

# Is Data-Monopoly Banned by Antitrust Law? Antitrust and Digital Economy in the US: Ideas, Institutions, Decisions and Impacts, 1998-2023

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## Abstract

This study employs case studies and historical research method to scrutinize the causes, processes, and outcomes of antitrust litigation against major internet platforms spanning the past quarter-century, commencing with the inaugural U.S. Internet antitrust case in 1998. Due to their intricacy, some antitrust proceedings remain ongoing, involving protracted timeframes and substantial financial resources. Nonetheless, the impetus and consequences of these cases are already affecting prevailing and forthcoming antitrust laws and policies. Given the significant role of major internet enterprises in the digital economy era, their adherence to equitable competition principles will engender an indelible impact on global economic development. Drawing on retrospective analysis, this study aims to elucidate the laws and trends undergirding antitrust regulations and practices within the digital economy milieu and to explore prospective transformations, pointing out the lack of regulation on data-monopoly and corresponding threats to the fair competition, thereby affording enlightenment for the realm of antitrust law, public policy-makers, and large technology enterprises.

**Keywords:** antitrust law, internet platforms, digital economy, competition principles, case study, historical analysis

## 1. Introduction

Over the last two decades, the digital economy has emerged as a prominent topic within the fields of science and technology, as well as the broader economic landscape. As Anderson and Rainie (2018) pointed out, the digital economy can be traced back to the 1970s and 1980s, when the development of personal computers and the internet enabled the widespread adoption of digital technologies in business and everyday life. During this time, companies began to adopt digital technologies for record-keeping, communication, and other business functions, which led to greater efficiency and productivity.

The World Bank has outlined six pillars that serve as the foundation for the digital economy, namely Digital Infrastructure, Digital Businesses, Public Digital Platforms, Digital Skills, Digital Financial Services, and Trust Environment. Similarly, the US Bureau of Economic Analysis has classified the digital economy into four major categories of goods and services, namely Infrastructure, E-commerce, Priced Digital Services, and Federal Non-defense Digital Services. Santander (2022) provides a more comprehensive definition of the digital economy, stating that it encompasses the use of information technology to create or adapt, market, or consume goods and services. This includes a wide range of digital activities such as digital banking, e-commerce, virtual education, smartphone applications, and collaboration platforms.

Since 1980s, the digital economy in the US has experienced significant growth, with the emergence of big tech companies like Google, Amazon, Facebook, and Apple. These companies have become dominant players in their respective markets, leading to concerns about their potential abuse of market power and impact on consumer

welfare. Antitrust laws have long been used in the US to promote competition and prevent monopolies, but the application of these laws to the digital economy remains a subject of debate and scrutiny.

As Tim Wu has pointed in the book *The Curse of Bigness*, the current approach to antitrust in the United States has allowed for the rise of powerful and largely unaccountable corporations, which have come to dominate many sectors of the economy (Wu, 2018). In July 2022, the Antitrust Subcommittee of the House Judiciary Committee formally published the Committee's Report, which called for new antitrust regulations that are specifically tailored to address the unique challenges posed by the digital economy, particularly by large internet companies like Amazon, Apple, Facebook, and Google (HJC, 2022). The report proposes a series of legislative recommendations, including measures to prevent dominant tech companies from engaging in anti-competitive behavior, as well as proposals for structural remedies, such as divestitures, to promote competition. There is a growing recognition that existing antitrust laws may not be sufficient to address the unique challenges posed by the digital economy, and there is a growing push to develop new regulations and enforcement mechanisms that are specifically tailored to the digital marketplace.

The aim of this paper is to examine the evolution of antitrust laws and practices against big tech companies and their impact on the digital economy in the United States between 1998 and 2023, as well as the institutional factors that have influenced the application of these policies. This study will contribute to the existing body of knowledge on the application of antitrust policies in the digital economy. Additionally, this study will identify emerging trends in antitrust regulation of the digital economy and provide recommendations for policymakers to strengthen the antitrust laws and promote competition in the digital economy. By highlighting the key economic ideas and institutional structures that have shaped antitrust policy during this period, I aim to draw attention to their connections to policy decisions and vice versa. These connections form a crucial area for further research. Like the creation of the digital economy, the policy-making process is complex and non-linear. Economic ideas may be incorporated into public policy as a result of consultation with academic economists or through education of policymakers themselves, among other factors. In the concluding section, I offer a preliminary analysis of the challenges of the regulations in digital economy and the impact of a lack of attention to digital monopolies revealed by the narrative, with the goal of informing future policy-making in the digital economy.

## **2. Antitrust as Constitution for the Digital Economy: From Sherman Act to 1998**

As the first federal antitrust law enacted in the United States, the Sherman Antitrust Act of 1890 played a crucial role in promoting fair competition and regulating monopolies in the United States. Followed by Clayton Antitrust Act of 1914, which further strengthens these prohibitions by regulating mergers and acquisitions that could reduce competition; and the Federal Trade Commission Act of 1914, which established the Federal Trade Commission, which is responsible for enforcing these antitrust laws.

Also, the US has a long history of 133 years enforcing antitrust laws, with several high-profile cases in recent years involving tech giants like Google, Apple, Facebook, and Amazon. These cases have centered around allegations of anti-competitive behavior, such as using their dominant market positions to stifle competition from smaller rivals. A widespread approach is to apply traditional antitrust laws to regulate large Internet companies operating in the digital economy; nonetheless, some scholars argue that the unique features of the digital economy necessitate the development and refinement of anti-unfair competition regulations that may not be effectively covered by conventional antitrust laws.

The evolution of antitrust since the inception of the Sherman Act has led to its recognition as a constitution for the digital economy, which aims to uphold principles of fairness, equality, privacy, and intellectual property rights by establishing a framework for governance, delineating rules and procedures for decision-making, and outlining basic principles and regulations for ensuring fair competition and safeguarding consumer welfare (Baker, 2003; Farrell & Klemperer, 2004; Wu, 2018; Varian, 2004; Newman, 2019). Analogous to a government constitution, antitrust law provides the foundational principles and guidelines for companies to compete in the marketplace, thereby serving as a "safeguard" against anti-competitive practices and promoting innovation by enabling smaller firms to compete with larger ones. Additionally, antitrust laws aim to protect consumer choice and privacy in the digital economy by preventing dominant firms from engaging in harmful data collection and usage practices (Ezrachi & Stucke, 2017; Lianos, 2019).

In order to effectively address emerging issues in the digital economy, such as data privacy, intellectual property, and network effects, it is imperative to establish a distinct legal framework tailored to these unique circumstances. As the digital economy continues to evolve, the significance of antitrust laws in shaping the industry's regulations and standards will become increasingly crucial. Without antitrust laws, digital platforms would possess an excessive amount of economic power, which would limit consumer options for products and services and increase the likelihood of harm.

Two emerging issues in the digital economy that require attention from antitrust laws are platform-based

businesses and the impact of data on competition, as highlighted by scholars (Baye & Wright, 2011; Hovenkamp, 2021). In the digital economy, the most dominant players are those that possess significant amounts of data, granting them substantial power. An Internet platform company, as the largest player in the digital marketplace, is an organization that manages a digital platform that facilitates the exchange of goods, services, or information between individuals or entities over the Internet.

Table 1. Main Global Internet Companies

Business Type	Business Description	Company	Revenue (2022) (billion US dollars)	Active Users (million)	Year Founded
E-Commerce Platforms	Operate online marketplaces that enable individuals and businesses to buy and sell goods and services.	Amazon	513.98	157.4	1995
		eBay	9.898	138	1995
		Alibaba	134.567	903	1999
Social Media	Provide online platforms for social networking, communication, and content sharing.	Facebook (Meta)	116.6	2960	2004
		Twitter	4.4	368	2006
		Instagram	51.4	1440	2010
		WeChat (TenCent)	83.64	1300	2011
Hardware Companies	Manufacture and sell physical technology products, such as smartphones, computers, and gaming consoles.	Apple	394.33	124.7«	1976
		Microsoft	198	270	1975
		Samsung	264.18	1033««	1969
Software Companies	Develop and sell software products, such as operating systems, productivity tools, and games.	Google	283	1000	1998
		Microsoft	198	270	1975
		Adobe	17.61	24.5	1982

Note: The number of active users for Apple refers to iPhone Users in 2022. The number of active users for Samsung refers to the number of Samsung smartphones in the market in 2022.

In addition to the five main types of digital economy platforms outlined in the table, there exist other important platforms such as sharing economy platforms, online marketplaces for services, and online payment platforms. Prominent examples of sharing economy platforms include Uber, Airbnb, and TaskRabbit, which enable individuals to connect with each other to exchange goods, services, or information. Similarly, online marketplaces for services like Fiverr, Upwork, and Freelancer connect individuals and businesses with service providers. Online payment platforms such as PayPal, Venmo, and Square facilitate the exchange of money between individuals and businesses. Categorization of digital economy participants can be done using various criteria, such as revenue sources, geography, market segment, ownership structure, or company size.

The antitrust legislation following the enactment of the Sherman Act has resulted in substantial expertise in regulating antitrust concerns surrounding large corporations. However, an important question remains as to whether the competitive landscape engendered by the unique “digital” environment is equitable, given the existing legal framework of all antitrust laws. It is crucial to undertake a comprehensive analysis of the major antitrust cases that have emerged in the digital economy in the last 25 years, given the distinctiveness of this sector. This examination may yield valuable insights into whether the antitrust claims that have arisen differ from those encountered in the pre-digital era.

### 3. The Microsoft Antitrust Case (1998-2001): The First Shot in Internet World

The first time that a major internet company in the United States faced antitrust enforcement action was in 1998, when the US Department of Justice filed an antitrust lawsuit against Microsoft. The lawsuit accused Microsoft of engaging in anti-competitive business practices in an attempt to maintain its monopoly position in the computer software market.

Figure 1 presents pivotal keywords identified in Microsoft antitrust cases, with a notable emphasis on the significance of “system” and “entry” during that period. The antitrust investigations against Microsoft focused on its dominant position in the computer software market, particularly the Windows operating system.

Microsoft's Windows operating system was installed on over 90% of personal computers worldwide, making it the de facto standard for personal computer operating systems. The antitrust investigations against Microsoft centered on whether the company had used its dominance in the computer software market to stifle competition and maintain its monopoly. While Microsoft has since diversified its business, its Windows operating system and Office suite of productivity software remain popular worldwide.

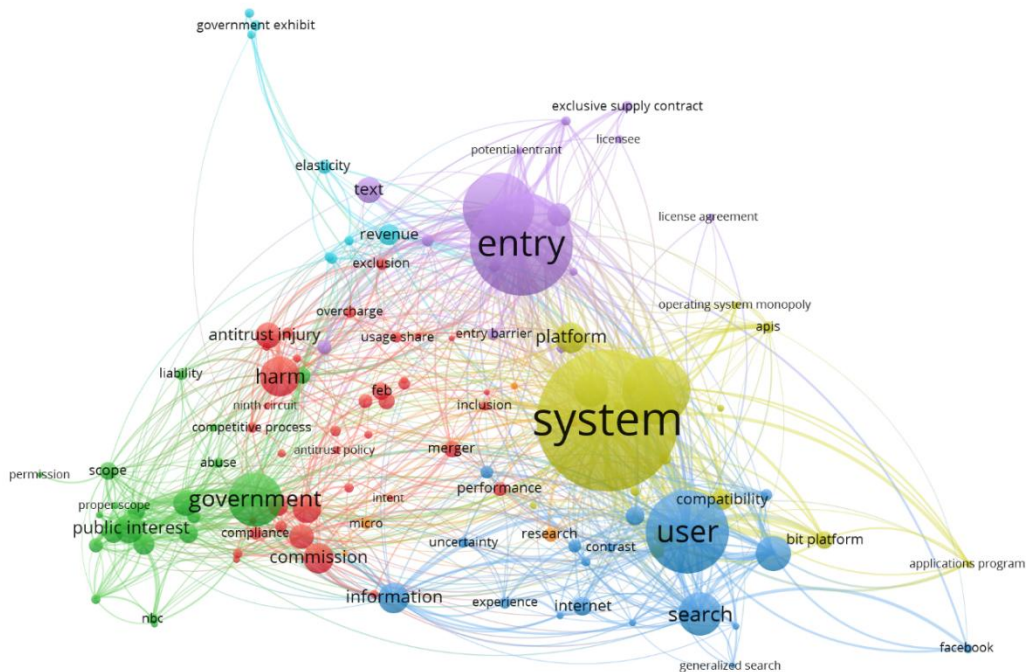


Figure 1. Semantic Cluster analysis on Microsoft antitrust case

One of the primary reasons behind the Microsoft antitrust case was the concern over the potential for digital firms to become dominant market players and stifle competition. As Cass & Hylton (2002) explain, “With the growth of the digital economy, many firms have become dominant players in their respective markets, and there is growing concern about the potential for these firms to use their market power to engage in anti-competitive practices.”

Another key factor driving the case was the recognition of the unique challenges posed by digital markets. As Katz and Shapiro (1999) note, “Digital markets are characterized by the potential for network effects, which can create powerful market players that are difficult for competitors to displace.”

The case was also driven by allegations that Microsoft had engaged in a variety of anti-competitive practices. These included bundling its Internet Explorer web browser with the Windows operating system, using its dominant market position to force computer manufacturers to pre-install its software, and engaging in other exclusionary conduct (Gavil & First, 2014; Posner, 2001).

It's also worth noting that the case was driven in part by pressure from Microsoft's competitors, who were seeking to level the playing field. As Mueller (2001) notes, “Many of Microsoft's competitors saw the company's practices as anti-competitive and lobbied for action from regulators.” There was also significant political pressure on the US government to take action against Microsoft. As Evans (2011) explains, “The Microsoft case was driven in part by political pressure from members of Congress, who were concerned about the impact of Microsoft's practices on the broader economy.”

Finally, the case was also driven by the influence of economists who argued that Microsoft's practices were anti-competitive and harmful to the economy. As Mankiw and Whinston (2002) note, “Economists played a key role in the Microsoft case, providing expert testimony and helping to shape the legal arguments.”

The value of Microsoft's shares dropped by 15% on the day the antitrust suit was filed in 1998, which equated to a loss of \$33 billion in market value (Geradin, 1999). Microsoft paid over \$2 billion in antitrust-related fines and settlements, including a \$750 million settlement with AOL Time Warner (Haucap & Wenzel, 2005). The case

marked a turning point in antitrust law and policy, with a renewed focus on preventing dominant firms from using their market power to stifle competition (Hylton, 1999; Litan & Singer, 2002). The case also led to a greater recognition of the unique challenges posed by digital markets, including the potential for network effects to create powerful market players (Katz & Shapiro, 1999; Manne, 2000).

The Microsoft antitrust case was one of the most high-profile antitrust cases in US history and had a significant impact on the technology industry. The case was ultimately settled in 2001, with Microsoft agreeing to a number of restrictions on its business practices. Since then, other major internet companies in the US have faced antitrust scrutiny and enforcement actions, including Google, Amazon, Apple and Facebook. These cases have highlighted the growing concern among regulators and the public about the power and influence of big tech companies, and they have led to increased calls for greater regulation of the technology sector.

#### 4. The Emergence of Online Platforms (After the Millennium)

##### 4.1 The Google Antitrust Investigation: Against the Largest Software Company

Google, one of the largest tech companies in the world, has faced a number of antitrust lawsuits in recent years. These lawsuits allege that the company has engaged in anticompetitive behavior and violated antitrust laws, resulting in a monopoly over certain markets.

As depicted in Figure 2, the antitrust investigation against Google centered on its operating system, particularly its Android operating system. Android is the most widely used mobile operating system globally, with a market share of over 80%. Google's dominant position in the mobile operating system market has led to accusations of anticompetitive behavior. The investigation against Google centered on whether it had used its dominance in the mobile operating system market to promote its other services and products unfairly.

Apart from the antitrust investigation centered on its operating system, Google has also faced conflicts surrounding "agreement" and "search result." These conflicts have emerged as novel lawsuits, reflecting the distinctive business characteristics of Google. Google's search engine algorithm plays a critical role in determining the search results displayed to users. The search engine results page (SERP) is Google's most significant revenue source, generating billions of dollars in advertising revenue annually. As a result, the ranking of websites on Google's SERP has become a matter of immense importance for businesses worldwide. The lawsuits surrounding "agreement" and "search result" focus on whether Google has used its dominant position in the search engine market to promote its own products and services unfairly. The lawsuits allege that Google has been prioritizing its own products and services over those of its competitors in its search results.

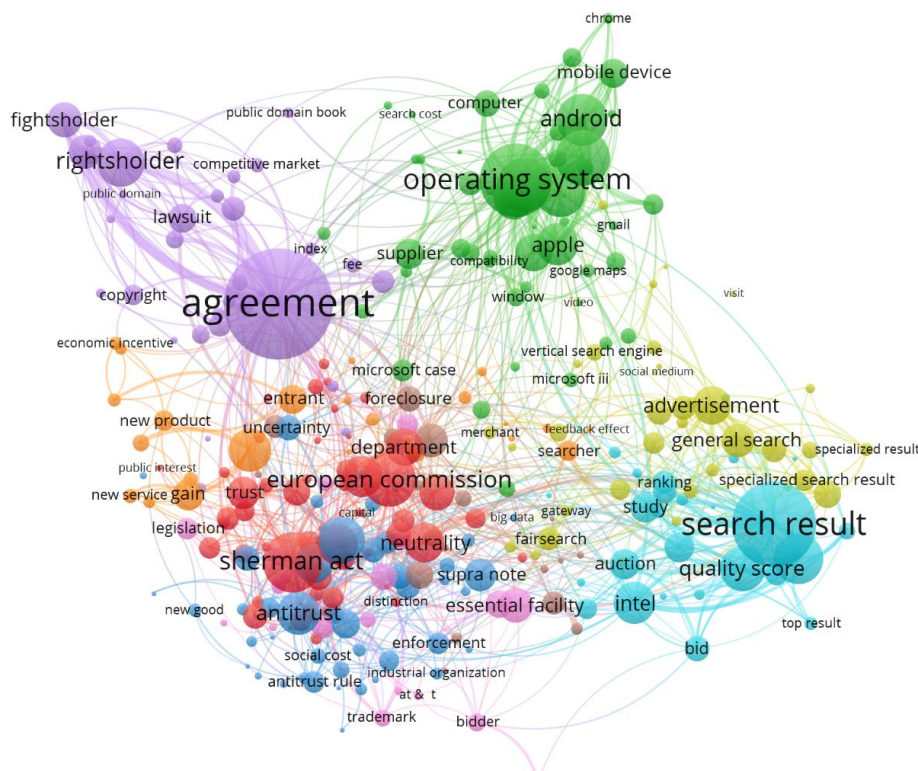


Figure 2. Semantic Cluster analysis on Google antitrust case

In the 2010s, Google faced numerous antitrust investigations and lawsuits in the US and Europe, with the most significant lawsuit being filed by the US Department of Justice (DOJ) in 2020. The lawsuit filed on October 20, 2020, was one of the largest antitrust cases in the US in decades and had significant implications for the future of the technology industry.

In October 2020, the United States Department of Justice (DOJ) alleged that the company has unlawfully maintained monopolies in the markets for search and search advertising, and that the company has engaged in a range of anticompetitive practices. (U.S. Department of Justice, 2020). These practices include entering into exclusionary agreements to block competition, using its monopoly power to limit competition and stifle innovation, and increasing the costs of advertising for advertisers. The lawsuit seeks to remedy these violations by requiring Google to change its business practices and imposing structural relief, such as divestitures or the creation of new businesses. (U.S. Department of Justice, 2020).

Another antitrust lawsuit was filed by a coalition of states led by Texas in 2022. This lawsuit alleges that Google has used its market power to control the pricing and distribution of online advertising, and that the company has engaged in a range of anticompetitive practices. (State of Texas, 2022). These practices include suing Google over facial and voice data collection. The states are seeking monetary damages, as well as changes to Google's business practices and remedies to restore competition to the digital advertising industry. (State of Texas, 2022).

Google has also faced antitrust lawsuits outside of the United States, including in the European Union and India. In March 2019, the European Commission fined Google €1.49 billion for violating EU antitrust rules by imposing restrictive clauses in contracts with third-party websites that prevented Google's rivals from placing their search adverts on these sites. (European Commission, 2019). The Commission found that these clauses had enabled Google to cement its dominance in the online advertising market.

In India, the Competition Commission of India (CCI) fined Google in 2018 for allegedly abusing its dominant position in the market for online search. (Competition Commission of India, 2018). The CCI found that Google had placed its own services at a prominent position on search results pages, while demoting or delisting rival services. Google has filed an appeal against the CCI's ruling.

In addition to these specific cases, there have been ongoing concerns about the size and power of tech companies like Google, Facebook, and Amazon. Many experts and policymakers argue that these companies have become too large and dominant, and that they are engaging in anti-competitive practices that harm consumers and other businesses.

Overall, the antitrust lawsuits against Google highlight the ongoing debates about competition, innovation, and regulation in the technology industry. While the outcomes of these cases are still uncertain, they could have significant implications for the future of the industry and for the way that tech companies operate.

#### *4.2 The Amazon Antitrust Investigation: Against the Largest Online Retailer*

Amazon, as the largest online retail giant, has brought increased scrutiny from antitrust regulators. The cases have accused the company of engaging in anti-competitive practices in the e-commerce market.

Figure 3 highlights the central themes of the antitrust case directed towards Amazon, which revolve around the concept of "publisher," "platform," and "power." Given Amazon's status as a dominant player in the e-commerce sector, this investigation concerns the extent of its market power and its potential anticompetitive practices. The company operates both as a platform for third-party sellers and a publisher for its own products, creating a potential conflict of interest. Moreover, Amazon's position as a key player in cloud computing services and its data collection practices further add to the complexity of the investigation.



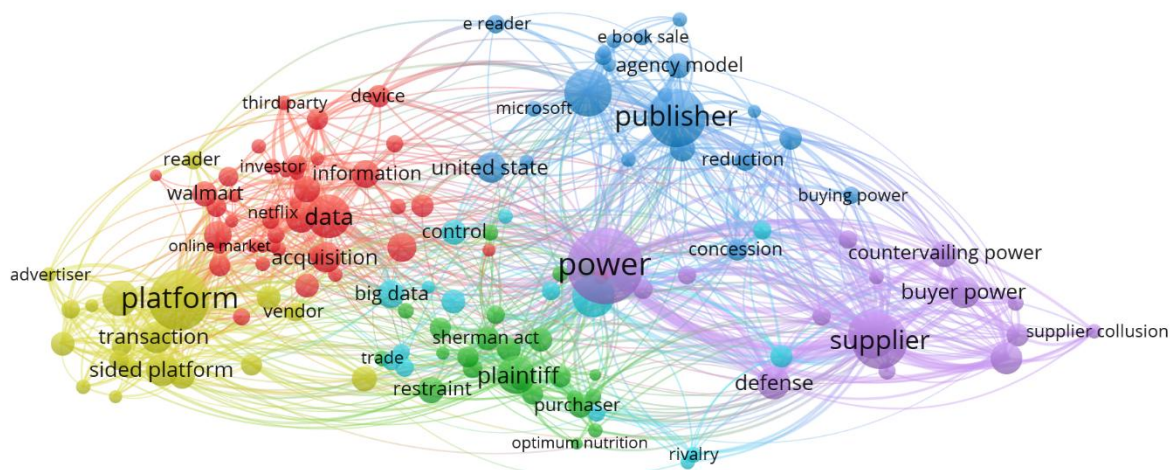


Figure 3. Semantic Cluster analysis on Amazon antitrust case

In 2019, the Federal Trade Commission (FTC) and the Department of Justice (DOJ) announced that they would be opening antitrust investigations into Amazon’s business practices (Ghosh, 2019). The FTC is reportedly looking into allegations that Amazon is using its dominance in online retail to harm competition (Molina, 2019).

One area of concern for regulators is Amazon’s use of data collected from third-party sellers to inform its own sales and marketing strategies (Ghosh, 2019). Critics argue that this gives Amazon an unfair advantage in the marketplace, as it can use its vast data resources to identify popular products and then create its own competing versions (Streitfeld, 2018). Additionally, Amazon’s position as both a marketplace and a seller of its own products has led to accusations of self-preferencing, with the company allegedly giving preferential treatment to its own products over those of third-party sellers (Satariano, 2021).

The investigation is ongoing, and it is unclear what the outcome will be. Some experts have suggested that it will be difficult to prove that Amazon’s practices are anticompetitive, as the company operates in a highly competitive marketplace (Ghosh, 2019). Others argue that Amazon’s dominance in certain segments of the market, such as online bookselling and cloud computing, give it significant market power that should be subject to regulatory oversight (Galloway, 2020).

Overall, the Amazon antitrust investigation highlights the challenges that regulators face in applying antitrust laws to the digital economy, where traditional measures of market power may not apply. As the investigation continues, it remains to be seen what impact it will have on Amazon’s business practices and the broader digital economy.

4.3 Antitrust Lawsuits Against Apple: Against the Largest Hardware Company

Apple, a technology giant on hardware, has been involved in several legal battles related to antitrust and anti-competitive practices. Apple is best known for its iPhone, iPad, and Mac computers, as well as its iOS and macOS operating systems. Apple’s dominance in the smartphone and computer software markets has also attracted the attention of antitrust regulators worldwide.

As shown in Figure 4, different from Microsoft’s, Amazon’s and Google’s antitrust cases, Apple’s antitrust case has a more diversified dispute focus, and the term “data” first appeared in dispute and discussion. The antitrust investigations against Apple have focused on its App Store and the company’s policies regarding in-app purchases, subscriptions, and commission fees. In particular, the antitrust investigations have focused on whether Apple has used its control over the App Store to stifle competition and maintain its monopoly.

At the same time, keywords about music and subscriptions also frequently appear in antitrust disputes involving Apple because of its specificity. Apple’s dominance in the music streaming market with its Apple Music service has led to allegations of anticompetitive behavior, particularly regarding the company’s policies regarding in-app purchases and subscriptions. The antitrust investigations against Apple have also focused on its control over the iOS operating system and the company’s alleged anti-competitive practices related to app developers and third-party app stores.

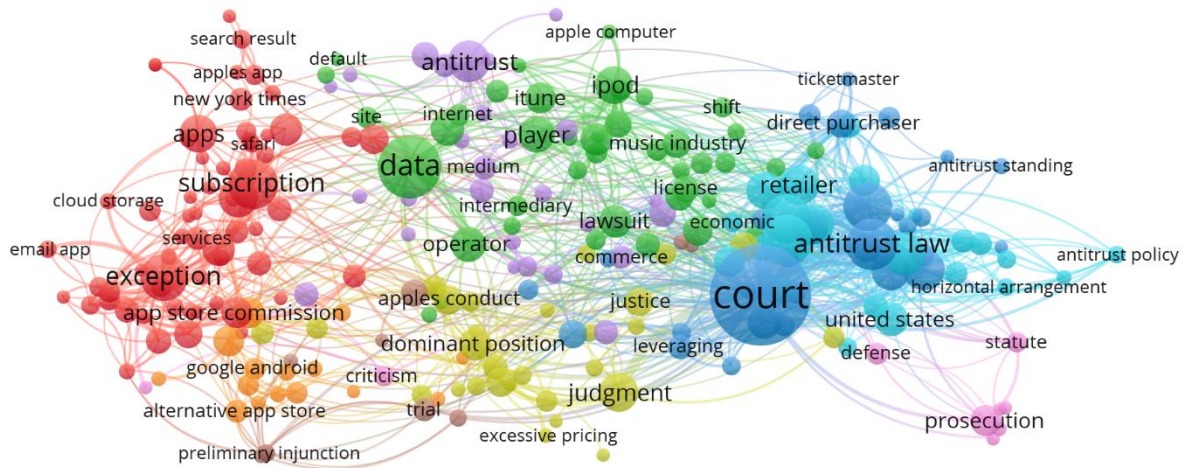


Figure 4. Semantic Cluster analysis on Apple antitrust case

In 2010, Apple was sued by the US Department of Justice and several states for allegedly entering into agreements with publishers for e-book pricing that resulted in anti-competitive practices. This case was settled with Apple required to renegotiate agreements and allow other retailers to offer e-books at lower prices.

In 2013, Apple was found liable in the *United States v. Apple Inc.* case and had to pay \$450 million in damages for colluding with book publishers to fix e-book prices, violating antitrust laws. In 2014, Apple settled the Apple iPod iTunes Antitrust Litigation for \$415 million, which involved allegations that Apple's iTunes software and iPod devices were designed to prevent users from playing music purchased from competing music services.

In 2017, Apple was accused of breaching its contract with Qualcomm by withholding payments for the use of its patented technology, which resulted in countersuits and a complex legal battle between the two companies that lasted for several years.

In 2019, the Supreme Court ruled in favor of iPhone users in the *Apple v. Pepper* class-action lawsuit, which alleged that Apple's App Store monopoly resulted in higher prices for apps. The Supreme Court rejected Apple's argument that only app developers, not users, have standing to sue. In 2021, the US Department of Justice filed an antitrust lawsuit against Apple, accusing the company of engaging in anti-competitive practices in the app store market.

In conclusion, Apple's dominance in the smartphone and computer software markets has attracted antitrust scrutiny worldwide, with a particular focus on the company's App Store policies and practices. The antitrust investigations have highlighted the importance of data, music, and subscriptions in the digital economy and have raised questions about the role of tech giants in shaping the future of the industry. While Apple continues to face regulatory challenges, it remains one of the most innovative and valuable technology companies in the world, with a loyal customer base and a diverse range of products and services.

#### 4.4 Antitrust Lawsuits Against Facebook: Against the Largest Social Media

Facebook has faced several antitrust lawsuits globally, which primarily focus on big data, data protection, content, acquisition, merger, entry, and competition law, as Figure 5 shows.

The company's business model heavily relies on gathering and analyzing user data to enhance its products and services while providing personalized advertising opportunities to advertisers. However, these practices have generated concerns regarding user privacy and data protection, resulting in increased regulatory scrutiny. The lawsuits also highlight Facebook's handling of harmful content, hate speech, and misinformation, which has led to calls for greater social media regulation. Furthermore, Facebook's acquisition of other companies, such as Instagram and WhatsApp, has raised concerns about its market dominance and potential antitrust violations. Another area of focus in the antitrust lawsuits against Facebook is entry and competition law. Facebook's strong position in the social media market has created a challenging environment for new entrants to compete, leading to allegations of anti-competitive behavior.

In December 2020, the US Federal Trade Commission and a coalition of state attorneys general filed antitrust lawsuits against Facebook, accusing the company of engaging in anti-competitive practices and acquiring potential rivals to maintain its dominant position in the social media market. The FTC's complaint, filed in the



US District Court for the District of Columbia, accused Facebook of using its market power to stifle competition, including through its acquisitions of Instagram and WhatsApp. The lawsuit sought to force Facebook to divest these companies and to prevent future anti-competitive conduct.

Similarly, the coalition of state attorneys general filed a separate lawsuit against Facebook in the US District Court for the Southern District of New York, alleging that the company had engaged in anti-competitive conduct that harmed both consumers and advertisers. The lawsuit sought to require Facebook to divest Instagram and to prevent the company from making any more acquisitions valued at over \$10 million without prior approval from the state attorneys general.

Both lawsuits represented a significant challenge to Facebook's business practices and its dominance in the social media market. However, the outcome of these cases is still ongoing, with legal proceedings and potential settlements yet to be determined.

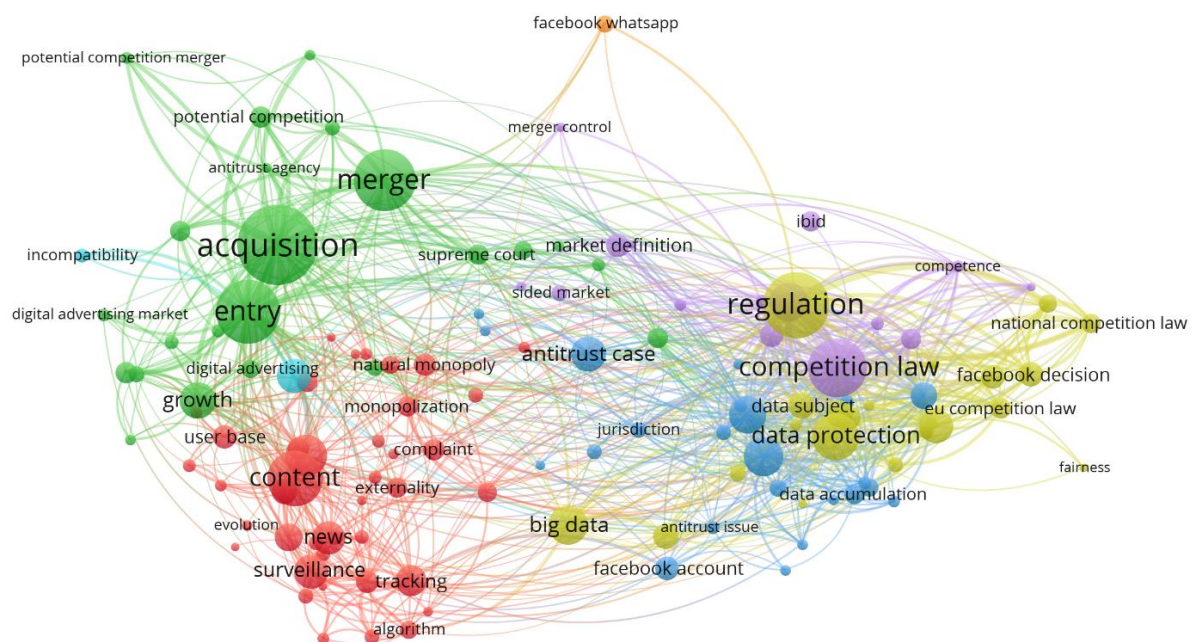


Figure 5. Semantic Cluster analysis on Facebook antitrust case

## 5. Discussion

Antitrust enforcement against companies, whether they are in the internet industry or not, is based on the same principles and goals of promoting competition and protecting consumers. However, there are some differences in how antitrust laws and enforcement may be applied to companies in the internet industry compared to companies in other industries, in terms of market structure, network effects, data and privacy concerns, and severe cross-border issues.

To be more precise, in the context of the digital economy, the current antitrust law restricts “behavior” instead of focusing on the “fact” attribute of monopoly in the digital economy. For example, even if a large Internet company does not have the behavior stipulated by the antitrust law, the fact that it controls data has brought about a substantial monopoly. Should data monopoly be detected and regulated? Before answering this question, we need to re-examine whether the major players in the digital economy have characteristics different from those of traditional industries. If there are differences, we should pay attention to these differences and the unfair competition that the differences may bring.

Considering the unique market structure of digital economy, it is characterized by rapidly evolving technology, rapidly changing business models, and the potential for rapid market entry by new players. This means that the market structure in the internet industry can be highly fluid and dynamic, which can make it challenging to apply traditional antitrust concepts. As noted by Duch-Brown, Martens and Mueller-Langer (2017), the digital economy is characterized by low transaction costs, network effects, and platform competition. Their creative business models have made it difficult to evaluate the competitive effects of mergers and acquisitions, as well as the use of exclusionary practices such as tying and bundling, since the existence of multi-sided platforms may create both pro-competitive and anti-competitive effects. This has led some antitrust scholars to call for a more

flexible and dynamic approach to antitrust enforcement in the digital economy, as the application of traditional antitrust rules could potentially stifle innovation and harm consumers (Manne & Wright, 2010; Portuese, 2021).

Moreover, the use of big data and artificial intelligence in the digital economy has presented new challenges for antitrust policy. As highlighted by Ezrachi and Stucke (2019), the use of data can create both pro-competitive and anti-competitive effects, and the power of big data can lead to the creation of “data-driven monopolies” that may stifle competition. This has led to calls for a greater focus on data as a potential source of market power, as well as the need to assess the competitive effects of data-related practices such as data collection, data sharing, and data analytics. In addition, the global nature of the internet industry has presented challenges for antitrust enforcement, as the reach of internet companies often extends beyond national borders.

The rapid evolution of technology and business models and the potential for rapid market entry, made it difficult to apply traditional antitrust concepts in the digital economy. As a result, there is a need for a more dynamic and flexible approach to antitrust enforcement that takes into account the unique characteristics of the digital economy.

Another threaten to antitrust in digital economy is network effects. Many internet companies, such as search engines and social media platforms, benefit from “network effects” which means that the value of the platform increases as more people use it. This can create barriers to entry and give companies with established platforms a dominant position in the market. The impact of network effects on competition and antitrust issues has been extensively studied in the economics and legal literature.

As more people join a network, the value of the platform increases, making it more attractive to new users, and therefore creating a self-reinforcing cycle that can lead to market power. This phenomenon can create significant challenges for antitrust enforcement, as traditional market definition and market power measures may not be suitable for digital platforms with network effects.

According to Shapiro and Varian (1998), network effects are a key reason why some digital markets tend to be highly concentrated. They argue that the dynamics of network effects can lead to a winner-takes-all market, where a single dominant firm emerges, making it hard for others to compete. This has been observed in various markets such as online search, social media, and e-commerce, where a few companies hold a dominant market position. Further, scholars have highlighted the role of data in facilitating network effects and reinforcing market power.

In her book *The Age of Surveillance Capitalism*, Shoshana Zuboff (2019) argues that the dominant tech firms extract data from users to create unprecedented network effects, which are used to fortify their market position and exclude competitors. This has resulted in the emergence of “surveillance capitalism,” where personal data is the raw material for value creation. In terms of antitrust enforcement, scholars have proposed several remedies to address the challenges posed by network effects. For instance, Tirole (2017) suggests that antitrust authorities should focus on promoting interoperability between competing networks, to reduce the barriers to entry and facilitate competition. This would enable users to switch between competing networks and enable smaller players to challenge the dominant platform.

Finally, recent antitrust investigations against some of the major tech firms have highlighted the role of network effects in facilitating market power. For example, the House Judiciary Committee report on Competition in Digital Markets (2020) identified network effects as a key driver of the dominance of firms such as Google, Facebook, and Amazon, and called for comprehensive antitrust reforms to address these issues. In the realm of antitrust law and policy, a prospective area of emphasis might pertain to the demonstration and dismantling of network effects.

Furthermore, data and privacy concerns are key distinguished features for antitrust in digital economy. The internet industry is often characterized by the collection and use of large amounts of data, that is, the use of so-called “big data” analytics. Big data analysis involves the processing of large and complex data sets to extract meaningful insights, and this has become a core competence for many internet firms. However, the use of big data analytics by dominant companies could result in the creation of “algorithmic collusion,” where companies use algorithms to coordinate their pricing and other business strategies, using their data advantage to engage in anti-competitive behavior. Data monopolies are not only a threat to competition but also to consumers, as they can reduce incentives to innovate, limit consumer choice, and increase the costs of entry for new firms.

The use of data by internet companies also raises important privacy concerns, as users’ personal data is often collected and used in ways that are not transparent to consumers. In addition, some authors argue that the concentration of data in the hands of a few companies could also lead to broader societal harms, such as political manipulation, discrimination, and the loss of privacy. To ensure that dominant firms are not using their data advantages to engage in anti-competitive behavior, antitrust law and enforcement in the internet industry needs to consider the unique privacy and data concerns of this industry, which is currently absent in antitrust law and

implementation.

Finally, the cross-border issues are big challenges for antitrust in digital economy, compared to traditional industry. The internet is a global network, and many internet companies operate across borders. This can raise complex issues for antitrust enforcement, as different countries may have different approaches to antitrust enforcement, and it can be challenging to coordinate enforcement actions across borders. The global nature can raise complex antitrust issues for regulator, and it can be challenging to develop a coordinated response to anticompetitive behavior in the digital economy. In addition, the decentralized and borderless nature of the internet can make it difficult to define relevant geographic markets for antitrust purposes.

A number of scholars have explored these cross-border antitrust issues in the context of the internet industry. For example, Christine Varney (2019) and Theodore Voorhees (2014) have highlighted the challenges of coordinating global antitrust enforcement actions, arguing that greater cooperation and dialogue between competition authorities is needed to address the challenges posed by the digital economy. They also suggest that common principles and standards for antitrust enforcement could help facilitate greater cooperation. Other scholars have explored the challenges of defining relevant geographic markets in the context of cross-border internet commerce. Morton and Dinielli (2020) argue that market definition is a critical component of antitrust analysis, but can be particularly difficult in the context of the internet, where many products and services are offered across borders. They suggest that regulators need to be flexible in their approach to market definition, and take into account factors such as consumer behavior and product substitutability when defining relevant markets. Finally, some scholars have explored the implications of cross-border data flows for antitrust enforcement. In a global industry like the internet, data can be a key competitive advantage, and companies with access to large amounts of data may have a dominant position in the market. However, the use of data can also raise concerns about privacy and data protection, which may need to be taken into account in antitrust analysis. Sokol and Comerford (2016) have argued that antitrust regulators need to take a more holistic approach to assessing the competitive impact of data, and consider both its potential benefits and harms. They suggest that this may require a greater degree of coordination between competition authorities and data protection regulators.

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