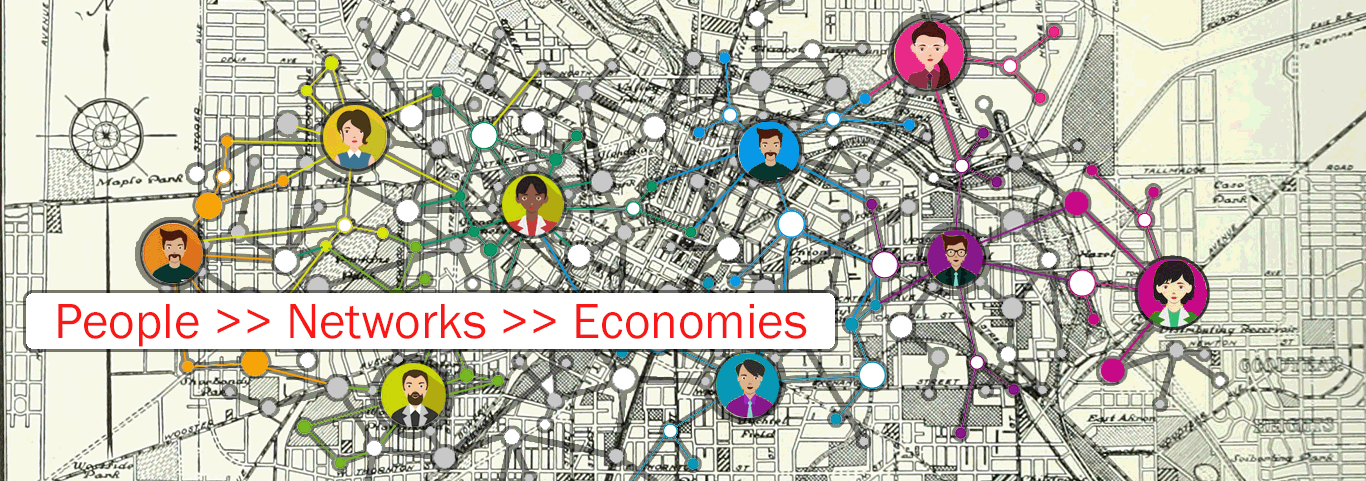


VIBRANT Graphs Blog Contact



Strengthening communities by improving productivity, opportunity, and the connections between us all.

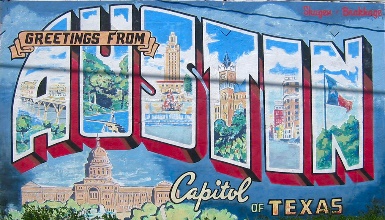
How does a community create inclusive economic growth? Many people are trying to answer this question as their communities experience increased inequality and stagnant incomes. Increased productivity – output per working hour – is an obvious part of the answer. Increased opportunity – measured in terms of absolute and relative economic mobility – plays a less obvious, but equally important role. To increase productivity and opportunity, though, we need to understand how communities might grow, and how individuals relate to that growth.

Vibrant Networks uses network analysis and basic machine learning to understand how individuals combine to create companies, how companies combine to create clusters, how clusters combine to create networks, and how networks relate to each other.

(picture – individual, occupation, company, cluster, network, regions)

The goal is to create inclusive economic growth by increasing the information necessary to put people in a position to succeed. Not every community can chase Amazon HQ2, build a biotech cluster, or diversify into high-paying professional jobs. So, what can they do? And what kind of workforce would that require?

To understand how this works, choose one of the three regions below. Don’t worry, you can come back and try the others later – they’re each very unique.

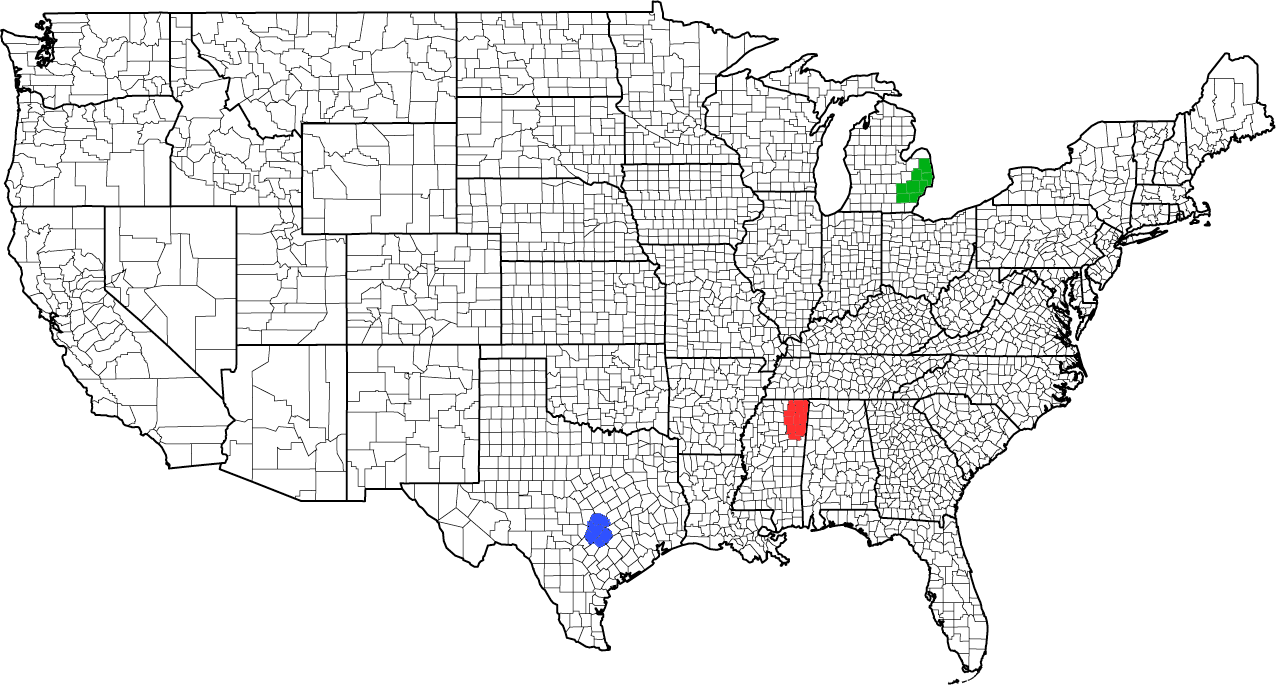


|  |  |  |
| --- | --- | --- |
| Austin, Texas | Tupelo, Mississippi | Detroit, Michigan |

Each region is more than just a city, or even a county. The Census groups counties into Statistical Areas that group an insufficient percentage of the country into very large units. The Bureau of Economic Analysis creates even larger units called Economic Areas. Academics typically use much more helpful units, called Commuting Zones, that group counties into the regions where their populations tend to work. Unfortunately, the most recent Community Zone data is from 2000, which means that it does not do a great job of reflecting current regions.

So, we display these visualizations using custom regions as defined by economic development practitioners, and we’re still thinking about how to solve this problem. For the record, we let the computer group counties by Commuting Zones while it learned from the data.

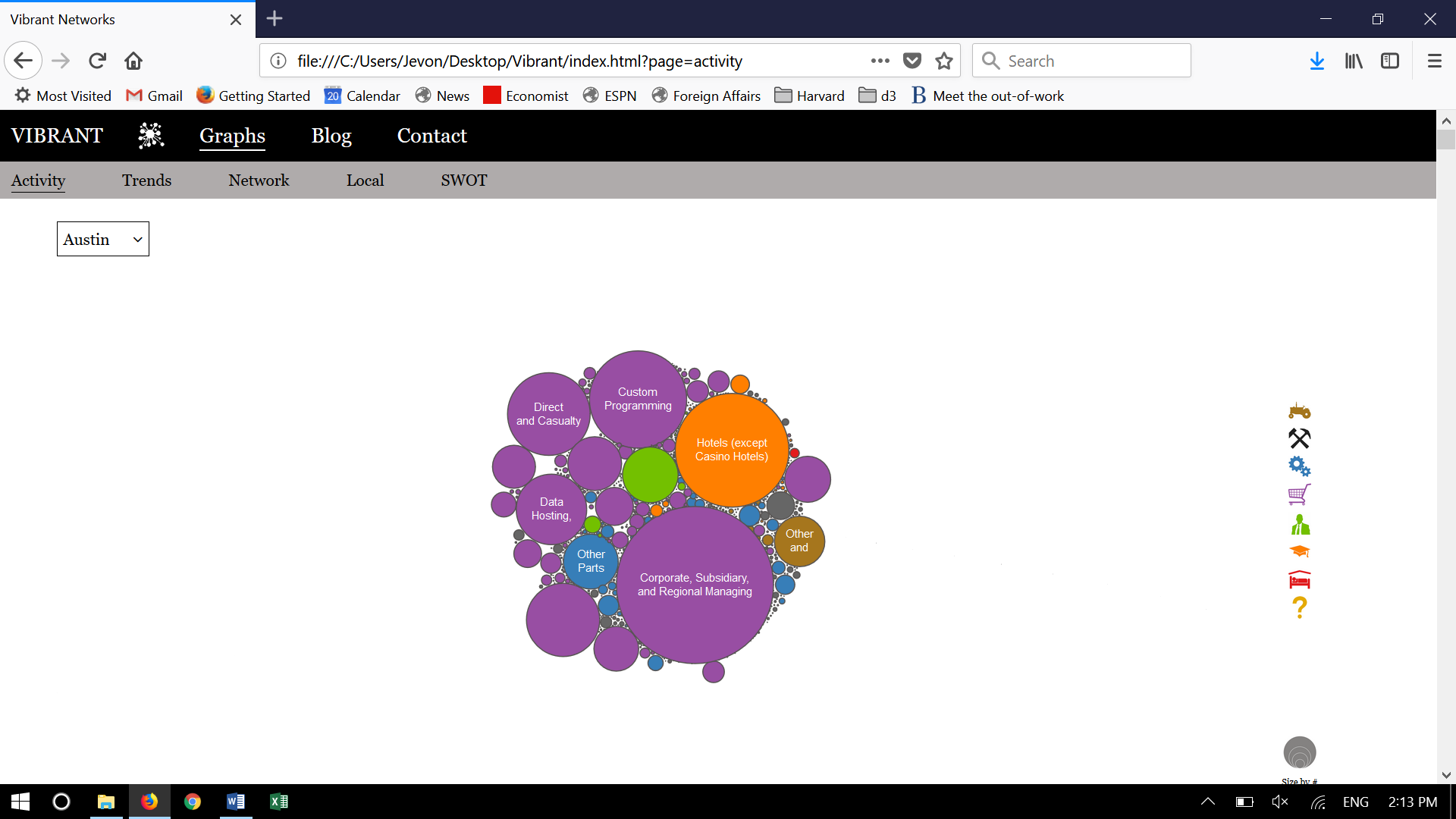
We define (city) using the counties below:

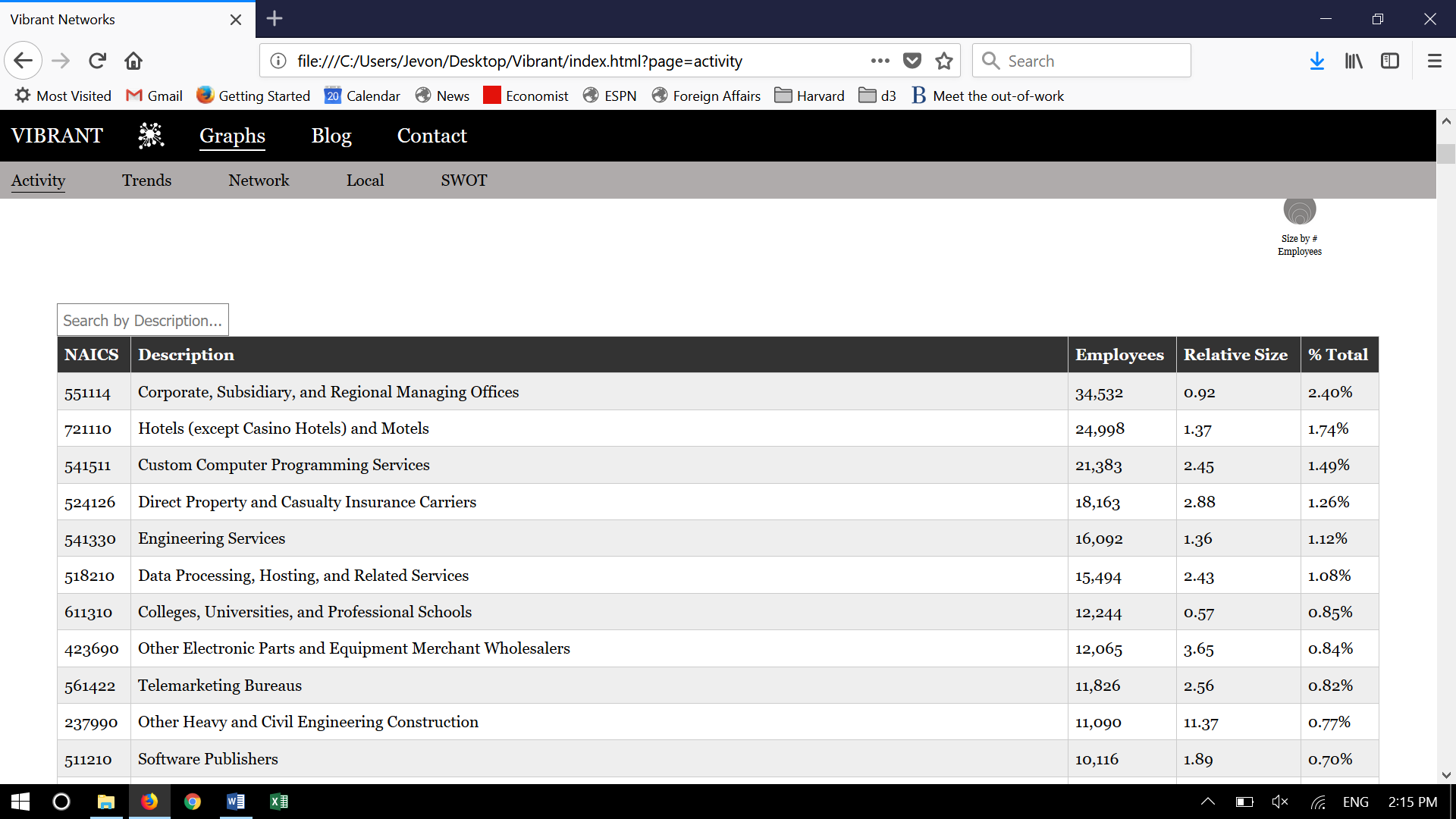


Next, we want to understand what (city) does. To do this, we take employment data to learn how many people work in any given industry for this region. We then sort the industries into “Traded” and “Local”. Traded industries, such as most manufacturers, create goods or services locally and sell them to other regions. They bring money into the region. Local industries, such as restaurants, create locally and sell locally. They circulate money within the region, or possibly extract it to corporate headquarters in other areas.

Both Traded and Local industries are important. Local account for most of a region’s jobs, but Traded drives the economy. Without Traded, the Local jobs will start to disappear. The opposite is much less true.

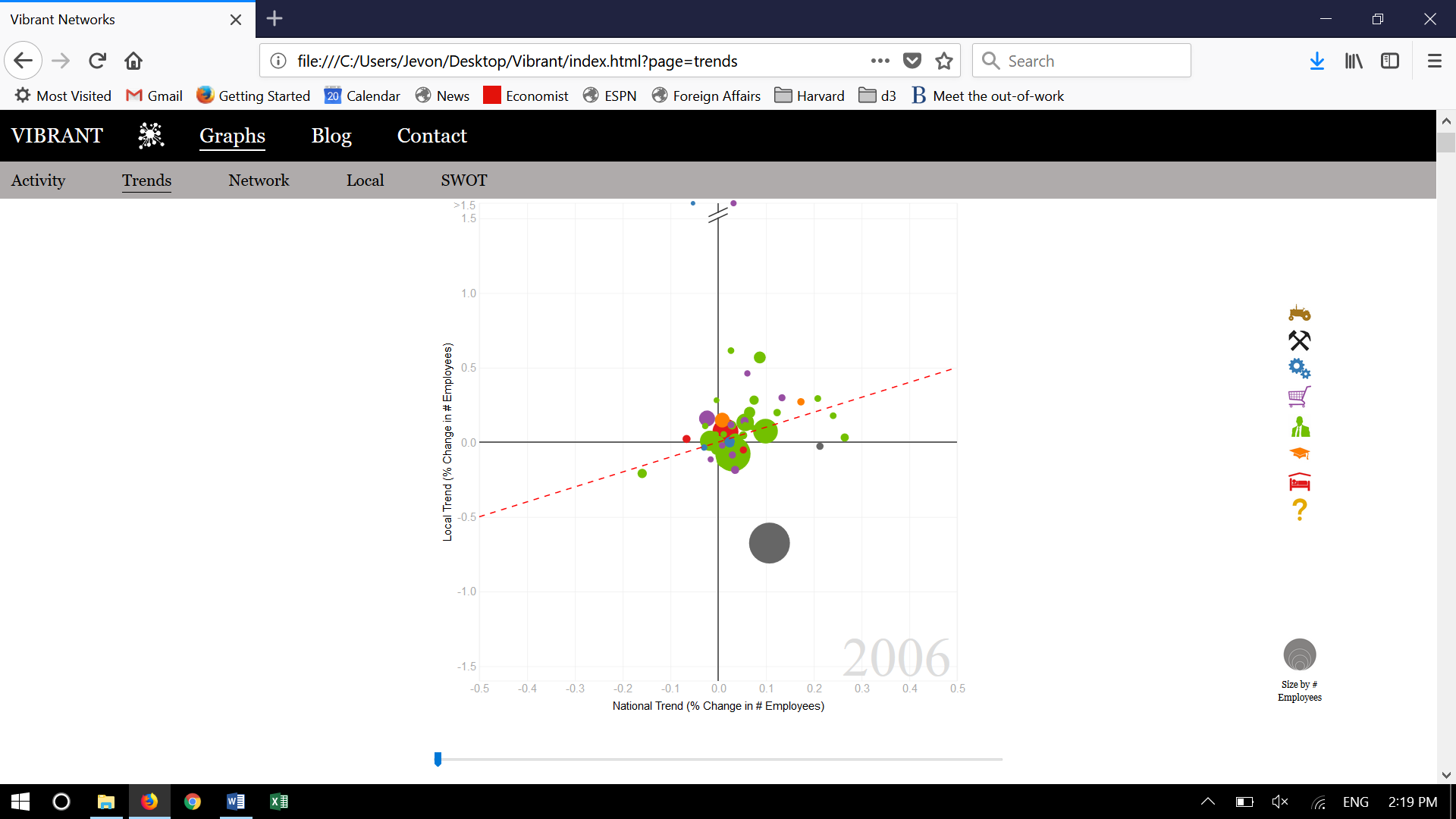
The visualization below shows the number of employees by industry in (city).

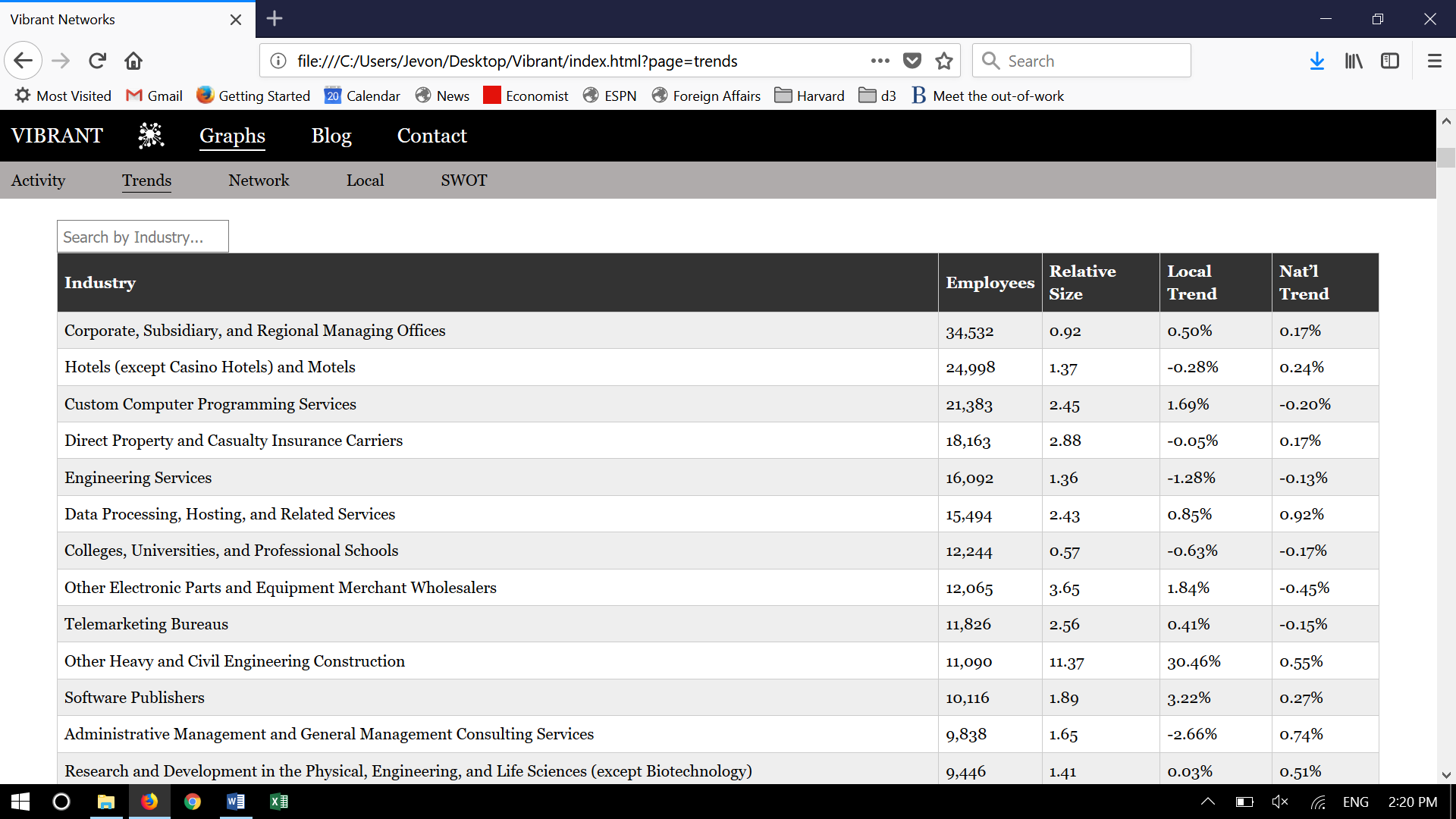




Now that we know what (city) does, we need to understand how that is changing over time. The next visualization shows the percent change in number of employees over time. The X-axis is the local trend and the Y-axis is the local trend. The dashed red line helps compare the local and national trend. If local is higher, that indicates some sort of competitive advantage. If local is lower, that indicates some sort of competitive disadvantage.

Scroll the bar below the chart to move from year to year. We use the ten years of data from 2006 to 2015 to create a 5-year estimate for how industries will change through 2020.



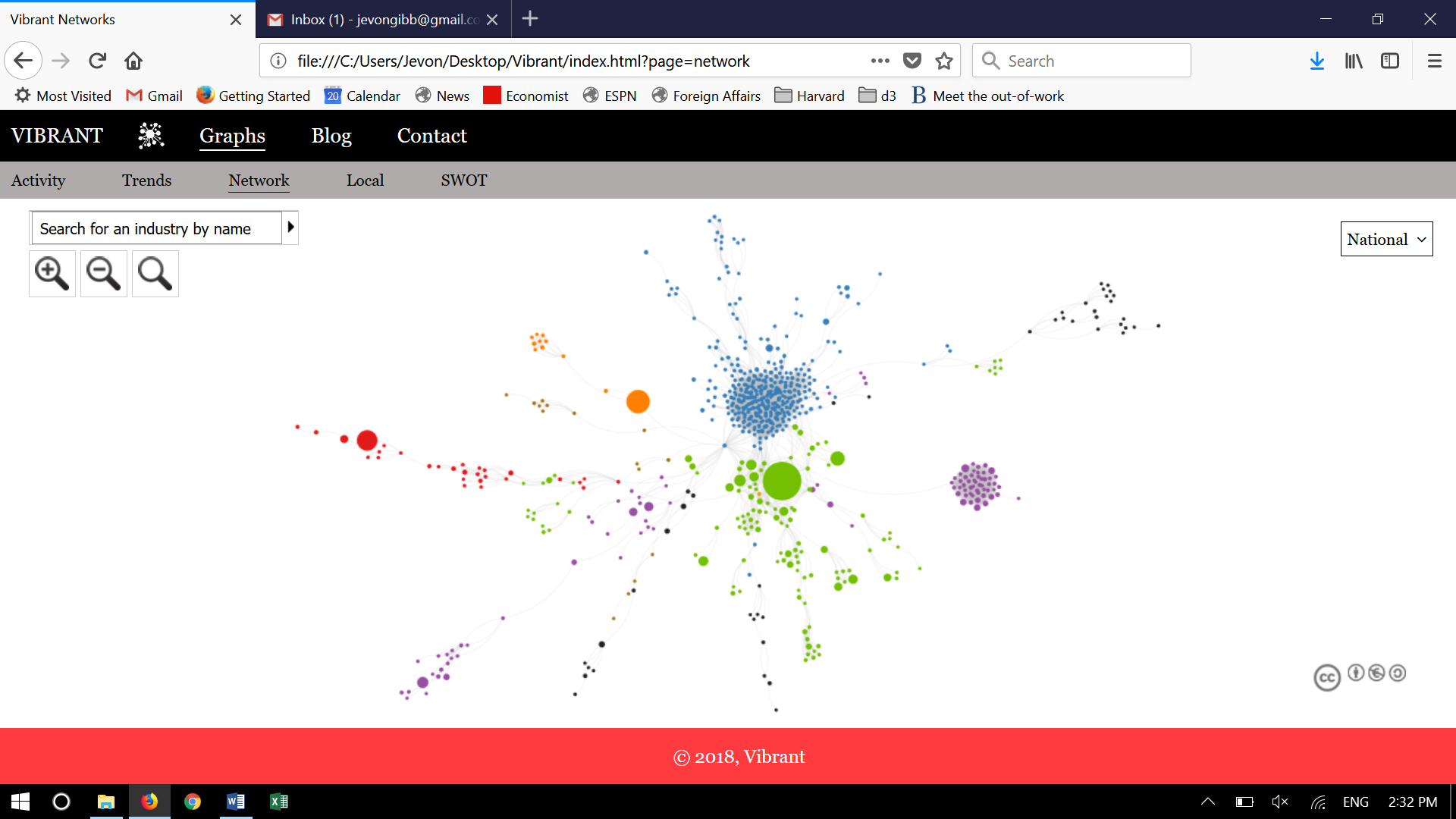


Now we understand what (city) does, how that has changed, and how it might change in the future. That part of the analysis was easy. The next part is where the massive computing power of data analytics helps. We need to understand how every industry relates to every other industry, which will help us understand whether our region should be thinking about boat building or biotech.

To do this, we look at four factors: (1) how the number of employees in an industry affects the number of employees in other industries within a region; (2) how the number of establishments/companies in an industry affects the number of establishments in other industries within a region; (3) the similarity between the types of occupations (lawyers, welders, office managers) employed by industries; and (4) the similarity between the inputs/outputs that are produced/consumed by industries. For a human, this would be like trying to boil the ocean. For a computer, this is easy.

We take all this information and create a network map. Each node represents an industry. The distance between industries indicates the relatedness between them. A connection means that the two industries are highly related. Finally, we bring back the circles from earlier that represent (city)’s activity. We “light up” the nodes where (city) has a Relative Size greater than 0.5, and we size every node by the number of employees in the industry.

The graph is not perfect, but it is our best attempt at a 2-dimensional representation of a 675-dimension matrix.

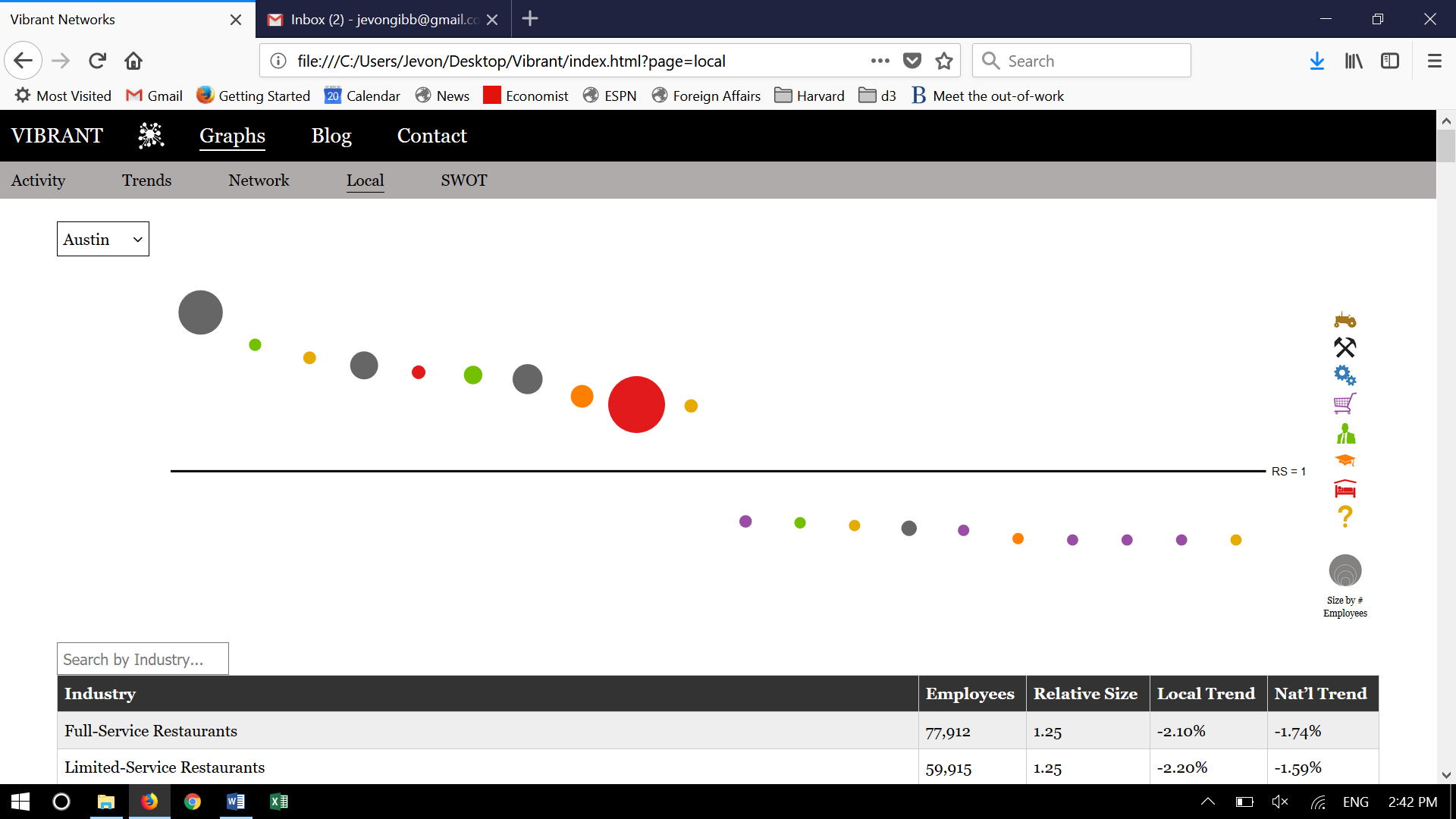


(insert language specific to each region????)

After looking at the network map, we understand how a region’s activities relate to the big picture. We know whether it has the sort of industries and occupations that would make other industries likely. Of course, any industry can occur anywhere, but our data shows obvious trends and probabilities.

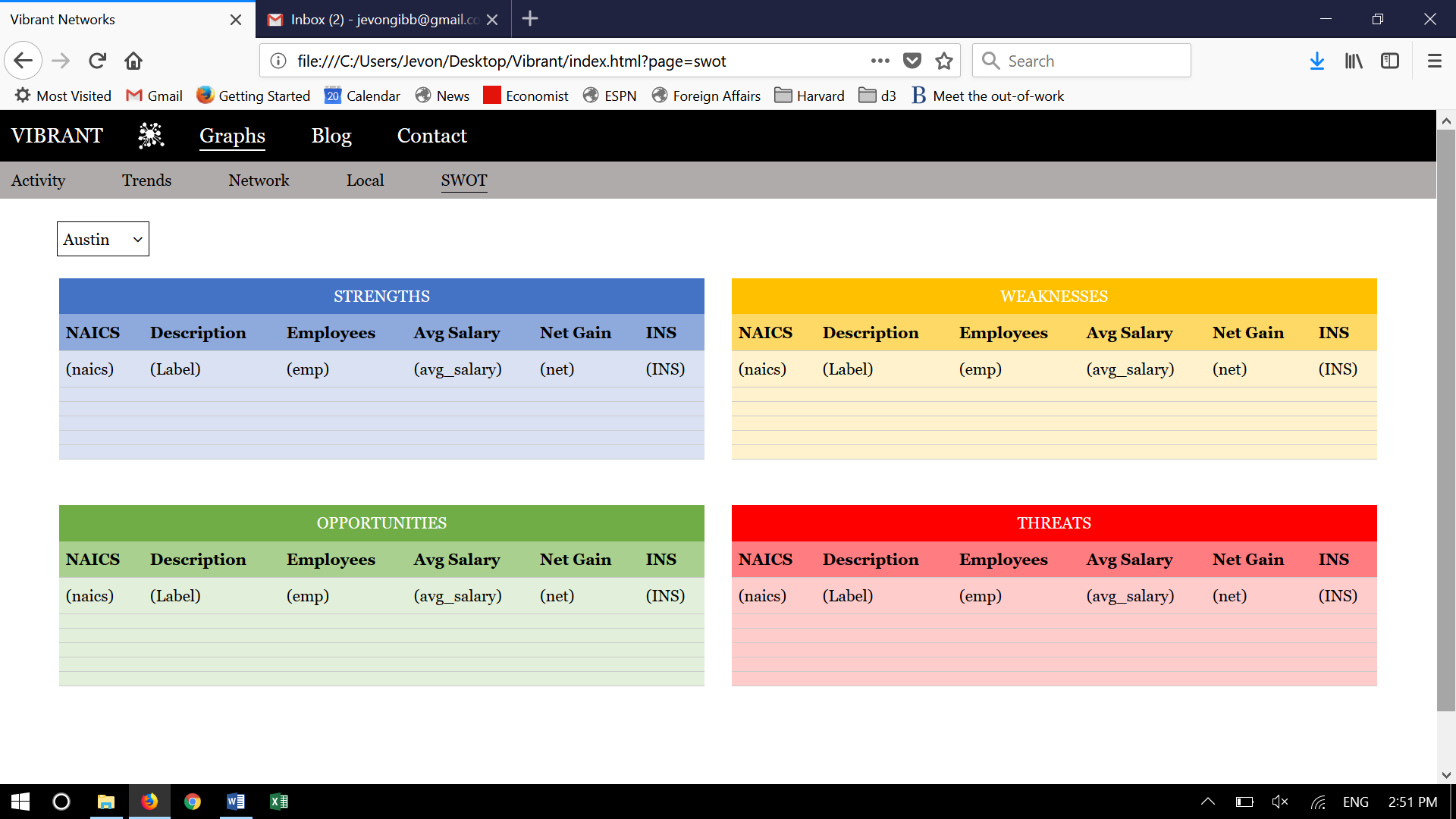
We don’t stop there, but we take a brief detour first. Remember all those important Local industries that provide lots of jobs? We did not forget them. The next visualization shows how Local industries in (city) compare to the number of employees we would expect to see given the size of the local economy.

This information can be used to identify Local industries that might be Traded in a specific region, strengths that communities might build upon, or excess supply in an industry. For example, Drinking Places are considered Local but can be an integral part of tourism/hospitality clusters. In contrast, we also show under-performers with low employment activity. These industries might need support, they might be irrelevant to the region, or they could indicate some other issue.



At this point, we have a massive amount of information. Again, we put computers’ massive power to good use and compute potential economic impact of trends. We make the computer use a SWOT analysis that many people will find familiar. We think about Strengths and Weaknesses as positive and negative trends based upon historical employment data. These are simple linear projections of “what is likely to happen”.

Next, we think about Opportunities and Threats using network analysis rather than linear projections. Remember, the network analysis looks at much more than historical data. It looks at co-location trends, employees’ skills, and inputs/outputs. This measure is about “what could happen”, as compared to “what is likely to happen”. We take the network analysis, compare it to the linear projections, and show where the computer thinks industries trends might be more positive or negative than the linear projections.



While “Net Gain” does not translate directly into “Productivity”, it serves as a convenient alternative. (Public leaders can use this data to create economic development policy…)

(Also, “Opportunity”)

Needs to be combined with LFPR, Mobility, Spatial Inequality, etc. But this is a good start. Show how this network connects with social? Show it as a circle.

(Also, why the data is hard. Census doesn’t help. Have to pay for good data.)

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