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The Impact of Net Neutrality and Additional Regulations on the Future of the Internet of Things in the United States

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Abstract

Throughout the history of the Internet and the development of computers, commercial Internet service providers (ISPs) and independent agencies of the United States government have always controlled how consumers interact with technology. Then, in the past decade, powerful technology corporations developed new products and services that fundamentally altered society's relationship with the Internet. The introduction of Internet of Things technology through devices such as smart speakers, smart appliances, smart cars, and wearables also contributed to the change. However, regardless of these significant advancements in technology, regulations for ISPs and technology corporations has predominately remained the same. The increased presence of technology in everyday life is undeniable, and its growth is not projected to end anytime soon. It is interesting to consider how government regulation of ISPs and corporations could change in the future. Specifically, with the increasing control of technology platforms over the growing IoT industry.

1. Introduction

Moving forward, the U.S. cannot predict exactly how the Internet will evolve or how ISPs will be able to take advantage of emerging technology. However, it is undeniable that the ability of consumers and businesses to connect to and use open broadband networks is essential. Gatekeeper-free access to networks is not only required for the development of technology, but is necessary for the growth of the U.S. economy overall.

The advancement of Internet of Things technology within the past five years was made possible through open connectivity over the Internet. The Internet of Things, or IoT, is an ecosystem of Internet-connected objects or devices that collect and transfer data over a wireless network. IoT extends the connectivity of the Internet beyond devices such as laptops and smartphones, to a wide range of traditionally non-

internet enabled 'things,' such as wearables and smart speakers that are embedded with technology. The IoT platform allows these devices or objects to interact and communicate over the Internet.

The recent repeal of net neutrality laws have enabled ISPs to subjectively decide which IoT devices can be connected or favor their own IoT activity over their competitors. Additionally, the ubiquitous presence and influence of technology platforms offering IoT products and services has increased significantly in the past decade. Corporations, such as Amazon, Apple, Google, and Facebook have become a few of the most powerful, valuable, and influential companies in the world. The control these companies hold over the market has made it difficult for smaller emerging technology companies to compete and stay independent. Regardless of the growth in power for both ISPs and technology platforms, Internet regulations have remained largely unchanged, ultimately limiting the innovative potential of the IoT industry.

In this thesis, I will discuss: the previous history and current state of net neutrality and Internet regulations. I will also address how our relationship with technology has changed through the evolution of technology corporations such as Amazon, Apple, Google, and Facebook. Finally, I will conclude with potential solutions through government intervention that could help ensure the positive future growth of the IoT industry.

2. Net Neutrality

Net Neutrality is defined as the idea, principle, or requirement that Internet service providers should or must treat all Internet data as the same regardless of its kind, source or destination.¹ Tim Wu, a professor at Columbia Law School, coined the term 'network neutrality' in 2002. In his work, Wu accurately predicts, "...communications regulators over the next decade will spend increasing time on conflicts between the private interests of broadband providers and the public's interest in a competitive innovation

environment centered on the Internet...² As technology advanced and the Internet evolved, the balance of power between ISPs and consumers became increasingly difficult to manage through government regulation.

The concept of net neutrality has a complicated and politically charged history. Communication methods within the United States, such as radio and telephone, have always been closely monitored and regulated by independent agencies of the government, such as the FTC and the FCC. However, these regulations were complicated through the development of the internet and its providers, and became increasingly difficult to manage.

2.1 FTC vs. FCC

The FTC and the FCC are both independent agencies of the United States government. Independent agencies are establishments created by Congress to address concerns that go beyond the scope of ordinary legislation in order to ensure the government and the economy are running smoothly.³ Examples of a few other independent agencies include: the Central Intelligence Agency, the U.S. Postal Service, and the Federal Reserve System.

The FTC, or the Federal Trade Commission, was established in 1914 by the Federal Trade Commission Act. This goal of this agency is to prevent fraudulent, deceptive, and unfair business practices while also providing information to help consumers spot, stop, and avoid scams and fraud.⁴ Essentially, its mission is to protect consumers and promote competition for businesses. Originally created by former President Woodrow Wilson as a major act against trusts, today, the FTC's focuses include preventing identity theft, overseeing the online advertising industry, and other regulations within the business industry.⁵

The FCC, or the Federal Communications Commission, was established by the Communications Act of 1934 to regulate interstate communications by radio, television, wire, satellite and cable. The overall goal of the Commission is to promote connectivity and ensure a robust and competitive market.⁶ The FCC has a detailed history with the regulation of ISPs, net neutrality, and other regulatory policies. It is overseen by five commissioners who are appointed by the President. The responsibilities and duties of the FCC are constantly changing with each administration.

Although the FTC and the FCC oversee different aspects of regulations in the U.S., both agencies have recently made headlines for their overlapping jurisdiction on many issues. For example, both the FTC and the FCC have the ongoing debate over what privacy means in the digital age, as well as whose

responsibility it is to oversee the regulation of ISPs. Despite this, both independent agencies have specific mandates and have worked together towards a common goal of protecting the U.S. Traditionally, the FCC has focused on the telecom industry and the FTC has overseen practically every other market, except for non-profits and banks.⁷

2.2 Internet Service Providers

Internet service providers, or ISPs, serve as consumer's gatekeeper to the Internet. Without net neutrality, ISPs can control how fast users can surf the web, how much users pay, and can even deny access to users at their own discretion. A few of the largest ISPs in the U.S. include Comcast, Charter, AT&T, and Verizon.

Often, ISPs sell broadband to discrete geographic regions with little overlap. The operators of major providers began to cluster all cable into regional monopolies during the summer of 1997. At this time, there were an estimated 4,500 ISPs in North America. As the market began to consolidate towards the end of the decade, the smaller ISPs began to merge with larger telephone companies in order to stay in business and provide their customers with a single source for internet and phone connections.⁸ Eventually, these telephone companies and the internet backbone providers all began to merge and be acquired. Today, the broadband market is controlled by only a handful of corporations. In many parts of the country, broadband is a duopoly, controlled by the two of largest ISPs that control their own internet backbone, Comcast and AT&T. This market concentration gives ISPs immense power to manipulate internet traffic speeds and charge expensive rates based on the location of their customers. Comcast is notorious for overcharging its customers and throttling traffic.

These tactics of exploitation have underhandedly impacted low-income and rural communities. According to the 2018 Broadband Deployment Report conducted by the FCC, over 24 million Americans still lack access to service fast enough to meet the federal definition of broadband.⁹ This lack of internet access is closely correlated with household income. To illustrate this point, a Pew Research Study found 53% of Americans with household incomes below \$30,000 lack home broadband, whereas internet access is nearly universal for households with an annual income of \$100,000 or more.¹⁰ Historically, ISPs have taken advantage of the socioeconomic status of low income households by redlining these demographic groups and creating a "digital divide" within our society.

3. Net Neutrality Policy Changes

As methods of communication within the United States has evolved, the policy that regulates it has changed as well. The concept of net neutrality contributes to polarizing the two political parties. Since the FCC and FTC commissioners are appointed by the current President, policy changes often occur after changes in the administration. To adequately evaluate where regulations could be headed in the future, it is imperative to understand what actions have been taken in the past.

3.1 Communications Act of 1934

The foundations of net neutrality can be traced back to former President Franklin D. Roosevelt's term with the Communications Act of 1934. This Act consolidated communication regulations, predominantly on radio, television, and telephone; and created the Federal Communications Commission to oversee all interstate and foreign communications. This act aimed to streamline the existing communications regulatory process while also expanding affordable access to communication services.¹¹

Under the act, there are seven major sections or titles: Title I: General Provisions, Title II: Common Carriers, Title III: Radio Provisions, Title IV: Procedural and Administrative Provisions, Title V: Penal Provisions; Forfeitures, Title VI: Cable Communications (added by the Cable Communications Policy Act of 1984), Title VII: Miscellaneous Provisions.¹² Specifically, Title I and Title II of this Act are the sections that set the basis for future net neutrality regulations in the U.S. This act subjected Title I services to weaker restrictions regulated by the FTC. In contrast, it subjected Title II services to more rigorous "common carrier" rules intended to protect equal access networks regulated by the FCC.¹³

3.2 Telecommunications Act of 1996

The Telecommunications Act of 1996 was the first major reform on communications regulation since the Communications Act of 1934. It was signed into law by former President Bill Clinton and aimed to reconstruct the U.S. telecommunications sector by reducing regulatory barriers to entry and competition and creating more specific terms.¹⁴ Since the original Telecommunications Act of 1934, new technologies such as computers and Internet portals had been invented. This 1996 Act provided classifications for these new technologies, and categorized them as Title I or Title II services based on their functionality.

Enhanced services that offered interactive features, such as AOL-style Internet portals, were classified as Title I "information service providers." Basic services that transmitted information, such as Digital Subscriber Line (DSL) companies, were classified as Title II "common carriers."¹⁵ In the end, this classification enabled the FTC to regulate information service providers, such as internet portals, and the FCC to regulate telecommunication carriers, such as DSL companies.

3.3 FCC 2002 Order

In 2002, cable TV companies such as AT&T and Comcast also began to provide Internet broadband access. This provided the FCC with an opportunity to reclassify these services, and alter the previous framework that had been established in 1996 by Clinton's administration. The FCC, under George W. Bush's administration, decided that Internet access would not be treated as a telecommunications service, exempting it from common carrier regulations that were applied to the traditional phone networks. This signified that cable-based broadband providers were not classified as a public utility, but instead as Title I "information service providers."

Because of their classification as Title I "information service providers," cable-based broadband providers were not required to sell access to their networks on a nondiscriminatory basis. These corporations were also largely unregulated and untaxed in comparison to Title II "common carriers."¹⁶ Although cable-based broadband could have easily been classified as a case of Title II common carriage, Michael Powell, the FCC chairman at the time, insisted on 'deregulation.'¹⁷

When disputed, the Supreme Court upheld the FCC's decision to classify cable-based broadband providers as a Title I information service on the basis that the definitions of telecommunications service and information service in the Communications Act of 1996 were ambiguous. Ultimately determining that the FCC, not the courts, had the authority to interpret the policy.¹⁸

3.4 2005 Internet Policy Statement

Not long after the FCC 2002 Order, the commission applied its newly classified Title I "information service provider" treatment of cable-based broadband providers to providers of DSL as well. This eliminated the Title II "common carrier" classification for DSL transmission services that was established with the Communications Act of 1996.

This classification was permitted because of the 2002 FCC Order decision made by the Supreme Court that granted the FCC with the authority to interpret the Title I and Title II classifications created under Communications Act of 1996.¹⁹

Therefore, when it came to classifying DSL companies, it was within the FCC's discretion to decide if these Internet access services should be subject to Title II "common carrier" regulations as telecommunications services or under Title I "information services" regulations. Ultimately, the FCC decided to treat all types of broadband Internet access services as Title I information services. This reclassification was consistent with Michael Powell's commitment to deregulation, and limited the FCC's authority to directly regulate the ISPs.²⁰

3.4.1 2005 Internet Policy Statement Enforcement

In 2007, Comcast was caught delaying peer-to-peer protocol traffic on BitTorrent, a commonly used file sharing service.²¹ The FCC found that Comcast's interference through throttling and blocking internet traffic was discriminatory and could not be excused as "reasonable network management."²² The FCC ruled that Comcast impeded consumers' ability to access content and use applications of their choice, which breached federal policy. As a result, the FCC ordered Comcast to stop slowing traffic and provide more information about its network-management policies.²³ In response, Comcast complied, defending its interference with consumers' peer-to-peer programs as necessary to manage scarce network capacity. However, the corporation also appealed to overturn the ruling under the argument that broadband was classified as a Title I "information service," giving the FCC no authority to censure under the obligations of common carriage.²⁴

In 2010, the U.S. Court of Appeals for the District of Columbia Circuit ruled that the FCC did not have the authority to order Comcast to stop throttling peer-to-peer traffic. If the court had accepted the FCC's argument, it would "virtually free the Commission from its congressional tether," thereby providing the FCC with authority to impose regulations on any ISPs.²⁵ After the ruling, the FCC issued the following statement, "The FCC is firmly committed to promoting an open Internet and to policies that will bring the enormous benefits of broadband to all Americans ... Today's court decision invalidated the prior Commission's approach to preserving an open Internet. But the Court in no way disagreed with the importance of preserving a free and open Internet; nor did it close the door to other methods for achieving this important

end."²⁶ The FCC went on to enforce these ideas with the 2010 Open Internet Order.

3.5 2010 Open Internet Order

In December of 2010, the FCC approved an Order that strengthened the rules governing the nation's ISPs. The need for stricter regulations surfaced from Comcast's court challenge to the FCC after the service provider was allowed to throttle peer-to-peer file sharing traffic due to ambiguous legal guidelines. The 2010 Open Internet Order was passed under Democratic FCC Chairman Julius Genachowski during former President Barack Obama's administration.²⁷ The order established three new rules: to force ISPs to be transparent about how they handle network congestion, prohibit them from blocking traffic, and outlaw unreasonable discrimination on networks.²⁸ Although the order was an attempt to find a balance among ISPs, content providers, and consumers, it was met with contention from all sides. Advocates of net neutrality did not think the order went far enough and prioritized profits of corporations over the public, while others argued the FCC was not Congress did not have the right to create Internet regulations and laws.²⁹

3.6 2015 FCC Net Neutrality Order

At the start of 2014, the FCC was tasked with developing stronger regulations for ISPs. Historically, advocates of net neutrality have supported regulation and the reclassification ISPs as Title II "common carriers," while ISPs have opposed reclassification.³⁰ In 2015, the FCC passed the Open Internet Order, or the Title II Order, which elaborated on the prior version adopted in 2010. This Order reclassified ISPs as Title II "common carriers," and for the first time, considered broadband a public utility subject to government regulation.³¹ The agency would be able to use this classification to enforce strong net neutrality on the Internet. This enabled the FCC to ban ISPs from participating in throttling and blocking, ensuring a neutral gateway of Internet traffic.³² FCC Chairman Tom Wheeler stated this policy would ensure "that no one, whether government or corporate, should control free open access to the Internet."³³

These net neutrality rules were supported by Internet companies ranging from large corporations, such as Netflix, AOL, and Twitter, to smaller startups and online communities such as Etsy, Tumblr, and Reddit. The Order was met with opposition from big broadband companies such as AT&T, Verizon, Comcast, and Cox; free-market groups, and many Republicans who saw these regulations as unnecessary government intervention.³⁴ After the ruling, several

ISPs filed suit to challenge the FCC's order. This dispute was combined into a single case: United States Telecom Association vs. Federal Communications Commission. Essentially, the case determined whether the FCC had the right to reclassify a large and growing segment of the economy and impose common carrier obligations on broadband internet-access service.³⁵ Ultimately, the U.S. Court of Appeals for the District of Columbia Circuit rejected these challenges, stating that the Internet should be treated as a utility and not as a luxury. The ruling was celebrated as a victory for consumers by various public interest groups and Internet companies that had supported the FCC in the lawsuit. However, Internet service providers signaled their intent to continue to challenge this ruling to the Supreme Court.³⁶

3.7 Rollback of Obama-era Rules

Shortly after his inauguration in early 2017, President Donald Trump appointed Ajit Pai as the new chairman of the FCC.³⁷ Prior to his nomination, Pai served as the Associate General Counsel at Verizon Communications Inc. from 2001 to 2003. His responsibilities for the telecommunications company greatly involved net neutrality matters, including regulatory issues and broadband initiatives.³⁸ In 2003, Pai began his career with the federal government, serving on multiple subcommittees within the Senate Judiciary Committee and holding several positions in the FCC's Office of General Counsel. Then, in 2011, Pai began serving his term as one of the five FCC commissioners. During his tenure, he consistently was a critic of net neutrality rules and advocated for less regulation, serving as a close ally to ISPs.³⁹ Pai's opinions opposing net neutrality policy became increasingly evident throughout the policies and regulations he passed, and continues to pass, in his term as Chairman.

On April 26th, 2017, the FCC announced their plans to undo the 2015 Net Neutrality Order.⁴⁰ On May 18th, 2017, the FCC voted 2-1 to roll back on these regulations. This began the process that would modify the existing rules.⁴¹ The new rules were classified under the Restoring Internet Freedom Order, and officially took effect on June 11th, 2018. According to the FCC, they aimed to provide a framework for "protecting an open Internet while paving the way for better, faster, and cheaper Internet access for consumers."⁴² The order proposed to reinstate the Title I "information service" classification for broadband Internet access service and reestablish that mobile broadband is not a "commercial mobile service" subject to heavy-handed regulation.⁴³ These rules were met with heavy backlash from individuals, business,

and non-profit organizations that were in favor of net neutrality.

By reversing Title II regulations and reclassifying ISPs as Title I "information services," this deregulation stripped away the FCC's authority to regulate broadband. Ultimately, this allowed ISPs to block or slow down traffic and offer fast lanes to companies willing to pay extra to reach consumers more quickly than competitors. Additionally, since ISPs were classified as Title II services, the responsibility of regulating them was revoked from the FCC and reassigned to the FTC. This meant that the process of handling consumer concerns about the Internet for issues such as digital privacy and broadband access would all be handled by the FTC.

"Winners" of this Order included big Internet service providers and wireless carriers such as Comcast, Verizon, AT&T, etc. After the Order passed, ISPs were able to craft data packages, throttle bandwidth, lie about unlimited plans, favor big payer or affiliate partner traffic over competitive traffic. "Losers" of this Order included content providers who do not own their own distribution, small businesses and start-ups who cannot afford high-speed bandwidth, and everyday users of the Internet. The goal of net neutrality was to ensure that ISPs did not favor delivery of its their content over competitive content from providers such as Netflix, Amazon, Hulu, etc. Additionally, if a smaller company could not afford highspeed bandwidth, or if their business model required large amounts of data, they would be at a serious disadvantage. In some cases, everyday users of the Internet were now forced to accept slower connections or pay extra for going over their data plan.

3.8 FCC's "Notice and Comment"

When the FCC develops new rules or policies, such as the Restoring Internet Freedom Order, it offers a "notice and comment" period during which the public can weigh in and voice their opinions. The comments are filed through the FCC's Electronic Comment Filing System where users file their comments through an Internet portal.⁴⁴ The FCC's "notice and comment" period on the proposed Restoring Internet Freedom Order ran from May to August of 2017.⁴⁵ Millions of Americans sought to speak out in defense of the internet, and submitted comments to the FCC's system. However, at the same time, other groups also began to flood the FCC's system with fake comments, discrediting authentic comments and interfering with the rule-making process. As the comments were made available to the public, third-party groups began to analyze their

contents using text mining and natural language processing techniques.

Since there is no user authentication by the FCC's Electronic Comment Filing System, it is difficult to determine if comment submissions are genuine or fraudulent. A study conducted by the data analytics consulting firm Emprata found that out of the 22 million comments filed to the docket, over 7.75 million comments were made under an artificial email address, 1.72 million comments were made from international email addresses predominately from Russia, and 9.93 million comments were duplicative comments using repeated email or physical addresses.⁴⁶ When all comments were considered, including duplicates and those made with false identities, 60% were against FCC's plan to repeal the Title II classification of ISPs. In contrast, when the spam comments were removed, the percentage increased to 97% of the comments supporting net neutrality.⁴⁷

In a September 2018 statement following the incident, chairman Ajit Pai acknowledged that over 500,000 comments were submitted from Russian email addresses during the public comment period.⁴⁸ News outlets, such as the New York Times, filed Freedom of Information Act requests for server, API, email, IP address, and other data to "shed light to the extent to which Russian nationals and agents of the Russian government have interfered."⁴⁹ The FCC denied the requests, arguing that releasing the information would leave the U.S. vulnerable to cyberattacks. However, this opinion was not unanimously agreed upon by the commission. Jessica Rosenworcel, one of the two current FCC Democratic Commissioners, attached her own opinion to the statement that argued the FCC should release the information. "As many as nine and a half million people had their identities stolen and used to file fake comments, which is a crime under both federal and state laws," she wrote. "Nearly eight million comments were filed from e-mail domains associated with FakeMailGenerator.com. On top of this, roughly half a million comments were filed from Russian e-mail addresses."⁵⁰

In a court ruling following the dispute, Judge Christopher Cooper of US District Court for the District of Columbia ordered the FCC to turn over the email addresses that were used to submit .CSV files, which contained a bulk of the comments.⁵¹ It is not clear if the FCC still has the .CSV files. However, as of now, the records are expected to be made public and the FCC is continuing to reverse Title II regulations in support of the Restoring Internet Freedom Order.

3.9 Other Challenges to Deregulation

Challenges to the Restoring Internet Freedom Order began within minutes of the FCC passing the new policy on December 14th, 2017. New York's Attorney General Eric Schneiderman announced his intent to lead a multi-state lawsuit, and several states showed support to express their disapproval.⁵² On February 22nd, 2018, a coalition of twenty-two states and Washington D.C., local governments, the Web browser developer Mozilla, the video-sharing website Vimeo, and public interest groups filed a formal suit in the United States Court of Appeals for the District of Columbia Circuit against the FCC's ruling.⁵³ On October 12th, 2018, the FCC issued its defense, and requested the Court to reject the lawsuit. The coalition argued, there is "no substantial reason to second-guess the commission's decision to eliminate rules that the agency has determined are both unlawful and unwise." The U.S. Court of Appeals for the District of Columbia plans to hold oral arguments on the case on February 1st, 2019.⁵⁴

Another challenge to the Restoring Internet Freedom Order began in January of 2018 when senators endorsed legislative action under the Congressional Review Act to reverse the Restoring Internet Freedom Order. The Congressional Review Act is a law that allows Congress to repeal agency rules and regulations with a simple majority vote from the Senate and the House of Representatives, finalized with a signature of approval from the President.⁵⁵ In the Senate, the effort was backed by Democrats, and gained support from three Republican Senators. The resolution was approved in with a 52-47 floor vote, and was then passed on to the House of Representatives.⁵⁶ In order to pass in the House, a discharge petition needs the support of a simple majority, or 218 representatives. By June 2018, the petition was still 46 signatures short of passing, and ultimately was unsuccessful.⁵⁷

Members of the FCC, such as Commissioner Jessica Rosenworcel, have also expressed general discontentment towards the policy changes. In an email statement issued after the Order was passed, Rosenworcel states, "Internet service providers now have the power to block websites, throttle services and censor online content. They will have the right to discriminate and favor the internet traffic of those companies with whom they have pay-for-play arrangements and the right to consign all others to a slow and bumpy road."⁵⁸

4. Public Engagement

As net neutrality regulations have changed, the public's engagement with these regulations has increased. Specifically, in the past few years, Internet advocacy groups and activists have campaigned to bring attention to the regulatory issues behind net neutrality. Stakeholders such as individuals online; celebrities; and corporations, such as Twitter, Netflix, and Reddit; have all voiced their opinions regarding freedom of the Internet. Activism has taken the form of online protests, Twitter trends, and petitions that have brought national awareness to this topic.

An example of an act of support for net neutrality was when former President Barack Obama joined the debate in November of 2014 and voiced his opinion over a two minute YouTube video. In this video, Obama called on the FCC to impose "the strongest possible rules to protect net neutrality" and argued that ISPs should not have the authority to "pick winners and losers in the online marketplace for services and ideas."⁵⁹ In this section, I will discuss more examples of how the public has engaged with net neutrality regulations in the past few years.

4.1 Save the Internet

Save the Internet is a coalition of individuals, business, and non-profit organizations led by the U.S. advocacy group, Free Press.⁶⁰ Initially founded in April of 2006, the online activist organization has a common goal of advocating for net neutrality, and asserts that the principle should be guaranteed by a "First Amendment" of the Internet.⁶¹ Save the Internet serves as a public resource to keep users up to date on threats to net neutrality and other digital rights. On their website, savetheinternet.com, Free Press provides information regarding issues including the free and open internet, the future of journalism, media control, and privacy and surveillance. The website also offers additional resources such as an expert analysis on the issues, methods of advocacy and organization, and a policy library of research. This website is just one of many that was created to provide the public with the connections and tools needed to effectively advocate for their consumer rights.

4.2 John Oliver

On June 1st, 2014, the debate over net neutrality went viral after John Oliver, the host of *Last Week Tonight* on HBO, did a segment that introduced the concept to millions of Americans. This occurred during

the same time that the FCC was tasked with developing new regulations for ISPs, right before FCC passed the 2015 Open Internet Order. Ultimately, the video went viral, and with the help of Reddit, it resulted in over 45,000 comments made by Americans complaining to the Federal Communications Commission and temporarily crashing their online comment system.⁶² Although John Oliver's feature was packed with technical details, including America's place in global Internet rankings, multiple aspects of Internet law, and ISP mergers, it successfully urged thousands of Americans to take action.

On the May 7th, 2017 episode of *Last Week Tonight*, John Oliver readdressed the topic, and devoted yet another segment to speak to the importance of an open and free internet. In this episode, he even introduced a website he created called GoFCCYourself.com. The website directed users to the FCC's Electronic Comment Filing System, where they could voice their opinion on the Restoring Internet Freedom rules that reversed Title II net neutrality policy. Public comments on the FCC's anti-net neutrality proceeding exploded following John Oliver's pro-net neutrality rant. Before the episode aired on Sunday, the proceeding had only 39,000 public comments. On Friday, five days after the segment had aired, the FCC proceeding had around 1.1 million comments.⁶³ As previously mentioned, there were several reports stating how the FCC commenting system had become a target of bots and spammers, not long after Oliver's segment aired. Therefore, it is difficult to accurately determine how many submissions were organic and how many were fake.

4.3 Internet-Wide Day of Action

Many consumer advocates expressed their concerns as a response to the Restoring Internet Freedom Order Act that was passed in mid 2018. They argued that once the 2015 FCC Net Neutrality Order was repealed, ISPs would begin to sell Internet packages in bundles, like they did for cable channels. For example, ISPs theoretically had the right to require customers to pay for a premium social media package to gain access to Facebook and Twitter.⁶⁴ Another concern was that without rules prohibiting paid prioritization, a fast lane could be occupied by big media companies and affluent households, causing most consumers to suffer. Small-business owners also expressed concerns towards the deregulation of net neutrality. They feared that industry giants could pay to gain an advantage and weaken their influence.⁶⁵ Similarly, paid prioritization has also created concerns for e-commerce start-ups through the worry that their

websites and services could run slower than those of large corporations.

As a result, Internet organizations like Amazon, Reddit, Google, Facebook, Twitter and more voiced their support for net neutrality. On June 12th, 2017, major companies held a simultaneous Internet-Wide Day of Action to Save Net Neutrality.⁶⁶ The day of action united together thousands of companies to protest and express unified discontentment against the Restoring Internet Freedom Order. The protest took a variety of forms including websites dramatizing what an Internet without net neutrality could look like by placing imitative website blockers, displaying images on their sites that simulated a slowed-down net, or “demanding extra money” for faster access.⁶⁷ Ultimately, over 70,000 websites, online services and internet users participated in the protest.⁶⁸

Support for the protest was also seen at a governmental level. Mignon Clyburn, one of the two current FCC Democratic Commissioners, expressed her support in a statement provisioning a free and open internet. She stated, “Its benefits can be felt across our economy and around the globe. That is why I am excited that on this day consumers, entrepreneurs and companies of all sizes, including broadband providers and internet startups, are speaking out with a unified voice in favor of strong net neutrality rules grounded in Title II... I remain committed to doing everything I can to protect the most empowering and inclusive platform of our time”⁶⁹

5. The Current State of Technology

As the regulation of the Internet has changed over time, the ways in which consumers utilize its capabilities has also transformed. Within the past three decades, the advancing functionalities of technology have had an increasing presence on various aspects of everyday life. Additionally, the influence that technology platforms have gained, specifically Amazon, Apple, Google, and Facebook has grown exponentially. These corporations hold control not just over commerce, but also over the news, politics, and our private information. Smartphones and smart speakers with artificial intelligence capabilities have transformed the nature of how and what we consume through mobile apps, personalized newsfeeds, and targeted content. The ubiquitous presence that technology platforms such as Amazon, Apple, Google, and Facebook hold has led to broader questions regarding their influence over what consumers see, hear, and do.

5.1 Shift in Consumption

In the past two decades, the United States has experienced staggering technological changes, specifically regarding the mediums in which content is consumed. For example, in 2000, smartphones were nonexistent and only 50% of Americans owned a basic cell phone. In contrast, currently 77% of the population owns a smart phone with instantaneous access to the Internet.⁷⁰ How people watch videos has shifted from VHS tapes, to DVDs, to digital streaming services like Netflix or Hulu. Similarly, how people listen to music has shifted from cassette tapes, to CDs, to music streaming services like Spotify or Apple Music. The shift to a technology culture dominated by streaming is largely due to the pervasive involvement of smartphones, smart TVs, and smart speakers in our daily lives that make this access instantaneous.

The rise of these smart device paired with social media platforms, the Internet of Things, and powerful data-processing techniques has provoked a shift in how consumers interact with the Internet.⁷¹ Today, Internet users are interacting less with pull actions and more with push actions. To elaborate, pull actions are when the user actively seeks out information on the Internet, usually the answer to a question. In contrast, push actions are when the user passively interacts with the Internet, and intakes the information that is provided through their social media feeds or by their digital voice assistants.

The rise of push era can be largely credited to the rise of smart phones and smart speakers. In order to provide functionality, these devices utilize apps to push content to consumers. Social media websites such as Facebook and Twitter push media to users based on followers and interests, and in turn users read whatever content they are provided. This gives social media platforms the power to choose and limit what consumers interact with on the Internet, and what news is pushed to them. This online technology is now a basic part of the lifestyle of most Americans. However, it is important to understand the technology behind online services like social media and Internet search engines can also be used by third parties to suppress particular viewpoints and manipulate public opinion. This questions if social media platforms, such as Facebook, should have the authority to regulate their site for threats such as fake news, or if this leaves them with too much influence.

Similar to smart phones, digital voice assistants also provide a limited scope of answers to users through digital voice assistants such as the Amazon Alexa. When asked a question or request, Alexa often pushes back one answer. In contrast, if the user were to pull the information, they would receive more

information and options. Additionally, according to a study from OC&C Strategy Consultants, purchases made through smart speaker devices like Amazon Echo and Google Home are projected to grow from \$2 billion today to \$40 billion by 2022.⁷² Smart speakers may become the next major disruptive force in retail as technology improves and the speakers become nearly as common in homes in the future as TVs are today. Online Amazon shoppers can order a specific brand from the Amazon marketplace, like Crest toothpaste or Kleenex tissues, or can request a general product. When asked, "Alexa, order me paper towels," the voice assistant defaults to a suggestion based on your past Amazon purchases. However, if paper towels have not previously been ordered, Alexa will push information, and recommend one or two Amazon Prime products through an algorithm. Most likely, the pushed recommendation will have an Amazon's Choice badge. When choosing a product suggestion, Amazon considers ratings, price and shipping speed. However, Alexa is also another way for Amazon to push customers to its growing product line, consisting of Amazon Basics, Wickedly Prime and Presto.⁷³

In addition to impacting how consumers navigate the Internet, the transition from pull to push actions has also impacted how online business operate. During the 2000s, users mainly interacted with the web through pull actions, often by utilizing search engines like Google. As search demand grew, websites provided more content, which was met with more demand. To provide more searchable resources, information utility websites developed, including Wikipedia, Yelp, and Trip Advisor.⁷⁴ Pull actions became so embedded in the economy of the Internet that search engine optimization, or SEO, became its own industry. Then, as the Internet shifted into the push era, there was a demand for businesses to provide relevant information to the right person at the right time in the right context. This was accomplished through personalized and targeted content. To achieve a deeper understanding of the user, businesses had a new goal: to collect consumer data and analyze it within context using information such as location, time of day, activity, weather and any other information that could provide insight.

The rise of smart phones, smart speakers, and other smart devices enabled users to remain continuously connected to the Internet through apps, largely contributing to the shift from pull to push actions. The content that consumers receive has shifted from being standardized, through mediums such as the newspaper and cable TV programming, to personalized, through curated social media newsfeeds and video streaming services.

5.2 Facebook's Big Data in The Push Era

The social media giant, Facebook, is one technology platform that has made the shift from pull to push media so widespread. In just over a decade, Facebook has connected over 2.2 billion people, creating a digital world that has reshaped political campaigns, the advertising business, and daily life around the world. Facebook is constantly gathering and analyzing personal user data, ranging from demographic information, such as generation, ethnic affinity, and gender to more profound information, such as how many lines of credits a user may have or how long they have owned their home for. Information is pushed from user to user via likes, shares, and posts. People tend to push things they find funny, interesting, moving, etc., which usually means they push media: articles, videos, lists, gifs, photos, etc. Facebook tracks this on-site activity through pages liked and ads clicked. It also tracks information through a user's device, such as the brand of phone they use, the type of Internet connection they have, and their device location.⁷⁵ Most users are aware of this level of data collection, and recognize how these things impact ad targeting. However, what many users are not aware of is the greater extent of Facebook's web-tracking efforts and its collaborations with major data firms.

For example, while a user is logged onto Facebook, the network has the ability to see every site that the user visits. When the user is logged off, Facebook is still alerted each time a user loads a page with a "like" or "share" button widget, or when an advertisement is sourced on the page. Additionally, Facebook has the ability to customize ads based on user data like age and gender, as well as through advertisers' customer data that is matched through Custom Audiences. Custom Audiences is a Facebook tool that uses a process called hashing to match an advertiser's list of customers' email addresses or phone numbers with Facebook user accounts containing the same information.⁷⁶ Facebook also offers marketers the option to target ads with supplementary information compiled by data service firms such as Acxiom, Epsilon, and Experian. Over the years, these companies have grown immensely, gathering data from government and public records, consumer contests, warranties, and subscription lists.⁷⁷

The growth of data collection and analysis is not projected to slow down anytime soon. Big data market revenues for software and services are projected to increase from \$42 billion in 2018 to \$108 billion in 2027 worldwide.⁷⁸ In terms of the user, this data is being leveraged to target consumers by drawing further conclusions, like whether they are likely to be an investor in a product or buy organic groceries for their

family. Corporations know consumer's weaknesses, things that give users pleasure and the things that cause users anxiety and anger. They utilize the data to source the information needed to sell their products and in turn, gather more data about consumer preferences. This limits what consumers can interact with on the Internet, and what news and information is pushed on their timelines and newsfeeds. The business of collecting and analyzing personal data of consumers is largely unregulated, and only has recently received government attention.

6. Who Holds the Power Now?

To effectively decide who hold the power in our current state of technology, it is critical to consider the level of authority among consumers, ISPs, technology corporations, and the government. Technology corporations such as Amazon, Apple, Google, and Facebook influence and dominate the daily lives of consumers on a micro and a macro level. ISPs such as AT&T and Comcast allow consumers to have access to the Internet and control how much users pay, what users can see, and can even deny users access at their own discretion. Independent government agencies, such as the FCC and the FTC, regulate these corporations, with the goals of protecting consumers and ensuring the government and economy are running smoothly. With the development of new technology and the widespread presence and utility of the Internet, the relationship among these groups has shifted in the past decade.

6.1 *The Curse of Bigness*

Arguably the most robust technology corporations of the early 21st century, Amazon, Apple, Google, and Facebook have fundamentally developed since they were originally established. In the past twenty years, these corporations have consistently emerged at the forefront of the technological revolution in the United States. The size and net worth of these companies have made it increasingly difficult for startups to compete and stay independent. The four firms have a combined market capitalization of over \$3 trillion, which according to the Wall Street Journal, is a rough equivalent to the annual gross domestic product of France.⁷⁹

The influence held by these corporations is gradually causing problems of monopolization and oligopolization in the American economy. According to the Wall Street Journal, currently in the U.S.: Google drives 89% of internet search; 95% of young adults on the internet use a Facebook Inc. product; and Amazon.com now accounts for 75% of electronic book

sales. Additionally, the article mentions that the firms that aren't monopolists are duopolists: Google and Facebook absorbed 63% of online ad spending last year; Google and Apple Inc. provide 99% of mobile phone operating systems; while Apple and Microsoft Corp. supply 95% of desktop operating systems.⁸⁰ Although monopolies and oligopolies are not always illegal or undesired, they often require price and output regulation. However, with corporations like Google and Facebook, antitrust regulators have been hesitant to take action since they have no dollar price for their product. Unless it can be proven that a corporation has attempted to restrain trade or collude, monopolies and oligopolies are legal and largely unquestioned in the U.S.

Tim Wu, who coined the term net neutrality, authored a book this past year titled *The Curse of Bigness: Antitrust in the Gilded Age*. In the past, Wu has worked on competition policy in the Obama White House and the FTC, served as senior enforcement counsel at the New York Office of the Attorney General, and worked at the Supreme Court for Justice Stephen Breyer.⁸¹ In his book, Wu discusses about 200 years of American economic policy and practice, and argues that now is the time to "control economic structure before it controls us." He also addresses the power that technology corporations have developed over the years.

Specifically, chapter seven of *The Curse of Bigness*, "The Rise of Tech Trusts," discusses the rise of dominant technology corporations, such as Amazon, Google, and Facebook. Here, Wu considers how all three companies emerged and developed in the late 1990s and early 2000 in a period of dynamic growth and easy market entry on the web. He writes how this era was "fast and chaotic; no position was lasting," providing AOL, Netscape, and MySpace as examples of corporations that have become obsolete. Wu contrasts the failure of these companies with the success of firms such as Amazon, Google, eBay, and Facebook, drawing attention to how they showed "no sign of impending collapse or retirement," but instead, were "growing in their dominance."⁸²

In terms of regulation, Amazon, Google, and Facebook have been largely unchallenged by antitrust laws, regardless of their anticompetitive takeovers and other questionable actions. As of 2018, Facebook has acquired around 70 companies, Amazon has acquired a little under 100, and Google has acquired over 200.⁸³ Many of these takeovers were spearheaded with the intent of eliminating competitive threats and were easily accomplished through pricey buyouts. For example, Amazon acquired competitors to the developing online market place such as Zappos, Diapers.com, and Soap.com; Google bought YouTube,

Waze, and Ad Mod which were direct challengers to Google Video, Google Maps, and Google AdWords; and Facebook acquired Instagram for \$1 billion and WhatsApp for \$22 billion, ultimately eliminating competition to their photo sharing and messaging services.⁸⁴

In situations where takeovers and buyouts failed, technology platforms mimicked, or copied, what the desired organization was doing. Copying products and features is yet another tactic that has been utilized by Amazon, Google, and Facebook to successfully eliminate competitive threats. For example, last year, Facebook was interested in taking over the group video-chat app Houseparty. Facebook showed persistent interest and approached the startup for meetings to explore a potential acquisition. A few months after Houseparty declined their requests, Facebook announced plans to internally launch an analogous app called Bonfire.⁸⁵ Houseparty and Bonfire share similar features and enable groups video chat over smartphones. In a similar manner, Google has copied features of Yelp, and Amazon also has a record of producing mimicked products that have been successful in their marketplace.

As a result of these competitive actions, Google controls a 92% share of the Internet search market, Amazon controls a 49% share of the U.S. e-commerce market, and Facebook owns four of the top five apps globally (Facebook, Instagram, WhatsApp, Messenger).⁸⁶ This consolidation of technology giants in creates two predominant challenges. First, it stifles innovation. The growing networks and dominant platforms of these “big four” corporations have become barriers to new entrants. Although emerging technology is making it easier to start a company with an innovative edge, it is also becoming increasingly difficult to avoid getting acquired or squashed by one of the technology giants. Facebook even has an internal database that tells it when a competitive app is gaining traction with its users, so that the social network can either buy out the company, as it did with Instagram and WhatsApp, or kill it by mimicking its features, as it did with Bonfire.⁸⁷ Therefore, as Amazon, Apple, Google, and Facebook become richer and grow more powerful, competitors such as smaller companies and startups with new innovative ideas are being left with two options: be bought or be beat. The second challenge created by the growth of these technology giants is political in nature. The concentration of economic power has enabled these corporations to generate tremendous political clout. For example, in the 2016 U.S. Elections, Facebook compromised the privacy of millions of users when it granted information to Cambridge Analytica, a political data firm linked to President Trump’s campaign.⁸⁸ This

breach of privacy questions how much influence Facebook and the other corporations have, and how they are capable of leveraging it in the future.

6.1.1 Case: Verizon and Neral Pro-Choice

In 2007, Verizon Wireless rejected a request from Naral Pro-Choice America, an abortion rights group, to make the mobile network available for a text-message program. The program allowed consumers to sign up for standard rate text messages from Naral by sending a message to a five digit number. An example of a text message the organization would send was: “End Bush’s global gag rule against birth control for world’s poorest women!¹ Call Congress. (202) 224-3121.⁸⁹ Thnx! Naral Text4Choice.” This program was accepted by other leading wireless carriers, however, Verizon justified their censorship by claiming they have the right to block “controversial or unsavory” texts.⁹⁰ Eventually, Verizon reversed its decision, and allowed the abortion rights group to send text messages to its supporters.

The dispute over the Naral text messages is a part of the larger battle over the question of power and content. Mobile carriers, ISPs, or content providers should not have authority to discriminate what content they provide to customers based on their own political views or opinions. Going forward, this situation can be applied to platforms such as Twitter and Facebook having control over what information and organization is pushed to consumers. Personal political interests of corporations should separate from business, and the best interest of the consumer should always be kept in mind.

6.2 Case: Amazon and the Government

To better gauge how the growing influence of these corporations has changed over time, it is interesting to analyze their current relationship with the government. Specifically, Amazon has recently become a powerful player in Washington D.C., building a presence through lobbyists and a growing list of government contracts.

¹ Under the global gag rule, foreign NGOs are forced to choose between one of two options: 1. Accept U.S. family planning funds and be prohibited from providing abortion counseling, referrals, or even advocacy efforts and from providing abortions outside of the three exceptions. 2. Refuse U.S. family planning funds and attempt to secure alternative sources of funding in order to keep health clinics open, continue providing a range of sexual and reproductive health services to clients, and continue advocating for law reforms to reduce unsafe abortion.

In the past five years, Amazon increased lobbying spending by more than 400%, totaling \$13 million in 2017. Ultimately, the company lobbied a total of thirty-nine entities, more than any other technology company, on issues ranging from sales-tax policy to drone-delivery regulations.⁹¹ As Amazon has increased its lobbying efforts, its PAC has also increased its contributions to political candidates. This past cycle, it gave \$1.19 million compared to \$151,170 in 2014 and \$515,200 in 2016.⁹² In total, the PAC contributed 48% to Democratic federal candidates and 52% to Republican federal candidates. When combined with employee donations, Amazon contributed over \$2.1 million to candidates in this cycle alone, \$1.66 million of which was given to incumbents.⁹³

Amazon's in-house and external registered lobbyists, are led by Brian Huseman, who previously worked as chief of staff at the FTC and a U.S. Department of Justice trial attorney. Hiring former government officials is common practice for Amazon. According to the watchdog group Center for Responsive Politics, 69 out of the total 102 lobbyists are "revolvers" who have previously worked for the federal government.⁹⁴ For example, Amazon's current senior vice president of global corporate affairs, Jay Carney, served as former President Barack Obama's press secretary. Similarly, the leader of Amazon's division of government affairs, Anne Rung, was the former U.S. Chief Acquisition Officer and leader of Office of Management and Budget's Office of Federal Procurement Policy, which plays a central role in shaping how the government purchases goods and services. Also from the Office of Management and Budget, Amazon hired Scott Renda, who oversaw a cloud computing initiative during his tenure in the Obama Administration. Lobbying services of former Senators like John Breaux (D-LA) and Trent Lott (R-MS) have also been solicited.⁹⁵

Additionally, during the 2012 presidential election Amazon Web Services, the company's cloud division, provided the technology used in former President Barack Obama's re-election campaign. Around the same time, Amazon was also signing contracts with government customers, including a \$600 million deal with the Central Intelligence Agency.⁹⁶ In 2016, Jeff Bezos, the CEO of Amazon, was appointed to the Defense Innovation Advisory Board, an organization that aims to keep the Pentagon in touch with new technologies.⁹⁷ Overall, Amazon's cloud-computing business with the U.S. government is projected to grow from \$300 million in 2015 to \$4.6 billion by 2019.⁹⁸

Amazon's recent increased presence in Washington is expected. With the immense growth of technology giants, such as Amazon, Google, and Facebook, comes the end of their honeymoon phase of

public goodwill and the beginning of potential government regulation. In the end, it is important to be mindful that these corporations hold control not only over Internet sales, but also over politics, the news, and our private data. The government is becoming aware of this fact, and it is critical they hold these large corporations accountable to the influence that they have amassed going forward.

6.2.1 Amazon HQ2

This past year, Amazon made plans to build a second headquarters in the United States. The corporation set out to build a \$5 billion HQ2 in North America with the promise of creating 50,000 jobs. The search spanned 13 months, and received applications from a total of 238 cities.⁹⁹ In order to entice the online retailer, Kansas City Mayor Sly James wrote five-star reviews for 1,000 random items on Amazon's website; Tucson, Arizona sent Amazon CEO Jeff Bezos a 21 foot cactus; and Stonecrest, Georgia, offered to rename some of its land "the city of Amazon."¹⁰⁰ Chicago even proposed to let Amazon keep \$1.3 billion in employee payroll taxes and spend this money as the company sees fit, fundamentally transferring its tax authority to Amazon and trusting the corporation to allocate taxes in a manner best for Chicago's residents.¹⁰¹ In the end, Amazon decided to create three new sites in New York, northern Virginia, and Nashville, Tennessee, for which the company expects to receive \$2.2 billion in tax incentives.¹⁰² Overall, the process was public enough to give Amazon valuable promotion while still keeping most of the details of each city's bid hidden. This tactic maximized Amazon's bargaining power and will be beneficial for planning further expansions.¹⁰³

Every year, American cities and states spend up to \$90 billion in tax incentives and subsidy packages to urge companies to stay or relocate. This amount is more than the federal government spends on housing, education, or infrastructure. Tax breaks for corporations take away resources from everything local governments would otherwise pay for the public, such as schools, roads, police, and prisons.¹⁰⁴ By being so powerful, Amazon, and other technology corporations are given an advantage so large that they can bring state governments to heel.

If the U.S. government wanted to express their authority, Congress could prohibit state governments from participating in corporate bribery against other state governments. Alternatively, the federal government could withhold funds from governors and mayors who threaten to steal jobs from other states, or who refuse to disclose their incentive packages. Instead, both Democrats and Republicans are showing support for large corporations, allowing them to grow

even more powerful. New Jersey and Maryland, both blue states, offered Amazon \$7 billion in tax savings to be the chosen state for HQ2. A few months ago, Republicans passed a corporate income-tax cut that is projected to save Amazon nearly \$1 billion over the next decade.¹⁰⁵ These actions reveal how much political clout and power corporations such as Amazon have gained over the government, and are indicative of what might happen as they grow larger.

7. The Future of IoT

Moving forward, when considering the theoretical future of regulations, it is important to consider how relationships among ISPs, technology corporations, independent government agencies, and the government have transformed since the original policy that governs them was created. In 1996, when the Telecommunications Act was altered under former President Bill Clinton's administration technology such as the Internet of Things and Artificial Intelligence were only ideas that were conceptualized in science fiction movies about a near dystopian future.

Along with the development of technology, small companies that started in someone's garage have evolved into powerful corporate giants. In recent years, the Internet has also begun its transform to a platform that connects intelligence in all forms through data, devices, ideas, apps, and ultimately people. Over the years, all aspects of the Internet have transformed drastically while the policy that regulates them has largely stayed the same. Ultimately, corporations are being regulated with the same policies that existed before they were established or the technology they utilize was invented.

7.1 Net Neutrality and IoT

It is important to note that a majority of communication between IoT devices does not happen over the Internet, but on private networks. When compared to content providers such as Netflix, IoT devices such as sensors, thermostats, and smart speakers use trivial amounts of data. Although this may mitigate the negative impact of a world without net neutrality, IoT, like the net as a whole, still runs on the free exchange of data. Former FCC chairman, Tom Wheeler, who is a strong advocate for net neutrality rules, is now a member on the board of an IoT software company. After the Restoring Internet Freedom Order was passed, Wheeler made a statement regarding net neutrality and IoT. Here, he pointed out that even if the majority of the data moves across a private network, there's opportunity for interference from a service provider if that data ever needs to touch the public

internet.¹⁰⁶ With people connecting more and more IoT devices, from digital voice-controlled personal assistants to thermostats to cars, net neutrality becomes that much more important.

Before the FCC's 2015 Open Internet Order that was passed during former President Barack Obama's administration, Internet in the U.S. existed without net neutrality. However, in our current world without net neutrality, things have changed dramatically. New technologies have appeared and the way that users interact with the Internet has become more complex. For example, the market for the Internet of Things has grown exponentially. According to Gartner, IoT is expected to grow to 26 billion installed units by 2020, generating incremental revenue exceeding \$300 billion.¹⁰⁷ Within IoT, the smart speaker and digital voice assistant market was practically non-existent in 2015. In the U.S., by 2017, there were 43.9 million smart speaker users, and by 2020, there are projected to be 76.5 million users. This growth rate is faster than any other technology device since the smartphone.¹⁰⁸

7.1.1 ISPs and IoT

Dismissing net neutrality rules could become an issue in the future with ISPs such as Comcast moving the IoT smart home market. In September of 2017, Comcast acquired Stringify, a startup that provides a network-based automation service that can connect with over five-hundred IoT products and digital services. Stringify's technology will soon be integrated into Comcast's products and services through Xfinity. This will allow customers to create and use rules and controls for device brands including August, Carrier, Chamberlain, ecobee, GE, Honeywell, Kwikset, Liftmaster, LIFX, Lutron, Nest, Netgear Arlo, Philips Hue, Danalock, Sengled, SkyBell, Tile, Yale, and Zen Ecosystems.¹⁰⁹ Comcast is also planning to release a streaming set-top box for its internet customers in 2019. The box is said to be able to combine offerings from streaming apps such as Netflix, Amazon Prime, and YouTube in a single, centralized place, and includes a remote that features voice control navigation. Comcast also intends for the set-top box to be an IoT smart home hub, letting users control things like lights and thermostats directly from their TV.¹¹⁰ Essentially, it is their existing Comcast's X1 cable box, without the cable, and will be a direct competitor to Apple's Apple TV, Amazon's Fire TV, and the Google Chromecast Ultra.

Now in direct competition with corporations like Amazon and Google in the smart home and set-top box market, Comcast has the incentive to create fast and slow lanes for particular gadgets and services. However unlike these other technology platforms,

Comcast does not have to rely on another corporation for broadband since they are an ISP. The goal, for Comcast, is to get embedded into customers' homes through the different IoT devices and provide useful features so they'll be less likely to switch providers, or use devices from other technology platforms such as Amazon or Google. However, if ISPs can dictate which brands or devices users can or can't use, or how efficiently they operate, broadband providers will have the ability to dictate "winners" and "losers" in the overall IoT industry. In the end, this does not benefit competition, innovation, or consumers.

7.2 Antitrust Regulation

The world has benefitted enormously from the development of big technology corporations and the development of the Internet. ISPs such as AT&T, Comcast, and Verizon have provided us with the broadband to access the Internet and these platforms. Amazon, Apple, Google, and Facebook have all contributed to connecting us with people across the globe and granting us access to a limitless amount of resources. Yet, ISPs are still selling broadband to discrete geographic regions with little overlap, leaving over 129 million Americans with only one provider option for Internet in their area. Moreover, over the past decade, Amazon, Apple, Google, and Facebook have aggregated more economic value and influence than nearly any other commercial entity in history. Today, almost all of these corporations are involved in the IoT ecosystem in some aspect, and are playing a role in redefining how we fundamentally communicate.

7.2.1 Case: Microsoft in the 1990s

Microsoft has spent around 20 years fighting antitrust battles with the U.S. government, waging one of the biggest monopoly wars in this country.¹¹¹ The U.S. government's interest in Microsoft began in 1992 with an inquiry by the Federal Trade Commission over whether Microsoft was abusing its monopoly on the PC operating system market. Then, in 1998, Microsoft Corporation was sued by the Department of Justice and a coalition of 20 state attorneys general for violating the Sherman Act and violating federal antitrust law.¹¹² At the time, Microsoft was the world's dominant software firm and Bill Gates, the CEO, was the world's richest man.

The suit was filed when Microsoft began giving away Internet Explorer, its browser software, for free. The charges accused the corporation of illegally protecting its operating-system monopoly and seeking a new monopoly for its own browser. The fear was that Microsoft would kill its top competitor, Netscape,

monopolize the browser market to dominate the coming age of the web.¹¹³ After several years, the government won the case. As a result, there is no browser monopoly, and the world has come to rely on the many apps, firms and ideas that were born after Microsoft's control was broken.¹¹⁴

It is important to note that when Microsoft was sued, it was a universally well-liked company, and CEO Bill Gates was commonly regarded as a visionary genius. Initially, the challenge to the corporation was not a popular decision and many believed it would stifle innovation and impede economic growth within the technology industry. Instead, after Microsoft's control was regulated, innovation surged and the U.S. continued to have immense technological growth. Since Microsoft no longer held a triple monopoly with its operating system, major applications, and browser, new companies had the opportunity to flourish. If Microsoft had not been broken down, Google, a tiny start-up, might have had to battle Microsoft-Bing, and Microsoft-Myspace might have become the default social network instead of Facebook.¹¹⁵

Today, antitrust efforts are guided by the idea that unless corporations are raising prices for consumers, there is no real harm. However, in the Microsoft case, Internet Explorer was technically "free," even though it enabled Microsoft to subdue competition. Today, Google and Facebook also offer products that are "free." As a result, they have not faced serious challenges because they have not harmed consumers in traditionally monopolistic ways.

7.2.2 Benefits to "Trust Busting"

There are a number of benefits to breaking up the "big four" firms, Amazon, Apple, Google and Facebook, to consist of smaller independent firms. For example, Amazon could be broken down to Amazon Alexa Products, Amazon Web Services, and Amazon Marketplace; Google could be broken down to Google Search, AdWords, and Google Home products. The goal of splitting these corporations would be to protect the overall health of the market. In return, there would be several clear benefits.

First, breaking up the corporations would create more jobs and shareholder value overall. Although "trust busting" is not beneficial for stocks in the short run, it has proven to promote shareholder growth in the long run. For example, despite Microsoft's challenges by the U.S. in the 1990s, the corporation hit an all-time high this year. By breaking apart the corporation, it made room for other innovative firms to flourish, and spurred economic technological growth overall. Additionally, it's reasonable to believe that Amazon and Amazon Web Services may be worth more as

separate firms than they are as one. Currently, AWS and Amazon's core businesses are connected by infrastructure, however, they don't necessarily have strong shared interests. If AWS was to spin off of Amazon to form two separate companies, each corporation could focus on their respective markets.

Second, breaking up the corporations would broaden the tax base. In a study conducted by analysts at S&P Global Market Intelligence, it was revealed that between 2007 and 2015, Amazon paid only 13% of its profits in taxes for federal, state, local and foreign taxes, Apple paid 17%, Google paid 16%, and Facebook only paid 4%. In contrast, the average tax rate for the S&P 500 average was 27%.¹¹⁶ The amount of influence that these firms have accumulated has resulted in political clout and accumulation of resources, allowing them to bring their tax rates to well below what a midsize company would pay. By creating loopholes, the most affluent corporations in the U.S. have legally avoiding paying taxes. In turn, this is creating a regressive tax system. Through tax avoidance, corporations are making millions of dollars off of the money that could have been used to fund public schools, advance medical research, utilize clean energy, keep our parks open, and arm the military.¹¹⁷

Lastly, breaking up the corporations would allow for more overall investment opportunities. As a result of consolidation, there are half as many publicly traded U.S. firms than there were twenty years ago.¹¹⁸ Going forward, many newly developing technology firms understand that the best path to success is to through acquisition by a bigger company. Essentially, fewer companies means fewer stocks, which ultimately means fewer options for investors. It has become increasingly difficult to build a diversified portfolio when investors have only a limited number of stocks to choose from.

Ultimately, breaking apart corporations like Amazon, Apple, Google, and Facebook is not meant to be an act with malicious intentions, but instead a vital part of keeping a healthy economy and ensuring market competition. With the growth of the IoT products and services, it is imperative that the innovation and power behind the entire industry is not dominated by only a handful of corporations. It is not too late to regulate these large technology platforms and ensure healthy growth for the IoT industry moving forward.

7.3 Compatibility Regulations

With different technology brands entering the IoT ecosystem, it is critical that all products have a level of standardization in order be able to communicating with other products. In a New York Times opinion piece by

Harvard Professor Jonathan Zittrain, this is one of the main challenges he addresses about the expanding IoT ecosystem. In this article, Professor Zittrain states that these devices should have the ability to communicate with each other in the same way that Mac and PC users are able to exchange email.¹¹⁹ Ultimately, this universal connectivity gives consumers a choice when it comes to selecting a brand, preventing forced brand loyalty for all devices. The challenge for emerging IoT devices to connect securely and reliably to the Internet and to each other is also addressed by Open Connectivity Foundation (OCF). The OCF is a group of industry leaders, including Samsung, Cisco, Intel, Microsoft, Qualcomm, Electrolux, and over 300 other member companies.¹²⁰ This group sponsored the IoTivity project to bring together the open source community and accelerate the development of the framework and services required to connect these billions of devices.¹²¹ Specifically, the project is working to develop a standard specification and certification program allowing IoT devices to communicate regardless of form factor, operating system, service provider, transport technology or ecosystem.¹²²

7.3.1 iPhone and Skype Calls

In order to understand how compatibility regulations could impact the future, it is helpful to look at an example from the past. One way that ISPs have limited how consumers can interact with technologies through compatibility was when Apple blocked Skype calls at the request of AT&T. This incident occurred pre-net neutrality rules in 2009 when AT&T wanted more money from consumers since Skype international calls were substantially cheaper than ones placed through a traditional carrier.¹²³ AT&T accomplished this by prohibiting iPhone users of voice-over Internet protocol to place calls over its wireless data network.¹²⁴ Eventually, Apple allowed AT&T customers to use Skype on their iPhones, but only after the FCC announced that it was planning to extend internet openness rules to mobile networks. After this ruling, ISPs fought back with the argument that wireless networks are not robust enough to operate without intense network management. However, the FCC ultimately approved the rules for wired and wireless broadband connections to the internet through the 2010 Open Internet Order.

When Apple announced the release of the iPhone, AT&T was the only mobile provider that was contracted to sell iPhones and had exclusive rights to the product.¹²⁵ Since the device's SIM card was locked, consumers could not use any other carrier and Apple retained control of the design, manufacturing, and

marketing of the iPhone.¹²⁶ When some customers attempted to unlock their device through jailbreaking, AT&T began charging them an early-termination fee for leaving before the end of their contract.¹²⁷

By pairing up with an ISP and limiting what mobile carrier the iPhone was compatible with, Apple was able to block users from using an application. In the future, with the growth of technology platforms, Amazon, Google, and Facebook may be able to restrict their platforms from competitors devices. If these technology corporations begin to form partnerships with ISPs, they may be able to restrict consumers with contracts to their devices and services. For example, earlier this year, Verizon and other ISPs decided to begin rolling out 5G Internet this year which changes how we will get TV and Internet in our homes. In an announcement in August of 2018, Verizon announced that instead of providing cable boxes, it's going to provide an Apple TV 4K and a wireless modem. Ultimately, since Verizon isn't going to run a standard cable line to your house, this offer will also include a subscription to YouTube TV, YouTube's streaming service that will provide access to TV channels.¹²⁸ In turn, this enables ISPs to force brand loyalty on consumers, through partnerships with Apple and Google or Amazon.

7.3.2 Amazon and Google's Public Dispute

Although many consider Amazon to be an online shopping platform and Google to be search engine, the two platforms services and products also overlap. Both platforms offer cloud computing services, digital voice assistants, smart devices, and video streaming services. A few products in direct competition include: Amazon Web Services and Google Cloud, Amazon Alexa and Google Home, Amazon Fire TV Stick and Google Chromecast, and Amazon Prime and Google's YouTube TV. Last year, the rivalry between Amazon and Google resulted in a public dispute through a series of competitive responses and actions restricting how consumers could access services and products.

In September of 2017, Google removed its YouTube apps from Amazon's Fire TV and Alexa-powered Echo.¹²⁹ When users attempted to open the YouTube app, they were met with an error message stating "YouTube is no longer available on Amazon Echo Show." At this point, Amazon and Google were rivals in the smart home devices market, competing through the Amazon Echo and Google Home, as well as through the Google Chromecast and Amazon Fire Stick. To eliminate product competition, Amazon did not sell these Google products through their website.

Then, in November of 2017, Amazon found a workaround for the YouTube block and reintroduced

the video service on their devices with a different user interface. Within two weeks, Google responded, and said it would once again pull YouTube from Amazon's powered devices. In a statement, Google justified their actions by blaming Amazon's lack of reciprocity for refusing to sell products from Google and Nest, another Google company. In addition, the statement also noted how Amazon also doesn't allow Google products to have access to its Prime Video streaming service.¹³⁰

More recently, in October of 2018, Amazon added a browser option to their Echo devices, where users could access the Internet through Firefox or Silk. This addition granted users access to YouTube, despite the disagreement with Google. Regardless of the re-integration of YouTube access, Amazon also announced that the video streaming service Vimeo would be the new default video service for Echo Show. While Vimeo doesn't have as many users as YouTube, it does allow for voice navigation of videos through Alexa.¹³¹ Additionally, in August of 2014, Amazon acquired Twitch, a popular online site for watching and streaming digital video broadcasts. When it was initially founded in 2011, Twitch focused almost entirely on video games. However, it has since expanded to include streams dedicated to artwork creation, music, and talk shows. Today, Twitch has 2.2 million monthly broadcasters, 15 million daily active users, and remains one of the highest sources of internet traffic in North America.¹³² Both Vimeo and Twitch are direct competitors to YouTube, and contribute to the ongoing rivalry between the two technology giants.

As of this past December, Amazon is once again selling Google and Nest products. One of the devices that Amazon has started selling is the Google Chromecast, a streaming product that connects to the apps on your phone. Although Amazon sells this device, it still does not support Chromecast streaming in apps like Prime Video or Amazon Music.¹³³ Amazon has even gone out of its way to block third-party apps that made Chromecast support possible.

In the end, although Amazon does not have an obligation to carry products of any kind and Google does not have an obligation to provide a service, failing to do either ultimately ends up hurting consumers. As these technologies become more prevalent in the everyday lives of consumers, it is imperative that they do not force brand loyal by pigeonholing users and restricting services. Consumers should be able to choose which technologies they interact with without being penalized by rivaling technology platforms.

8. Case: The Amazon Alexa

Amazon, Apple, and Google are investing billions to make voice recognition the main way consumers communicate with the Internet. This has been the most significant technology shift since the launch of the iPhone in 2007. Digital voice assistants are more frequently appearing in areas such as within our home appliances, our intimate living spaces, our smartphones, and our cars. Research indicates that the global sales of digital voice assistants is forecasted to grow thirteen times from 1.1 million devices in 2015 to 15.1 million by 2020. With this sheer volume of growth, it is critical to consider what they are capable of given the nature of the technology, and how this technology will continue to impact us in the future.¹³⁴

Amazon and Google want to colonize everyday space through their digital voice assistants. In the near future, everything from lights to air-conditioners to refrigerators, coffee makers, and even toilets could be wired to a system controlled by voice. The company that succeeds in cornering the smart-speaker market will lock appliance manufacturers, app designers, and consumers into its ecosystem of devices and services, just as Microsoft tethered the personal-computer industry to its operating system in the 1990s.

Currently, Alexa exists in two places. First, the digital voice assistant is part of a device category, the Echo smart speaker, which now comes in a variety of permutations, from the Echo Dot to the Echo Show. Second, like Google's Android operating system, Alexa is also a piece of software that Amazon makes available for free for other device makers to put into their products.¹³⁵ Alexa already works with more than 20,000 smart-home devices representing more than 3,500 brands. The digital voice assistant is also present in over 100 third-party gadgets, including headphones, security systems, and automobiles.¹³⁶ As a result, Alexa's presence is quickly spreading in a variety of devices in our homes.

8.1 Growth of Alexa in Our Homes

Alexa is one of the most popular and well known digital voice assistants. According to Amazon's Q3 2017 earnings release, it was confirmed that more than 20 million Alexa devices have been sold in just over a year.¹³⁷ Alexa serves as a digital voice assistant for a variety of different devices, allowing users to play music, control their smart homes, get news, and more just through the power of their voice. Although the creation of Alexa is fairly recent, it has quickly become difficult to imagine a world without the digital voice assistant.

Through Amazon's acquisitions and partnerships, Alexa devices are becoming a one stop shop to satisfy almost all needs of users. For example, with its most recent acquisition of Whole Foods, Amazon has begun to enter the food delivery service. Now offering the AmazonFresh grocery service and a new meal kit service, more customers are turning to Amazon for their food related purchases. Additionally, Amazon has partnered with a host of companies like GE, Whirlpool, LG, and Samsung to offer smart washer dryers, microwaves, ovens, dishwashers, refrigerators, and more. These appliances now include voice command through Alexa, allowing users to start or stop the washing machine, adjust the oven temperature, or check how long is left on the dishwasher's cycle with a simple voice command. Amazon has also incorporated order functionality directly into some of their products through the virtual Dash button. The Dash buttons are integrated within the LCD touchscreens on appliances, allowing homeowners to easily order supplies direct from Amazon with a few clicks or with Alexa by using their voice. For example, Samsung joined Brother in offering a printer that can automatically re-order ink; Obe, Oster, Petnet, and CleverPet all can reorder pet food; and GE has a washing machine that will reorder detergent. Alexa is in our kitchens, in our bathrooms, in our living rooms, in our bedrooms, and even in our cars.

8.2 The Future Regulation of Alexa

Since Alexa runs in the cloud, it allows for a device-agnostic user experience. Alexa is the same on a user's Echo as the Alexa on their smart TV or on in their car. Regardless of the device, users can find their apps, contacts and data, accessible through the same interface. With these technology capabilities increasing, users can expect to talk to a computer that knows their musical tastes, their shopping lists, their apps, and the smart-home services they have installed.

As Alexa's presence has grown in the digital voice assistant world, Amazon's presence has grown in virtually almost every other industry. In addition to being a retailer, the company is now a marketing platform, a delivery and logistics network, a payment service, a credit lender, an auction house, a major book publisher, a producer of television and films, a fashion designer, a hardware manufacturer, and a leading host of cloud server space.¹³⁸ Amazon is even considering offering internet service directly to consumers in Europe, allowing Amazon to bundle internet access with its Prime streaming video.¹³⁹ By gaining dominance in a variety of different markets, Amazon has gained an influential position in e-commerce and

serves as an essential infrastructure for a host of other businesses.

However, through Alexa, Amazon found a way to dive even deeper into the lives of consumers and make buying from Amazon nearly effortless. Even Amazon CEO Jeff Bezos acknowledges, “the fact that it’s always on, you never have to charge it, and it’s there ready in your kitchen or your bedroom or wherever you put it, the fact that you can talk to it in a natural way —removes a lot of barriers, a lot of friction.”¹⁴⁰ An example of friction, especially in the world of e-commerce, is user choice. If you ask Alexa for batteries, the digital voice assistant won’t offer Duracell or Energizer; instead, Alexa will push the AmazonBasics brand. Alexa’s growing presence in our lives is enabling Amazon to take control of our preferences and become more powerful.

Amazon’s concentration of power and wealth is having a greater impact on other business in the U.S. economy as well. With the rise of e-commerce, small business have been vanishing in the U.S. Between 2005 and 2015, one in five, nearly 85,000 small retailers went out of business.¹⁴¹ As local business disappear, people are losing retail jobs. The retail industry employs about one out of every ten Americans.¹⁴² As Amazon expands and creates more warehouses, it still is not creating enough jobs to make up for the losses that it is causing. Instead, Amazon only requires half as many workers to distribute the same volume of goods as traditional stores. In the future, the amount of human labor required is only going to decrease as Amazon continues to explore robot automation, and design devices that can accomplish complex tasks.

The Amazon Alexa is not only having an impact on our daily lives, but also on the U.S. economy overall. Amazon’s involvement with Washington D.C., partnerships and acquisitions within different industries, and overall dominance in e-commerce is making it an unstoppable force. In the future, if Amazon were to pair up with an ISP, such as Comcast, it would be able to gain an even larger forced presence in homes of consumers. Corporations forming partnerships with ISPs is not unheard of as seen through Verizon, Google, and Apple’s recent streaming partnership through the telecom’s 5G broadband service. In the end, the only way to regain necessary control over corporations, the technology industry, and ultimately the U.S. economy is through government intervention and regulation to provide oversight.

9. Conclusion

Affordable, fast Internet access facilitates significant economic opportunities in the U.S. An open Internet provides all individuals with the power to utilize emerging technologies and turn their ideas into tangible products or services. In the past decade, the Internet has created millions of jobs and accounts for a considerable portion of the U.S. economy’s GDP.

The Internet of Things was largely built during a period of net neutrality in the U.S. when all products and services were developed on the assumption that connectivity is going to be fast, fair and open. Today, everything from smart phones to smart appliances to smart cars connects and sends information over the Internet. The functionality of these devices is enabled through network connectivity. When the Restoring Internet Freedom Order was passed in 2017, the comprehensive, continuing, and consistent protections of the open internet rules were taken away. As a result, any product or service that required connectiveness was threatened.

As a result of the repeal of net neutrality laws, ISPs have been enabled to subjectively decide which IoT devices can be connected or favor their own IoT activity over their competitors. Additionally, the ubiquitous presence and influence of technology platforms offering IoT products and services has increased within the past decade giving corporations like Amazon, Apple, Google, and Facebook extreme power over consumers. The control these companies hold over the market has made it difficult for smaller emerging technology companies to compete and stay independent. Regardless of the growth in power for both ISPs and technology platforms, Internet regulations have remained largely unchanged. This ultimately limits the innovative potential of the IoT industry in the future.

To decide how to effectively cultivate innovation within the current technology industry, it is critical to reconsider the level of authority among consumers, ISPs, technology corporations, and the government. Technology platforms such as Amazon, Apple, Google, and Facebook influence and dominate the daily lives of consumers. ISPs such as AT&T and Comcast enable consumers to have access to the Internet. Independent government agencies, such as the FCC and the FTC, aim to find a balance of power between corporations and consumers. With the development of new technology and the widespread utility of the Internet, the relationship among these groups has shifted dramatically within the past decade. In order to guarantee the presence of innovation and market competition in the future, it is necessary to change the ways in which these entities are regulated.

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