



Research paper | Month 2024

Impact of technology on society in the United States

A population with technology acumen and access to technology jobs will have an overall better human condition.

By Dan Cavey

Hypothesis

The relationship between regional and state economic status or wealth and various societal factors is well known. There is certainly debate on the scale and magnitude of the cause and effect, but the relationship is clear. This paper will explore the specific relationships between the pervasiveness of technology and any clear relationships to societal metrics that impact the human condition. The hypothesis is that a more technologically oriented society will be a more safe, healthy, and prosperous society.

Data Evaluation

A large dataset containing state level data for 30 metrics was created. It included multiple metrics in each of the following categories:

- General state level economics
- Government and corporate spending on technology
- Population usage of technology
- Environmental metrics
- Population health, education, and crime statistics

The number of potential measures required that common factors and regression relationships be identified to determine useful, viable blended metrics for deeper analysis. The best candidates were:

- State Economic Condition which factored: GDP per Capita, Median Income, Cost of Living Index
- IT Jobs per Capita
- Percent College Educated
- Tech Savvy Population which factored: Compute device Ownership Rate, Internet usage rate
- Human Condition Status (OPI Rate) which factored: Obesity Rate, Poverty Rate, Incarceration Rate

Other factors that were not significantly related to each other or other metrics of interest included:

- State Technology Budget and Expense Measures
- Environmental Measures
- Healthcare Measures (other than included above)
- Crime Measures (other than included above)
- Migration Measures
- Job Growth Measures

Our initial data evaluations provided five target measures for further study including those in which were of particular interest to our study.

Special Note on IT Jobs per Capita

Data on technology spend by government was available, but not a factor that was useful for further study. Technology spend by corporations was also of particular interest, but it is not possible to discern with any confidence what state is the beneficiary of any specific corporate technology spend. This is because of the broad national footprint of most corporations that spend most of the technology dollars. IT Jobs per Capita, then becomes the best proxy for measuring technology spend by corporations as it is measurable, and the benefit will most likely stay in the state in which the job is created.

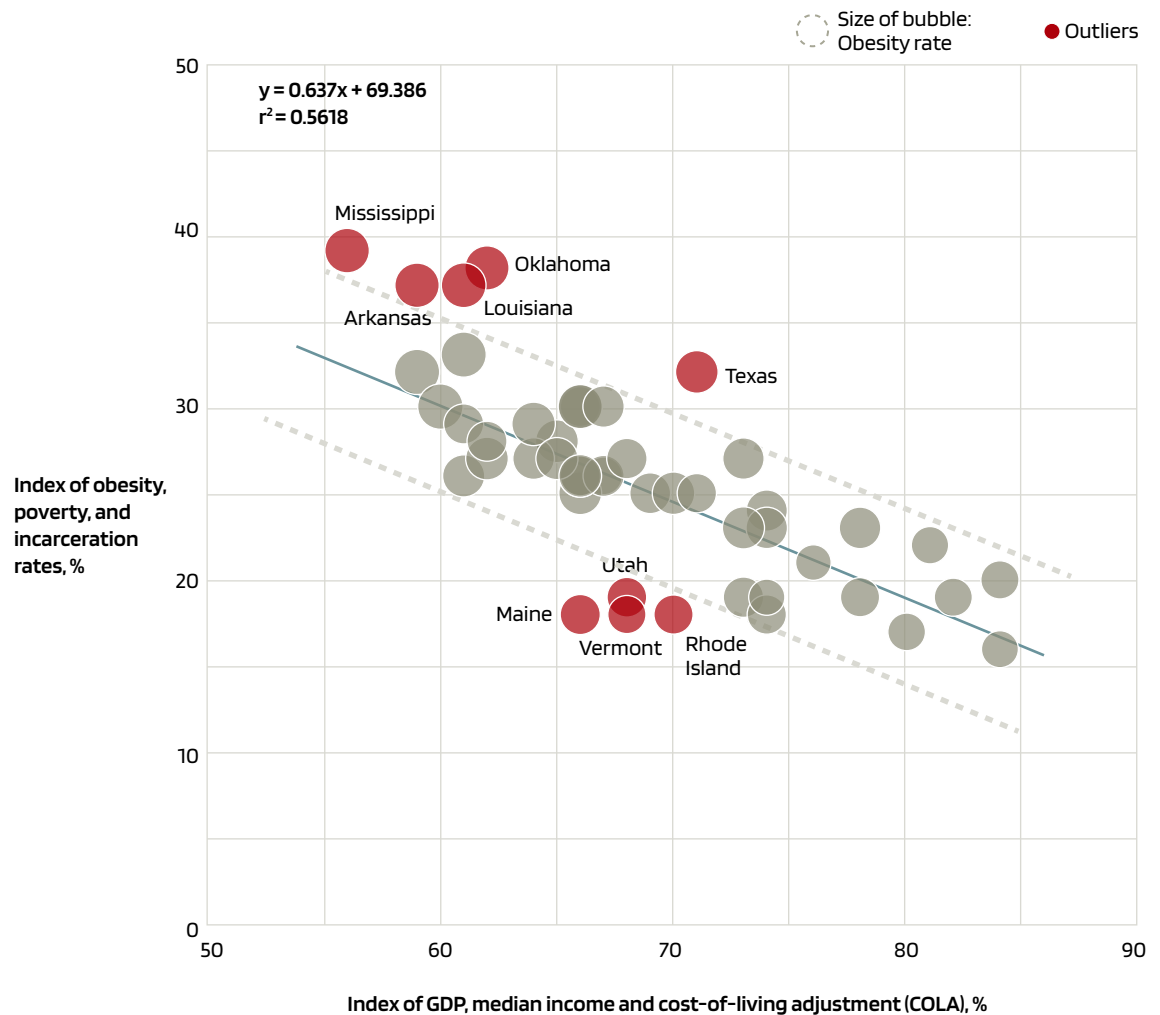
Analysis

A Human Condition Status, or OPI Rate, was calculated for each state, this could be stated in the inverse as well and as such stated as an HWW (Health, Wealth, Wise) Rate. Either way it becomes a valid measure of the Human Condition for each state and the target dependent variable in our analysis.

The candidates for understanding cause and effect were indices created for Economic Condition and Population Tech Savvy Rate, along with College Educated Rate and IT Jobs per Capita. All four of these showed a certain amount of inverse correlation to the OPI Rate, but when evaluated with regression models the Economic Condition index was not significant enough to overcome the impact of the other three.

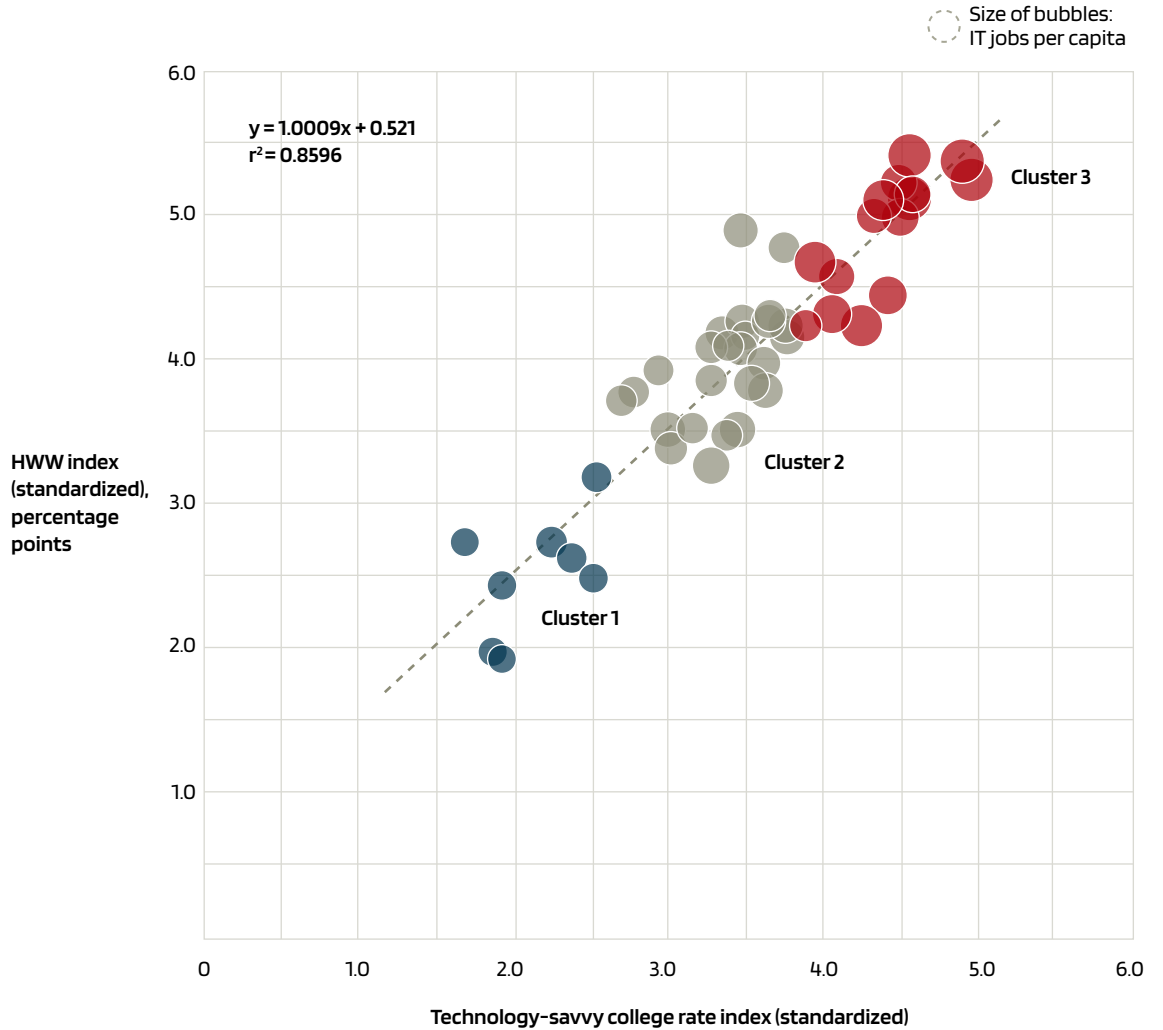
But before dismissing the Economic Condition Index as a factor, we can see from Figure 1 below that there are eight or more outliers when evaluating this relationship. These outliers are enough to impact the statistical analysis, but later analysis will show that there is value in understating why these states are outliers when evaluating this relationship.

Figure 1: **Economic index versus OPI rate shows eight or more outliers.**



Further study of the regression analysis allows shows us that Tech Savvy Population and College Education Rate have significant interaction, which is quite intuitive as well, but that interaction is quite significant in predicting OPI Rate. This finding is critical to our hypothesis. At the same time, IT Jobs per Capita did not produce a significant factor.

Figure 2: Technology-savvy college education rate with IT jobs per capita versus healthy, wealthy, and wise (HWW) index




Cluster 1	Cluster 2	Cluster 3
Alabama	Arizona	California
Arkansas	Florida	Colorado
Kentucky	Georgia	Connecticut
Louisiana	Idaho	Delaware
Mississippi	Illinois	Maryland
New Mexico	Indiana	Massachusetts
Oklahoma	Iowa	Minnesota
West Virginia	Kansas	New Hampshire
	Maine	New Jersey
		New York
	Michigan	Oregon
	Missouri	Utah
	Montana	Vermont
	Nebraska	Virginia
	Nevada	Washington
	North Carolina	
	North Dakota	
	Ohio	
	Pennsylvania	
	Rhode Island	
	South Carolina	
	South Dakota	
	Tennessee	
	Texas	
	Wisconsin	
	Wyoming	

The quandary around the lack of significance for IT Jobs per Capita become clear in Figure 2. In this analysis, the data was normalized to eliminate any impact of unequal scales and the inverse of OPI rate was used to give a better visual analysis. Not only do we see that HWW Rate increases with an increase in our Tech Savvy * College Education Rate factor, but the states with large IT Jobs per Capita are dominant in the higher HWW levels. The issue is that a handful of states dominate the IT Jobs. Possibly further study using a log transform on IT Jobs per Capita might raise the significance overall, but the visual of the graphic shows the impact.

In both Figure 1 and Figure 2, states begin to group together that share common characteristics. Using some commonality tools like k-means clustering further validation of this appears. We see that Cluster 1 includes primarily states with high OPI Rate and low numbers of IT Jobs per Capita. While the states in Cluster 3 generally have lower OPI rates and high IT Jobs per Capita and are generally known for being states with a significant technology industry presence.

Conclusion

While cause and effect are difficult to prove, there is a strong relationship between the Tech Savviness of a population, the availability of IT jobs and an improved human condition. The relationship between being Tech Savvy and College Educated is intertwined but not necessarily causal, nonetheless the impact they have on an improved human condition is significant. It could be argued that poor human conditions (or a high OPI Rate) cause lower tech savviness and therefore a lower college education rate which leads to less technology jobs. This is quite intuitive and possibly true, but it does not negate the opposite. The relationships are strong and an impact on any of them will raise the others.

Any efforts to increase a population's technology acumen and access to technology jobs should have a positive impact on the overall human condition of that population. 

About the author

Dan Cavey, Technology Economist

Questions

Please contact: info@technologyeconomists.com.

Stay up to date

To view the latest indicators, join our community, and sign up for monthly updates, please visit: TechnologyEconomists.com.

© 2024 The Technology Economists. All rights reserved.