THE INNOVATION INDEX

If innovation is important, if not critical, for our future prosperity then we should probably have an idea about how innovative we are. Here at Business Oregon, we created the Innovation Index to develop a better understanding of how innovative Oregon is compared to other states. Perhaps more importantly, the index is a tool to help identify areas of strength that we don't want to jeopardize, areas of weakness that we need to lift up, and areas where our competitive advantage is eroding and thus, necessitating greater investment.

Oregon's Innovation Index is an ongoing report that was first published back in 2004. This is the 7th update to the index with the last version published in 2022. Although there is a lot of continuity from one version of the index to another there have been subtle changes to the indicators included or the methodology over the years. As a result, the innovation index should not be used as a time-series where rankings are compared between versions. The index is a snapshot in time attempting to use the best available data to identify the innovative environment of each state.

The goal of the index is to capture the entrepreneurial and innovative activity within all states and, new for this version, the District of Columbia. Eighteen different metrics were tracked that measured a diversity of economic activity that is largely tied to innovative economies. These 18 metrics can be grouped into three broad categories: commercialization, business environment, and skills/ talent. We will go into more detail about each of these metrics and Oregon's score for each later in the report. A complete list of these metrics, along with their measures and sources, can be found at the end of the report.

Commercialization

Entrepreneurship
Invention Disclosures
Patents
Research & Development Investments
University License Income
University Licenses
University Start-ups
Venture Capital

Business Environment

Business Growth
Exports
High Tech Employment
Manufacturing GDP
Small Business Awards

Skills/Talent

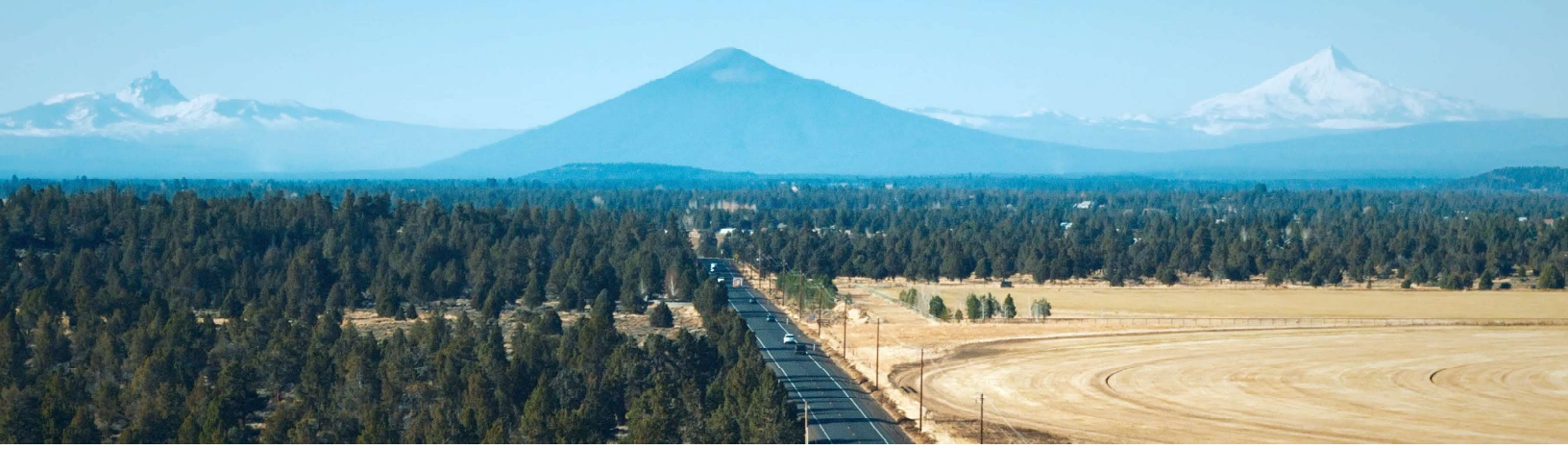
Average Wage
Broadband Access
Educational Attainment
Knowledge Workers
STEM Workforce

The Oregon Innovation Index was developed by looking at each state and the District of Columbia's performance in each of the 18 indicators. Performance for each indicator was measured in two ways. The first was the relative performance of each state compared to the national average. The second was the change in that indicator over the past five years.

Scoring for the relative performance for each indicator was limited to three possible scores for each state: 1, 0.5, and 0. If a state's relative performance was ½ a standard deviation above the national average they were given a score of 1 for that metric; if the state was ½ a standard deviation below the national average a score of 0 was given, and if the relative performance was between those two values a score of 0.5 was given. The relative performance scores for each metric were summed together to identify the relative performance score for each state.

Measuring state change for each indicator over the past five years was also an important component of the Innovation Index. Even if a state performed relatively poorly in a particular metric, it was important to capture and give credit for improvement in that metric. Inversely, a state that was strong in a metric but saw an erosion over the past five years, was penalized for that slow down. The growth rate for every metric for each state was calculated over the past five years of available data. The top 1/3rd of states were given a score of 1, the middle 1/3rd of states were given a score of 0.5, and the bottom 1/3rd were given a score of 0. The change scores for each metric were summed together to identify the change rank score for each state.
The final Innovation Index ranking was made by combining the relative performance score and the change scores. However, the relative performance score was weighted higher than the change score. How strong (or weak) a state was in a particular metric was captured by the relative performance score, which is more important than the rate of change over the past five years. As a result, the relative performance score was weighted more heavily accounting for 70% of the final index ranking and the change score accounted for 30% of the final index ranking. One reason why the change rank score is weighted lower than the relative performance is

Oregon Manufacturing Innovation Center, Research and Development (OMIC R&D)



that the change rank score can punish states that are leaders in one of these metrics. For instance, Massachusetts is ranked #1 in invention disclosures with 285 invention disclosures per million residents. Maryland is #2 with 197 invention disclosures per million residents. Put another way, Massachusetts is way ahead of any other state for this metric. Despite being the national leader there was a notable decline in invention disclosures in Massachusetts over the past 5 years of available data (-23%). That decline ranked Massachusetts 38th overall in change rank. Yet, despite this decline in invention disclosures Massachusetts remains the clear national leader. Lowering the weight of the change rank score helps to avoid overly penalizing states for slow growth or even declines in a metric over the past 5 years where they are already strong/ national leaders in that metric.

Finally, it is worth noting the changes that were made for this version of the innovation index compared to the last version completed in 2022. First, the District of Columbia was added to this version, but had not been included in previous versions. Second, patent citations were not included as one of the metrics in this version due to data availability constraints. However, it is important to note that patents were still included and those are nearly perfectly correlated with patent citations. Third, STEM graduates were not included as one of the metrics in this version due to an update to the "classification of instructional program (CIP)" codes that makes developing a 5-year look back difficult. Like patent citations the loss of STEM graduates did not have a significant impact since two different measures (STEM workforce and knowledge workers) remain as indicators in the index that capture similar trends to STEM graduates. Finally, change rank shifted from a 10-year look back to a 5-year look back. This shift was due to data availability concerns for several critical metrics.

It is worth noting that this is the first version of the innovation index that fully includes data capturing the impact of the COVID-19 pandemic. The public health response to the pandemic was largely done at the state level and those responses varied quite dramatically from state to state. These public health measures and the economic conditions around the pandemic recession and recovery had notable impacts on some of these metrics. For instance, new business formation skyrocketed during the pandemic, and we saw that every state posted a notable increase in business formation compared to before the pandemic. Similarly, the recovery from the pandemic recession resulted in a large increase in the average wage for all states due to the tight labor market and inflation.

THE INNOVATION SCORE

Oregon ranked 7th in the 2024 Innovation Index among the 50 states and the District of Columbia. The top performing states in the Innovation Index were our neighbors to the north, Washington, followed by Colorado, New Hampshire, California, Maryland, and the District of Columbia.

Oregon's strong performance in the overall Innovation Index was largely a reflection of the relative performance rank, which was tied with New Hampshire for 4th overall. Oregon's five-year change rank for these metrics was a notable weakness ranked 35th overall. Oregon was not unique to be ranked high in the relative performance for these innovation metrics but rank poorly for improvement in these metrics over the past five years. California, Massachusetts, North Carolina, and Texas all had a similar trend of scoring well in these metrics overall but posting relatively slow improvement or even declines in some of these metrics over the past five years.

Had the relative performance and five-year trend been weighted equally, Oregon's overall ranking would have been 13th rather than 7th. As a reminder, the decision to weight relative performance higher than the five-year trend was to highlight the states that performed well in these metrics first and foremost. Factoring in improvement or erosion in a metric over the last five years was also important, but that trend was secondary to overall performance.

When looking how Oregon ranked among each of the 18 metrics in the index, a few broad trends emerge. First, although Oregon's overall rank in the Innovation Index was 7th, the state was rarely a leader in any of these metrics. The handful of exceptions were university licenses, patents, university start-ups, and exports, where Oregon was among the nation's best.

	Relative Performance Rank	5-year Change Rank	Innovation Index Weighted Rank
Washington	1	3	1
Colorado	2.5	9	2
New Hampshire	4.5	5	3
California	2.5	40.5	4
Maryland	8	9	5
District of Columbia	6	17.5	6
Oregon	4.5	35	7
Connecticut	10	7	8
New York	8	17.5	9
Rhode Island	17	1.5	10.5
Vermont	17	1.5	10.5
Pennsylvania	12.5	13.5	12.5
Utah	12.5	13.5	12.5
New Jersey	17	9	14
Massachusetts	8	47.5	15
Tennessee	22.5	5	16
North Carolina	12.5	35	17
Virginia	20.5	11	18
Delaware	17	22.5	19
Texas	12.5	40.5	20
Georgia	20.5	13.5	21
South Carolina	25.5	5	22
Minnesota	17	43	23
Arizona	22.5	35	24
Illinois	25.5	22.5	25
Missouri	25.5	28.5	26
Michigan	25.5	35	27
Ohio	29	22.5	28
Florida	31.5	13.5	29
Kansas	29	35	30
Wisconsin	29	40.5	31
Idaho	34	17.5	32
Nebraska	34	22.5	33
Iowa	36.5	22.5	34.5
New Mexico	36.5	22.5	34.5
Alabama	34	40.5	36
Montana	31.5	47.5	37
Kentucky	39	28.5	38.5
Maine	39	28.5	38.5
Hawaii	42.5	28.5	40.5
Louisiana	42.5	28.5	40.5
South Dakota	46.5	17.5	42
Nevada	42.5	35	43
Alaska	39	50	44
Mississippi	46.5	35	45
Indiana	42.5	47.5	46
Wyoming	46.5	44.5	47
Oklahoma	46.5	47.5	48
West Virginia	49.5	44.5	49
Arkansas	51	28.5	50
North Dakota	49.5	51	51

If Oregon was not exceptional in more than a handful of metrics, then how did it rank so highly overall? The answer is that Oregon was roughly in the top 1/3rd of states for 14 of the 18 metrics. A good way to frame this is that Oregon was rarely the leader, but consistently among the highest performing states for most measures of innovation. Not too dissimilar from the adage, "jack of all trades, master of none."

Another observation when looking at how Oregon ranked among each of the 18 metrics was the five-year change rank was routinely lower than the relative performance rank. Oregon ranked in the bottom 1/3rd for 8 of the 17 metrics where five-year change was available. This is a notable threat where Oregon's competitive advantage may be slipping. Even if Oregon's performance is ranked highly in a metric, a low five-year change rank can reflect the state losing market share in that metric.

When looking at the three broad innovation categories of commercialization, business environment, and skills/ talent, there is remarkable consistency among these broad measures. Oregon is routinely ranked around the 66th percentile for performance and closer to the median state (or slightly worse) for change rank. In the following section we will go into more detail about these three broad categories and highlight specific metrics that stand out within those categories.

Oregon's Rank (out of 51 States and DC)

		Relative Performance	5-Year Change
Commercialization		14	23
	Entrepreneurship	24	40
	Invention Disclosures	28	31
	Patents	4	6
	Research & Development Investments	18	42
	University License Income	13	20
	University Licenses	1	5
	University Start-ups	5	11
	Venture Capital	18	27
Business Environment		18	35
	Business Growth	23	45
	Exports	5	4
	High Tech Employment	14	43
	Manufacturing GDP	15	44
	Small Business Awards	33	40
Skills/Talent		17	29
	Average Wage	17	8
	Broadband Access	15	NA
	Educational Attainment	18	43
	Knowledge Workers	18	48
	STEM Workforce	17	15