WHY THE DYNAMICS OF COMPETITION FOR ONLINE PLATFORMS LEADS TO SLEEPELESS NIGHTS, BUT NOT SLEEPY MONOPOLIES

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Abstract

Recent claims that online platforms have secured permanent monopolies, protected by barriers to entry from network effects and stockpiles of data, and should be the focus of intense antitrust and regulatory scrutiny, are inconsistent with the economics, technology, and history of online competition. Online platforms face dynamic competition as a result of: disruptive innovation that provides opportunities for entry; competition from online platforms that have secured a toehold in one area but compete across multiple areas; the fragility of category leadership resulting from the fact that network effects are reversible and entry costs are low; and the prevalence of ad-supported models, which result in seemingly disparate firms competing for consumer attention and advertiser dollars. The last two decades of online platform competition demonstrate that category leaders are often toppled, unexpectedly, through some combination of technological change, business model innovation, and cross-platform rivalry. The palpable threat of displacement prevents online platforms from taking their customers for granted. The history of online platform competition also provides empirical refutation of the proposition that data on users protects platform leaders from competition or puts an insurmountable obstacle before entrants. All this points to online platforms facing sleepless nights since any online platform that tries the quiet life of monopoly risks catastrophe.

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I. Introduction

Some commentators are raising concerns that the online platforms spawned by the Internet “look unstoppable.” They claim these platforms lack effective competition and pose similar concerns as giant companies did a century ago. There are calls for greater antitrust scrutiny, regulation, and even breakups. A recent theme is that these firms have built impregnable moats around themselves based on the vast amounts of data they control.

The last twenty years of history should humble anyone who claims that online platforms have secure monopolies. The record is replete with forecasts, soon proved wrong and then forgotten, that the winners that took all, or most, were unbeatable. Online platforms are impelled to innovate and compete for users because so many supposed winners have in fact been beaten. Thus, as of now, comparisons between the online platforms and old titans are inapt and overwrought. Four features distinguish online platforms from the firms that once dominated traditional industries, and lead to vigorous dynamic competition in the digital economy.¹


First, turbulent waves of disruptive innovation have shaken the business models of platform leaders and opened new avenues of entry and competition. The Internet revolution that began in the mid-1990s led to the ultimate collapse of AOL, which had built a large online network and had a first-mover advantage. The smartphone revolution started just thirteen years ago, after the opening of the commercial Internet. Microsoft failed to leverage its leadership in desktop operating systems into mobile operating systems. Its power and relevance were diminished. Meanwhile, Blackberry’s once-vaunted device and secure e-mail network business collapsed. Now, less than ten years after the start of the smartphone revolution, voice-activated artificial intelligence platforms are taking off, and promising alternatives to current ways of doing things. The winners of this new round of competition will challenge the winners of previous ones. Smooth seas going forward are unlikely given ongoing underlying technological innovations that could prompt further disruptions. Nothing similar happened over such short time periods to the firms that dominated certain sectors of the economy from the late 19th century to the late 20th century.

Second, online platforms pegged as leaders in one area compete with each other in many other areas. They identify one another as competitors and commonly encroach on each other’s turf. Consumers, for example, are as likely to start product searches on Amazon, the leading e-commerce firm, as on Google, the leading search-engine firm. A century ago dominant firms largely occupied silos. U.S. Steel didn’t compete with AT&T, which didn’t compete with the Chesapeake & Ohio Railroad, which didn’t compete with General Electric. None of those firms competed with Standard Oil before its 1911 breakup.

Third, online platforms are more susceptible to attack by entrants than network industries of a century ago. Network effects and sunk costs made the natural monopolies around the turn of 20th

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century difficult to challenge. Rivals had to sink massive amounts of capital into duplicating physical networks such as railroad tracks and telephone lines. Using multiple networks, or switching between them, was expensive for customers, even if a second network was available. However, online platforms can leverage the Internet to provide wired and wireless connections globally. People find it generally easy, and often costless, to use multiple online platforms, and many often do. The ease and prevalence of multihoming have enabled new firms, as well as cross-platform entrants, to attract significant numbers of users and secure critical mass necessary for growth. Incumbent platforms then face serious competitive pressure from new entrants—startups or other online platforms—because their network effects are reversible. Sleepy firms risk a death spiral, as Yahoo learned.

Fourth, while many online platforms are “leaders” in particular categories, such as portals, these firms compete for the scarce attention of people and then compete to sell slices of that attention to advertisers. Even when differentiation softens this competition, the ad-supported platforms are much closer rivals than were the titans around the turn of the 20th century, or the most valuable firms towards the end of the century. Unlike traditional ad-supported media, online attention platforms, such as Pinterest, don’t have to invest in printing plants or television licenses. The technology of buying online also makes the ad-supported platforms substitutes, to some degree, for e-commerce platforms.

It is true that online platforms collect much information on their users, which then provides inputs into enhancing and improving their products and services. They invest in algorithms for processing and learning from that data and rent or build server farms to hold it. However, the rise and fall of platforms over the last twenty-five years, or even the last seven, refutes the claim that, as a general matter, data prevents entry or protects dominance. Many platforms, in possession of large amounts of data, such as Orkut, have gone into sharp decline while others, such as Tinder, have grown rapidly without possessing large amounts of data until they achieved scale.
Even the most successful online platforms don’t behave as if they’ve ever had much rest or are expecting to be getting some anytime soon. Economics, history, and technology suggest that they will face sleepless nights for the foreseeable future. None of these firms look remotely ready or able to settle into the quiet life of monopoly. More likely, they will be forces of competition, and disruption, throughout the economy, as the incipient revolutions in physical retail, transportation, and voice-activated platforms relying on artificial intelligence (to name just a few examples) show.

That doesn’t mean that competition authorities should take naps. Like all firms, online platforms may engage in unlawful collusion or monopolization. They may attempt mergers and acquisitions that could harm competition. Some online firms may have significant market power in particular lines of commerce and abuse that market power, through unilateral or vertical practices, to squelch competition. Evidence-based analysis, sharply focused on whether there is harm to consumers, and an understanding of the history and economics of online rivalry, however, should inform vigilance over the digital economy.

II. Economics and Technology of Online Platforms

Many successful Internet firms operate platforms. Platforms are businesses that connect two or more different types of users, such as drivers and riders in the case of Uber, facilitating a mutually beneficial exchange between users. Modern technologies, particularly the Internet, have made it easier to create platforms and to scale them globally. The business model isn’t new. Ancient village matchmakers, medieval bazaars, nineteenth century newspapers, telecommunications networks, and 20th century credit card systems have used the same model.

Platform businesses often have what economists call indirect network effects. One type of user, drivers for example, value platforms that enable them to connect to more of the other type of user, riders for example. Larger platforms are more valuable to their participants to the extent they can connect more of each type of user with more of each other type of user. Telecommunications networks became more valuable to their participants as they expanded their reach because people who wanted to make calls could reach more people who could receive calls and vice versa.

Commentators often point to indirect network effects as the propellant that makes these firms unstoppable. The dynamics of competition among these firms demonstrates that these indirect network effects, while important, are neither decisive for continued success, nor insurmountable entry barriers. In fact, Internet platforms have features that tend to make them much more susceptible to competition than the 20th century giants of American industry and companies built on physical networks.

A. Online Platforms Don’t Have to Sink Capital into Physical Networks

Online platforms don’t have to sink capital into providing the physical facilities for providing services. They rely on the companies that have built regional, national, and global networks for carrying Internet traffic, mobile carriers and local broadband providers that enable users to access the Internet, and cloud companies that rent storage and computing capacity to companies that want to distribute their products and services over the Internet. The online platforms also rely on chip makers, phone manufacturers, computer makers, and other manufacturing businesses for the devices

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6 These indirect network effects often go in just one direction for media platforms. Advertisers value access to more users but people often don’t like advertising—they come for the content and tolerate the ads. See the discussion of attention platforms below.

7 Telecommunications is a classic two-sided network even though the same people make and receive calls. So long as there is a difference in the intensity that people make or receive calls the demand to make calls, or to receive calls, depends not just on the number of participants but on the extent to which each participant tends to be on one side of the call or the other. As Rochet and Tirole observed in the seminal paper on two-sided platforms, many cases in which economists have pointed to direct network effects, including telecommunications, are in fact indirect network effects. Jean-Charles Rochet and Jean Tirole (2003), “Platform Competition in Two-Sided Markets,” Journal of the European Economic Association, 1(4): 990-1029; Jean-Charles Rochet and Jean Tirole (2006), “Two-Sided Markets: A Progress Report,” RAND Journal of Economics, 37(3): 645-667. See also Leonard Waverman (2007), “Two-Sided Telecom Markets and the Unintended Consequences of Business Strategy,” Competition Policy International, 3(1): 249-256.
that users rely on to connect to their platforms. Online platforms sometimes choose to build data centers, or content distribution networks, to realize efficiencies. They generally don’t do that until they’ve become successful and the risk of making sunk-cost investments in the business is low.⁸

As a result, dynamic competition is much easier for online platforms than for traditional network industries. Entrants don’t have to incur significant capital costs in building physical networks.⁹ And they don’t face ruinous competition with incumbents who have already made significant sunk-cost investments. Online platforms are, therefore, much more vulnerable to entry and displacement than traditional network firms.¹⁰

Google’s experience illustrates the difference in competitive dynamics for online and physical networks. It released its Chrome desktop browser in September 2008 at a time when Microsoft’s Internet Explorer (IE) accounted for 59 percent of worldwide desktop browser use.¹¹ Microsoft’s IE share had already declined significantly from 87 percent in 2001, largely as a result of the growth of Firefox, which was provided by the non-profit Mozilla Foundation.¹² By May 2017, Chrome

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⁹ That doesn’t mean they are “free-riding” on those networks which, of course, earn revenue and profits from serving end users, including data charges that are based on intensity of use.

¹⁰ The physical networks aren’t the only factor that sets these online and offline platforms apart. Modern telecommunications networks have evolved, mainly since the 1980s, from state-owned monopolies or regulated firms that were shielded from competition. Even as recently as the mid to late 2000s, companies that were trying to produce smart phones, and smart-phone apps, faced significant obstacles with telecommunications companies which wanted to control the phone experience. See Matchmakers, p. 110-112. Apple was able to break the dominance of the telecommunications companies in the late 2000s—not because it was a large platform, which it wasn’t then—but because it had a highly desirable consumer product, the iPhone. See Brian Merchant (2017), The One Device: The Secret History of the iPhone (New York: Little, Brown, and Company), at 4-6; Jacquie McNish and Sean Silcoff (2015), Losing the Signal: The Untold Story Behind the Extraordinary Rise and Spectacular Fall of Blackberry (New York: Peterson Books), at 134-135; Fred Vogelstein (2013), Dogfight: How Apple and Google Went to War and Started a Revolution (New York: Sarah Crichton Books), at 3-4.


accounted for 58 percent of desktop browser and IE and Microsoft’s new product Edge, together only accounted for slightly less than 10 percent.¹³

By contrast, in 2010 Google launched Google Fiber to deliver fast sired broadband service nationwide in competition with local cable and telco providers.¹⁴ It faced significant capital costs in laying fiber optic cable underground.¹⁵ It also encountered political barriers to entry in securing rights of way.¹⁶ Six years later, with losses mounting, it pulled back.¹⁷

B. Online Platforms Leverage Operating Systems as well as the Internet for Fast Global Distribution

Online platforms also rely on operating systems that sit on top of these physical networks to achieve fast global distribution.¹⁸ HTML, combined with various Internet protocols, provides an operating system for developing websites. Browsers enable users and web sites to connect with each other. Search engines enable users to find websites. Operating systems, such as Windows for desktops and the iOS for mobile, provide software and hardware services that online platforms can also use. Spotify, for example, developed a desktop app that people could download from the web and use to stream music over the Internet. While it had to negotiate music rights to make music available in particular countries it could make its website and app available to anyone with a computer and an

¹⁸ Online platforms sit on top of two foundational platforms, one based on software and the other based on hardware, as discussed in Matchmakers, pp. 45-48. Operating systems, as used here, are software platforms that support other software.
Internet connection. Spotify, and other streaming music apps, rapidly eroded Apple’s market leadership in downloadable music as it launched in country after country.

Mobile app platforms—principally iOS and Android—enable online platforms to rely on mobile operating systems for obtaining hardware and software services on smart mobile devices. That reduces the cost of writing apps and expands what those apps can do. Mobile app stores enable businesses to make their apps available, often for free, to every smart mobile user on the app platform.19 Ride-sharing companies, for example, have obtained widespread use by providing apps, easily and simply, to drivers and passengers through the Apple App Store and Google Play. They didn’t need significant additional physical infrastructure to provide services in almost every major city in the world.20 That has made it possible for Uber, for example, to expand its ride-sharing business globally, but also for other firms to challenge Uber without incurring the significant sunk costs associated with establishing physical networks.

C. Online Platforms Can Easily Add Features Because They Are Based on Software

When traditional businesses want to expand into a new product category, they often have to modify assembly lines, build new factories, upgrade equipment, and secure suppliers. Online platforms are built from software code, which is highly malleable, making it possible for firms to add features, including highly complex ones.21 Facebook, as shown below, completely rebuilt its iOS app in less than six months, providing a much more desirable product for consumers.22

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19 Apple and Google charge commissions only to apps that use their app store payment mechanisms. Apple requires that apps providing paid digital content to users acquired through its app store to use the iOS app store payment mechanisms. Sellers of physical goods may use alternative payment mechanisms, and sellers of digital goods may use alternative payment mechanisms for users who sign up outside of the app store. Google allows all apps to use alternatives to its Google Play. Apple and Google charge developers a small free for getting access to their software development kits and other aids for app development.

20 See Matchmakers, Chapter 3.

21 Modifying software code to add features can be risky since software engineers need to make sure they don’t break the existing functionality when they add new code and take time for highly complex software. These difficulties, though, pale in comparison to traditional industries.

Traditional businesses also have to secure distribution for their new products. That often requires persuading physical distributors that they should make scarce store space available. By contrast, once online platforms incorporate these new features, it is trivial for them to make those features available to users. Microsoft Windows can quickly make new versions of its software available for download to everyone who has a valid license.

Traditional businesses usually obtain customer feedback slowly. They may have call centers to report complaints, conduct consumer surveys, and evaluate product reviews. Most importantly they observe the trajectory of sales. Online platforms obtain data from users on the performance of the platform continuously. They typically use that data to improve performance and identify opportunities for new features. For example, Pandora uses data on the songs liked by its 76 million listeners to immediately identify other songs that each listener might also like, varying with the time of day and the device used. Thus, Pandora can continuously identify new songs that its listeners didn’t know they liked.

Online platforms typically innovate continuously, rolling out incremental as well as disruptive innovations because it is relatively easy for them to do so. Moreover, since all online platforms can engage in this continuous innovation, at fairly low cost, any platform that fails to do so would face a loss of position and, through the reversible indirect network effects discussed below, potential demise. Not surprisingly online platform providers often compete intensively with each other by adding features, to improve their basic product offerings and for entering new categories.

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23 The Internet-of-Things will improve this situation in the coming years as many physical products, such as microwaves, have embedded internet connectivity.

The history of portal competition illustrates the process, which applies generally. Table 1 below shows the timing of selected new features introduced by the major web portals Yahoo, MSN, and AOL. Yahoo and AOL offered a web search engine in 1995, and Microsoft launched Bing in 1998. In 1996, Microsoft created Expedia and offered it through its portal. Yahoo added travel services in 1997 and AOL in 2000. Yahoo and MSN (Hotmail) offered free email starting in 1997, which AOL finally matched in 2005. Yahoo offered a shopping comparison engine in 1998, followed by AOL in 1999 and Microsoft in 2006. AOL began offering mapping services with its acquisition of MapQuest in 2000. This was matched by Yahoo in 2002 and MSN in 2005. In the mid-2000s, the main portals responded to the success of Myspace by aggressively adding social networking services. AOL was first with AOL Journals in 2003, followed by MSN Spaces in 2004 and Yahoo! 360 in 2005. Yahoo was the first portal to add a Q&A service, in 2005, followed by MSN in 2006 and AOL in 2007.

D. Online Platform Users Can Multihome and Switch Platforms at Low Cost

In traditional network industries, people typically single-home and switching is costly if there is even an alternative.25 For example, people have only one wired broadband provider for their household. They would have to pay for an additional subscription to have another. It is not simple to add or drop a wired broadband provider. Consumers often get broadband as part of a bundle from their cable provider. Switching cable providers is notoriously difficult in the United States. Consumers have to get new wires into their households and new set-top boxes when they switch cable providers. Some cable providers require consumers to return the set-top box, possibly by taking it to a physical location, before they will discontinue billing. The prevalence of single-homing and switching costs are true for electricity, gas, water, and commuter rail, as well as for durable consumer products that require investments in collateral devices.

Table 1: Selected Features at Major Portals by Year of Launch or Acquisition

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Increasingly, online platforms are mobile-centric or at least offer an app. It is easy to add and subtract apps from devices. The number of apps that people can use is limited mainly by their ability to keep track of icons or bookmarks. Many online platforms are available to users for free.
Consumers face no significant expense in installing an additional online platform app. Nor must they agree to use an online platform exclusively.

As a result of these features, it is easy for people to multihome on several online platforms. They can conveniently switch back and forth depending upon which they prefer for which purpose. It is also easy for people to try a new alternative online platform and decide whether to keep using it or not. The same is true for business users on online platforms, such as advertisers and gig-economy workers. Large advertisers often use multiple online platforms, including ones in the same narrow category such as search, and switch advertising budgets between them.26 Drivers for ride-sharing apps can, and many do, use more than one app.27 Multihoming is so prevalent among online platforms that it is hard to identify exceptions.

The prevalence of multihoming, and switching, between platforms is inconsistent with the claim that data provides a substantial barrier to entry. Time and again new platforms arise, with no data at inception, and acquire consumers and obtain data over time. That doesn’t mean that data isn’t valuable. It does strongly suggest that lack of data doesn’t pose significant obstacles to online platforms that develop valuable products that consumers like.28

E. Indirect Network Effects Work in Reverse

Platforms, whether online or physical, must attract enough members of each group of users to provide enough value to the other group of users.29 Buyers won’t use a marketplace, whether online or physical, unless it has enough sellers, and sellers won’t use a marketplace unless it has enough buyers. Platforms that crack this chicken-and-egg problem can grow very rapidly. More users

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28 Although the sweeping statements about the importance of data do not have empirical support, it is possible that there are situations in which data could prove to be a barrier to entry and enhance market power. Empirical analysis is necessary to determine whether that is true, and whether the collection and possession of data facilitates consumer harm, on net, in violation of competition laws in those specific circumstances.
29 Matchmakers, Chapter 5 on the solving the chicken and egg problem and securing critical mass.
in each group attract more users in the corresponding group. As noted above, economists refer to the positive feedbacks between groups as “indirect network effects.”

Indirect network effects do not necessarily lead to monopoly. They may become exhausted at some point, as additional users don’t add much value. Several platforms can soften the impact of indirect network effects by differentiating themselves on one or both sides and thereby appealing to different users. Congestion can limit the value of additional users. In fact, multisided platforms with indirect network effects are seldom monopolies.\(^3\) The exceptions that are sometimes pointed to, such as Windows, don’t prove the rule.

Some commentators claim that these network effects result in an insurmountable barrier to entry and point to some physical networks, such as telephones and railroads, as proof. There is a fundamental difference, however, between some physical platforms and most online platforms. Indirect network effects can be difficult to reverse for physical networks because users made specific capital investments in those networks that they would have to duplicate if they joined another network. That can make it hard for customers to try another network or to switch altogether. Indirect network effects help protect physical platforms from entry. To try a new telephone service, for example, customers of AT&T’s local exchanges at the turn of the 20th century had to get an additional wired connection to their home, use an additional telephone handset, and pay for an additional subscription.\(^3\)


\(^3\) Even these switching costs didn’t prevent competitive entry after AT&T’s patents expired. Independent telephone companies entered in parts of cities that AT&T didn’t serve or served poorly and, by 1907, accounted for 51 percent of telephone subscribers. AT&T was eventually allowed to consolidate competing telephone exchanges and was protected by regulatory barriers to entry. “AT&T” refers to the various entities that evolved from the original Bell Telephone Company. These entities were affiliated with each other under sometimes complex ownership structures over the years. Robert Bornholz and David S. Evans, “The Early History of Competition in the Telephone Industry,” in David S. Evans, ed., Breaking Up Bell (New York: Elsevier Science Publishing Co., 1983. See also Peter Temin with Louis Galambos (1987), The Fall of the Bell System: A Study in Prices and Politics (Cambridge, UK: Cambridge University Press).
By comparison, indirect effects are easier to reverse for online platforms because of the multihoming and lower switching costs described above. Users can add another platform to try it out which makes it easier for a challenger to crack the chicken and egg problem. Users can drop a platform, or reduce their use of it, if they find a better alternative. If users of one group drop it, the platform becomes less valuable to users of the other group, and indirect network effects, working in reverse, propel the decline of the platform.

The history of communications platforms—messaging apps and social networks—over the last two decades illustrates the importance of reverse indirect network effects as well as the data that comes along with users. People value communications platforms that have more of the people they want to interact with. A naïve view of indirect network effects implies that a successful communications platform would be secure from competition since people wouldn’t join or use a platform that didn’t include most of their personal network. The flaw in that reasoning is that people can multihome on online communications platforms. A few people in a network try a platform. If enough join, and like it, then eventually all of them could switch or drop the initial platform. This phenomenon has happened repeatedly. AOL, MSN Messenger, Friendster, Myspace, and Orkut all rose to great heights, and then rapidly declined, while Facebook, Snap, WhatsApp, Line, and others quickly rose. Nothing about the underlying economics or technology of online platforms has changed that would prevent this same cycle from repeating itself going forward.

The possibility of reverse indirect network effects doesn’t mean that online platforms necessarily die. By competing dynamically, through offering new innovative features and services and increasing value to users, online platforms can retain their momentum and forestall decline. Indirect network effects can therefore act as a competitive constraint rather than an entry barrier.

F. Many Online Platforms Compete for Attention and Advertising
Facebook and Google derive virtually all of their revenue from selling advertising—97 percent for Facebook and 88 percent for Alphabet, Google’s parent. Amazon and Microsoft also operate significant online advertising businesses. Six of the top ten websites, and nine of the top ten mobile apps, based on U.S. unique visitors, also sell advertising and appear to derive most of their income from ads. They all operate “attention platforms.”

Attention platforms, which include traditional ad-supported media such as television, solve a basic problem in commerce. Businesses would like to deliver ads to those consumers that are most likely to buy from them based on being exposed to the ad. Consumers generally don’t like many kinds of ads and wouldn’t seek them out. So long as businesses value delivering an ad message more than a consumer would pay to avoid it, there is room for a value-increasing exchange. Attention platforms generate value by providing users with valuable content and then charging the advertisers for the opportunity to present an ad to the consumer. Almost all physical attention platforms make access to consumers free, as is the case for free radio and TV, or charge consumers a fee that defrays the cost of distribution but not of providing the content, as is the case for many newspapers and magazines.

Online attention platforms have changed the traditional ad-supported media model in two critical ways. Traditional media show the same ad to many people and don’t have detailed information on who engaged with the ad. Everyone sees that same ad in this month’s Vogue Magazine or during a commercial break on CNN. Online attention platforms, which have an Internet connection with each viewer, can customize the ad in real time to the person viewing the ad. That increases the likelihood

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32 Facebook, 10-K for Year Ending December 31, 2016, at p. 9; Alphabet, 10-K for Year Ending December 31, 2016, at p. 13.
35 Matchmakers, pp. 128-129.
that the viewer will see a relevant ad and that the advertiser pays to present an ad to a relevant consumer. Online attention platforms use customer data to improve performance for advertisers who reach the most likely actual consumers of their products, and for consumers who receive targeted advertising and fewer irrelevant adds.

Online attention platforms compete with each other, in various dimensions, even though, from the perspective of a consumer, they seem to be doing different things. On the consumer side of the platform, they are all vying directly against each other to attract attention that can then be monetized through advertising. On the other side, they are also vying against each other for advertising spending. Advertisers, to maximize their investment, allocate their spending across attention platforms—online and physical—based on the return on investment they will make from presenting ads to consumers through these different channels.

Commentators who claim that categories are “winner-take-all” and that the winner is “unstoppable” miss the fundamental feature of much of Internet competition. Even if a category is really winner-take-all, the so-called victor basically wins the opportunity to provide valuable services to consumers for free. The victor then has to compete for advertising dollars with all the other winners.

Twitter, for example, has “won” the micro-blogging category outside of China. A decade after its start, with 319 million monthly active users worldwide, the company has struggled to sell enough advertising to cover its costs and make a profit. Part of its difficulty, according to analysts, is competing for advertising campaigns with other online platforms, such as Google and Facebook, neither of which provide the same microblogging functionality as Twitter, but both of whom compete with Twitter for both user attention and advertiser dollars.36

Ad-supported Internet-based platforms that seem to dominate their categories are therefore quite unlike traditional firms with large market shares. The ad-supported platforms are competing for attention on one side and for advertising dollars on the other.

G. Online Platforms Face Frequent Disruptive Innovation

Online platform competition is dynamic and unpredictable because waves of disruptive innovation expand opportunities for entry and pose challenges to incumbents. Online services for computer users began in the mid-1980s with the launch of various online providers such as AOL. These companies provided email, chat rooms, information, and other services. Computer users connected with a telephone modem. By 1994 AOL had one million users all of whom had aol.com e-mail addresses.37

In the mid-1990s the development of the World-Wide-Web, the opening of the commercial Internet for connecting users, and the availability of easy-to-use web browsers for rendering web pages launched the desktop-centric online world. The steady development and deployment of ever faster wired broadband connections accelerated the online growth. Despite its large user base, hoard of data, and brand name, AOL was not able to make the transition to a web-based environment. Yahoo was able to leapfrog AOL.

A bit more than a decade later the iPhone-led revolution, based on a pioneering device, operating system, and app distribution platform and followed closely by the Android platform, gradually eliminated the smart phone leaders, Microsoft, Blackberry, and Symbian. Each of those leaders had a significant installed base, data, applications, and network effects. The smart phone revolution also challenged online attention platforms, such as Yahoo, that had difficulty making the transition to mobile devices.


In 2014, just seven years after Apple introduced the iPhone, Amazon launched a voice-activated platform called Alexa that relies on voice recognition and artificial intelligence to complete tasks. Developers can write apps, called “skills,” for the Alexa platform. As of January 2017, more than 8 million U.S. households have Amazon Echo devices running Alexa, and Alexa has more than 10,000 skills. Other companies, including Apple, Google, and Microsoft are developing similar platforms. Analysts forecast that the sales of voice-first devices such as Amazon Alexa and Google Home will reach 24.5 million in 2017, raising the installed base to 33 million. It is too soon to tell who, if anyone, will fall prey to the voice-activated platforms.

Facebook’s experience exemplifies the difficulty that these disruptions can cause incumbents. By 2012, Facebook was the leading social network. It had 900 million active monthly users compared to 35 million for Myspace, the previous leader in the U.S. and many other countries. In its filings for its impending IPO, it reported $3.7 billion of advertising revenue and operating income of $1.8 billion for the year ending December 31, 2011. It earned this advertising revenue primarily from serving ads to people who accessed Facebook on their desktop with a browser. Eyes, however, were rapidly shifting to mobile devices where its ads were less effective. Analysts sharply questioned its ability to make the transition to mobile. As its failure at developing a mobile app became apparent, its stock

41 Facebook, Amendment 8 to Form S-1 Registration Statement, May 16, 2012. Myspace monthly active users are for May 2011.
value plummeted. By November 30, 2012 its stock was trading at 26 percent lower than the IPO price.42

Facebook had to scramble to make an effective transition to mobile. It trained hundreds of programmers in iOS and Android development and assigned mobile engineers to every developer team so that all new features could be built with a “mobile-first” mindset. The company went from updating its mobile apps every three to six months to updating them every month.43 It introduced new ad formats, like mobile app installation ads, and switched from banner ads and pop-up ads to native ads integrated into the user’s feed.44 Facebook also switched from developing an HTML5 mobile app to native apps for iOS and Android for better speed and performance.45 Today, Facebook earns 83 percent of its advertising revenue from mobile.46

If Facebook hadn’t made the transition it would have been in a far different position. Successfully making the move to mobile wasn’t inevitable, as the failure of AOL and Yahoo to bridge similar waves of disruptive innovation demonstrates. The threat of losing user attention and advertising, as consumers spent more time on mobile devices, impelled Facebook to innovate in ways that ultimately provided value to consumers and advertisers. This sort of do-or-die innovation plays out constantly for online platforms.

III. Dynamic Competition Among Online Platforms Between 1995 and 2016

The history of online competition shows that even the most successful online platforms at any point in time can’t sleep well at night because they face existential threats, and provides no

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42 Facebook’s IPO price was $38.00, and it closed at $38.23 on its first trading day. It’s closing price on November 30, 2012, was $28.00, 73.7 percent of its $38.00 IPO price.
46 Facebook, 10-K for Year Ending December 31, 2016, at p. 41.
support for the view, now pushed by various commentators, that Internet leaders have secure positions in the categories they serve. To be clear, the point isn’t that Internet leaders will die regularly, but that the threat of demise made tangible by fallen leaders from the past, forces leaders of the present to engage in constant intense innovative competition.

A. Dynamics of Competition Among Current Platform Leaders

Discussions of the state of competition among Internet-based firms often begin with the observation that five of them are now the most valuable companies in the world. Given the ability of Internet-based firms to disrupt traditional industries, globally, as well as to provide new products and services, it is not surprising that successful Internet firms have significant market caps. The market-cap charts illustrate, however, the vigor of online competition rather than its diminution. Every few years, new firms, that challenge old firms in important ways, bubble to the top.

Table 2 shows the top five U.S.-incorporated firms by market capitalization for 1990, 2000, 2010, and 2017. At the start of this 27-year period only two of the five Internet giants even existed—Apple and Microsoft—but neither ranked in the top 10 firms. IBM, which was a significant provider of hardware and software for the emerging online economy, and AT&T, which provided portions of the physical networks for the digital economy, were in the top 10. IBM had the highest market cap. Both firms possessed troves of data. Ten years later, IBM had tumbled to spot 14. Cisco, which provided infrastructure for the Internet was number 3. Microsoft had vaulted to 5.

By 2010, Apple, mainly on the strength of its 2007-introduction of the iPhone, was number 2 followed by Microsoft at number 3. Alphabet (Google accounts for almost all its revenue), based on its success as search-based advertising platform, was number 7. That year Facebook was still two years away from an IPO and Amazon ranked 32nd in market cap. Seven years later, Amazon and

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47 This dynamic competition does not mean, of course, that these large Internet firms could not have significant market power in particular categories, or engage in exclusionary or predatory practices. It does caution, however, against taking narrow views of markets that ignore dynamic competition.
Facebook joined Alphabet, Apple, and Microsoft in the top five. IBM had fallen to 32nd largest firm based on market cap.

Unlike the largest firms at previous points in time, these large Internet firms compete with each other across a range of products and services, despite each having gotten a toehold in the digital economy doing completely different things from one another. They compete in the near term (what economists call static competition): Amazon, Facebook, Google, and Microsoft, for example, all compete for advertising and promotional dollars. The largest Internet firms also compete long-term (what economists call dynamic competition): Amazon, Apple, Google, and Microsoft are all engaged in an intense race involving voice-activated platforms. Table 3 shows the current overlap between these firms in a number of categories.

**Table 2: Top Five U.S.-Incorporated Firms by Market Capitalization**

<table>
<thead>
<tr>
<th>Rank</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>International Business Machines Corp.</td>
<td>General Electric Corp.</td>
<td>Exxon Mobil Corp.</td>
<td>Apple Inc.</td>
</tr>
<tr>
<td>2</td>
<td>Exxon Mobil Corp.</td>
<td>Exxon Mobil Corp.</td>
<td>Apple Inc.</td>
<td>Alphabet Inc.</td>
</tr>
<tr>
<td>3</td>
<td>General Electric Co.</td>
<td>Cisco Systems</td>
<td>Microsoft Corp.</td>
<td>Microsoft Corp.</td>
</tr>
<tr>
<td>5</td>
<td>Merck &amp; Co.</td>
<td>Microsoft Corp.</td>
<td>General Electric Co.</td>
<td>Facebook Inc.</td>
</tr>
</tbody>
</table>

Source: S&P Capital IQ. Data for 1990, 2000, and 2010 are from December 31 of each year. Data for 2017 are for May 19, 2017. Outlier estimates for privately held companies have been removed from the S&P data.
<table>
<thead>
<tr>
<th>Table 3: Selected Products and Features of Largest Online Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Search</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td><strong>Browser</strong></td>
</tr>
<tr>
<td><strong>Mail</strong></td>
</tr>
<tr>
<td><strong>Messaging</strong></td>
</tr>
<tr>
<td><strong>Voice/Video Calling</strong></td>
</tr>
<tr>
<td><strong>Maps</strong></td>
</tr>
<tr>
<td><strong>Payments/Wallets</strong></td>
</tr>
<tr>
<td><strong>Operating Systems</strong></td>
</tr>
<tr>
<td><strong>Social Networking</strong></td>
</tr>
<tr>
<td><strong>Workplace Collaboration and Enterprise Productivity Software</strong></td>
</tr>
<tr>
<td><strong>Cloud Storage and Cloud Computing</strong></td>
</tr>
<tr>
<td><strong>Photo Storage</strong></td>
</tr>
<tr>
<td><strong>App Store</strong></td>
</tr>
<tr>
<td><strong>Artificial Intelligence</strong></td>
</tr>
<tr>
<td><strong>Automonomous Vehicles</strong></td>
</tr>
<tr>
<td><strong>Mobile Handsets</strong></td>
</tr>
<tr>
<td><strong>Tablets / Basic PCs</strong></td>
</tr>
<tr>
<td><strong>Wearables</strong></td>
</tr>
<tr>
<td><strong>Virtual Reality/Augmented Reality</strong></td>
</tr>
<tr>
<td><strong>Streaming Device</strong></td>
</tr>
<tr>
<td><strong>Voice-Activated/Virtual Assistant, Chatbots, Smart Speakers</strong></td>
</tr>
<tr>
<td><strong>Video Aggregation / Live Video</strong></td>
</tr>
<tr>
<td><strong>Online Advertising</strong></td>
</tr>
</tbody>
</table>
In fact, each of these firms has posed, and continues to pose, a significant threat to at least one of the other firms. In 2006, just ten years ago, for example, Microsoft appeared “unstoppable.” It licensed the operating system software for most personal computers in the world. It looked like it was going to extend that position into mobile. It had the third largest share of operating systems for smartphones (behind Symbian and Linux, and ahead of Blackberry) and the most sophisticated platform for app developers. But Apple’s iOS and Google’s Android platform leapfrogged Microsoft. Together they eliminated Microsoft as a serious competitor in mobile. Importantly, though, mobile operating systems compete for user and developer interest with desktop operating systems. Microsoft still earns significant revenues from licensing Windows for desktop computers, as IBM did from mainframes in 1990, but its operating system platform is not as relevant to many of the innovative businesses in the digital economy today as it was in the past.

In 2012, Google accounted for 41.3 percent of U.S. online advertising revenue. The second largest provider, Yahoo, accounted for only 8.4 percent. Most of this revenue came from desktop ads but the company looked well positioned to extend its search advertising business into mobile. Google Search had an exclusive agreement with Apple for the iPhone and was bundled into most Android handsets. Four years later, Google faced a much more significant competitor in online

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49 Aside from limiting its ability to engage in anticompetitive practices the U.S. and EU litigation involving Microsoft did not place any apparent constraints on its ability to compete in mobile.
advertising. Facebook had become the second largest provider of online advertising; as of 2016 it had a 16.6 percent share compared to Google’s 41.0 percent share. But on mobile, which is accounting for an increasing share of people’s time, Google accounted for 31.5 percent of U.S. ad revenue, compared to Facebook’s 22.5 percent.

Over the same time period, Google has faced increasing pressure from Amazon. Google earns virtually all of its revenue from serving ads to consumers who are looking for products. As Amazon has grown in prominence many consumers are starting their product searches on Amazon, and in many cases then purchasing from Amazon. Estimates vary as to the exact magnitude of this shift. PowerReviews estimates that 38 percent of U.S. online shoppers start their search on Amazon, compared to 35 percent who start on Google. BloomReach estimates that 55 percent of U.S. online shoppers start their online search on Amazon, compared to 28 percent who start with a search engine.

Just focusing on the firms with the highest market capitalizations today shows the firms that were leading at each point in time based on market capitalization faced more competition over the next decade rather than less. Most of the so-called Internet giants face direct competition from several of the other giants as well as from much smaller firms. History indicates that some of those smaller firms will likely become giants themselves in the coming decade. After all, three of the five so-called Internet giants were much smaller firms just a decade ago.

**B. Dynamic Competition Among Attention Platforms**


Many significant Internet-based firms over the last two decades have operated attention platforms that focus on developing content that attracts viewers and selling advertisers access to those viewers. The flux in the leading firms, based on the amount of attention they attract, shows the dynamism in this significant part of the digital economy. Table 4 shows the top 10 properties at various points in time based on published reports by comScore. Of the top 10 sites in each year, 8 dropped off from 1996-2006, 4 dropped off from 2006-2011, and 4 dropped off from 2011-2016.

**Table 4: Top Ten Web Properties by Unique Visitors**

<table>
<thead>
<tr>
<th></th>
<th>Jan-1996</th>
<th>Jan-2006</th>
<th>Jan-2011</th>
<th>Jan-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AOL.com</td>
<td>Yahoo!</td>
<td>Yahoo!</td>
<td>Google</td>
</tr>
<tr>
<td>2</td>
<td>WebCrawler.com</td>
<td>MSN-Microsoft</td>
<td>Google</td>
<td>Facebook</td>
</tr>
<tr>
<td>3</td>
<td>Netscape.com</td>
<td>Time Warner Network</td>
<td>Microsoft</td>
<td>Yahoo</td>
</tr>
<tr>
<td>4</td>
<td>Yahoo.com</td>
<td>Google</td>
<td>Facebook.com</td>
<td>Microsoft</td>
</tr>
<tr>
<td>5</td>
<td>Infoseek.com</td>
<td>eBay</td>
<td>AOL, Inc.</td>
<td>Amazon</td>
</tr>
<tr>
<td>6</td>
<td>Prodigy.com</td>
<td>Amazon</td>
<td>Ask Network</td>
<td>AOL, Inc.</td>
</tr>
<tr>
<td>7</td>
<td>Compuserve.com</td>
<td>Ask Jeeves</td>
<td>Turner Digital</td>
<td>Comcast NBCUniversal</td>
</tr>
<tr>
<td>8</td>
<td>UMich.edu</td>
<td>MySpace.com</td>
<td>Viacom Digital</td>
<td>CBS Interactive</td>
</tr>
<tr>
<td>10</td>
<td>Well.com</td>
<td>Viacom Online</td>
<td>CBS Interactive</td>
<td>Mode Media (formerly Glam Media)</td>
</tr>
</tbody>
</table>

Source: comScore. Note that prior to 2013, comScore’s top web properties were based on desktop visitors only, while after 2013 they are based on combined desktop and mobile visitors.

The dynamics of competition among attention platforms is seen in the rapid rise of Snapchat. This camera-based communication application started in September 2011. Snap reported an average of 158 million daily users in its S-1 filing in February 2017. It showed its first ad in October 2014. In 2015, it generated more than $400 million in advertising revenue. As of June 1, 2017, it had a market cap of $25.2 billion.

Like many attention platforms, Snap started by coming up with a differentiated way of attracting attention. It focused on providing ephemeral camera-based communications between

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56 S&P Capital IQ.
people.\(^{57}\) This attracted users who likely shifted some of their time from other online and physical attention platforms such as Twitter. Once it had attracted significant user attention it could offer advertisers the ability to reach those users with ads. Snap developed innovative advertising products that it used, together with its user base, to compete for ad spending with other attention platforms. That gave advertisers another option and likely diverted spending from other platforms.

Competition from Snapchat for users and advertisers places pressure on other platforms. Those platforms can compete with different features to attract users or they can mimic features that Snap has introduced. Snap’s success, for example, induced a competitive response from Facebook on both Instagram (a camera-based property it owns) and on its main Facebook property. Facebook launched Instagram Stories, a feed of ephemeral content similar to Snapchat’s central feed.\(^{58}\) In turn, Snapchat has been working to improve its audience segmentation ability in order to attract advertisers away from Facebook.\(^{59}\) Snap also has to worry about competition from entrants as well as other platforms. As it points out “[T]he barrier to entry for entrants is low, and the switching costs to another platform are also low.”\(^{60}\)

C. The Durability of Platform Leadership

The rise and fall of Yahoo illustrates the forces that propel firms to great heights but then accelerate their decline. Yahoo went live in January 1995. By January 1996, Yahoo had about 5.8 million monthly unique visitors.\(^{61}\) Having gone public in 1996 Yahoo’s market value as of July 1, 1998 was $8.3 billion and $46.2 billion on July 1, 2004, after the dotcom bubble burst, but before its

\(^{57}\) Snap, Amendment No. 3 to Form S-1 Registration Statement, at p. 1.


\(^{60}\) S-1, p. 15.

investment in Alibaba. The company had first mover advantages, had network effects from various user groups, and access to capital.

Yahoo faced significant competition, however, from new attention platforms. Over the 2000s, as the online advertising industry matured, many firms started introducing services, and content, to attract the attention of users. Despite a head start and a major user base, Yahoo failed to deliver a successful search engine, which became an important service for attracting users. In the 2010s, as consumer attention shifted from desktop to mobile and from browsers to apps, Yahoo failed to develop content, and related advertising products, that were a good fit for smartphones. Its share of digital advertising revenue plummeted from 12.8 percent in 2010 to 4.2 percent in 2015. Yahoo was sold to Verizon for slightly more than $4 billion in a deal that closed on June 13, 2017.

The history of messaging apps further illustrates how disruptive innovation, resulting from technological change, can topple leaders. Early messaging programs include CTSS (1961), Talkomatic (1973), CompuServe’s CB Simulator (1980), and Zephyr Notification Service (1980s). But messaging applications really took off in the mid-1990s, with the introduction of ICQ (1996), AOL's AIM (1997), Yahoo! Pager (1998), and MSN Messenger (1999).
Of these, the most successful was AOL, which sought to preserve its advantage by making it difficult for other messenger programs to interoperate with AIM. The FCC was worried it would be able to leverage its monopoly into next generation services, and behavioral restraints intended to prevent this and encourage interoperability as a condition for approving the AOL merger with Time Warner in 2000. Despite the FCC's intervention, AOL didn’t become fully interoperable with third-party messaging services until 2008, after it had started rapidly losing share to competitors such as Google Talk, MSN, and Skype.

By mid-2011, AIM’s worldwide share had fallen to less than one percent. Press accounts attribute the decline to mistakes by AOL’s management and innovations by competitors. AIM’s user base peaked in 2007, at 63 million, and declined to only 4 million when it shut down in 2012. Today, the most successful messenger programs are mobile apps such as Snapchat, WeChat, Line, and Viber.

Apple’s music download business shows how disruptive innovation, including business models, can quickly break the dominance of online platforms. Apple introduced its downloadable music service, the iTunes Store, in 2003 after negotiating deals with the major music publishers. The distribution of music quickly shifted from physical stores, and physical media, to online downloads. By 2010, Apple accounted for 70 percent of U.S. sales of music online and 28 percent of all U.S.

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music sales. Commentators suggested that its dominance was so great that entrants could only hope to complement Apple, and not unseat it:

But its dominance is so strong that the only realistic way to compete with Apple is to compete around it with offerings that complement the iTunes experience rather than attempt to unseat it, e.g., Shazam, SoundCloud, Last.FM, MXP4, Pandora, even Spotify. And more often than not, that actually means integrating into the iTunes ecosystem, thus further strengthening Apple’s role.

In late 2008 Spotify launched its streaming music business in Sweden. Instead of downloading music, which consumers could then listen to whenever they wanted, Spotify made it possible for consumers to stream most music on demand. It negotiated licensing deals with the major music labels that gave it access to most music that people want to listen to. Spotify made money from a free ad-supported basic platform as well as a paid premium service. It expanded from Sweden to other countries including the U.S. in July 2011. Other music streaming companies, including Deezer and Pandora, also entered using somewhat different business models.

Apple’s download business went into gradual decline. In the United States, music downloading by all retailers peaked in 2012 (at $2.8 billion), just after Spotify’s U.S. entry. The small decline in 2013 was followed by a much larger decline in 2014, when U.S. music downloading revenues dropped by 10 percent across all retailers.

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to decline, and by 2016 was 63 percent of its peak level in 2012 (60 percent of its 2012 peak level in inflation-adjusted terms).\textsuperscript{79} Apple’s decline was even larger than the industry average—13 to 14 percent worldwide through the first nine months of 2014.\textsuperscript{80} In subsequent years, Apple’s music download sales declined even further (16 percent in 2015 and 25 to 30 percent in 2016), with rumors in the trade press suggesting that Apple is considering abandoning its download business altogether.\textsuperscript{81}

Apple, with a seemingly secure position in downloadable music, with massive amounts of data on users, including what they downloaded, could not forestall the decline of its music download business. It is now trying to catch up with the disruptors. By March 2017 Spotify had over 100 million active users, including over 50 million paid subscribers.\textsuperscript{82} In response, Apple launched its own paid streaming service in June 2015, which had 20 million subscribers as of December 2016.\textsuperscript{83}

Airbnb illustrates how difficult it is to predict where competition will come from. In the early 2010s, online travel sites such as Booking.com and Expedia viewed Google as a major competitive threat. People use search engines to examine hotel options and often find their ways to online hotel booking sites in the process. As Google developed its own travel-related option the online travel sites were concerned that it would use its control over search results to tilt things in its favor.

Over the 2010s, however, Airbnb, which started in an early version in 2008, disrupted the lodging industry including the vertical search properties. It developed a marketplace for people to

\textsuperscript{82} Spotify, “About Us,” https://press.spotify.com/us/about/. Note that the estimate of paid users is from March 2017, while the estimate of total active users is from June 2016.
lease or rent lodging such as spare rooms, vacant apartments, and vacation homes. By 2017 it had 3 million listings in more than 190 countries. About 80 million people rented places to stay using its platform in 2016. As Airbnb has given people more choices, the hotel and lodging industry under competitive pressure.

Juniper’s latest research, Sharing Economy: Opportunities, Impacts, and Disruptors 2016-2020, found that shared space platforms, such as Airbnb are allowing users to rent rooms in residential properties at rates often undercutting traditional hotel rooms, disrupting the leisure and tourism industry significantly.

One academic study found that Airbnb reduces hotel revenue by 8-10 percent, particularly for hotels serving leisure travelers at times of peak demand. Morgan Stanley has estimated that Airbnb will reduce the growth rate of hotel revenue per available room by half a percentage point per year.

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through 2020. It has also placed the travel sites under competitive pressure, as bookings are diverted from its platform, which serves as an intermediary between people and hotels, to Airbnb.

Airbnb's competitive threat to the OTAs [online travel agencies] is larger than that faced by hotels. First, the more hotel demand Airbnb cannibalizes – impacting occupancy and RevPAR [revenue per available room] – the harder it will be on the OTAs. Second, the fact that the OTAs over-index toward leisure (80%+ of Expedia/Priceline bookings from leisure demand) puts them in more direct competition with Airbnb. Airbnb's cannibalization of non-hotel categories – like bed and breakfasts and vacation rentals – further impacts OTA demand. We see further long-term OTA risk if Airbnb ever decides to allow the traditional hotels to list on its site.

Expedia, recognizing this threat, purchased an Airbnb competitor, HomeAway in 2015.

While Google was improving its online travel business and online travel platforms were complaining about Google leveraging its position in search to do so, these players ended up facing much more serious competition from a new entrant that started on a shoe string and within a few years developed a global booking business.

Between the mid-2000s and early 2010s several platforms that looked like unstoppable leaders, protected by supposedly insurmountable network effects and first-mover advantages, fell from their perches. In many cases, disruptive technological change laid the groundwork for rivals to enter. Rapid increases in wired broadband speeds made streaming music more reliable, which facilitated the entry of Pandora. The development and deployment of faster and more capacious wireless broadband resulted in the dramatic move of users and developers to smart mobile devices. That in turn set in motion developments that accelerated the decline of desktop-centric platforms such as AOL and Yahoo and put others, such as Facebook and Google, at significant risk.

The point, as noted above, is not that online platform leaders face inevitable displacement. Rather, it is that threat of disruptive innovation, in technologies and business models, and the

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knowledge that seemingly secure platform leaders have been toppled, forces online platform leaders to engage in constant innovation to keep attracting users and holding on to their positions.

IV. Barriers to Entry and Expansion and the Role of Data

It is easy to start an online platform in the sense that it often takes little more than renting cheap servers, putting some effort into writing code, and running things from home, or cheap space, at first. Many successful online platforms have started this way. Credit cards are the financial instrument of choice for obtaining liquidity. Entrepreneurs can make considerable progress before they tap angel investors and venture capitalists.

Although entry in this sense is easy, success is anything but. Most online platforms have to figure out how to get a critical mass of users on board before they can create significant value and grow. Few succeed at this. YouTube, for example, struggled for a year to figure out how to get enough people to upload videos and enough people to view videos to make their platform useful to either. More than 40 other companies, including Google Video, tried and failed.

Successful platforms are the ones that figured out the right combination of products, prices, design, and ignition strategies. They then have some measure of protection from competition simply because any challenger has to solve the same difficult chicken-and-egg problem. History has shown, however, that enough entrepreneurs succeed in figuring out how to grow their platforms to keep competitive pressure on incumbents, and that major online platforms enter each other’s categories to compete as well.


90 This combination may seem obvious ex-post but seldom is a priori. Facebook, for example, focused on developing a social network in which people had to be real and enforced this early on by limiting membership to people with valid .edu addresses at select schools. That turned out to be important but at the time one could make reasonable arguments for less exclusive approaches.
Recently, commentators have argued that data results in a significant barrier to entry. According to the Economist,

Internet companies’ control of data gives them enormous power. … With data there are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on… Vast pools of data can thus act as protective moats.\footnote{The Economist, “Regulating the Internet Giants: The World’s Most Valuable Resource Is No Longer Oil, But Data,” May 6, 2017, \url{http://www.economist.com/news/leaders/21721656-data-economy-demands-new-approach-antitrust-rules-worlds-most-valuable-resource}.}

At least one book and a number of articles have raised similar concerns.\footnote{See, for example, Maurice E. Stuke and Allen P. Grunes (2016), Big Data and Competition Policy, Oxford: Oxford University Press.} One can make various conceptual arguments as to why data should or shouldn’t be important for online competition, and there is a thriving literature that does so.\footnote{See, for example, Anja Lambrecht and Catherine E. Tucker (2015), “Can Big Data Protect a Firm from Competition,” Working Paper, \url{https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2705530}; Daniel L. Rubinfeld and Michal S. Gal (2017), “Access Barriers to Big Data,” Arizona Law Review, 59: 339-381.} A fundamental point, however, is that as a general description of how online platform competition works the data-barrier to entry theory is inconsistent with the facts. The history described in the previous section doesn’t support the view that data acts either as a significant barrier to entry for online platforms or as an asset that protects incumbent platforms from competition.

AOL, Friendster, Myspace, Orkut, Yahoo, and many other attention platforms had data on their users. So did Blackberry and Microsoft in mobile. As did numerous search engines including AltaVista, Infoseek, and Lycos. Microsoft did in browsers. Yet, in these and other categories data didn’t give the incumbents the power to prevent competition. Nor is there any evidence apparent that data increased the network effects for these firms at least in a way that gave them a substantial lead over challengers.

In fact, firms that, at their inception, had no data whatsoever displaced the leaders. When Facebook launched its social network in India, in 2006, in competition with Orkut, it had no data on Indian users since it didn’t have any users. That same year Orkut was the most popular social network
in India with millions of users and detailed data on them.\textsuperscript{94} Four years later Facebook was the leading social network in India.\textsuperscript{95} A similar story was true for Spotify. When it entered the U.S. 2011, Apple had more than 50 million iTunes users and was selling downloaded music at a rate of one billion songs every four months.\textsuperscript{96} It had data on those people and what they downloaded. Spotify had no users, and no data, when it started. Yet it has been able to grow to become the leading source of digital music in the world. In all these cases the entrants provided a compelling product, got users, obtained data on those users, and grew.

Although it is possible that data provides some online platforms with important advantages, which could result in barriers to entry, the historical evidence refutes the proposition that data, as a general matter, provides online platforms with permanent advantages or places insurmountable obstacles before new firms.\textsuperscript{97}

V. Online Platforms, Sleepy Monopolies, and Sleepless Nights

A century or ago there were sound concerns, in the United States, that some of the firms that had emerged from the rapid process of industrialization could exert significant market power over buyers and were protected from competition. In some cases, those firms had natural advantages, coming from scale economies and network effects, while in other cases, they obtained their position

\textsuperscript{97} The literature on the big-data barrier to entry for online platforms doesn’t provide meaningful empirical evidence that data results in significant barrier to entry or magnifies network effects. The articles typically provide an argument as to why big data might have these effects. Of course, there could be specific situations in which data could provide a barrier to entry and result in significant market power. As Gal and Rubinfeld (2017), point out, it is unlikely that there is a single explanation for how data affects the competitive process. Daniel L. Rubinfeld and Michal S. Gal (2017), “Access Barriers to Big Data,” Arizona Law Review, 59: 339-381.
through merger to monopoly or secured political or regulatory barriers to entry. Some manufacturing industries also evolved into stable oligopolies for which consumers might have benefited from more competition and innovation.

Today’s digital economy looks diametrically opposed. The underlying technology, and business models, facilitate entry and enable firms, with the right formula, to attain global scale quickly, and to challenge incumbent platforms in one or more dimensions. It also results in reversible network effects, unlike physical network industries, that can pose existential threats to the category leaders. History has borne this out over the last several decades as successive waves of online platforms rise and fall. There is no apparent reason, based on changes in economics or technology, why this time is different.

These facts, and history are well known to executives of and investors in online platforms. They know that some largely new type of business could peel off platform users, and cause accelerating declines. That forces all online platforms, no matter how secure they may seem, to keep innovating and providing value to users. And each needs to worry about other successful platforms in addition to the proverbial inventor in the garage.

None of the firms act as if it has a moat around it, protected by data, network effects, or anything else. There don’t seem to be sleepy monopolies littering the digital economy. Few who participate in this sector can sleep well at night.