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MUSA Capstone

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Mid-point Work in Progress

Disclaimer - Major work in progress, the writing needs editing and great expansion, including far more cited sources. Hopefully, this provides a clear picture for where I’m heading.

**Introduction & Motivation**

As America turns to clean energy sources such as wind and solar power, reliance on coal fire power plants is slowly, but steadily declining. While this may have a positive environmental impact, this transition will shut down coal mines, dramatically changing the economy and job accessibility in Appalachia, a coal hub of America.

Politicians, tech leaders, and former miners alike have suggested the region shift industries towards computer science and technology, creating a “Silicon Holler.” While it could lead to a regional renaissance and the work force seems open to the change, is it realistic to suggest that coal mine towns can attract tech jobs? Critics suggest that tech is a regionalized industry as evident in Silicon Valley. But several recent events indicate that the industry is becoming less centralized.

First, IBM, a leader in the tech world, pledged $20 billion in January 2022 to open a processor factory near Columbus, Ohio.[[1]](#endnote-1) In 2021 the company made similar pledges to build two facilities in Arizona.[[2]](#endnote-2) *TO ADD: THE PROGRESS OF TECH VALLEY IN NEW YORK STATE. TECH COMPANIES IN THE REGION ALREADY.*

Secondly, the COVID-19 pandemic shut offices across the country sending workers home in an effort to social distance and stop the spread of the virus. This change forced companies to develop a “work-from-home” approach through virtual meetings and remote project management. Despite being unplanned, this evolution demanded decentralization. As cases decline and the world slowly returns to normalcy, workers are advocating for more flexible expectations with regards to hours and office time. This new style of work makes the location of an employee far less important than their qualifications.

So, with the right qualifications, “Silicon Holler” can be a reality, but much of the region lacks a key ingredient: reliable, high-speed internet. The terrain that makes Appalachia ideal for mining, in turn make it difficult for broadband, but with financial support from the recent Infrastructure Bill, broadband can reach remote areas.

FIGURE 1: Internet Access in America

FIGURE 2: Broadband Access in America

*I plan to add a brief analysis of the status of high-speed internet in America then zoom in to Appalachia.*

**Question**

How should the broadband resources of the Infrastructure Investment and Jobs Act be distributed in Appalachia to spur the greatest economic impact?

**Literature Review** – *I need to expand on this*

Appalachia Economic Trends:

The Appalachian Regional Commission releases comprehensive reports about the economic status and trends of the region. The most recent report[[3]](#endnote-3) features the map below and identifies 78 distressed counties and 104 at-risk. These are largely concentrated in Kentucky, West Virginia, and Mississippi. Meanwhile, Pennsylvania, Virginia, and North and South Carolina show positive economic trends. These classifications are based on unemployment, income, and poverty rates.

Map

Description automatically generated

Tech in Appalachia & its shortcomings:

Appalachia’s transition from coal mining to tech has been explored a great deal by major media publications including articles from the Energy News Network,[[4]](#endnote-4) The Guardian,[[5]](#endnote-5) and The New York Times.[[6]](#endnote-6) In fact, the congressman representing Silicon Valley has celebrated the idea of a “Silicon Holler” in his recent book Dignity in a Digital Age: Making Tech Work For All of Us and article “The Digital Revolution Can’t Be Confined to Silicon Valley” in The Atlantic.[[7]](#endnote-7) On the other hand, there have been several investigative reports that examine the shortcomings of non-profits that promise coding education that will turn into computer science careers, like Mine Minders, that ultimately fall short.[[8]](#endnote-8) Often it seems these organizations have good intentions, although some have been accused of fraud, but struggle to realize their mission due to the lack of reliable internet and accessible jobs. Given the changing job climate, it seems that broadband may be the missing piece.

**Exploratory Analysis**

*I have a LOT more to do. So far I’ve wrangled data, but have not yet developed maps and graphs for the exploratory portion of the report.*

Plot relationships of the factors – especially cost and economic distress level

**Understanding the Bill** – *I’d like to dedicate a section (or a least a few paragraphs within another section) to detailing how the Bill is set up to allocate broadband resources. Where is the best place for this?*

**Methods of Prioritization** – *After the exploratory analysis I want to dive in depth into each of the main methods of site selection with this section. I’m a few steps away, but right now I picture having the following sub-sections:*

Demographics

-Age of population

-Population density

Education

-Education demographics

-Educational resources such as community colleges

Economic Trends

-joblessness

-income

-existing industries

Existing Resources

-where is there no internet vs low-quality internet

Cost of implementation

-What makes broadband expensive to install? Terrain? Distance from X?

**Prioritization Tool** – *My vision here is for an interactive element where readers can select/order which elements they feel are most important to prioritize. Readers can rearrange a list or change the weight of factors and a choropleth map would populate colored according to the reader’s selection.*

**Conclusion** – *Obviously more to do before I arrive here, but this section will outline my recommended prioritized approach and how I arrived at this method.*

**Next Steps**

I ran into some significant data wrangling challenges of coal mine locations, which greatly slowed my progress. Downloading the broadband data for the Appalachia region through the Cenpy API tool took time and utilizing OSMx to calculate a distance to each census tract is giving me tremendous trouble. Regardless, here’s what needs to happen next:

* First, I must wrangle the mine location data with the broadband data and develop a distance feature for each census tract, using Open Street Maps
* Next, economic trends must be investigated using income, poverty levels, and other economic indicators
* Additionally, a time component is necessary to truly understand the relationship between the mines and the economic trends, separate from the broadband accessibility. [This report](https://www.arc.gov/map/county-economic-status-in-appalachia-fy-2020/) is an excellent example of these trends in the area – I don’t need to reinvent the wheel here, just extract the relevant information.
* Once these trends are identified and all data is wrangled and merged appropriately, I will be able to conduct my highest needs assessment

**Questions I need to answer**

* What drives the price of broadband installation?
* Existing industries
* Distances to educational resources
* Other prioritization factors that I might be missing

1. References so far:

   https://www.wsj.com/articles/intel-to-invest-at-least-20-billion-in-ohio-chip-making-facility-11642750760 [↑](#endnote-ref-1)
2. https://www.cnbc.com/2021/03/23/intel-is-spending-20-billion-to-build-two-new-chip-plants-in-arizona.html [↑](#endnote-ref-2)
3. https://www.arc.gov/map/county-economic-status-in-appalachia-fy-2021/ [↑](#endnote-ref-3)
4. https://energynews.us/2020/06/25/thousands-of-coal-workers-lost-jobs-where-will-they-go/ [↑](#endnote-ref-4)
5. https://www.theguardian.com/us-news/2017/apr/21/tech-industry-coding-kentucky-hillbillies [↑](#endnote-ref-5)
6. https://www.nytimes.com/2019/05/12/us/mined-minds-west-virginia-coding.html [↑](#endnote-ref-6)
7. https://www.theatlantic.com/ideas/archive/2022/02/ro-khanna-digital-revolution-silicon-valley-jobs/621421/ [↑](#endnote-ref-7)
8. https://www.nytimes.com/2019/05/12/us/mined-minds-west-virginia-coding.html [↑](#endnote-ref-8)