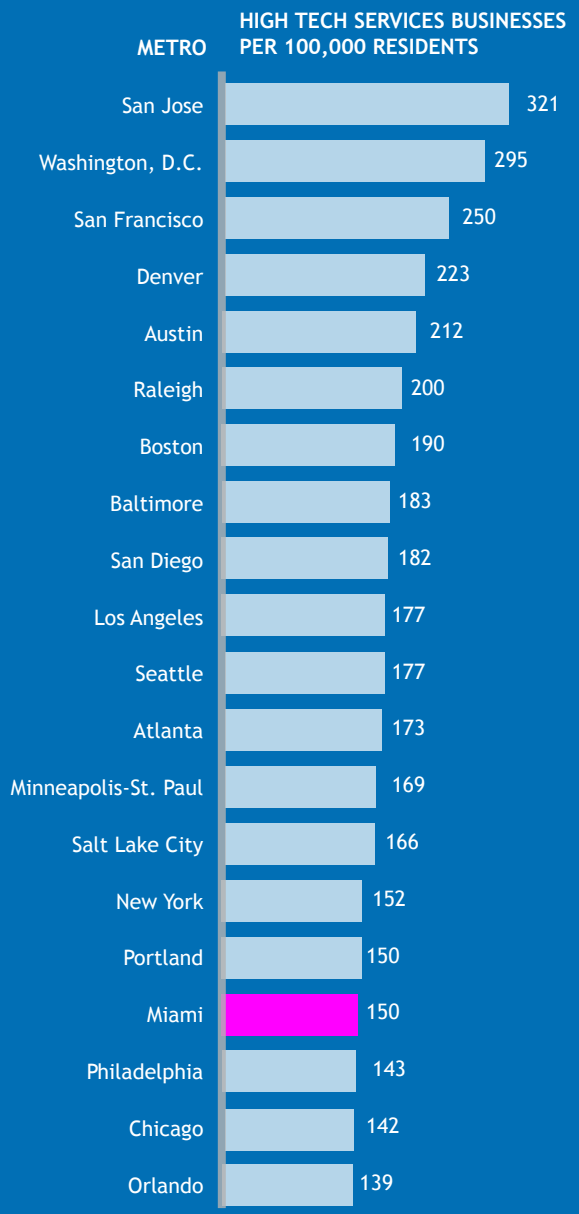
Figure 8: High-Tech Services Businesses for Large U.S. Metros

Rank	Metro	High-Tech Services Businesses	High-Tech Services Businesses (Share of U.S. Total)
1	New York	30,693	8.4%
2	Los Angeles	23,595	6.5%
3	Washington, D.C.	18,078	5.0%
4	Chicago	13,504	3.7%
5	San Francisco	11,708	3.2%
6	Atlanta	10,005	2.7%
7	Dallas	9,990	2.7%
8	Boston	9,122	2.5%
9	Miami	9,072	2.5%
10	Philadelphia	8,682	2.4%

Note: Large metros are those with more than one million people. Milken Institute high-tech business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015

Figure 9: High-Tech Services Businesses per 100,000 Residents for Large U.S. Metros



Note: Large metros are those with more than one million people. Milken Institute high-tech business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015

MIAMI'S INNOVATION AND ENTREPRENEURSHIP (CONTINUED)

HIGH-TECH MANUFACTURING

- **High-Tech Manufacturing.** High-tech manufacturing businesses span industries such as computer equipment, pharmaceutical and medicine, and electronic manufacturing. With more than 600 high-tech manufacturing businesses (2.2 percent of the national total), Miami ranks 10th among large U.S. metros, ahead of tech hubs like Seattle and Washington, D.C. but behind superstar metros like L.A., New York, and Chicago.

  Miami ranks 23rd among large U.S. metros according to its number of high-tech manufacturing businesses, adjusted for population size. With just 10 high-tech manufacturing businesses for every 100,000 residents, Miami ranks ahead of Phoenix and Pittsburgh but behind Austin and Chicago.

- **Concentration of High-Tech Manufacturing.** Miami ranks 35th among large U.S. metros according to the location quotient of its high-tech manufacturing businesses (0.84), which are 16 percent smaller than the national average. This puts the metro just behind Orlando, ahead of major metros like New York and Washington, D.C., but far behind top-ranking San Jose, whose share is more than four times the national average.

Figure 10: High-Tech Manufacturing Businesses for Large U.S. Metros

Rank	Metro	High-Tech Manufacturing Businesses	High-Tech Manufacturing Businesses (Share of U.S. Total)
1	Los Angeles	2,158	7.9%
2	New York	1,762	6.5%
3	Chicago	1,038	3.8%
4	Boston	904	3.3%
5	San Jose	816	3.0%
6	San Francisco	723	2.7%
7	Philadelphia	663	2.4%
8	Dallas	657	2.4%
9	San Diego	635	2.3%
10	Miami	607	2.2%

Note: Large metros are those with more than one million people. Milken Institute high-tech business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015

KNOWLEDGE ECONOMY

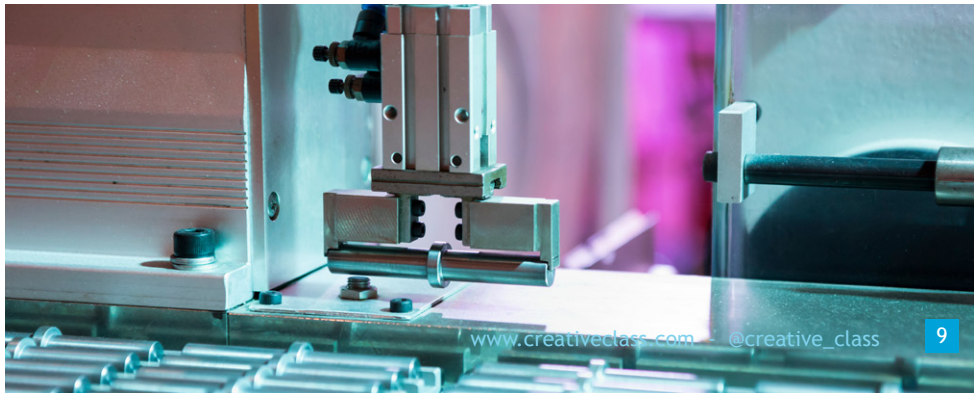
- **Knowledge Economy Businesses.** Knowledge economy businesses—those involved in the production and distribution of information—are key drivers of urban economic growth. With nearly 82,500 knowledge economy businesses (3.2 percent of the national share), Miami ranks fourth among large U.S. metros, ahead of Washington, D.C. and Dallas but behind Chicago, L.A., and New York.
- **Concentration of Knowledge Economy Businesses.** Miami also ranks highly according to the location quotient of its knowledge economy businesses (1.15), exceeding the national average by 15 percent. Coming in ninth among large U.S. metros, Miami has the same location quotient as Las Vegas but ranks behind major tech hubs like Washington, D.C., San Jose, San Francisco, and Austin.

Figure 11: Knowledge Economy Businesses for Large U.S. Metros

Rank	Metro	Knowledge Economy Businesses	Knowledge Economy Businesses (Share of U.S. Total)
1	New York	220,813	8.5%
2	Los Angeles	152,753	5.9%
3	Chicago	96,102	3.7%
4	Miami	82,495	3.2%
5	Washington, D.C.	70,974	2.7%
6	Dallas	66,714	2.6%
7	Atlanta	58,712	2.3%
8	San Francisco	57,853	2.2%
9	Philadelphia	57,443	2.2%
10	Houston	55,179	2.1%

Note: Large metros are those with more than one million people. Machlup knowledge economy business definition utilized.

Source: U.S. Census Bureau (County Business Patterns) 2015



MIAMI'S INNOVATION AND ENTREPRENEURSHIP (CONTINUED)

Figure 12: Knowledge Economy Business LQ for Large U.S. Metros

Rank	Metro	Knowledge Economy Business LQ
1	Washington, D.C.	1.25
2	San Jose	1.23
3	San Francisco	1.20
4	Austin	1.19
5	Denver	1.19
6	San Diego	1.18
7	Phoenix	1.18
8	St. Louis	1.16
9	Miami	1.15
10	Las Vegas	1.15

Note: Large metros are those with more than one million people. Machlup knowledge economy business definition utilized. National average is 1.0.

Source: U.S. Census Bureau (County Business Patterns) 2015

UNIVERSITY R&D SPENDING

- University R&D Spending. The amount of money colleges and universities spend on research and development (known as university R&D spending) is a key underpinning of a region's high-tech, entrepreneurial ecosystem. With around $565 million in university R&D spending in 2015, Miami ranks 24th among large U.S. metros on this metric. This places Miami well behind metros like New York, which invested more than $4 billion in 2015, and Boston and L.A., which spent around $3 billion each.

  Miami ranks even lower—43rd among large U.S. metros—according to the amount of money its colleges and universities spent on research and development, adjusted for population size. With its colleges and universities spending around $9.3 million for every 100,000 residents, Miami ranks alongside Phoenix but behind the majority of other large metros.

APPENDIX

All venture capital data (below) is from the National Venture Capital Association for 2016.

VENTURE CAPITAL STARTUPS AND INVESTMENT

Venture Capital Investment: The amount of venture capital invested in high-tech startups.

Venture Capital Investment per 100,000 Residents: The amount of venture capital invested in high-tech startups for every 100,000 residents.

Companies Receiving Venture Capital: The number of high-tech startups receiving venture capital in a given year.

Companies Receiving Venture Capital per 100,000 Residents: The number of high-tech startups receiving venture capital in a given year for every 100,000 residents.

Average Venture Capital per Company: The average amount of venture capital invested in a high-tech startup, excluding those companies that did not receive any venture capital investment.

Data on high-tech businesses and knowledge economy businesses (below) is from the U.S. Census Bureau County Business Patterns for 2015.

HIGH-TECH BUSINESSES

High-Tech Businesses: Businesses spanning 19 technology-intensive industries, which spend an above-average amount of revenue on research and development and employ an above-industry-average number of technology-using occupations. The definition of high-tech businesses is based on that of the Milken Institute.

High-Tech Businesses per 100,000 Residents: The number of high-tech businesses for every 100,000 residents.

Concentration of High-Tech Businesses: The share of high-tech businesses relative to the national average based on a "location quotient," or LQ, which shows how concentrated an industry is compared to the U.S. as a whole.

HIGH-TECH BUSINESSES

High-Tech Businesses: Businesses spanning 19 technology-intensive industries, which spend an above-average amount of revenue on research and development and employ an above-industry-average number of technology-using occupations. The definition of high-tech businesses is based on that of the Milken Institute.[4]

High-Tech Businesses per 100,000 Residents: The number of high-tech businesses for every 100,000 residents.

Concentration of High-Tech Businesses: The share of high-tech businesses relative to the national average based on a "location quotient," or LQ, which shows how concentrated an industry is compared to the U.S. as a whole.

SIZE DISTRIBUTION OF HIGH-TECH COMPANIES

High-Tech Business Size: The average size of a high-tech business based on number of employees.

Concentration of High-Tech Business Size: The size of high-tech businesses relative to the national average based on a "location quotient," or LQ.

HIGH-TECH SERVICES

High-Tech Services Businesses: High-tech services businesses span nine industries: telecommunications, software publishing, motion picture and video, computer system design, medical and diagnostic laboratories, scientific research and development services, architecture and engineering services, internet and data processing services, and other information services. The definition of high-tech services is from the Milken Institute.[5]

High-Tech Services Businesses per 100,000 Residents: The number of high-tech services businesses for every 100,000 residents.

Concentration of High-Tech Services Businesses: The share of high-tech services businesses relative to the national average based on a "location quotient," or LQ.

APENDIX (CONTINUED)

HIGH-TECH MANUFACTURING

High-Tech Manufacturing Businesses: High-tech manufacturing businesses span 10 manufacturing industries: computer equipment, audio and video equipment, communication equipment, commercial and service industry machinery, pharmaceutical and medicine, medical equipment and supplies, aerospace products, magnetic and optical media, navigation/ measuring, and electronic manufacturing. The definition is from the Milken Institute.[6]

High-Tech Manufacturing Businesses per 100,000 Residents: The number of high-tech manufacturing businesses for every 100,000 residents.

Concentration of High-Tech Manufacturing Businesses: The share of high-tech manufacturing businesses relative to the national average based on a "location quotient," or LQ.

KNOWLEDGE ECONOMY

Knowledge Economy Businesses: Businesses involved in the production and distribution of information, including real estate; finance and insurance; professional, scientific, and technical services; management of companies and enterprises; educational services; healthcare and social assistance; and information services.

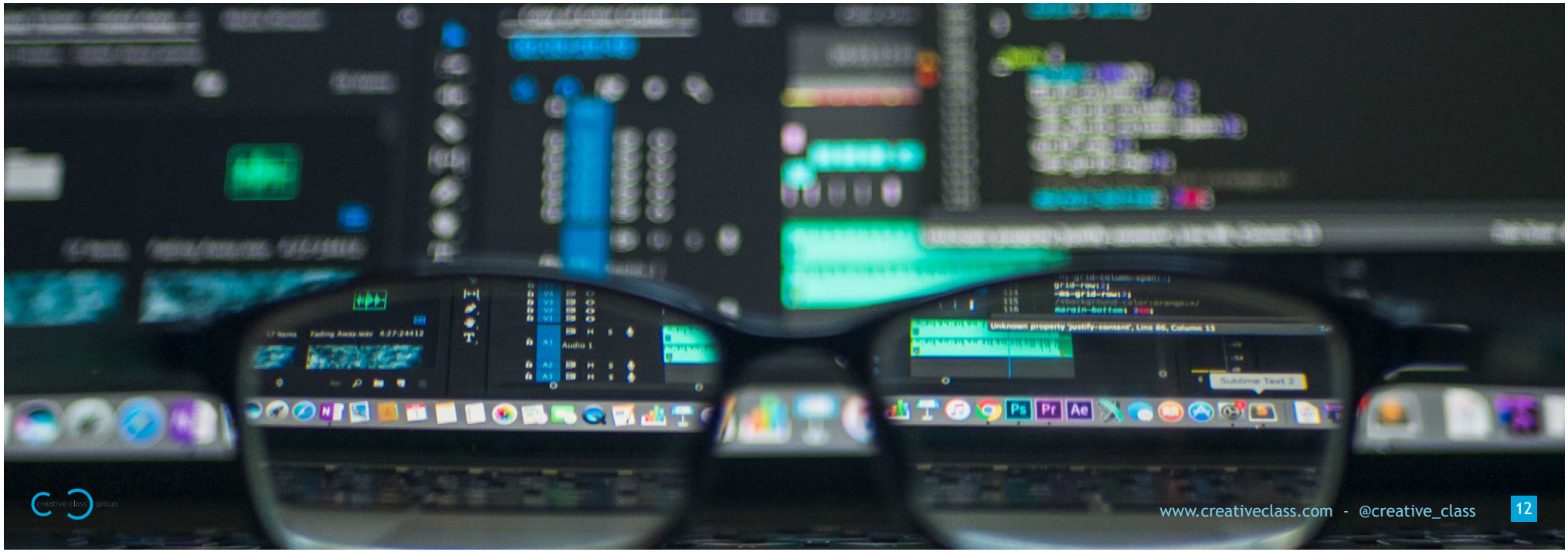
Concentration of Knowledge Economy Businesses: The share of high-tech manufacturing businesses relative to the national average based on a "location quotient," or LQ.

Data on university R&D spending (below) is from the National Science Foundation for 2015.

UNIVERSITY R&D SPENDING

University R&D Spending: The amount of money that colleges and universities spent on research and development in a given year.

University R&D Spending per 100,000 Residents: The amount of money that colleges and universities spent on research and development for every 100,000 residents in a given year.



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