

The Colonization of Loudoun County through Cloud Computing

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Dhruv Pandya

Fall 2023

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

Kathryn A. Neeley, Associate Professor of STS, Department of Engineering and Society

Introduction

With the ever growing expansion of the internet, the number of people online globally jumped from 400 million in 2000, to 4.5 billion (Pingdom, 2010). This growth is largely in part by the rise of factors such as broadband connectivity, affordable smart devices, and growing digital competence worldwide. The technical and architectural side of the internet has also been improving, giving room for major corporations to show their prowess. Global spending on public cloud services grew from \$182 billion in 2015 to over \$500 billion in 2022 (Economics, M. 2020). Cloud computing, a data center-hosted storage unit, now accounts for over 30% of total informational technology (IT) spending. Due to the dominance of the cloud in modern technology, as well as the growing number of users, the cloud landscape will continue evolving to keep pace with our increasingly digital lives and work.

The emergence of the Internet and cloud computing has resulted in a technological boom and a need for a central hub for hosting these large cloud data centers. Loudoun County, VA, located just south of Washington D.C., has emerged as the unfortunate winner (Bast, 2022, Gong, 2022). While the presence of these centers is growing, the long-term ramifications are still unknown. Citizens and government officials alike are beginning to notice impacts on their daily lives such as overconsumption of education, land, and profits by these tech companies. All these sectors have been radically altered, and often to benefit the companies that have rather forcefully entered the country without regard to the people - making them big tech cloud companies - modern-day colonizers for Loudoun County.

Many large tech corporations, such as Amazon, have purchased extensive land in the area to create data centers for personal cloud services. Unfortunately, this development has caused the natural land in the region to be torn down in replacement of these servers. There are also many

consequences socially, on the job market, and even on the residential land (Sverdlik, 2016). However, tech corporations can be seen contributing funds to advancing STEM research in schools (LCPS, 2020). The merit of such funding is to be questioned, as it can be seen as a robin-hood-esque attempt to win over public sentiment. Such methods have been seen time and time again in the past. For example, the British colonization of India brought deplorable conditions to the people, but their implementation of certain skills and tools such as railroads led many people to believe that they did more harm than good in the area. Similarly, technology corporations may be funding the school system in an attempt to hide an ulterior motive while appeasing the public.

This paper aims to research the impact that rapid expansion of the technological companies has in Loudoun County - viewed under the dynamic of the unwilling colonized Loudoun County and the domineering technological industry. More specifically, this paper will analyze the effects expansion has on several major factors of the county: the land, citizens, governments, corporations, and schools.

Big Tech's Strategic Choices: Motives and Consequences

To demonstrate how Northern Virginia was occupied by big tech, it is important to look at why it was an ideal location, how the local government was easily misled, the ecological damage done in the process of "looting land," and their infiltration of local education.

The Perfect Location to Steal

Northern Virginia became the "data capital of the world" and the region's prominent field mainly due to its strategic location near the nation's capital and the attractive tax benefits offered by officials. Harvard University performed research that looked at 97 data centers around the United States. It was discovered that data centers are more likely to be in areas with adequate

connectivity, ideal temperature conditions, and tax laws and incentives that are advantageous to their operations (Greenstein 2020). The economic consequences are significant; while data centers do not require much manpower, they function as accelerators for job creation and economic progress. Favorable tax laws not only attract data center enterprises but also help the local economy by providing tech employment and fostering growth in associated industries. This interdependence between the data centers and host regions emphasizes the way in which a favorable landscape can help to lead to jobs.

Local writers in Maryland, located near Northern Virginia, also investigated the significance of data centers and its spatial distribution in the region with the hope of shedding some light on why the Washington, D.C., metropolitan area is an ideal location for establishing large-scale server facilities. Desmond Bast's 2022 article provided valuable insights into this topic and included a visual representation of server distribution in the area with a helpful legend. From this map, it is evident how the data centers have been strategically planned to be in areas that are further from water bodies and tend to cluster in small regions, rather than be spread apart. The strategic positioning near the nation's capital is easily seen in this visualization, along with the scale and number of servers in the region. This illustration serves as an important representation of how data centers are spread in the Northern Virginia area, specifically in Loudoun County, emphasizing their importance in supporting the digital infrastructure that modern society and our federal government rely on.

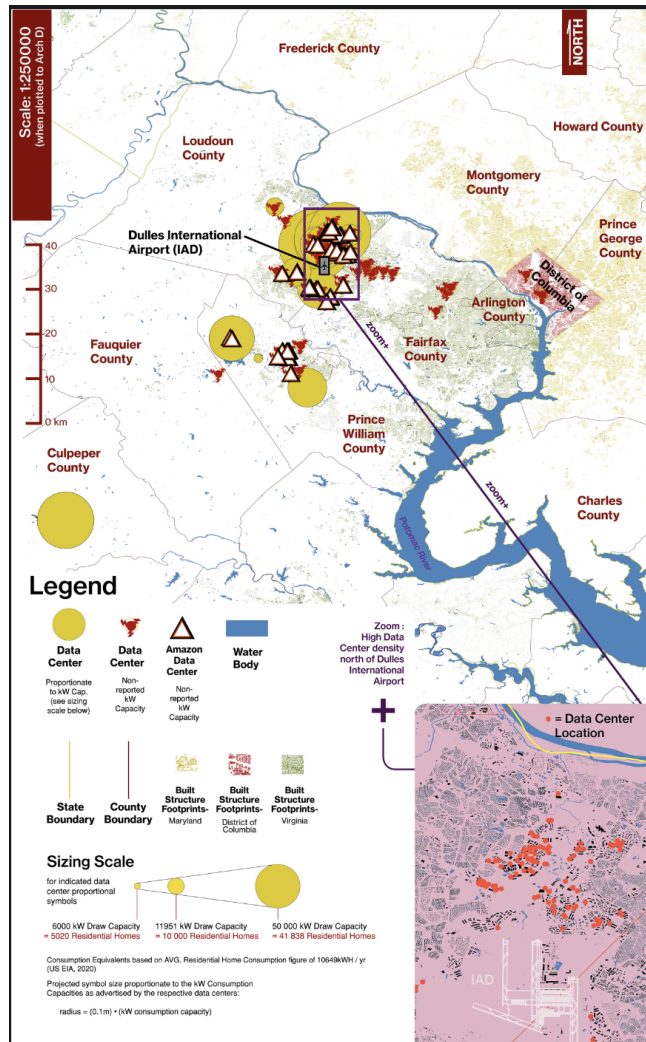


Figure 1: The Data centers in the Washington area and the kW needs for each with a Legend (Bast, 2022)

Local Government and the Tax Benefits

While location is a key factor, local governmental policies that incentivized big tech to enter the region created the data center capital of the world. When Amazon threatened to walk away from creating its headquarters based in New York, it was Northern Virginia who stepped in and offered tax breaks “intended to help distressed communities by building a new Virginia data center” (Kocieniewski, 2019). This claim, coming from America’s wealthiest county, does not seem as transparent as it claims to be. The influx of big tech companies like Amazon and

Microsoft establishing data centers and offices in Northern Virginia has led to massive growth and economic development, but it also caused issues like skyrocketing housing costs and increased [income] inequality (Santarelli, 2023). Northern Virginia has effectively been taken over by big tech, becoming economically dependent on these companies. While this has created a technology hub, it has also led to concerns about an overreliance on big tech and the associated consequences like displacement of lower-income residents.

Amazon's supposed eagerness to select Virginia to be their home over New York claims to be a "symbolic moment for the tech industry's increasing importance to the American economy" (Weise, 2023). In this context, the use of patriotism, and the notion that Amazon is concerned for the greater good of America, could serve as a guise for a justification of the technological gentrification of Loudoun. Perhaps it is all a publicity stunt intending to benefit their agenda. In stark contrast to their previously keen statement, Amazon chose to pause the construction of headquarters in VA to reflect on the scope of the project (Weise, 2023). The lack of commitment to what they claim is - the betterment of the American economy - further supports the notion that this was all an exhibition on Amazon's part. Despite the promise of economic boosts and new jobs, Northern Virginia has not seen these changes due to Amazon's lack of ability to complete their project. Evidently, Amazon has been utilizing the land and people of Northern Virginia as a cog for their financial gain. With no regard to their word, and the people of the area, big tech companies are beginning to assume economic control without having to pay any form of reparations to those that exist within the realm of their headquarters,

Amazon received \$573 million in performance-based incentives for its investment in National Landing in Arlington, Virginia, which includes providing high paying stable jobs for the community (Feiner, 2018). However, with a post-COVID-19 slowdown in economic growth,

Amazon has cut almost 27,000 jobs with their biggest hit being in the AWS division, which has many positions in Northern Virginia. This demonstrates evidentially how Amazon took over Northern Virginia with promises of jobs and growth but is now downsizing and renegeing. Additionally, the local government failed the community by providing massive tax incentives without guarantees. Despite incentivizing Amazon's presence, local leaders did not ensure contractual provisions to protect Northern Virginia from prime job cuts that are now occurring. Big tech has assumed economic control without returning promised benefits, while local governments enabled this imbalance of power. Both Amazon and local leadership failed to deliver for the community.

Ecological Damage for Profit

A rising concern for Northern Virginia residents is the seemingly endless installation of power lines in the area, due to the demand for power caused by the data centers (Yevgeniy Sverdlik, (2016). The current power grid is reaching capacity, and residents worry about the implications this will have on health via radiation, property value, environmental damage, and electricity bills (Environmental Health Sciences, 1998). Data centers' massive carbon emission is sure to make a footprint, uncontrolled, the damage could be unbearable and irreversible (Main, 2022). Irrespective of all the concerns raised by residents, tech giants continue to abuse their position and expand into the area, consuming more and more land, resources, energy, and carbon. Rising tensions are beginning to loom between these companies and residents, as people are opposing the seemingly unequal domination of corporations in their hometowns. In return for their troubles, residents do get the benefit of investments into their area and new jobs, which companies may be hiding behind as a method to continue pushing on with business. Further suppression of residents may have repercussions on the tech sector. Establishing better

communication between residents and companies could serve as a tool in combating the current tension.

Much like the colonizers of past eras, big tech firms have begun to colonize Northern Virginia, all while reaping the resources and economic benefits needed to fuel their growth whereas the residents are forced to deal with the aftermath. Big Tech's covetousness and self-interest come at the cost of exploitation of residents, a story history has seen many times before. It is all good if we are helping the kids.

Northern Virginia is accredited for their significant emphasis on Science, Technology, Engineering, and Mathematics (STEM) and IT courses. This is demonstrated by the 2020 curriculum offered by Loudoun County Public Schools (LCPS), which includes courses in computer science, cybersecurity, digital media, and other related subjects. With technological jobs on the rise, and often more financially plentiful than its counterparts, there is an apparent emphasis on such skills. Programs like LCPS's Academy of Engineering and Technology (AET) encapsulate Northern Virginia's commitment to STEM education. AET, which was founded in 2016, gives hands-on engineering and tech experience by partnering with local businesses. In turn, those partners provide internships and real-world training for the students during their education. These collaborative efforts underscore the community's commitment to developing proficiency in STEM and information technology fields.

The dedication to IT and STEM education is also demonstrated via outside partnerships. As Amazon constructs its new National Landing headquarters (HQ2), the company has undertaken substantial investments in computer science education initiatives throughout the surrounding region. Seeking to expand K-12 students' access to computer science learning opportunities, Amazon forged partnerships with local schools and educational organizations,

supplying funding, instructional resources, and teacher training programs, as reported internally in 2018 (Staff, 2018). These collaborative efforts underscore the community's commitment to developing talent in STEM and information technology fields. As previously mentioned, the merit of such investments needs to be further questioned.

The Long-term Commitment to Colonized Land

At the corporate level, Northern Virginia's growth is largely due to Amazon's commitment to the region. Amazon's pledge to install discrete power lines for its data centers, emphasizes the data center industry's ongoing efforts to address environmental and infrastructure challenges while investing further in the region (Alley 2020). However, it is unclear if these efforts will be sustained.

Moreover, the future sustainability of the data center industry in Northern Virginia could be influenced by factors such as land availability and the evolution of emerging technologies, such as edge computing. Edge computing is a form of cloud that would be less reliant on a centralized data center, and in turn, would prove the idea of mega cloud regions like this obsolete. If this is the case, big tech would likely need to move on from data center-heavy regions, such as Loudoun County's, and invest in propping smaller ones where it seems necessary. While it is not known when this technology may grow, the takeover of a region with promises of a sustained commitment would mean investment beyond the boom of technology. As an example, Detroit's overreliance on auto manufacturing led to economic and social decline when the industry crashed, as the city lacked diversity in its economic sectors and tax base (Freeman, 2004). An overreliance on one sector has the potential to cause catastrophic economic outcomes, as those few companies control all influx of finances. Economic reliance on solely

tech is too volatile, Northern Virginia's future is teetering close to Detroit's past, and to ensure economic safety, they must diversify their income.

Evaluating Big Tech's Market Dominance and Antitrust Challenges

The method utilized in this paper is an analysis of how big tech has and continues to display several anti-competitive practices that have hurt the reputation of the industry. Manuel Wörsdörfer wrote *What Happened to 'Big Tech' and Antitrust? And How to Fix Them!* to figure out why companies like Google, Amazon, or Microsoft may have several exclusionary business practices. The steps displayed in the paper analyze the anti-competitive practices in the digital economy, antitrust issues, and finally, reform proposals.

The digital economy is an economy based on digital computing tech, the key characteristics of it are: zero marginal costs, strong network effects, and impact on big data. This leads to "concentration or monopolization tendencies" and "a 'winner-takes-all' market environment" (Wörsdörfer, 2022). An example of digital colonization is Amazon and its strong monopoly over e-commerce. As the 'winner' of this online sector, people lean towards Amazon products, including AWS cloud computing due to a sense of familiarity. Unlike traditional businesses, it is significantly easier to expand across markets (from shopping to cloud) in the online world - allowing the perfect environment for a monopoly and total control of the tech companies over the way users interact with the online space.

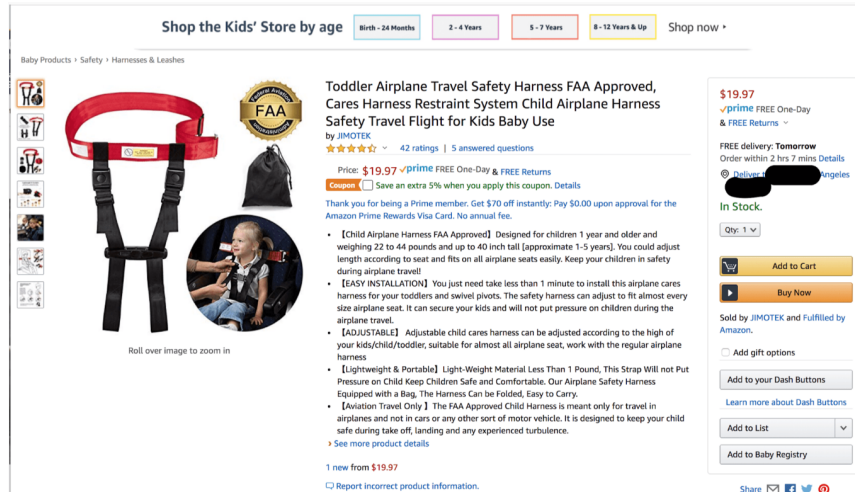


Figure 2: A counterfeit product advertised on Amazon as real, claiming it has FAA approval. Demonstrates how user purchase is highly linked to dependence on Amazon's name attached. (Suthivarakom, 2020)

To address these competition issues, the article suggests several reforms like limiting self-preferencing, ensuring data portability, monitoring acquisitions and pricing tactics, and shifting the burden of proof in mergers onto tech companies to show efficiencies. The key for Wörsdörfer is "to ensure free and open markets with low market entry (and exit) barriers and a healthy form of competition" (Wörsdörfer, 2022). The reforms here would help to close loopholes and mainly try to open digital markets that prevent tech giants from creating power for themselves exclusively. Overall, Amazon has grown to such a level of power that people refuse to buy items unless it is validated and created by the monopoly themselves, limiting other competitors useless. Reforms put in place can help control monopolies and allow success in other companies - decreasing the prowess of larger technology companies.

Interpreting the acquisition of control in Loudoun County through Big Tech Viewpoints

It is important to understand the tech sector leaning power dynamic that currently exists within Loudoun County from the eyes of Big Tech. Just like colonizers, they dominate new regions using the money and power they have acquired through borderline anti-trust policies and see how they can reshape an area to their benefit. The figure below by Wörsdörfer describes how they were able to accomplish several anti-competitive practices. Likewise, a simplified illustration showing the important ways that big tech has infiltrated Loudoun County was created through the knowledge gained from the research process.



Figure 3: The Big Tech Anticompetitive Cheat Sheet (Wörsdörfer, 2022)

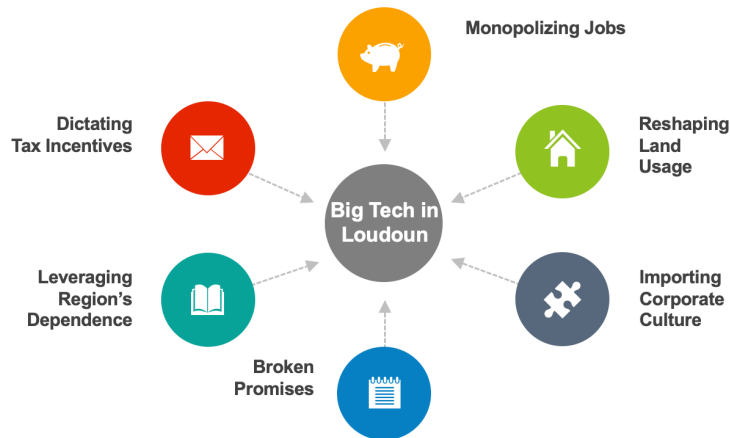


Figure 4: The Big Tech’s impact in Loudoun (Created by author)

The growth of data centers and the tech industry in Loudoun County has fundamentally transformed the region, some would say for the worse. Many see the area's economy and culture as having been colonized and exploited by outside tech interests. The massive expansion of data centers and related infrastructure to support the cloud has radically altered Loudoun's landscape and identity, with little consideration of local concerns. Just as Detroit became dependent on the auto industry, Loudoun now relies heavily on tech giants like Amazon and Microsoft, having precious few other economic engines (Freeman, 2004). Through political influence and monopolistic business practices, these companies have inhibited diversity in Loudoun's economy. The region is now beholden to the tech industry for jobs and growth, with scarce opportunities to chart an independent course. Like Detroit's crisis after autos declined, Loudoun could face immense challenges if tech's dominance diminishes. The region has relinquished much of its agency and self-determination to its tech colonizers.

Loudoun County government officials have the opportunity to safeguard local interests against the advance of large outside corporations like big tech. Time and again, tech giants have been seen to make appealing promises to local governments of jobs, economic growth, and community investment to gain tax incentives and regulatory clearance to build data centers and establish operations (Kocieniewski, 2019). However, their actual intentions are self-serving: to exploit resources and cement dominance over regions, as demonstrated by their broken vows, like the 25,000 jobs Amazon renounced after getting Arlington's approval. Just as the FAA was misled, Loudoun County and its residents are on the same path if they continue to rely on tech firms whose allegiances lie with shareholders, not local citizens. Responsibility therefore lies in local leaders to pass sensible policies and diversification strategies to prevent this region from being colonized by big tech, who have continued to stay silent about these kinds of issues. The public seemingly depends on officials to see through tech's empty rhetoric and defend Loudoun's long-term welfare.

Loudoun County can explore the opportunity to reassess the substantial tax incentives granted to giant tech firms that dominate the region. With their vast digital economy profits, tech companies do not need public subsidies to build data centers and operate locally. Their willingness to accept tax cuts stems from Loudoun's total dependence on the tech sector, enabling them to dictate terms and extract concessions that further their colonization of the area's economy and identity. Beyond serving their self-interest, tech companies do little to improve other facets of life in Loudoun. The tax cuts represent economic capitulation that chiefly benefits wealthy outside interests. While generating some jobs, Loudoun receives minimal value for relinquishing public funds to tech giants that would operate locally regardless. This imbalance

demonstrates the firms' power and Loudoun's constrained options within the tech-reliant status quo they've engineered.

To build public and political momentum for revising Loudoun's generous tax incentives to big tech, local concerns about the Loudoun County industry being run by cloud computing giants must be considered. Rather than a dry battle over obscure taxation policies, an emphasis on how declining tax revenue harms Loudoun's schools, infrastructure, and services can be made to residents. Specifically highlighting projects and community needs that cannot be funded under current tax conditions, as money is being given to the technology sector. Change for those forced to live with the slow colonization of their land will only come when residents are fully aware and passionate about the situation. Communication and awareness of this topic in local areas, schools, etc., can shift the narrative. If residents recognize being pressured by local officials to enact reforms on companies and ensure their taxes are being used for residents first, long-term change can truly begin. Similar to the uprising and revolt of those suppressed by their colonizers, residents must come together to fight for the safeguarding of their town and future.

Big tech's philanthropic programs, like school donations, aim to foster gratitude and distract from their broader impacts. These firms are not acting from genuine care, but self-interest. Allowing key business units like AWS and Azure to grow massive data centers that alter Loudoun's landscape and society. While creating economic opportunities, their presence makes the region wholly reliant on tech. All too similar to colonizers who begin eating away at the oppressed, until they are forced to live under the new regulations and guidelines imposed. Tech giants likely believe they are helping by providing jobs and funding. However colonial powers had similar mentalities while exploiting resources and people. When they eventually left, their institutions and dependence on external systems left post-colonial societies struggling for

decades to come. Though not identical, tech's dominance of Loudoun resembles aspects of colonialism—reshaping the area's identity and economy around outside interests. Even benevolent-seeming corporate charity helps tether the region to big tech's way of operating. Loudoun must be cautious in perceiving tech firms as selfless community partners rather than strategically self-interested.

The evidence provided hopefully shows how easy it is for big tech to infiltrate almost anything and anywhere they want. Whether they are entering a growing sector like AI or establishing a presence in new regions such as Loudoun County, big tech companies recognize the invaluable role of the local workforce in supplementing their goals. Conversely, their motivations may not all be malicious. As a citizen of Loudoun County, it is important to reflect through the lens of big tech to understand the shaping of the region in which they exist. Big tech has the potential to engage the local workforce in an up-and-coming industry such as cloud computing, allowing for their intentions to represent an evolution of economic opportunities and skill development within the community, paving the way for a transformative shift in the local workforce landscape. However, big tech in Loudoun County is becoming a monopoly, and as such, it is just as important to scrutinize its empty rhetoric and harm to diversity. The region's identity does not have to be defined and controlled by its tech colonizers, but reversing the tide requires spotlighting its effects on this community.

Conclusion

This paper has analyzed the ways in which Loudoun County's economic structure and land development were taken over by big tech, specifically with the rapid addition of data centers, in their pursuit of becoming a cloud computing hub. Through researching this, the many

ways in which big tech has used their influence on local politics to get land and wealth, while shaping an entire economy around the region that follows them. The way they have done this is through the implementation of cloud computing datacenters, which have in turn caused several residents to work for one of these corporations. The culture of Loudoun County has also dramatically shifted to the side of cloud tech, as it has even influenced the schooling done in the region.

While this was an attempt to consolidate key pieces of information to review changes of Loudoun County economy and land structures through the lens of colonization, it isn't all encompassing and only sheds light on a small portion of a rather nuanced conversation. It may be missing the real intentions behind several of the reasons big tech functions in the way it does. The colonization viewpoint is more of a generalization of trying to relate back to some of the foul-intentioned parts of big tech. However, they are also unable to help issues such as economic downturn or change in technology concepts which may cause their plans and promises to have to change for the sake of keeping the business healthy as well.

References

- Alley, A. (2020, November 5). *AWS proposes “discreet” power lines for data center in Loudoun, Virginia*. Data Center Dynamics.
<https://www.datacenterdynamics.com/en/news/aws-proposes-discreet-power-lines-data-center-loudoun-virginia/>
- Bast, D., Carr, C., Madron, K., & Syrus, A. M. (2022). Four reasons why data centers matter, five implications of their social spatial distribution, one graphic to visualize them. *Environment and Planning A: Economy and Space*, 54(3), 441–445.
<https://doi.org/10.1177/0308518X211069139>
- Economics, M. (2020). *THE IMPACT OF DATA CENTERS ON THE STATE AND LOCAL ECONOMIES OF VIRGINIA PREPARED BY LEAD SPONSORS SUPPORTING SPONSORS NVTc 2020 Data Center Report*. https://biz.loudoun.gov/wp-content/uploads/2020/02/Data_Center_Report_2020.pdf
- Environmental Health Sciences, N. I. (1998). Assessment of Health Effects from Exposure to Power-line Frequency Electric and Magnetic Fields: NIEHS Working Group Report. In *Google Books*. National Institute of Environmental Health Sciences, U.S. National Institute of Health, U.S. Department of Health and Human Services, Public Health Services.
https://books.google.com/books?hl=en&lr=&id=yZMVAQAAMAAJ&oi=fnd&pg=PA1&dq=does%2Bpowerlines%2Blead%2Bto%2Bdeprecated%2Bhome%2Bvalue&ots=nktmC0r3gi&sig=fZns_bEAY49vOvesZN1qsMDdzH8#v=onepage&q&f=false
- Feiner, L. (2018, November 13). *Amazon will get up to \$2.2 billion in incentives for bringing new offices and jobs to New York City, Northern Virginia and Nashville*. CNBC.
<https://www.cnbc.com/2018/11/13/amazon-tax-incentives-in-new-york-city-virginia-and-nashville.html>
- Freeman, R. (2004). *Death of Detroit: Harbinger of Collapse of Deindustrialized America*. https://larouchepub.com/eiw/public/2004/eirv31n16-20040423/eirv31n16-20040423_021-death_of_detroit_harbinger_of_co.pdf
- Gong, Q., Grigoryan, A., Isowa, K., Jo, Y., & Robles, J. (2022). *Community Choice Aggregation to Decarbonize the Data Center Capital of the World Applied Policy Project*. https://www.virginiacleanenergy.org/uploads/1/1/7/0/117039634/0606_cca_ulca_report_revised.pdf
- Greenstein, S., & Fang, T. (2020). *Where the Cloud Rests: The Location Strategies of Data Centers - Working Paper - Faculty & Research - Harvard Business School*. [Www.hbs.edu](http://www.hbs.edu). <https://www.hbs.edu/faculty/Pages/item.aspx?num=58964>
- Huth, A., & Cebula, J. (2012). *The Basics of Cloud Computing*. Amazonaws.com.
<http://findnerd.s3.amazonaws.com/data/152759075583.pdf>

- Kocieniewski, D. (2019, February 15). Amazon May Get a Tax Break for the Poor With a Project in America's Richest County. *Bloomberg.com*.
<https://www.bloomberg.com/news/articles/2019-02-15/amazon-may-get-tax-break-for-poor-with-project-in-richest-county>
- LOUDOUN COUNTY PUBLIC SCHOOLS PROGRAM OF STUDIES 2020 - 2021 FOR SECONDARY STUDENTS EMPOWERING ALL STUDENTS TO MAKE MEANINGFUL CONTRIBUTIONS TO THE WORLD*. (2020).
<https://www.lcps.org/cms/lib/VA01000195/Centricity/Domain/30558/2020-2021%20Program%20of%20Studies%20FINAL.pdf>
- Main, I., December 9, V. M., & 2022. (2022, December 9). *Virginia has a data center problem*. Virginia Mercury. <https://www.virginiamercury.com/2022/12/09/virginia-has-a-data-center-problem/>
- Musings, T. (2010, October 22). *The incredible growth of the Internet since 2000*. Pingdom. <https://www.pingdom.com/blog/incredible-growth-of-the-internet-since-2000/>
- Ozalp, H., Ozcan, P., Dinckol, D., Zachariadis, M., & Gawer, A. (2022). "Digital Colonization" of Highly Regulated Industries: An Analysis of Big Tech Platforms' Entry into Health Care and Education. *California Management Review*, 64(4), 000812562210943. <https://doi.org/10.1177/00081256221094307>
- Rice, W. (2021, May). *An Exploratory Factor Analysis of SMEs Cloud Computing Adoption - ProQuest*. Wwww.proquest.com. <https://www.proquest.com/docview/2705788364?pq-origsite=gscholar&fromopenview=true>
- Santarelli, M. (2023, September 14). *Northern Virginia Housing Market Trends & Forecast 2023*. Norada Real Estate Investments. <https://www.noradarealestate.com/blog/northern-virginia-housing-market/>
- Staff, A. (2022, December 8). *Amazon doubles down on computer science education in our HQ2 community in Virginia*. US about Amazon. <https://www.aboutamazon.com/news/community/computer-science-aws-hq2>
- Staff, A. (2023, September 18). *6 ways cloud-enabled businesses are addressing economic and societal challenges*. About Amazon. <https://www.aboutamazon.com/news/aws/societal-impact-of-cloud-enabled-businesses-aws-accenture-report>
- Stoller, B. (2016, May 16). *How Long Will the Cloud Data Center Land Grab Last?* Data Center Knowledge | News and Analysis for the Data Center Industry. <https://www.datacenterknowledge.com/archives/2016/05/16/long-will-cloud-data-center-land-grab-last/>
- Suthivarakom, G. (2020, February 11). *Welcome to the Era of Fake Products*. Wirecutter:

Reviews for the Real World. <https://www.nytimes.com/wirecutter/blog/amazon-counterfeit-fake-products/>

Sverdlik, Y. (2016, September 23). *Power Lines for Data Centers Continue Causing Rifts in N. Virginia*. Data Center Knowledge | News and Analysis for the Data Center Industry. <https://www.datacenterknowledge.com/archives/2016/09/23/power-lines-for-data-centers-continue-causing-rifts-in-n-virginia>

Thompson, M. (2016). Understanding Physical Internet Infrastructure Vulnerabilities. *The CIP Report*. <https://cip.gmu.edu/2016/10/26/understanding-physical-internet-infrastructure-vulnerabilities/>

Weise, K., & Kelley, L. (2023, March 3). Amazon Pauses Work on 2nd Headquarters in Virginia. *The New York Times*. <https://www.nytimes.com/2023/03/03/technology/amazon-second-headquarters.html>

Wörsdörfer, M. (2022). What Happened to “Big Tech” and Antitrust? And How to Fix Them!. *Philosophy of Management*. <https://doi.org/10.1007/s40926-022-00193-5>

Writer, H. D., Times-Mirror Staff. (2016, September 1). *Inaugural class starts at Loudoun Public School's new engineering academy*. Loudoun Times-Mirror. https://www.loudountimes.com/news/inaugural-class-starts-at-loudoun-public-schools-new-engineering-academy/article_45b3b541-34a2-5c90-821d-5730db79ab39.html