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Examining Arizona's Technology and Research Initiative Fund

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Executive Summary

- Over the past few decades, global competition has increasingly shifted growth to sectors driven by knowledge-based industries, technology, and innovation.
- As bidirectional exchanges of information between academic and industry researchers strengthen, so does the commercially attuned knowledge that leads to a rise in economic and entrepreneurial activity.
- Arizona is a low cost, low regulation state. This low-cost structure has proven beneficial to the state's overall economic competitiveness.
- Arizona faces a number of challenges to sustain its innovation economy.



Executive Summary Cont'd

- The growth in Arizona's research spending, along with the resulting patents and economic activity, has significantly benefited the state's economy.
- From 2013 to 2018, Arizona has seen high-tech employment rise by an impressive 15.48 percent, and high-tech gross domestic product (GDP) grow at an even more remarkable 27.16 percent.
- From 2012 to 2019, the Arizona university system has seen its annual return on investment from TRIF funding nearly double, from \$232,647,448 to \$433,655,365.
- This remarkable growth has been made possible by consistent and significant growth in patents issued, startups formed, and local success stories throughout the Arizona innovation economy. The continued TRIF funding to Arizona universities and the private sector continues to have a huge, sustained benefit to the Arizona economy.

Proposition 301

- 85 percent of the funds would be used for K-12 funding, 12 percent would be used for university research and tech transfer operations (TRIF), and the remaining 3 percent would be used for community college workforce development programs.
- Although each part of the public education system draws from a separate allocation of Prop 301 funding, all pieces are integrated. The K-12, community college, and university systems rely on each other, making it vital to secure Prop 301 funding for the entire public education ecosystem.

Technology and Research Initiative Fund (TRIF)

- Arizona state law mandates that these monies are continuously appropriated by the Arizona Board of Regents (ABOR), providing policy and project supervision to Arizona State University, Northern Arizona University, and University of Arizona.
- Since its official launch in 2001, the TRIF has provided over \$1.12 billion to develop projects in certain ABOR-approved policy areas.
- For research investment, the universities must develop initiatives that support improving health, national security systems, water, environmental, energy solutions, or space exploration and optical solutions.

Best Performing Cities

Table 1. Metro Rankings on Best-Performing Cities US Over Time

	2018	2017	2016	2015	2014	2013	2012	2011
Phoenix-Mesa-Scottsdale	20	40	46	62	65	66	122	136
Tucson	102	154	155	175	161	115	150	112
Flagstaff*	84	71	81	42	98	50	123	57

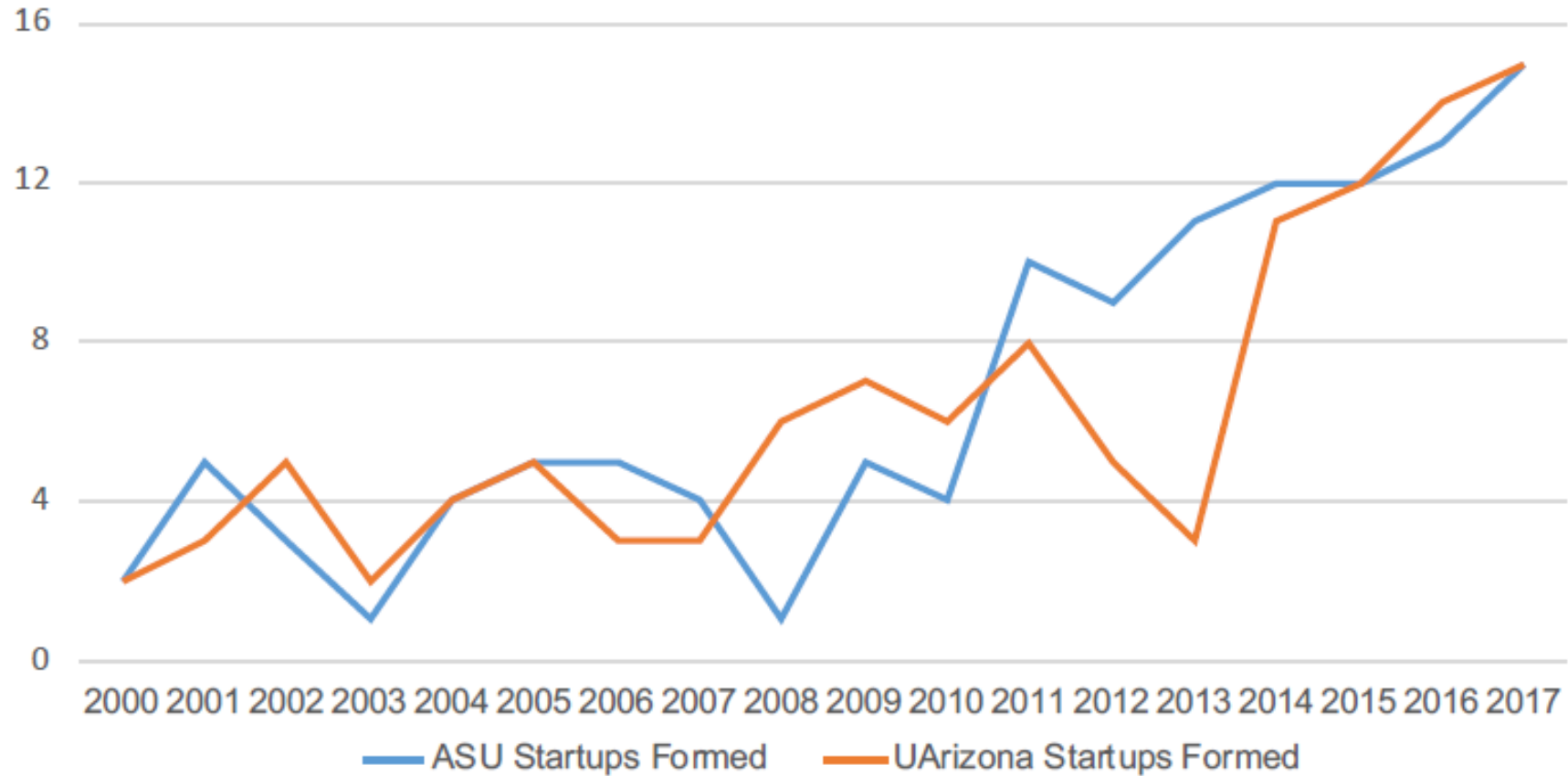
Note: * indicates that Flagstaff is in our small city ranking while the others are in our large city ranking.

Growth in High-Tech and Life Sciences across Peer States

Table 2. Growth in High-Tech and Life Sciences across Peer States

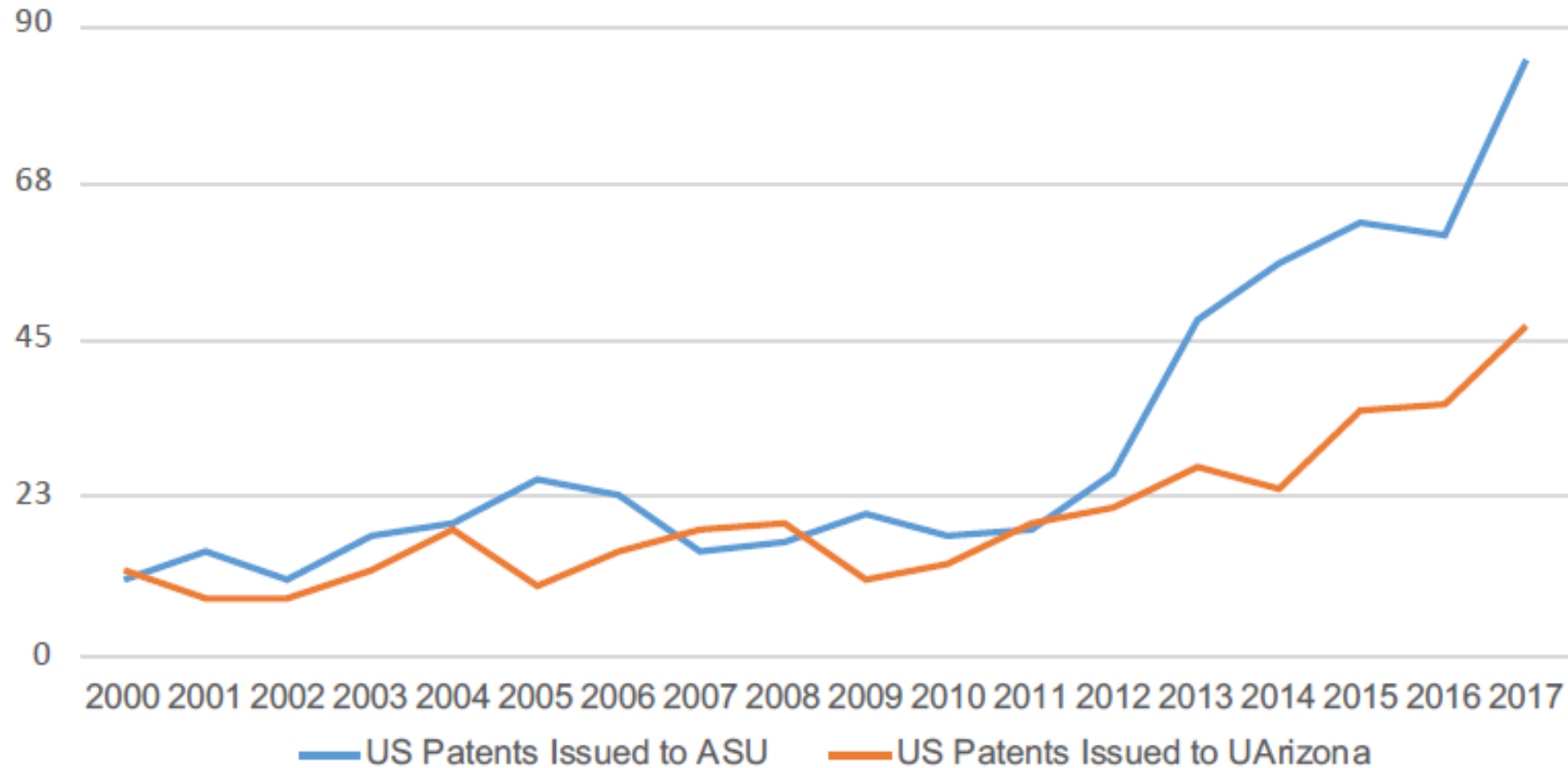
	Employment		Wages			GDP	
	2013-2018	2017-2018	2012-2017	2016-2017	2016-2017	2013-2018	2017-2018
Arizona	15.48%	3.05%	21.30%	5.19%	5.19%	27.16%	6.83%
California	17.63%	2.85%	41.17%	8.78%	8.78%	43.31%	7.65%
Colorado	17.49%	2.87%	27.93%	5.93%	5.93%	23.04%	6.56%
Florida	15.45%	2.42%	26.57%	4.94%	4.94%	26.56%	5.10%
North Carolina	11.08%	2.38%	26.21%	6.02%	6.02%	20.12%	3.41%
New Mexico	8.50%	0.87%	12.45%	1.36%	1.36%	12.40%	2.50%
Nevada	25.62%	5.17%	31.11%	6.27%	6.27%	41.82%	7.32%
Texas	12.05%	2.30%	25.60%	4.88%	4.88%	25.00%	6.57%
Utah	19.62%	3.22%	37.36%	6.38%	6.38%	37.43%	7.33%

Return on TRIF Funding – Growth of Startups Formed



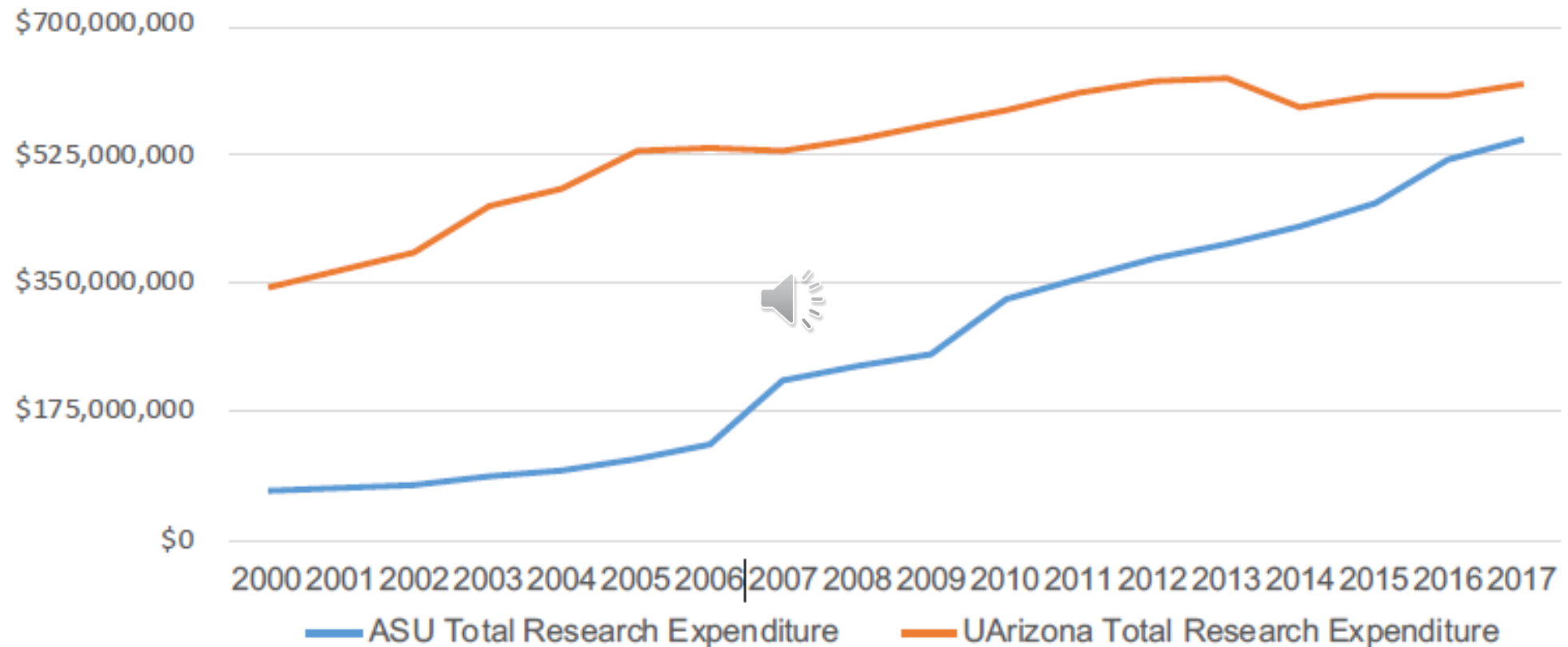
Source: Milken Institute analysis of data from Association of University Technology Managers (2020)

Return on TRIF Funding – Growth of US Patents



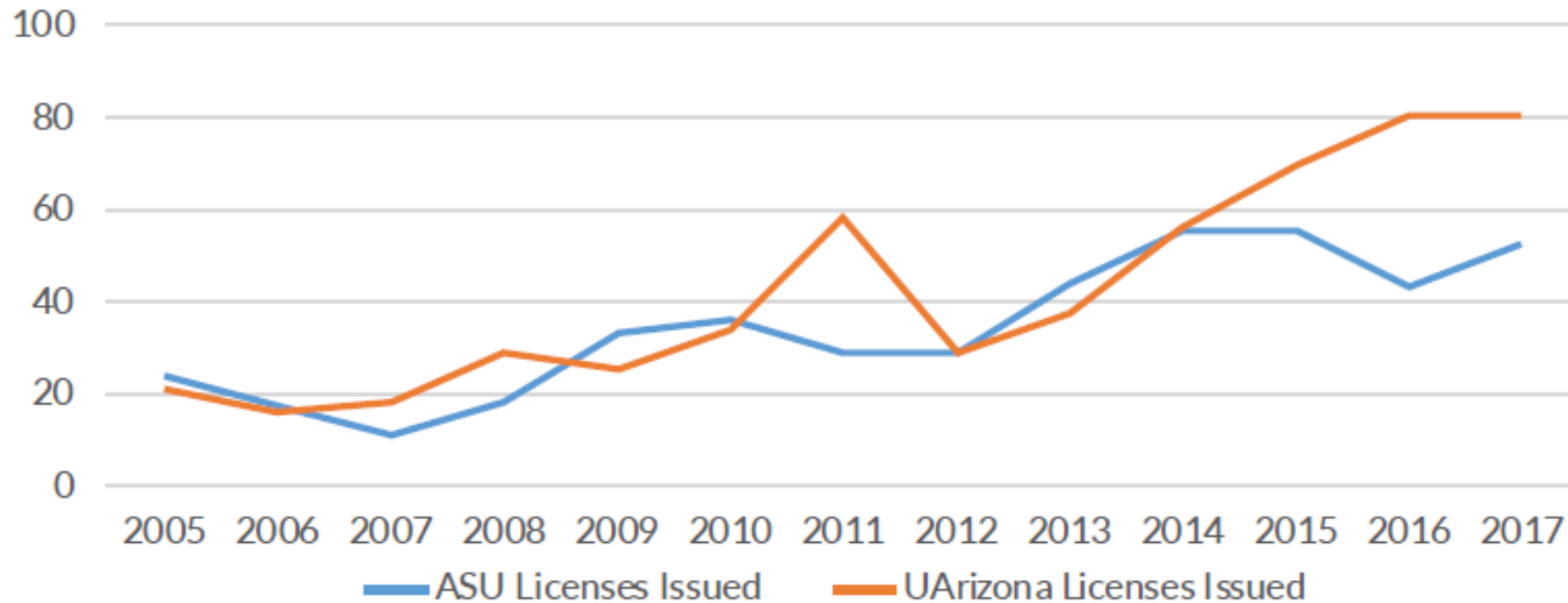
Source: Milken Institute analysis of data from Association of University Technology Managers (2020)

Return on TRIF Funding – Growth of Research Expenditure



Source: Milken Institute analysis of data from Association of University Technology Managers (2020)

Return on TRIF Funding – Growth of Licenses Issued



Source: Milken Institute analysis of data from Association of University Technology Managers (2020)

Return on Investment from TRIF Expenditures from ASU, NAU, UA

Year	Total TRIF Expenditure	ROI
2019	\$83,610,510	\$433,655,365
2018	\$77,211,246	\$457,350,814
2017	\$72,797,471	\$363,239,721
2016	\$69,703,829	\$363,240,790
2015	\$68,438,317	\$309,803,154
2014	\$65,475,490	\$282,143,620
2013	\$60,241,824	\$237,847,734
2012	\$57,190,239	\$232,647,448

Source: Data provided by Arizona Board of Regents (2019)

Percentage of Tech Transfer Activity from Biosciences in 2018

	ASU	NAU	UArizona
University R&D Funding	24.48%*	44.76%	58.19%
Invention Disclosures Received	45.96%	32.00%	45.09%
Total US Patent Applications Filed (including provisional)	52.13%	51.85%	58.45%
US Patents Issued	37.40%	40.00%	50.00%
Licenses & Options Executed	32.05%	50.00%	31.25%
License Income Received	72.04%	0.00%	66.79%
Startups from University IP	41.18%	NA	68.75%

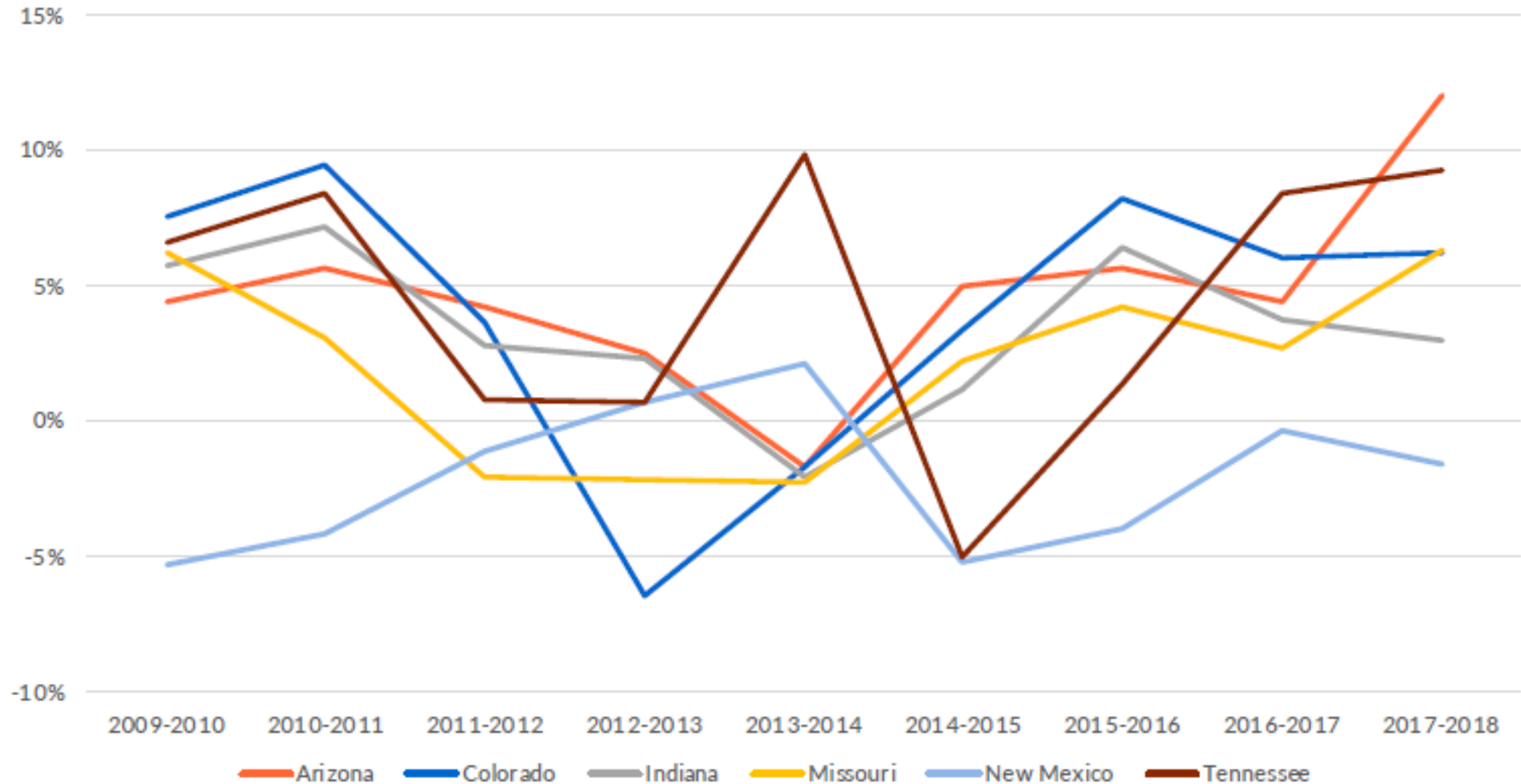
Source: Data received directly from each university as facilitated by the Flinn Foundation; Milken Institute (2020)



Technology and Science Workforce Rankings 2018 – Compared to Peer states

State	Ranking
Arizona	14
Colorado	4
Indiana	41
Missouri	27
New Mexico	22
Tennessee	42
Utah	9

Higher Education R&D Expenditure Growth (2009–2018 Fiscal Years)





Recommendations

- Continue to maintain the current structure and funding levels of the TRIF program, in order to ensure ongoing support for innovation at the Arizona public universities.
- Further efforts in technology transfer at Arizona public universities and continue to facilitate the establishment and growth of start-ups based off of this technology.
- Prioritize ongoing efforts at the universities in conjunction with the private sector to educate and create opportunities for workers in the life sciences and in other scientific research connected to the TRIF program in order to ensure the creation and local hiring of high paying knowledge based jobs.

Thank You!