

THE SECOND DIGITAL DISRUPTION: STREAMING AND THE DAWN OF DATA- DRIVEN CREATIVITY

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This Article explores how the explosive growth of online streaming is transforming the market for creative content. Two decades ago, the popularization of the internet led to what we refer to here as the first digital disruption: Napster, file-sharing, and the re-ordering of numerous content industries, from music to film to news. The advent of mass streaming has led us to a second digital disruption, one driven by the ability of streaming platforms to harvest massive amounts of data about consumer preferences and consumption patterns. Coupled to powerful computing, the data that firms like Netflix, Spotify, and Apple collect allows those firms to know what consumers want in incredible detail. This knowledge has long shaped advertising; now it is beginning to shape the content streaming firms purchase or even produce, a phenomenon we call “data-driven creativity.” This Article explores these phenomena across a range of firms and content industries. In particular, we take a close look at the firm that is perhaps farthest along in its use of data-driven creativity. We show how MindGeek, the little-known parent company of Pornhub and a leader in the market for adult entertainment, has leveraged streaming data not only to organize and suggest content to consumers but even to shape creative decisions. MindGeek is itself the product of the same forces—the shift to digital distribution and the accompanying explosion of free content—that transformed mainstream creative industries and paved the way for the rise of streaming. We first show how the adult industry adapted to the first digital disruption; that story aligns with similar accounts of how creative industries adapt to a loss of control over intellectual property. We then show how MindGeek and other streaming firms such

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as Netflix, Spotify, and Amazon are leveraging the second digital disruption, using data to make decisions about content promotion, aggregation, dissemination, and investment. Finally, we consider what these trends suggest for competition and innovation in markets for creative work. By making creative production far less risky, data-driven creativity may drive down the need for strong IP rights and reshape conventional assumptions about the purpose and role of IP. At the same time, the rise of data-driven creativity may reinforce the tendency of online markets toward dominance by a few major firms, with significant implications for competition and innovation.

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INTRODUCTION

Over the last two decades, as content has moved online and away from physical media, many have predicted the death of the music, motion picture, and publishing industries.¹ Digital piracy was long identified as the culprit, with the recording industry held up as the first

¹ See, e.g., Jazper Abellera, *We Blacked Out at Kirk Hammett's Horror Festival*, VICE: NOISEY (Feb. 20, 2014, 10:00 AM), https://noisey.vice.com/en_au/article/654dxr/we-blacked-out-at-kirk-hammetts-first-annual-fear-festevil (describing Kirk Hammett of Metallica's argument that the internet has killed the recording industry); Jason Blum, *Piracy Is the Biggest Threat Facing the Film Industry as We Know It – but Not in the Way You Think*, VOX (Apr. 20, 2016, 11:30 AM), <https://www.vox.com/2016/4/20/11393162/piracy-arthouse-film-extinct-jason-blum> (arguing that internet piracy will cause movie studios to stop producing less profitable art movies); Charles C. Mann, *The Year the Music Dies*, WIRED (Feb. 1, 2003, 12:00 PM), <https://www.wired.com/2003/02/dirge> (describing the negative effects of internet piracy on the recording industry); Vicky Roach, *Mad Max Director George Miller: Internet Pirates Will Kill Cinema, Put People out of Jobs*, NEWS.COM.AU (June 27, 2014, 1:42 PM), <https://www.news.com.au/technology/online/piracy/mad-max-director-george-miller-internet-pirates-will-kill-cinema-put-people-out-of>

casualty. And the doomsayers were backed by some frightening statistics: In the nearly two decades since the digital file-sharing service Napster burst onto the scene, recording company revenues have plunged by almost sixty-seven percent.² What portion of this shift in the industry's fortunes is due to piracy is debated; legitimate outlets such as iTunes also played a part. But it is increasingly clear that internet-enabled piracy played a causal role.³

This "first digital disruption" led to a dramatic re-organization of power within several creative industries and transformed the ways in which key players (particularly intermediaries like publishers, record companies, and retailers) did business. But the doomsaying was overblown. Creative industries eventually adjusted, most notably via the introduction of subscription-based streaming services such as Netflix, Hulu, Amazon Prime, Audible, Spotify, and Apple Music.⁴ We see

jobs/news-story/fc3e2a92d23be0c5666482b7844d02d3 (describing George Miller's argument that internet piracy will destroy the movie industry).

² This calculation is based on year-end 2015 data collected by the Recording Industry Association of America (RIAA) compared with year-end 1999 RIAA data (adjusted for inflation). See *U.S. Sales Database*, RIAA, <https://www.riaa.com/u-s-sales-database> (last visited Sept. 12, 2019). Streaming began to take off shortly after 2015.

³ At this point, the weight of the evidence is firmly on the side of piracy leading to recording industry revenue loss. Whether piracy leads to a decrease in the supply of new music is a separate question. See Joel Waldfoegel, *Copyright Protection, Technological Change, and the Quality of New Products: Evidence from Recorded Music Since Napster*, 55 J.L. & ECON. 715, 727–28, 735 (2012) [hereinafter Waldfoegel, *Copyright Protection*] (arguing that file sharing has reduced recording industry revenues but has not led to a decline in music quality); Joel Waldfoegel, *Music Piracy and Its Effects on Demand, Supply, and Welfare*, 12 INNOVATION POL'Y & ECON. 91, 100–04 (2012) [hereinafter Waldfoegel, *Music Piracy*] (noting that most studies have found that file sharing displaces recording industry sales but arguing that there has not been a decline in the production of high-quality music); Joel Waldfoegel, *Bye, Bye, Miss American Pie? The Supply of New Recorded Music Since Napster* 18–22 (Nat'l Bureau of Econ. Research, Working Paper No. 16,882, 2011) [hereinafter Waldfoegel, *Napster*], http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1789463 (same).

⁴ In the music industry as elsewhere, most of the impact fell on middlemen (record labels, publishing companies, and retailers) who saw their revenues sink. And even there, the story has been as much about creation as disruption. Record labels, formerly the dominant force in the industry, are much diminished today. But music streaming services, such as Spotify, Apple Music, and Tidal, once tiny, are now important players. Indeed, the total revenue of digital distributors now exceeds that of the total revenues of recording companies. Bill Rosenblatt, Keynote Address at the Department of Commerce Internet Policy Task Force Second Public Meeting on Developing the Digital Marketplace for Copyrighted Works: Enabling Efficient and Fair Markets for Content 9 (Jan. 25, 2018), https://www.uspto.gov/sites/default/files/documents/transcript_012518meeting.pdf. The U.S. live music industry has also grown substantially and is expected to continue to grow at about twice the rate of the overall economy. See Amy Watson, *Live Music Industry Revenue in the United States from 2012 to 2021 (in Billion U.S. Dollars)*, STATISTA (Mar. 20, 2019), <https://www.statista.com/statistics/491884/live-music-revenue-usa> (describing how live music ticket sales are estimated to grow by 5.23% annually between 2015 and 2020).

this adjustment even in the music industry, which suffered the most from piracy. Record company revenues shrank severely, yet the best evidence suggests that more music is being produced than ever.⁵ On the other side of the market, consumers pay less for, and have more access to, that cornucopia of music than ever before.⁶

In sum, this first digital disruption, although significant, was ultimately limited in scope. It undermined existing business models but did not fundamentally change the way music is created. This Article is about what comes next. We believe that technological changes are unleashing a new round of disruption, one which is likely to reach deeper into our creative economy. If it unfolds in the way we expect, the “second digital disruption” will re-order how new artistic and literary works are *created*, not just how they are promoted and sold. We believe it is likely also to accelerate trends toward consolidation in the production and distribution of creative content. It may transform our notions of authorship and raise fundamental questions about the nature and value of human creativity. And it may shift how we think about both the economic and moral underpinnings of intellectual property (chiefly, copyright) law.

What is this second digital disruption? At its core is the technology of digital streaming, and specifically the ability of streaming platforms to gather massive amounts of consumer data. Streaming is not just a means of distributing content; it is fundamentally a two-way communications channel for data about content consumption. The data that streaming platforms collect about consumer behavior can be used to support more targeted, and therefore less risky, decisions about what to create. The deeper understanding of consumer preferences that streaming data permits leads not only to a new competitive landscape—some firms have access to huge volumes of data, others do not—but also, more significantly, to new ways of creating content.

We can see early signs of the second digital disruption’s impact in the recent merger between AT&T, which owns digital cable and satellite networks, and Time Warner, which produces content. The

⁵ *E.g.*, Waldfoegel, *Copyright Protection*, *supra* note 3, at 727–28, 735 (arguing that there has not been a decline in the quality of music since the introduction of Napster); Waldfoegel, *Music Piracy*, *supra* note 3, at 100–04 (arguing that there is no evidence of a decline in the amount of recorded music produced since the introduction of Napster); Waldfoegel, *Napster*, *supra* note 3, at 18–22 (arguing that there was no decline in the quantity of recorded music produced after the introduction of Napster).

⁶ See Hannes Datta, George Knox & Bart J. Bronnenberg, *Changing Their Tune: How Consumers’ Adoption of Online Streaming Affects Music Consumption and Discovery*, 37 *MARKETING SCI.* 5, 6 (2018) (finding that consumers who use streaming music services consume a larger quantity and variety of music than they did before they started using streaming services).

Department of Justice challenged the merger, arguing that it would harm competition. Time Warner countered that, as a stand-alone content producer,⁷ it faced a competitive disadvantage versus rivals, such as Netflix, Google, and Facebook, that produce content but also own a digital distribution platform. As Time Warner put it:

First, unlike Google and Facebook, Time Warner has no access to meaningful data about its customers and their needs, interests, and preferences. In most cases, Time Warner does not even know its viewers' names. This data gap impedes its ability to compete with Google, Facebook, and other digital companies in advertising sales *The data gap also gives online video programmers a competitive advantage in the production and aggregation of content based on extensive data about the content preferences of their viewers.*⁸

The United States District Court for the District of Columbia agreed, holding that “[t]raditional programmers and distributors are experiencing increased competition from innovative, over-the-top content services”—i.e., companies that provide video programming over the internet:

Those web-based companies are harnessing the power of the internet and data to provide lower-cost, better-tailored programming content directly to consumers. The dramatic growth of the leading [internet video providers] in particular, including Netflix, Hulu, and Amazon Prime, can be traced in part to the value conferred by vertical integration—that is, to having content creation and aggregation as well as content distribution under the same roof.⁹

The court in the AT&T/Time Warner case concluded that access to data about consumer preferences is rapidly becoming a competitive necessity.¹⁰ And indeed Netflix, Amazon, and Spotify all use the data they collect on consumer activity to make decisions about some aspect of content.¹¹ The intensity with which these services use consumer data varies. All of the streaming platforms we will discuss already use the data they collect from users to target advertising. They also use

⁷ Time Warner, Inc. is not connected to Time Warner Cable, which was spun off from Time Warner in 2008 and acquired by fellow cable giant Charter Communications in 2016. Chris Ariens, *Time Warner and Time Warner Cable Are 2 Different Things*, ADWEEK (Oct. 22, 2016, 6:52 PM), <https://www.adweek.com/tvspy/time-warner-and-time-warner-cable-are-two-different-things/180524>.

⁸ Pretrial Brief of Defendants at 8, *United States v. AT&T Inc.*, 310 F. Supp. 3d 161 (D.D.C. 2018) (No. 17-2511) (emphasis added), *aff'd*, 916 F.3d 1029 (D.C. Cir. 2019).

⁹ *AT&T Inc.*, 310 F. Supp. 3d at 173.

¹⁰ *See id.* at 173–74.

¹¹ *See, e.g.*, Sapna Maheshwari, *Netflix and Spotify Ask: Can Data Mining Make for Cute Ads?*, N.Y. TIMES (Dec. 17, 2017), <https://www.nytimes.com/2017/12/17/business/media/netflix-spotify-marketing.html>.

data to decide how to organize, present, and recommend content. Some go further and use data to purchase content.¹² And, most strikingly, some use their data to *produce* content.¹³ It is this last twist—the use of consumer data to directly shape content creation—that is the frontier of the second digital disruption and the ultimate expression of what we refer to in this Article as “data-driven creativity.”¹⁴

Streaming and the data-driven creativity it permits are already reshaping our media landscape. Netflix, once a small company whose business model was mailing DVDs to consumers in red envelopes, is now an entertainment behemoth with over 100 million subscribers and a huge slate of original streaming video.¹⁵ Amazon, not content with merely transforming the book industry, has become a massive online marketplace for nearly everything—as well as a major distributor of streaming content through its Amazon Prime portal. But the company that has traveled furthest down the road to data-driven creativity is much less well known. The websites owned by this company, MindGeek, are collectively one of the internet’s biggest destinations, generating nearly two billion visits per month across the portfolio¹⁶—an amount of traffic that makes the company one of the top five bandwidth consumers in the world.¹⁷

MindGeek describes itself as “a global industry-leading information technology firm.”¹⁸ That language is accurate enough but largely a smokescreen. MindGeek is a leading firm in the vast universe of online pornography. And although, to the typical consumer of adult

¹² Jon Markman, *Netflix Harnesses Big Data to Profit from Your Tastes*, FORBES (Feb. 25, 2019), <https://www.forbes.com/sites/jonmarkman/2019/02/25/netflix-harnesses-big-data-to-profit-from-your-tastes>.

¹³ *Id.*

¹⁴ We use the term “data-driven creativity” rather than “data-driven content” to highlight the novel, and, we believe, significant, ways that the creative process itself is being transformed by the use of big data. As we note above, data can be, and already is, used to make decisions about the arrangement, investment in, and marketing of content. At the furthest extreme, and most interesting, is the actual incorporation of big data into the creative process. Given that focus, we believe data-driven creativity is the more appropriate term.

¹⁵ Josef Adalian, *Inside the Binge Factory*, VULTURE (June 11, 2018), <https://www.vulture.com/2018/06/how-netflix-swallowed-tv-industry.html>; Jeremy Bowman, *Netflix Proves It's Ready for World Domination*, BUS. INSIDER (July 22, 2017, 11:06 AM), <http://www.businessinsider.com/netflixs-last-quarter-world-domination-2017-7>.

¹⁶ Dominic Rushe, *Pornhub and Redtube to Join Go-Slow Protest over US Threat to Net Neutrality*, GUARDIAN (Sept. 5, 2014, 11:09 AM), <https://www.theguardian.com/technology/2014/sep/05/pornhub-redtube-join-go-slow-protest-net-neutrality>.

¹⁷ *Id.* It is worth noting, as a caution, that statistics about the adult entertainment industry are difficult to verify. There are no publicly traded companies subject to SEC disclosure rules, nor are there industry publications or industry trade associations that are viewed as reliable sources for industry data.

¹⁸ MINDGEEK, <https://www.mindgeek.com> (last visited July 22, 2019).

video, MindGeek is essentially unknown, many of its subsidiary sites and brands—Pornhub, YouPorn, GayTube, Brazzers, Digital Playground, and many others—are famous and heavily trafficked.¹⁹ Cumulatively, these brands, plus a dizzying array of specialized channels and user-uploaded content (some of it pirated), have made MindGeek a principal player in an industry estimated to generate up to \$97 billion in annual revenues globally.²⁰ Most significantly, MindGeek is at the leading edge of the second digital disruption: a highly successful company that has married big data,²¹ mined from billions of views, to content aggregation, organization, and even creation.

In this Article we examine how streaming firms are using consumption data to reshape the media landscape and, in the process, are recasting the role of intellectual property rights and competition in our creative economy. We use the adult entertainment industry as our primary lens, but, as we will show, the techniques so effectively deployed there are increasingly apparent in the music, film, and television industries as well.

To understand the adult industry's transformation in the second digital disruption, it is important to understand how the industry adapted to the first digital disruption. We first explain how the adult industry has continued to produce new content even as the rise of the internet led to the widespread availability of free pornography. That story is essential to understanding how MindGeek came to be so powerful. As with music in the early 2000s, the move to free content is an inescapable fact in the adult industry today. Once forced to surrepti-

¹⁹ Our discussion of MindGeek in this paper draws on previous journalistic accounts but also two long phone interviews with the CEO of MindGeek, Feras Antoon, as well as interviews with two individuals (Cathy Tsolakos and Kate Miller) who served as MindGeek's Director of Corporate Communications during our research and writing of this Article, and with business people and lawyers in the adult industry who work with or compete with MindGeek. In addition, MindGeek shared with us an example of their script-writing, discussed below.

²⁰ *Things Are Looking Up in America's Porn Industry*, NBC NEWS (Jan. 20, 2015, 7:17 AM), <https://www.nbcnews.com/business/business-news/things-are-looking-americas-porn-industry-n289431>. MindGeek's chief competitor is an even less well-known firm called WGCZ Holdings, based in Eastern Europe, which controls XVideos, Bang Bros, and many other brands. As a comparison, in 2016 "legitimate" motion pictures produced box office revenues of approximately \$38 billion worldwide and approximately \$11 billion in the United States and Canada. Ryan Faughnder, *Global Box Office Barely Grew in 2016. Blame It on China*, L.A. TIMES (Mar. 22, 2017, 4:15 PM), <http://www.latimes.com/business/hollywood/la-fi-ct-mpaa-box-office-20170322-story.html>.

²¹ See generally Bernard Marr, *The Complete Beginner's Guide to Big Data Everyone Can Understand*, FORBES (Mar. 14, 2017, 3:34 AM), <https://www.forbes.com/sites/bernardmarr/2017/03/14/the-complete-beginners-guide-to-big-data-in-2017> (noting that big data analysis can be used to spot patterns in large databases of videos and images).

tiously purchase DVDs in dingy stores, consumers of adult material can now go to any of the websites owned by MindGeek (or its competitors) and easily find millions of clips organized in hundreds of categories. Much of this material is available for free, sometimes in violation of applicable copyrights.²² Yet, despite the ubiquity of free content, new pornography continues to be produced at a high rate.

While other content industries have turned to subscription models, the vast majority of adult entertainment customers are averse to paid subscriptions. And because adult industry firms have rarely relied on the legal system to enforce IP rights,²³ free content has long been readily available. Learning to navigate and even leverage a world of free content was key to MindGeek's success.

But this is not merely a story of how one creative industry has adapted to a technological revolution, as important as that phenomenon is for our understanding of innovation and intellectual property law.²⁴ Even more significant is mapping how major digital distributors are leveraging this revolution to alter creative production. Both of the narratives about the adult industry we detail in this Article—the industry's adaptation to piracy and its subsequent move toward data-driven creativity—have important implications for our understanding of the interplay between competition, innovation, and intellectual property rights.

In the sections that follow we make two principal arguments.

First, the adult industry responded to the explosion of free content and piracy brought about by the first digital disruption by diversifying its outputs. Diversification is not new; it began when the industry first transitioned from showing films in theaters to videotapes, DVDs,

²² In interviews with us, MindGeek personnel repeatedly emphasized that the company responds expeditiously to requests to take down infringing content, as they are required to do under U.S. copyright law. See 17 U.S.C. § 512 (2012) (containing Copyright Act's "notice and takedown" provisions); Telephone Interview with Feras Antoon, Chief Exec. Officer, MindGeek (May 27, 2014).

²³ See Kate Darling, *Internet Pornography Without Intellectual Property: A Study of the Online Adult Entertainment Industry*, in CREATIVITY WITHOUT LAW: CHALLENGING THE ASSUMPTIONS OF INTELLECTUAL PROPERTY 201, 201–27 (Kate Darling & Aaron Perzanowski eds., 2017).

²⁴ See KAL RAUSTIALA & CHRISTOPHER SPRIGMAN, THE KNOCKOFF ECONOMY 7 (2012) [hereinafter RAUSTIALA & SPRIGMAN, KNOCKOFF ECONOMY] (noting that copyright protection is not available or is not used in many creative industries such as fashion and comedy); Darling, *supra* note 23, at 201–27 (discussing generally the effect of widespread illicit online content distribution on the adult entertainment industry); see also Kal Raustiala & Christopher Jon Sprigman, *When Are IP Rights Necessary? Evidence from Innovation in IP's Negative Space*, in 1 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW 309, 325, 327 (Ben Depoorter et al. eds., 2019) [hereinafter Raustiala & Sprigman, *When Are IP Rights Necessary*] (arguing that IP rights are not necessary to incentivize content creation in many industries).

and, finally, to subscription-based websites. During these transitions filmed scenes remained the central product. But today, the role of filmed scenes has increasingly shifted *from product to advertisement*. The primary purpose of filmed clips is to attract customers to other sources of revenue, which (importantly) are themselves resistant to piracy.

The industry's revised business model thus relies on the massive popularity of free pornography. Every day, there are likely to be at least 100 million pairs of eyes viewing adult material online.²⁵ Many clips on the major sites have millions of views. This exposure helps to enlarge the class of consumers who choose to spend money on pornography and has permitted major sites, such as Pornhub and XVideos, to grow very large. And as the economic value of video has declined, other revenue sources, such as "camming,"²⁶ custom videos,²⁷ sexting for pay,²⁸ and, as in the contemporary music business, merchandise, have moved to the fore.²⁹ The more well-known a performer, the more lucrative these alternative revenue streams are.

²⁵ Pornhub alone claims eighty million visits per day. *2017 Year in Review*, PORNHUB: INSIGHTS (Jan. 9, 2018), <https://www.pornhub.com/insights/2017-year-in-review>.

²⁶ Kate Darling, *IP Without IP? A Study of the Online Adult Entertainment Industry*, 17 STAN. TECH. L. REV. 709, 739–41 (2014) (noting that adult entertainment companies are increasingly moving towards business models focused on providing services and interactive content); see also SHIRA TARRANT, *THE PORNOGRAPHY INDUSTRY: WHAT EVERYONE NEEDS TO KNOW* 55–56 (2016). Live webcam shows, or cam sites, involve running a webcam, chatting with customers online, performing a variety of on-camera sex acts (usually solo), and going into private "rooms" when customers decide to pay for the performer's time. Matt Richtel, *Intimacy on the Web, with a Crowd*, N.Y. TIMES (Sept. 21, 2013), <https://www.nytimes.com/2013/09/22/technology/intimacy-on-the-web-with-a-crowd.html> (characterizing camming as "a kind of digital-era peep show" and noting its resistance to piracy).

²⁷ Andy Campbell, *Can Custom Porn Save a Flaccid Industry?*, HUFFPOST (Jan. 17, 2014, 2:16 PM), https://www.huffingtonpost.com/2014/01/17/porn-industry-piracy-pay_n_4613642.html; Jon Ronson, *Jon Ronson on Bespoke Porn: 'Nothing Is Too Weird. We Consider All Requests.'* GUARDIAN (July 29, 2017, 5:00 AM), <https://www.theguardian.com/culture/2017/jul/29/jon-ronson-bespoke-porn-nothing-is-too-weird-all-requests>. While this is not a new phenomenon—Anaïs Nin wrote bespoke erotica for patrons back in the 1940s—it is far more prevalent today. See ANAÏS NIN, *DELTA OF VENUS*, at xvi (1977) ("At the time we were all writing erotica at a dollar a page, I realized that for centuries we had had only one model for this literary genre—the writing of men. I was already conscious of a difference between the masculine and feminine treatment of sexual experience.").

²⁸ That is, sexual text messages and images sent from a performer to a fan. See *How to Make Money from Sexting*, WEBCAM STARTUP, <https://webcamstartup.com/sexting> (last visited July 22, 2019).

²⁹ See Mark Kernes, *Porn Costumes, Lingerie Bring in Big Bucks in Online Auctions*, ADULT VIDEO NEWS (July 1, 2014, 2:37 PM), <https://avn.com/business/articles/video/porn-costumes-lingerie-bring-in-big-bucks-in-online-auctions-565544.html> (discussing the increasing importance of sales of performers' costumes to the profitability of the adult entertainment industry).

Free clips play a role in what is essentially a “freemium” model,³⁰ by enabling performers to build individual brands that can be leveraged to generate other revenue streams.

Because these revenue streams are resistant to piracy—and in fact depend on extensive free content to work—they allow firms such as MindGeek to accrue huge libraries of streaming content and millions of daily visitors. Free content has thus encouraged consolidation, with a handful of major digital distributors at the core serving a massive audience of consumers. This transformation tees up our second argument: that mass streaming is altering the creative process.

The key, but underappreciated, feature of streaming is that as content flows out, data flows in. Enabled by fine-grained insights into consumer behavior, creators can increasingly tailor ads and even content to preferences.³¹ This is especially true for large firms, whose dominant role in content distribution gives them access to data that smaller rivals cannot replicate.³² One major result of the second digital disruption is greater returns to both scale (a firm’s absolute size) and scope (the variety of products a firm produces) in markets for creative work, and hence the likelihood of greater vertical and horizontal consolidation in those markets.

The goal of data-driven creativity is simple but powerful: Content producers deploy consumer data to lower the “risk of failure”—i.e., the risk that a particular work will be a bomb and not a blockbuster. And this in turn has important implications for what we term “the risk of success”: the risk that a hit will be copied by others. Intellectual property law exists to protect against this risk of success and to ensure that creators reap the full rewards of their creativity. But as the risk of failure goes down, the expected value of investment in new creativity goes up. Does copyright’s traditional justification as a spur to crea-

³⁰ See Chris Anderson, *Free! Why \$0.00 Is the Future of Business*, WIRED (Feb. 25, 2008, 12:00 PM), <https://www.wired.com/2008/02/ff-free> (introducing “freemium” concept where a basic service is offered free for the user with the aim of inducing the user to purchase more advanced or additional features).

³¹ See, e.g., Maheshwari, *supra* note 11.

³² Fashion is another form of creativity that is beginning to use data-driven creativity. See, e.g., Zoë Bernard, *This MIT Grad Just Got Millions to Build an Entire Fashion Brand That’s Inspired by Algorithms*, BUS. INSIDER INDIA (May 15, 2018), <https://www.businessinsider.in/this-mit-grad-just-got-millions-to-build-an-entire-fashion-brand-thats-inspired-by-algorithms/articleshow/64179463.cms> (describing a fashion company that uses algorithms to analyze trending Instagram posts in order to develop new clothing designs); Alexandra Schwartz, *Rent the Runway Wants to Lend You Your Look*, NEW YORKER (Oct. 15, 2018), <https://www.newyorker.com/magazine/2018/10/22/rent-the-runway-wants-to-lend-you-your-look> (“Rent the Runway’s chief merchant officer . . . told me that she worked with the designer Jason Wu to develop a collection of dresses data-tailored to her customers.”).

tivity retain the same traction in a world where the ability to gather and analyze massive amounts of data is a central criterion—perhaps, in the future, *the* central criterion—of creative success? The answer to this question has positive analytic implications: It can, for example, help explain why the adult industry continues to invest in new production in the face of extensive copying. It also has normative ones: The incentives rationale for strong intellectual property rights is diminished the more the risk of failure is reduced.

For years intellectual property theorists have described shifts away from the traditional authorial role, usually in terms of the increasing centrality of corporate and shared authorship.³³ The advent of streaming and data mining adds a critical dimension. To be sure, reacting to or anticipating market preferences is not new. But data-driven creativity raises new questions about the meaning of “authorship.” We contrast the traditional lonely genius or “Promethean” conception of authorship with an emerging “Panoptian” model in which creativity emerges not from solitary expression but from the sophisticated analysis of collective preference.

The rationale for strong intellectual property rights may also be diminished if the rise of data-driven creativity leads to large platforms like MindGeek and Amazon becoming even larger. The access to data that these giant platforms enjoy may become a crucial competitive advantage and a barrier to the entry of new competitors. The centrality of data thus increases the tendency of these digital markets to consolidate. In such an instance, the market power of a dominant digital distributor might even effectively substitute for the market power granted by intellectual property protection.³⁴

We want to be clear that our claim is *not* that intellectual property protection becomes unnecessary in a world of ubiquitous data mining via widespread streaming. Data does not eliminate the risk of market failure. The risk of copying by others still justifies some legal protection even if producers are in a much better position to anticipate what consumers want. The key question is how much protection is needed and how the law should adapt to this new competitive terrain.

In Part I of this Article we ground our inquiry by briefly examining the history of our core case, the adult industry, and its dramatic transformation in the wake of the first digital disruption. Part II details how the industry has reacted to the advent of free streaming

³³ For an excellent overview, see Jessica Litman, *What We Don't See When We See Copyright as Property*, 77 CAMBRIDGE L.J. 536 (2018).

³⁴ See *infra* Section III.C.

and explains how both traditional and new forms of content continue to be produced. In Part III we expand our focus to show how a wide variety of content industries are following a similar path and beginning to exploit the data that flows from streaming. This Part, which is the core of the Article, explores how the enormous increase in both data capture and data analytics by firms such as MindGeek, Amazon, and Netflix is leading to a creative process which is more interactive and deliberately targeted. This Part then assesses what the second digital disruption means for our conventional theories of intellectual property and our understanding of the interplay of intellectual property, competition, and innovation in contemporary markets for creative work.

I

ADULT ENTERTAINMENT AND THE RISE OF DIGITAL CONTENT

While it is impossible to date the birth of pornography, its roots are undoubtedly ancient. Cave paintings and carved “Venus” figures depicting sexualized female forms date back at least 35,000 years.³⁵ The 3000-year-old Kangjashimenji Petroglyphs, bas-relief carvings in a rock formation in the Xinjiang region of northwest China, include the earliest known depictions of copulation.³⁶ The Roman ruins at Pompeii are famously replete with graphic sexual imagery,³⁷ as too are centuries-old Japanese *shunga* prints.³⁸ Adult content, in short, is nothing new. But only with the development of the camera and then the motion picture did adult entertainment begin to take the forms we associate with the term “pornography” today.³⁹ And only in the last

³⁵ See Alan F. Dixon & Barnaby J. Dixon, *Venus Figurines of the European Paleolithic: Symbols of Fertility or Attractiveness?*, J. ANTHROPOLOGY 8 (Nov. 4, 2011), <http://downloads.hindawi.com/archive/2011/569120.pdf> (discussing the hypothesis that ancient female figurines depict sexualized female forms).

³⁶ Mary Mycio, *Archeology Isn't for Prudes*, SLATE (Feb. 14, 2013, 5:30 AM), http://www.slate.com/articles/health_and_science/science/2013/02/prehistoric_pornography_chinese_carvings_show_explicit_copulation.html.

³⁷ *Pompeii's Whorehouse: Erotic Murals Re-Exposed*, SPIEGEL ONLINE (Oct. 30, 2006, 11:24 AM), <http://www.spiegel.de/international/pompeii-s-whorehouse-erotic-murals-re-exposed-a-445134.html>.

³⁸ *'Shunga' Exhibit Explores Sex and Pleasure in Traditional Japanese Art (NSFW)*, HUFFPOST (Dec. 6, 2017), https://www.huffingtonpost.com/2013/10/01/shunga-exhibit_n_4018457.html.

³⁹ In 1896, a film called *Le Coucher de la Mariée* showed a woman performing a striptease. This is generally considered the first pornographic film in existence. Only the opening part of the film survives. JONATHAN M. FARLOW, I'VE SEEN IT ALL AT THE LIBRARY: THE VIEW FROM BEHIND THE DESK 87 (2015); *LE COUCHER DE LA MARIÉE* (Pathé Frères 1896).

few decades was pornography recognized as a form of creative work protected by copyright law.⁴⁰

For much of the twentieth century, the industry's relationship with the law was largely antagonistic.⁴¹ Pornography's copyrightability was contested at best, and there is little evidence that the early producers and distributors aggressively deployed IP rights to protect their creations. This is not surprising: Producers often worked underground, and obscenity convictions were an ever-present threat.⁴² The First Amendment offered little shelter. The Supreme Court's 1957 decision in *Roth v. United States* had made clear what most had assumed: Material deemed obscene was not constitutionally protected.⁴³ In 1979, however, in the wake of the 1970s wave of "porno chic"⁴⁴ epitomized by the huge commercial success of films such as *Deep Throat*, the Fifth Circuit issued a ruling that became a landmark for the industry. In *Mitchell Bros. Film Group v. Cinema Adult Theater*, the court held that pornographic films were not per se barred from copyright protection.⁴⁵

⁴⁰ We take no stance in this Article on whether pornography is properly understood as a creative art form or is one that copyright law ought to protect. As we describe below, these questions were live for most of American history, but today, absent a few rare cases, pornographic film is treated much the same as mainstream film for purposes of intellectual property law.

⁴¹ Pornography is relatively little studied in the law in part because it is a controversial subject. People hold a range of views on the morality of pornography, its effect on gender relations and on children, its relationship to sexual trafficking, and a range of other issues related to pornography's role in society. We are aware of these important debates, but this Article does not engage with them. Our focus here is on a largely novel set of intellectual property issues: on the industry's innovation incentives and on what recent trends here and in various related industries suggest about the nature of authorship and the theoretical underpinnings of copyright law.

⁴² See, e.g., Susan King, 'Lovelace': A Look Back at the Porno Chic Era, L.A. TIMES (Aug. 8, 2013, 4:20 PM), <http://www.latimes.com/entertainment/movies/moviesnow/la-et-mn-porno-chic-lovelace-deep-throat-20130808-story.html>.

⁴³ 354 U.S. 476, 484–85 (1957); cf. *Jartech, Inc. v. Clancy*, 666 F.2d 403, 406 (9th Cir. 1982) (stating, in the context of copyright infringement of a pornographic film, that "[p]ragmatism further compels a rejection of an obscenity defense" because "obscenity is a community standard which may vary to the extent that controls thereof may be dropped by a state altogether"); *Nova Prods., Inc. v. Kisma Video, Inc.*, No. 02 Civ. 3850(HB), 02 Civ. 6277(HB), 03 Civ. 3379(HB), 2004 WL 2754685, at *2–3 (S.D.N.Y. Dec. 1, 2004) (first citing *Jartech, Inc.*, 666 F.2d 403; then citing *Mitchell Bros. Film Grp. v. Cinema Adult Theater*, 604 F.2d 852 (5th Cir. 1979)) (holding that the question of whether particular pornographic films are "obscene" is one of fact for the jury, and that, even were the films deemed to be obscene, it would not prevent their protection under a valid copyright).

⁴⁴ In this era pornographic films were widely shown in theaters and influenced popular culture, as with the film *Deep Throat*. See, e.g., King, *supra* note 42 (discussing the cultural impact of several popular porno chic-era films such as *Deep Throat*). The tail end of this era is depicted in Paul Thomas Anderson's 1997 film *Boogie Nights*. *BOOGIE NIGHTS* (New Line Cinema 1997).

⁴⁵ 604 F.2d 852, 865 (5th Cir. 1979).

Mitchell Bros. originated as a copyright infringement suit involving a 1972 film titled *Behind the Green Door*.⁴⁶ *Behind the Green Door* was a full-length film reviewed in the mainstream media and is today seen as a product of pornography's so-called golden age.⁴⁷ The defendants, who had screened a pirated copy in a theater, successfully asserted in their defense that the film lacked a valid copyright because it was obscene. The Fifth Circuit reversed, noting that Congress had not included any statutory bar to copyright based on obscenity. In the Fifth Circuit's words,

In the present case the copyright holders' actions are not inconsistent with any policy of the copyright laws. The infringers' attempt to immunize their illegal acts by wrapping themselves in the mantle of a "public injury" caused by plaintiffs is antithetical to the purpose of these laws. The effort cannot be sustained.⁴⁸

Reflecting the rapidly evolving sexual mores of the time as well as the increasingly long and elaborate form that pornographic films took, *Mitchell Bros.* normalized adult entertainment and allowed a pornographic film to be, for intellectual property purposes at least, treated the same as any other film. Since *Mitchell Bros.*, adult films have received broadly comparable copyright treatment to conventional films, although in isolated instances courts have continued to question whether and to what extent copyright protects pornography.⁴⁹

⁴⁶ *Id.* at 854.

⁴⁷ On this "golden age," see TARRANT, *supra* note 26, at 22.

⁴⁸ *Mitchell Bros.*, 604 F.2d at 865.

⁴⁹ See, e.g., *Devils Films, Inc. v. Nectar Video*, 29 F. Supp. 2d 174, 175–77 (S.D.N.Y. 1998) (refusing to exercise its equitable powers to issue a preliminary injunction against infringement of pornographic films and commit the resources of the United States Marshals Service to support the operation of plaintiff's pornography business, holding that the films were "obscene" and illegally distributed through interstate commerce). For decades, the adult entertainment industry also faced the threat of criminal prosecution under "pandering" laws that were aimed at those who facilitated prostitution. The most important pandering prosecutions were centered in California, where a large share of pornography was produced. For example, in *People v. Fixler*, 56 Cal. App. 3d 321, 325–27 (1976), and *People ex rel. Van de Kamp v. American Art Enterprises*, 75 Cal. App. 3d 523, 541–52 (1977), the California Court of Appeal held that photographers of nude models violated pandering statutes. In both instances, the non-participation of the photographers (and other defendants) in the sexual acts themselves was not a bar to successful conviction; instead, the mere payment made to performers for their sexual activity was upheld as sufficient to support the convictions. Similar reasoning was applied by the Supreme Court of New York in *People v. Kovner*, 409 N.Y.S.2d 349, 352 (Sup. Ct. 1978), which held that the state's broad power to regulate social evils like prostitution and pornography allowed it to convict pornographers despite their lack of physical interaction with the performers themselves. Pandering prosecutions were largely blunted by the ruling of the Supreme Court of California in *People v. Freeman*, 46 Cal. 3d 419 (1988). In *Freeman*, the court held that a pornography producer could not be convicted of pandering because that charge implicitly required (1) payment for sexual acts which led to (2) sexual gratification of the payor. *Id.* at 424–25. The court further held that no prostitution charge could be upheld for

Over the subsequent decades the adult industry boomed, in part because it proved to be very adept at leveraging new technologies. The industry was an early adopter of distribution via home video—indeed, some say that the porn industry’s adoption of the VHS format was the deciding factor that vanquished its rival, Betamax.⁵⁰ The adult industry was also among the first to move from distribution on videotape to DVDs, then to online downloads, and finally to streaming.⁵¹ But the uncertain legal foundations of pornographic content had lasting effects, and industry players remained wary for a very long time of asserting copyright aggressively.

The embrace of new technologies allowed the audience for adult entertainment to steadily expand.⁵² When viewing pornography required going to a theater or a peepshow, the market was unsurprisingly limited. With the wide distribution of home video in the late 1970s and early 1980s, adult films were suddenly consumable in private.⁵³ Nonetheless, even in the video and DVD era, many people would not risk the personal embarrassment of buying or renting at a store.⁵⁴ This constraint was mitigated with the rise, first, of online downloads and then, following the ubiquity of home broadband access, high-definition video streaming.⁵⁵

The watershed was the debut of YouTube in 2005.⁵⁶ YouTube was soon followed by the creation of Pornhub and XVideos,⁵⁷ both of which took the YouTube model of user-uploaded content—and the

the production of non-obscene pornography without violating the First Amendment. *Id.* at 425. The *Freeman* court’s reasoning has been widely followed outside California. *See, e.g., State v. Theriault*, 960 A.2d 687, 692 (N.H. 2008) (paying to videotape the sexual acts of others that was not intended to sexually gratify the payor was not pandering).

⁵⁰ Samuel Gibbs, *Betamax Is Dead, Long Live VHS*, *GUARDIAN* (Nov. 10, 2015, 6:44 AM), <https://www.theguardian.com/technology/2015/nov/10/betamax-dead-long-live-vhs-sony-end-production>.

⁵¹ Harry Tucker, *Whether We Like It or Not, Porn Rules Our Lives and Has Changed the Way We Live. This Is How*, *NEWS.COM.AU* (Jan. 18, 2015, 5:24 AM), <https://www.news.com.au/technology/online/social/whether-we-like-it-or-not-porn-rules-our-lives-and-has-changed-the-way-we-live-this-is-how/news-story/2735d8b8b5c72246db3f8ef06c9364b2> (explaining the interaction between adult industry and technology).

⁵² On technology and pornography generally, see TARRANT, *supra* note 26, at 15–27, which discusses how changes in technology such as home video and digital distribution have made pornography more widely available.

⁵³ *Id.* at 23–24.

⁵⁴ *Id.* at 24–25.

⁵⁵ *Id.*

⁵⁶ The first video on YouTube was posted on April 23, 2005. Megan Rose Dickey, *The 22 Key Turning Points in the History of YouTube*, *BUS. INSIDER* (Feb. 15, 2013, 9:01 AM), <https://www.businessinsider.com/key-turning-points-history-of-youtube-2013-2>.

⁵⁷ *See* Taylor Cox, *10 Interesting Things You Might Not Know About Pornhub*, *YAHOO! FIN.* (May 25, 2017), <https://finance.yahoo.com/news/10-interesting-things-might-not-141704415.html>.

safe-harbor provisions in U.S. copyright law that protect online service providers that host user-uploaded content⁵⁸—and expanded it into the adult realm. As streaming high-quality video became technically viable, and broadband internet access spread throughout the world, the consumption of adult material has moved almost entirely online. Indeed, as of July 14, 2019, Pornhub and XVideos were respectively the twenty-eighth and forty-fifth most popular websites in the world by traffic.⁵⁹ The impact on the industry was rapid—and much like the story of the music industry just a few years earlier. As the *New York Times* reported in 2007, as the first “porntube” sites were gaining market share,

The Internet was supposed to be a tremendous boon for the pornography industry, creating a global market of images and videos accessible from the privacy of a home computer. For a time it worked, with wider distribution and social acceptance driving a steady increase in sales. But now the established pornography business is in decline—and the Internet is being held responsible. The online availability of free or low-cost photos and videos has begun to take a fierce toll on sales of X-rated DVDs.⁶⁰

In the intervening decade, this decline has only accelerated. Today, adult DVD sales are a tiny fraction of what they once were.⁶¹ And revenues for the traditional producers of recorded content have fallen, by some estimates (likely overblown) by up to eighty percent.⁶² At the same time, however, streaming viewership has grown to enormous levels:

It’s impossible to ignore the top-level stat: that Pornhub averaged 81 million visitors per day (28.5 billion visitors for the year), with 24.7 billion searches performed. That’s 50,000 searches per minute, 800

⁵⁸ See 17 U.S.C. § 512 (2012) (establishing immunity, subject to certain conditions, for websites hosting infringing content uploaded by users).

⁵⁹ *The Top 500 Sites on the Web*, ALEXA, <https://www.alexa.com/topsites> (last visited July 14, 2019).

⁶⁰ Matt Richtel, *For Pornographers, Internet’s Virtues Turn to Vices*, N.Y. TIMES (June 2, 2007), <https://www.nytimes.com/2007/06/02/technology/02porn.html>.

⁶¹ Telephone Interview with Feras Antoon, *supra* note 22; Interview with Adam Grayson, Chief Fin. Officer, Evil Angel, in Sherman Oaks, Cal. (Nov. 3, 2017).

⁶² *Things Are Looking Up in America’s Porn Industry*, *supra* note 20; see also Ej Dickson, *When Porn Stars Become Escorts: Lucrative New Trend Could Also Be Risky*, SALON (Feb. 24, 2014, 5:00 AM), https://www.salon.com/2014/02/24/when_porn_stars_become_escorts_lucrative_new_trend_could_also_be_risky (pointing to numerous changes in the industry, including “the advent of digital piracy . . . driv[ing] performers’ rates down”); David Moye, *Porn Industry in Decline: Insiders Adapt to Piracy, Waning DVD Sales (NSFW)*, HUFFINGTON POST (Jan. 19, 2013, 12:42 PM), https://www.huffingtonpost.com/2013/01/19/porn-industry-in-decline_n_2460799.html (explaining the porn industry has “gone limp” because more people are watching porn over the internet for free).

per second. The global community was active as well, with over four million videos totaling 595,492 hours uploaded. If you were to watch that much porn in a continuous fashion, your eyes would be locked onto the screen for 68 years.⁶³

The advent of digital streaming opened the way for a dramatic reorganization of the industry. For nearly all its history the adult industry has been composed of relatively small players. There are currently no publicly traded pornography firms⁶⁴ and even the largest well-known adult brands—Playboy Enterprises, Hustler, Vivid—are very small compared to their Hollywood or recording industry counterparts. Playboy, probably the best known, had revenues in 2018 of only \$90 million.⁶⁵ By comparison, Sony Pictures had revenues of \$9 billion in the 2017–2018 financial year.⁶⁶ The vast majority of production firms were and remain tiny.

But not all. MindGeek is completely different.

FIGURE 1: MINDGEEK BY THE NUMBERS⁶⁷



⁶³ Curtis Silver, *Pornhub 2017 Year in Review Insights Report Reveals Statistical Proof We Love Porn*, FORBES (Jan. 9, 2018, 10:00 AM), <https://www.forbes.com/sites/curtissilver/2018/01/09/pornhub-2017-year-in-review-insights-report-reveals-statistical-proof-we-love-porn>.

⁶⁴ See Keith J. Kelly, *Playboy Stripping Down to 4 Issues Per Year in 2019*, N.Y. POST (Sept. 11, 2018, 2:41 PM), <https://nypost.com/2018/09/11/playboy-stripping-down-to-4-issues-per-year-in-2019> (noting that Playboy was public but went private in 2011).

⁶⁵ *Id.*

⁶⁶ Patrick Frater, *Sony Pictures Swings Back to Profit, Lifts Group Results*, VARIETY (Apr. 26, 2018, 11:14 PM), <https://variety.com/2018/biz/asia/sony-full-year-results-1202789954>.

⁶⁷ MINDGEEK, *supra* note 18.

MindGeek is both a pornography producer and a technology company claiming to employ over 400 engineers and software programmers on its 1000-person team.⁶⁸

MindGeek's early porntube sites (Pornhub and YouPorn) were not the only sites featuring adult content in a YouTube-like format; XVideos remains one of the world's most popular and its parent company, WGCZ Holdings, is one of the biggest players in adult entertainment.⁶⁹ But the impact of these new streaming sites was dramatic. Consumers quickly flocked in, and the industry shook out. MindGeek expanded, buying a number of porn producers, including Reality Kings and Twistys, as well as porntube sites GayTube, RedTube, and SexTube.⁷⁰ By 2014, MindGeek's power in the industry had so solidified that *Slate* ran a story declaring,

[MindGeek is] *the* porn provider. MindGeek has become the porn monopoly, putting industry members in the paradoxical position of working for the very company that profits from the piracy of their work. The MindGeek hydra exerts so much force that people in the online-porn industry are scared to talk about it for fear of blacklisting.⁷¹

Although the term “monopoly” is almost certainly an overstatement, there is no question MindGeek is a particularly powerful firm. Some in the adult industry maintain that MindGeek used online piracy as a weapon, using its tube sites to flood the market with pirated content and then snapping up producers whose businesses had been devalued by the onslaught of free content.⁷² Whether this story is true is not clear, but it is undisputed that MindGeek, like virtually all sites that allow user-uploaded content, at times distributes pirated material.⁷³ It

⁶⁸ Telephone Interview with Feras Antoon, *supra* note 22.

⁶⁹ See *The Top 500 Sites on the Web*, *supra* note 59 (Alexa rank forty-five). WGCZ is quite secretive and little is clear about its ownership structure. See *Company Overview of WGCZ Ltd S.R.O.*, BLOOMBERG, <https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=570423463> (last visited July 16, 2019).

⁷⁰ John Sanford, *Manwin Acquires Reality Kings*, XBIZ (Sept. 10, 2012, 12:15 PM), <https://www.xbiz.com/news/153764/manwin-acquires-reality-kings>; *The Butterfly Effect Ep. 1: A Nondescript Building in Montreal*, AUDIBLE (Nov. 3, 2017), <https://tunein.com/podcasts/Media—Entertainment-Podcasts/The-Butterfly-Effect-with-Jon-Ronson-p1015037>.

⁷¹ David Auerbach, *Vampire Porn*, SLATE (Oct. 23, 2014, 4:36 PM), http://www.slate.com/articles/technology/technology/2014/10/mindgeek_porn_monopoly_its_dominance_is_a_cautionary_tale_for_other_industries.html. MindGeek challenged some of the statistics and characterizations in the *Slate* story. E-mail from Kate Miller, Manager of Corp. Comm'ns, MindGeek, to Author (May 27, 2019) (on file with author).

⁷² Interviews with Anonymous Attendees at the XBIZ Convention, in Los Angeles, Cal. (Jan. 2017, Jan. 2018).

⁷³ See Chris Morran, *Court Orders Pornhub to Identify Potentially Thousands of Users*, CONSUMERIST (Apr. 7, 2017, 12:34 PM), <https://consumerist.com/2017/04/07/court-orders->

shelters itself from copyright liability by complying with the notice and takedown provisions of section 512 of the Copyright Act,⁷⁴ which gives online service providers immunity from secondary liability for infringing content posted by users.⁷⁵

In short, MindGeek, and firms like it, have constructed a business model that is not merely resistant to piracy but, at times, leverages it. MindGeek's sites, such as Pornhub, inevitably feature pirated content.⁷⁶ But they also feature a huge amount of content that is posted by producers, who offer teaser clips in the hope of converting a small percentage of the massive number of casual viewers into paying subscribers. It may be that piracy and free content not only transformed the adult entertainment industry but now help fuel it. That development has two facets, which we detail in Part II below.

II

ADAPTING TO THE FIRST DIGITAL DISRUPTION

The adult industry's adaptation to the first digital disruption is an important story about industrial change. It is essential to understanding how MindGeek grew to be so successful. And it gives us a chance to think afresh about how creative industries are impacted when technology transforms established business models. The onset of the second digital disruption also spurs us to rethink some fundamental features of intellectual property theory and doctrine. Copyright is traditionally justified as necessary to protect investments in the production of creative works. If others are simply free to copy original works, then originators will find it impossible to recover their invest-

pornhub-to-identify-potentially-thousands-of-users (explaining that Pornhub was served with a subpoena for having allegedly infringing material on its website).

⁷⁴ 17 U.S.C. § 512 (2012).

⁷⁵ The adult industry has generally eschewed the aggressive tactics of the music business, which often went after individuals for copyright infringement. To the degree the adult industry has deployed lawsuits, the goal often seems to be to extract quick settlements via "porn trolling"—i.e., by threatening the embarrassment of naming defendants in lawsuits alleging unauthorized downloading of content. These efforts have sometimes succeeded in extracting settlements but have often foundered, with judges dismissing cases and in some instances sanctioning plaintiffs and their lawyers. *See, e.g.,* Debra Cassens Weiss, *9th Circuit Upholds Sanction Against 'Copyright Trolling' Lawyers Who Sued Porn Downloaders*, A.B.A. J. (June 14, 2016, 5:45 AM), http://www.abajournal.com/news/article/9th_circuit_upholds_sanction_against_copyright_trolling_lawyers_who_sued_po. Prosecutors have also charged lawyers accused of engaging in porn trolling schemes. *See, e.g.,* Stephen Montemayor, *Feds Charge Porn-Troll Lawyers in Major Fraud, Extortion Case in Minneapolis*, STAR TRIB. (Dec. 19, 2016, 2:17 PM), <http://www.startribune.com/feds-charge-porn-troll-lawyers-in-major-fraud-extortion-case-in-minneapolis/407095106>.

⁷⁶ *See* Morran, *supra* note 73.

ments. If you want creativity, the story goes, you have to stop copying.⁷⁷

Yet this has not been the case in the adult industry. Widespread copying and ubiquitous free content have not killed the production of pornography. In the face of the first digital disruption⁷⁸ forms of adult content have diversified, new revenue streams have arisen, and the industry has consolidated. These changes have major implications for both intellectual property and our understanding of the interplay of competition and innovation in markets for creative content.⁷⁹ Despite all these changes, new content continues to be produced at a high rate.⁸⁰

Pornography is far from an outlier in this regard. As recent scholarship exploring many other creative industries has shown, intellectual property rights are often neither as central to innovation incentives as commonly believed nor the only available means to constrain copying.⁸¹ Fashion designs get knocked off regularly, and for the most part, knockoffs are perfectly legal in the United States.⁸² Nonetheless the fashion industry is vibrantly creative, continuing to produce new designs rapidly.⁸³ Chefs have no copyright protection over either their recipes or their “built food,” yet cuisine in America keeps getting more varied and more innovative.⁸⁴ These significant cases, and

⁷⁷ See generally Christopher Jon Sprigman, *Copyright and Creative Incentives: What We Know (and Don't)*, 55 HOUS. L. REV. 451 (2017) (reviewing empirical findings and assessing strength of evidence for orthodox justification for copyright protection).

⁷⁸ See *supra* notes 56–66 and accompanying text.

⁷⁹ See *infra* Part III.

⁸⁰ It is difficult to assess how much content is produced in comparison to the pre-tubesite era since reliable statistics do not exist. In some interviews, industry participants suggested that production may be half of what it was a decade ago. See, e.g., Interview with Adam Grayson, *supra* note 61. But this may reflect their circle of producers, and, especially as production has diversified in location (in part due to laws passed in Los Angeles, the traditional home of the industry, related to condom use), these anecdotal assessments may be even less reliable than is ordinarily the case. See, e.g., Katrina Forrester, *Making Sense of Modern Pornography*, NEW YORKER (Sept. 26, 2016), <https://www.newyorker.com/magazine/2016/09/26/making-sense-of-modern-pornography>.

⁸¹ Aaron Perzanowski & Kate Darling, *Introduction to CREATIVITY WITHOUT LAW: CHALLENGING THE ASSUMPTIONS OF INTELLECTUAL PROPERTY*, *supra* note 23, at 1, 1–2; Raustiala & Sprigman, *When Are IP Rights Necessary*, *supra* note 24, at 327.

⁸² Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687, 1696 (2006). *But see id.* at 1691 (“Fashion firms take significant, costly steps to protect the value of their trademarked brands, but they largely appear to accept appropriation of designs as a fact of life.”).

⁸³ *Id.* at 1689.

⁸⁴ RAUSTIALA & SPRIGMAN, *KNOCKOFF ECONOMY*, *supra* note 24, at 9; Christopher J. Buccafusco, *On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be Per Se Copyrightable?*, 24 CARDOZO ARTS & ENT. L.J. 1121, 1122 (2007).

others,⁸⁵ call into question the assumed relationship between intellectual property and intellectual production. While intellectual property rights are often important spurs to innovation and creativity, the relationship is not a necessary one.

From the perspective of the balance between consumer and producer interests, the new regime in the adult entertainment industry looks like what one would expect from the introduction of greater competition.⁸⁶ Producer surplus (at least for producers engaged in producing the traditional forms of pornographic content) appears to have fallen. Consumer surplus has at least arguably risen.⁸⁷ It is undeniable, given the massive amount of internet traffic devoted to pornography, that consumer demand remains very high. Historically, pornography thrived without the incentive effects of intellectual property protection, and it continues to thrive in the face of abundant free content.

In what follows we break out some of the major adaptations the industry has undergone in the wake of the move to digital distribution.

A. *The Decline of the Pornographic Feature*

The advent of widespread digital piracy and free content helped usher out the feature film as the adult industry's flagship product.⁸⁸ But, looking back on the pre-streaming era, one is led to wonder why the feature film was *ever* the industry's focus. For most consumers a brief clip is sufficient (indeed, the average time a Pornhub viewer stays on the site in the United States is ten minutes and thirty-three seconds).⁸⁹ It was the first digital disruption, and the piracy it engendered, that provided the external shock that decisively moved the

⁸⁵ See generally RAUSTIALA & SPRIGMAN, *KNOCKOFF ECONOMY*, *supra* note 24 (discussing industries such as fashion, databases, and comedy where IP laws don't apply (or are not utilized), but innovation remains frequent).

⁸⁶ Piracy is "competition," but it is a form generally disfavored by the law on the theory (articulated above) that, absent strong protection against copying, creators will not invest sufficiently in new content and therefore content production will dry up. As the adult industry's trajectory shows, this has not happened to any appreciable degree, though precisely how much production volume or quality has been impacted by piracy is difficult to measure in the absence of good statistics.

⁸⁷ This last observation is, of course, controversial. Is access to more pornography, and more pornography that is more closely tailored to consumer preferences, a gain in consumer welfare? For ordinary goods the answer is generally assumed to be yes. We take no position in this Article on the merits of more or cheaper or more diverse or more innovative pornography, though we recognize many would consider the advent of cheaper, more readily accessible pornography to be a harmful development.

⁸⁸ Forrester, *supra* note 80.

⁸⁹ *2017 Year in Review*, *supra* note 25. This varies, according to Pornhub data, geographically. The average Pornhub viewer in Russia, for example, stays on the site for an average of seven minutes and forty-one seconds. *Id.*

industry from the feature film to the (usually) much shorter scene or clip. In other words, it was piracy that forced the industry to match its production to actual consumer demand.⁹⁰

In this sense what the first digital disruption produced in the adult industry is analogous to an important shift in the music industry. For decades, record labels supplied a thriving market in “singles”—i.e., in seven-inch, forty-five rpm vinyl records. But the album grew dominant in the 1970s, and by the mid-1980s the single was starting to disappear from record stores.⁹¹ The reasons for the decline of this market were complicated, but one important factor was that singles, which typically listed for \$1.99 and often sold for less, were not (at least from the perspective of record labels and music retailers) an efficient use of limited space in record stores and were therefore not very profitable for record companies.⁹² Music piracy brought back the single with a vengeance. It took the music industry five years to accept that consumption had moved (irretrievably) online and back to singles and to license Apple to distribute music downloads—which consumers purchased mostly in the form of \$0.99 singles. The industry never looked back, and now many artists release tracks piecemeal rather than releasing bundles of songs arranged as an “album.”⁹³

And just as recorded music has become a form of promotion for the real moneymaker for many musical acts—the live show⁹⁴—so too has traditional pornographic content (often re-formatted into shorter video clips) come to serve more as an advertisement for other services than as a money-making product in itself. In today’s adult entertainment industry, short clips continue to be produced in part because the

⁹⁰ We note that early pornographic films, shown in coin-operated booths in places like New York’s 42nd Street, were often short. But we lack good data on how short. The rise of the feature adult film was probably a result of envy of Hollywood and a desire to ape and mimic the form and the style of films made on the other side of the Santa Monica Mountains. It may have worked for a model of distribution based on theaters (no one goes to a theater for ten minutes) but much less well for home viewing.

⁹¹ Jon Pareles, ‘45’ *Single Record: A Disk in Decline*, N.Y. TIMES (Oct. 30, 1986), <http://www.nytimes.com/1986/10/30/arts/45-single-record-a-disk-in-decline.html>.

⁹² *Id.*

⁹³ Ashley Rodriguez, *Unless You’re Adele, You Have No Business Releasing Album Tracks All at Once*, QUARTZ (Nov. 3, 2015), <https://qz.com/536000/unless-youre-adele-you-have-no-business-releasing-album-tracks-all-at-once>.

⁹⁴ Amy X. Wang, *How Musicians Make Money—or Don’t at All—in 2018*, ROLLING STONE (Aug. 8, 2018, 10:21 AM), <https://www.rollingstone.com/music/music-features/how-musicians-make-money-or-dont-at-all-in-2018-706745> (“Live events are quickly shaping up to be the most lucrative space for musicians in the digital-music era, and for good reason: As listeners become inundated with cheap access to music provided by streaming services, dedicated music fans crave more intimate experiences with their favorite artists.”).

massive traffic to tube sites yields substantial ad revenues.⁹⁵ This is true for individuals as well as for firms; MindGeek alone has over 100,000 models in its Pornhub Model Program, which allows independent performers to generate ad revenues off their uploads.⁹⁶ More importantly, the ubiquity of free streaming clips helps to drive three new revenue sources: camming, customs, and social media subscriptions. And, paradoxically, free video clips help also to maintain a viable business in subscription sites and even à la carte purchasing of clips.

B. Camming

In a 2014 article, Kate Darling documented the rise of the so-called “cam girls”—women (and men) who produce live adult performances using webcams.⁹⁷ Clients pay to watch these performances and to interact with the performers. Among the ways porn tube sites make money is by inducing casual visitors who consume free online clips to become paying customers of cam rooms.

Camming is a big and fast-growing part of the industry. As one adult industry watcher noted, “The rise of webcamming has been a game changer.”⁹⁸ Leading cam site LiveJasmin ranks as the thirty-seventh most popular site in the United States and thirty-second globally,⁹⁹ and other popular cam sites like CamSoda and Chaturbate also have very heavy usage.¹⁰⁰ Most popular camming websites encourage visitors to purchase tokens that are used to tip performers during cam sessions.¹⁰¹ “Tip” is often a euphemism for the purchase of a partic-

⁹⁵ There is virtually no reliable industry data for the adult industry, and so it is difficult to measure ad revenues, though interviews with industry participants suggest they are substantial, a characterization supported by the astonishing volume of traffic to the top porn tube sites. TARRANT, *supra* note 26, at 42–44; Interview with Colin Rowntree, Chief Exec. Officer and Founder, Wasteland.com, and Chauntelle Tibbals, Sociologist, in West Hollywood, Cal. (Jan. 15, 2015).

⁹⁶ E-mail from Kate Miller, Manager of Corp. Commc’ns, MindGeek, to author (May 24, 2019) (on file with author).

⁹⁷ Darling, *supra* note 26, at 751.

⁹⁸ Frances Stead Sellers, *In an Industry That’s Gone Online, Stormy Daniels Survives as ‘One of the Last Movie Stars of Porn,’* WASH. POST (Apr. 19, 2018), https://www.washingtonpost.com/politics/in-an-industry-thats-gone-online-stormy-daniels-survives-as-one-of-the-last-movie-stars-of-porn/2018/04/18/0b0fd366-32b2-11e8-94fa-32d48460b955_story.html (quoting gender studies professor Lynn Comella).

⁹⁹ *Livejasmin.com*, ALEXA, <https://www.alexa.com/siteinfo/livejasmin.com> (last visited Sept. 5, 2019).

¹⁰⁰ See *Camsoda.com*, ALEXA, <https://www.alexa.com/siteinfo/camsoda.com> (last visited July 17, 2019); *Chaturbate.com*, ALEXA, <https://www.alexa.com/siteinfo/chaturbate.com> (last visited July 17, 2019).

¹⁰¹ Richtel, *supra* note 26.

ular sexual performance.¹⁰² Customers can also use tokens to buy private shows.¹⁰³ In 2013, the *New York Times* reported that camming brings in around \$1 billion in annual revenue,¹⁰⁴ a figure which has doubtlessly grown substantially since.

The revenue stream that camming produces for performers is resistant to piracy for much the same reason that live music performances are—even if recordings are made, they are far from a perfect substitute for the live experience. Typically, cam performers work with a studio that takes a cut (perhaps 30% to 50%) but handles web traffic, technology set-up, and advertising.¹⁰⁵ As one performer explained in a recent article, the revenue from camming varies but can be anywhere from \$5 to \$8 a minute, and \$200 to \$800 a day.¹⁰⁶ The technological needs are simple—an internet connection and a way to take payment.¹⁰⁷

C. Customs

“Customs” is the term used within the industry for bespoke pornography. This is not a new form of production: In the 1940s, Anaïs Nin wrote custom erotic literature for a man she referred to as “the Collector.”¹⁰⁸ But contemporary customs, ordered and delivered over the internet through sites like Customs4U.com and iwantclips.com, are on an entirely different scale (in terms of revenue if not quality) than any historical form of bespoke pornography. The customs websites are built around interfaces that allow customers to choose among performers and to specify genre, video format, and picture resolution.¹⁰⁹ If a performer accepts a customer’s order, the performer will produce a custom video within an agreed-upon time frame and upload

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*; see also Interviews with Anonymous Attendees at the XBIZ Convention, *supra* note 72.

¹⁰⁶ Reed Amber, *Being a Cam Girl Taught Me About How Men Think*, VICE (May 10, 2018, 5:18 AM), https://broadly.vice.com/en_us/article/nekjzx/camming-web-cam-cam-girl; see also TARRANT, *supra* note 26, at 55–56.

¹⁰⁷ Payment processing is a huge part of the adult business. Credit card companies and their rules are often noted as one of the key barriers in the industry. As one recent panelist stated at XBIZ, an industry conclave in Los Angeles, “the most powerful players in our industry are Visa and Mastercard.” Lena Paul, Remarks at XBIZ 2019: Revenue Streams: Dollars from Diversity (Jan. 15, 2019).

¹⁰⁸ See ANAÏS NIN, *THE DIARY OF ANAÏS NIN, 1939–1944*, at 177–78 (Gunther Stuhlmann ed., 1969) (describing a letter Nin writes to the Collector regarding her disdain for his stylistic requests).

¹⁰⁹ See Ej Dickson, *Customs4U Is Like Build-A-Bear, but with Porn*, DAILY DOT (Mar. 17, 2014, 3:18 PM), <https://www.dailydot.com/debug/porn-customs4u-sex/> (“Customs4U lets you order personalized porn videos that are tailored precisely to your tastes, from the

it to the site.¹¹⁰ The customer can usually view the video on the site or download a single copy. Typically, the performer retains copyright in the video.¹¹¹

According to the adult industry's Free Speech Coalition, "over 75 percent of industry models are now creating and getting paid for their own content, including social media, cam shows, and – the new forefront – bespoke videos."¹¹² The growth of customs is a direct result of two trends enabled by the same technologies that facilitate streaming and camming. First, digital technologies make the production, marketing, and distribution of pornography much cheaper.¹¹³ As production costs fall, a customs market becomes economically viable. Second, the proliferation of free pornography has massively expanded the audience for adult content. Most people who consume free pornography are casual consumers, and remain so. But the ubiquity of free content creates a relatively small but absolutely large number of consumers who become aficionados. Some of these people are willing to spend hundreds or even thousands of dollars to purchase a personalized adult video tailored to their individual taste.

D. Subscription Sites and à la Carte Purchase of Clips

As the wide availability of free content has drawn millions of eyes to tube sites, an increasing number of producers have begun to post their own free clips to those sites in the hope of attracting a small percentage of the tubes' massive audience to their subscription sites and converting them into paying customers.¹¹⁴ As with customs, the subscription sites seek to take advantage of both the expansion of the audience that free content has provoked and also the desire among

model to the genre to the duration to the film quality."); Ronson, *supra* note 27 (explaining the growth of the bespoke porn industry).

¹¹⁰ Dickson, *supra* note 109.

¹¹¹ See, e.g., *Performer Terms and Conditions (T&C)*, CUSTOMS4U, <https://customs4u.com/terms-performer.html> (last updated Apr. 30, 2017) ("You [the performer] retain copyright of the content you upload or stream via live services."); *Terms & Conditions for Customers*, CUSTOMS4U, <https://customs4u.com/terms-customer.html> (last updated Apr. 30, 2017) ("Performers retain the sole copyrights on any content they upload to Customs4U. It is therefore illegal for a customer to re-distribute or re-sell any content downloaded from Customs4U without the express consent of the intellectual copyright owner.").

¹¹² Sloane Hunter, *Yup, "Bespoke Porn" Is Now a Thing*, 2OCEANSVIBE NEWS (Nov. 14, 2017), <http://www.2oceansvibe.com/2017/11/14/yup-bespoke-porn-is-now-a-thing>.

¹¹³ Digital technologies help lower the costs of distribution (there is no physical storage or shipment) but also production, since traditional porn shoots required extensive staff. See, e.g., TARRANT, *supra* note 26, at 39–42 (describing cost structure).

¹¹⁴ See *Pornhub Network Content Partner Program*, PORNHUB, <https://www.pornhub.com/partners/cpp> (last visited July 20, 2019) (explaining Pornhub's content partner program, which allows producers to post authorized content).

some consumers of free pornography for a better product. In particular, many of the subscription sites also hope to profit from the enormous heterogeneity in tastes among consumers. For that reason, many producers with paysites focus on offering content within a narrow niche—by, for example, producing pornography with a focus on a consistent aesthetic or fetish.¹¹⁵

Paysites attract a tiny percentage of an enormous market. For subscribers, they may seek (and get) some mix of higher resolution, more complete libraries of particular actors, and freedom from ads (as on YouTube and many other legitimate sites, ads often precede films on tube sites).

The tremendous heterogeneity of demand among consumers also drives continued demand on sites that offer clips for sale à la carte. A prominent example is clips4sale.com. The site's homepage consists of a listing of hundreds of niches, arranged alphabetically. Here are a few of the less sexually overt niches drawn just from the A's: "Abused Shoes (8322 clips)," "Age Regression (3081 clips)," "Aliens & Monsters (5442 clips)," "Apron Fetish (868 clips)," and "Armwrestling (2579 clips)." Producers selling clips through the service are free to set their own price; clips4sale.com provides a "marketplace," in much the same way that eBay does, by providing hosting, a search feature, and billing and payment processing.

E. Merchandise, Sexting, Dancing

In the past, adult performers had little direct contact with fans. Today, many aggressively leverage social media platforms to build their brand and engage directly with fans. At least thirty-five adult film actors have over one million followers on Instagram.¹¹⁶ Many have similar numbers on Twitter and Snapchat.¹¹⁷ Social media is not only a pathway to connect with fans; it has become a revenue stream itself. Top stars charge monthly subscription fees for access to private Snapchat and Instagram accounts that feature special photos and short clips.¹¹⁸ OnlyFans, for instance, manages social media accounts that include subscriptions (with a minimum monthly charge of \$4.99) as well as "paid private messages," in which performers charge for

¹¹⁵ Interviews with Anonymous Attendees at the XBIZ Convention, *supra* note 72.

¹¹⁶ *Most Popular Porn Stars on Instagram*, FAME REGISTRY, <http://www.fameregistry.com/popular-porn-stars-instagram> (last updated Feb. 22, 2019).

¹¹⁷ *See Top Twitter Porn Stars*, FAME REGISTRY, <http://www.fameregistry.com/top-twitter-porn-stars> (last updated Feb. 22, 2019) (showing at least thirty actors having over 500,000 followers on Twitter).

¹¹⁸ *See, e.g., Kendra Sunderland: About*, FANCENTRO, <https://fancentro.com/kendrasunderland> (last visited July 23, 2019).

personalized messages (often with personalized media content), and “tips,” which are basically monetary gifts to performers.¹¹⁹

Social media followers may also purchase items from, or provide gifts to, their favorite performers. Items for sale can include fetish-like objects, such as clothing worn by the performer, but also t-shirts, lingerie, and other personal effects.¹²⁰ Major stars also endorse products, such as sex toys. Fleshlight, which manufactures sex toys for men, has dozens of products endorsed by, and often directly modeled after, adult film actors.¹²¹ While endorsements like these are limited to a select few stars (in this sense the endorsement market mimics the superstar economy observed in so many other contemporary markets¹²²), direct sales, worn clothing, autographs, and other merchandise merely require a set of committed fans. Many performers also make appearances as featured dancers at strip clubs, where fans will come out to see their favorite performers. Such appearances reportedly can net upwards of \$2000 a night.¹²³ Anecdotally, some performers also engage in escorting.¹²⁴

F. *Adapting to a New World*

These revenue-generating activities all share a few key features. They cannot be digitized or streamed or otherwise readily shared in contravention of intellectual property laws. To be sure, some have intellectual property dimensions to them; sex toys, for instance, may be eligible for utility or design patents, be marketed using trademarks, and may even implicate state law rights of publicity. But the key fea-

¹¹⁹ *Frequently Asked Questions*, ONLYFANS, <https://onlyfans.com/faq> (last visited July 27, 2018); see also Jake Hall, *OnlyFans Is the Site Where Porn Is More Intimate than Ever*, DAZED (Jan. 19, 2018), <http://www.dazeddigital.com/science-tech/article/38717/1/onlyfans-is-the-site-where-porn-is-more-intimate-than-ever> (“[OnlyFans] users can sign up to become ‘fans’ of sex workers and porn creators, paying a regular monthly fee for a slow but steady influx of content.”).

¹²⁰ Used panty sales alone can reportedly net \$700 a month for some performers. Aurora Snow, *The Dirty Panties Black Market: Porn Stars Make Big Money Selling Their Underwear to Superfans*, DAILY BEAST (Apr. 14, 2017), <https://www.thedailybeast.com/the-dirty-panties-black-market-porn-stars-make-big-money-selling-their-underwear-to-superfans>.

¹²¹ See Jeremy Glass, *Talking to the Ex-Cop Who Invented the Fleshlight*, THRILLIST (Jan. 20, 2016), <https://www.thrillist.com/sex-dating/nation/the-oral-history-of-fleshlights-mens-sex-toys> (recounting how the Fleshlight founder first recruited adult film actors to serve as models).

¹²² See generally Sherwin Rosen, *The Economics of Superstars*, 71 AM. ECON. REV. 845 (1981) (containing the seminal analysis of the distinct economic trends applicable to the small number of people who dominate their respective activities).

¹²³ Lyz Lenz, *How Much Money Do Porn Stars Really Make?*, DAILY DOT (Sept. 20, 2016), <https://www.dailydot.com/irl/porn-star-salaries-income>.

¹²⁴ See Dickson, *supra* note 62.

ture is that they all raise revenue not from the traditional core of adult entertainment—the (copyrightable) film—but instead depend on exposure and fame. And exposure and fame in turn derive from, or are enhanced by, the existence of abundant free content. The greater the fame of a performer, the greater the likelihood a fan will want to buy an item, subscribe to a private Snapchat account, visit a strip club, or otherwise spend money that flows directly to a performer. For this reason, the flood of free, searchable online content is not merely lost sales of DVDs or clips: It is a powerful advertising service that allows some performers to build reputations and access these alternative revenue sources.

The bottom line is that the abundant free content enabled by the first digital disruption destroyed one business model but ushered in many others. The porn feature film has largely been superseded by the short, streamed clip. The clips may earn money but function principally as advertisements for other services. Subscription services and à la carte clip purchase sites cater to consumers who seek niche content. Many producers of adult content now take advantage of falling production and distribution costs (costs that have been reduced by the same technologies that facilitate piracy and digitization) to produce huge numbers of clips catering to every imaginable sexual taste. Some of these producers of paid content post teasers on sites such as Pornhub and XVideos in the hope of netting paying customers from the huge audience that free content on the porntube sites has helped create. Revenues may come from banner ads or from click-throughs to sites offering services, like cams and live chats, that cannot easily be copied.

Over time, the pornography business is likely to become more diversified, progressively lower-margin, and increasingly competitive. The wages of producers and performers—at least those involved in producing recorded clips—appear to have fallen overall, though other sources of revenue may have made up at least some of the difference.¹²⁵ Consumers pay less and generally get more. A massive amount of new content continues to be produced. That flood of streaming content is critical to the next Part of this Article.

III

ALGORITHMS & AUTHORSHIP

In the preceding Part we explained how the adult industry adapted to the internet. The rise of streaming and huge amounts of

¹²⁵ This was noted on several panels and discussions at the annual XBIZ Conference. Interviews with Anonymous Attendees at the XBIZ Convention, *supra* note 72.

free content opened the way for firms like MindGeek to upend the traditional adult industry. As we described above, the industry now depends on free (and sometimes pirated) content for many of its revenue models.¹²⁶ MindGeek's business model has both been shaped by piracy and leverages it.

In this Part, the core of this Article, we focus on the broader implications of the rise of streaming. MindGeek's billions of monthly views allow it to gather massive amounts of consumer data, and to use that data to grow, become more competitive, and help shape new content. This new phenomenon of "data-driven creativity" is the key to understanding the second digital disruption.¹²⁷ And what we observe MindGeek doing in the adult realm is not unique—there are other streaming firms that are proceeding along a similar path. As noted in the introduction, Netflix, the world's largest distributor of mainstream digital film and television content,¹²⁸ does a lot (though seemingly not yet all) of what MindGeek does. We have analyzed MindGeek in detail because it is the leading edge of the phenomenon of data-driven creativity. But increasingly, we believe, the same patterns will emerge across the production of many different types of content. We believe this will have major implications for the law, especially for intellectual property law and for the regulation of competition and innovation in markets for creative works.

Throughout this Part we distinguish two related but distinct phenomena. The first and most important is the gathering of consumer data relevant to viewing preferences and patterns. Data harvesting is the key feature of the second digital disruption. Firms like MindGeek and Netflix use the data they collect to create content that they hope will have a higher likelihood of success in the market. The second is the use of algorithms,¹²⁹ artificial intelligence,¹³⁰ and machine

¹²⁶ See *supra* Section II.F.

¹²⁷ Of course many factors contribute to the making of any creative work or decision; in data-driven creativity data is not the sole source of creative input or even necessarily the dominant one. But it is a critical factor, and as we show in the remainder of this Article, while creators have long looked to sales and other lagging indicators to guide their creative choices, today's streaming data is vastly richer and more fine-grained. This allows for a qualitatively different approach to creativity, which we highlight in what follows.

¹²⁸ Netflix is responsible for almost fifteen percent of global internet traffic. Cam Cullen, *Global Internet Phenomena Report: Netflix Is Approximately 15 per Cent of Worldwide Downstream Traffic*, SANDVINE (Sept. 28, 2018), <https://www.sandvine.com/blog/global-internet-phenomena-report-netflix-is-15-of-worldwide-downstream-traffic>.

¹²⁹ An "algorithm" is defined as a "prescribed set of well-defined rules or instructions for the solution of a problem, such as the performance of a calculation, in a finite number of steps." *Algorithm*, OXFORD REFERENCE: A DICTIONARY OF COMPUTER SCIENCE (Andrew Butterfield et al., eds., 7th ed. 2016).

¹³⁰ "Artificial intelligence" (AI) is defined as a "discipline concerned with the building of computer programs that perform tasks requiring intelligence when done by humans."

learning¹³¹ to guide the creation of content or even, in some cases, to create the content without, or with little, human intervention.¹³² The ultimate expression of data-driven creativity—works created entirely by machines—is today a decidedly niche activity.¹³³ But when (or if) fully machine-created works begin to have economic significance, they are likely to act mostly as an accelerant of the spread of data-driven creativity that is already underway.

A. *The Rise of Data-Driven Creativity*

A decade ago, streaming television and film was a minor phenomenon. But now it is mainstream. According to a recent Deloitte survey, 55% of American households now subscribe to at least one streaming service, an increase of 450% over 2009.¹³⁴ The average subscriber has three services they pay for.¹³⁵ U.S. consumers spend over \$2 billion a month on streaming services,¹³⁶ of which Netflix is the

Artificial Intelligence (AI), OXFORD REFERENCE: A DICTIONARY OF COMPUTER SCIENCE (Andrew Butterfield et al., eds., 7th ed. 2016). As we will explain, AI is increasingly deployed to create or enhance content. See, e.g., Dani Deahl, *We've Been Warned About AI and Music for Over 50 Years, but No One's Prepared*, VERGE (Apr. 17, 2019, 10:30 AM), <https://www.theverge.com/2019/4/17/18299563/ai-algorithm-music-law-copyright-human>. A number of scholars have considered questions relating to ownership of the copyright in works produced by AI. See generally Bruce E. Boyden, *Emergent Works*, 39 COLUM. J.L. & ARTS 377 (2016); Annemarie Bridy, *Coding Creativity: Copyright and the Artificially Intelligent Author*, 2012 STAN. TECH. L. REV. 5; Annemarie Bridy, *The Evolution of Authorship: Work Made by Code*, 39 COLUM. J.L. & ARTS 395 (2016); James Grimmelmann, *Copyright for Literate Robots*, 101 IOWA L. REV. 657 (2016); James Grimmelmann, *There's No Such Thing as a Computer-Authored Work—and It's a Good Thing, Too*, 39 COLUM. J.L. & ARTS 403 (2016); Margot E. Kaminski, *Authorship, Disrupted: AI Authors in Copyright and First Amendment Law*, 51 U.C. DAVIS L. REV. 589 (2017); Pamela Samuelson, *Allocating Ownership Rights in Computer-Generated Works*, 47 U. PITT. L. REV. 1185 (1986). We express no view on this issue here.

¹³¹ “Machine learning” is defined as “[a] branch of artificial intelligence concerned with the construction of programs that learn from experience.” *Machine Learning*, OXFORD REFERENCE: A DICTIONARY OF COMPUTER SCIENCE (Andrew Butterfield et al., eds., 7th ed. 2016).

¹³² Sony has begun to do this with its Flow Machine, which has created an entirely computer-generated album. Lucy Jordan, *Inside the Lab That's Producing the First AI-Generated Pop Album*, SEEKER (Apr. 13, 2017, 8:15 AM), https://www2.deloitte.com/content/dam/insights/us/articles/4479_Digital-media-trends/4479_Digital_media%20trends_Exec%20Sum_vFINAL.pdf.

¹³³ See, e.g., HELLO WORLD ALBUM, www.helloworldalbum.net (last visited Oct. 11, 2019).

¹³⁴ KEVIN WESTCOTT ET AL., DELOITTE, DIGITAL MEDIA TRENDS SURVEY (12th ed. 2018), <https://www2.deloitte.com/insights/us/en/industry/technology/digital-media-trends-consumption-habits-survey-2018.html>.

¹³⁵ *Id.*

¹³⁶ Christine Wang, *More than Half of US Homes Now Subscribe to a Streaming Service, Spending \$2.1 Billion a Month*, CNBC (Mar. 20, 2018, 8:12 AM), <https://www.cnb.com/2018/03/19/streaming-services-americans-spend-2-point-1-billion-a-month-in-55-percent-homes.html>.

largest and the one that spends the most on content—some \$13 billion in 2018, of which 85% of new spending was dedicated to original series and movies.¹³⁷ But Amazon (\$4.5 billion), Hulu (\$2.5 billion), and Apple (\$1 billion and rising fast) are close behind.¹³⁸ Disney has recently announced a foray into streaming too,¹³⁹ and Apple and Amazon in particular have the means to outspend all their competitors, including Netflix, should they choose to.¹⁴⁰

Netflix is the current poster child for this phenomenon.¹⁴¹ And as we will explain, Netflix has grown enormously thanks to a revolutionary (for mainstream media) marriage of streaming and data. While the exact extent of Netflix's reliance on data versus old-fashioned intuition is a matter of intense speculation within the entertainment industry, by many accounts Netflix's collection and use of data is a key competitive advantage that has allowed the firm to grow incredibly powerful in Hollywood in a matter of just a few years.¹⁴²

Netflix's dramatic rise demonstrates the power of streaming and big data. In the years before it began creating content, Netflix struggled. Studios and networks demanded high licensing fees, constraining

¹³⁷ Dana Feldman, *Netflix's Content Budget Is Updated to \$13B for 2018*, FORBES (July 9, 2018), <https://www.forbes.com/sites/danafeldman/2018/07/09/netflixs-content-budget-is-updated-to-13b-in-2018>.

¹³⁸ Rani Molla, *Netflix Spends More on Content than Anyone Else on the Internet—and Many TV Networks, Too*, VOX (Feb. 26, 2018, 4:00 PM), <https://www.recode.net/2018/2/26/17053936/how-much-netflix-billion-original-content-programs-tv-movies-hulu-disney-chart> (providing 2017 figures).

¹³⁹ See David Sims, *Why Disney+ Will Be Tough to Beat*, ATLANTIC (Apr. 16, 2019), <https://www.theatlantic.com/entertainment/archive/2019/04/disney-plus-why-streaming-service-will-be-hard-beat/587209>.

¹⁴⁰ See Elvis Picardo, *10 of the World's Top Companies Are American*, INVESTOPEDIA, <https://www.investopedia.com/articles/active-trading/111115/why-all-worlds-top-10-companies-are-american.asp> (last updated May 30, 2019) (listing Apple and Amazon as being in the world's top ten companies measured by market capitalization).

¹⁴¹ See Alex Shephard, *Can Netflix Take Over Hollywood?*, NEW REPUBLIC (Apr. 24, 2018), <https://newrepublic.com/article/148102/can-netflix-take-hollywood> (“Next month, the Cannes Film Festival will kick off without any films from America's largest film studio. That wouldn't be Paramount or Disney or Fox—that would be Netflix.”).

¹⁴² See, e.g., David Carr, *Giving Viewers What They Want*, N.Y. TIMES (Feb. 24, 2013), <http://www.nytimes.com/2013/02/25/business/media/for-house-of-cards-using-big-data-to-guarantee-its-popularity.html>; Markman, *supra* note 12; Shephard, *supra* note 141. Exactly how data-driven Netflix is is a matter of some dispute. Compare Tim Wu, *Netflix's Secret Special Algorithm Is a Human*, NEW YORKER (Jan. 27, 2015), <https://www.newyorker.com/business/currency/hollywoods-big-data-big-deal> (citing Ted Sarandos, Netflix Chief Content Officer, as stating that Netflix relies seventy percent on data, the rest on human judgment), with Adalian, *supra* note 15 (discussing how some Netflix executives downplay the role of data in their decisions—despite the widespread belief in the industry that data is hugely important in its decisionmaking).

Netflix's profitability.¹⁴³ Beginning in 2011, as Netflix moved from physical distribution to streaming, it set out to solve that problem by producing its own content. At first, the prospects that Netflix would emerge as a major producer seemed dim—Netflix was a technology firm and had no track record in producing programming. But less than a decade later, Netflix has emerged as a programming giant. The CFO of Netflix told the attendees of a Morgan Stanley-sponsored conference that the company was set to spend upwards of \$8 billion on content in 2018 and that it had about 700 original TV shows on the service worldwide last year.¹⁴⁴ It is currently valued at \$170 billion—more than Disney—despite never having turned a profit.¹⁴⁵ And having a series or a film on Netflix has become a mark of success in Hollywood, even for established producers and directors. As *The Economist* recently noted,

[Netflix] will spend \$12bn-13bn this year [2018]—more than any studio spends on films, or any television company lays out on stuff that isn't sport. Their viewers will get 82 feature films in a year when Warner Brothers, the Hollywood studio with the biggest slate, will send cinemas only 23.¹⁴⁶

How did Netflix succeed so quickly in the very competitive programming business? A central part of its formula has been intensive analysis of proprietary viewing data. The details of Netflix's data mining began to be widely reported following the runaway success of the Netflix-produced *House of Cards*, which was the most streamed piece of content in the United States in 2013.¹⁴⁷ After extensive analysis of viewing patterns, Netflix concluded that fans of the original U.K. series on which *House of Cards* was based would also be attracted to material that either starred Kevin Spacey or was directed by David Fincher.¹⁴⁸ With the data drawing out three overlapping circles of viewer interest, Netflix determined that the intersection of the Venn diagram—a *House of Cards* reboot starring Kevin Spacey and

¹⁴³ See Nathan McAlone, *Netflix's Content Chief Said Something About Its 'Originals' That Should Make Investors Optimistic About the Future*, BUS. INSIDER (Apr. 23, 2017), <https://www.businessinsider.com/netflix-originals-are-as-efficient-as-licensed-shows-and-movies-2017-4> ("Around 2013, Netflix began to see the writing on the wall: The days of licensing a back catalog of great TV shows for dirt cheap were numbered.").

¹⁴⁴ Todd Spangler, *Netflix Eyeing Total of About 700 Original Series in 2018*, VARIETY (Feb. 27, 2018), <http://variety.com/2018/digital/news/netflix-700-original-series-2018-1202711940>; see also Adalian, *supra* note 15 (noting that, as other studios remove their content from Netflix, it "will become even more reliant on originals").

¹⁴⁵ *Briefing: The Television Will Be Revolutionised*, ECONOMIST, June 30, 2018, at 18, 18.

¹⁴⁶ *Id.*

¹⁴⁷ Carr, *supra* note 142.

¹⁴⁸ *Id.*

directed by David Fincher—would be a “very good bet.”¹⁴⁹ The company was so confident in the series’s prospects that it committed \$100 million for two thirteen-episode seasons¹⁵⁰—a decision “widely derided as profligate” at the time.¹⁵¹

In 2013, Netflix was examining more than thirty million plays per day (a number that has surely gone up dramatically in the years since).¹⁵² Jonathan Friedland, then Netflix’s Chief Communications Officer, told the late David Carr of the *New York Times* that Netflix uses data from these user interactions to gauge consumer interest in new programming and to determine how best to categorize and present existing programming.¹⁵³ At about the same time, Friedland told *Wired* that “[w]e know what people watch on Netflix and we’re able with a high degree of confidence to understand how big a likely audience is for a given show based on people’s viewing habits.”¹⁵⁴ Indeed, Netflix has boasted that about seventy-five percent of user viewing is attributable to its recommendation algorithm,¹⁵⁵ which is itself continually reconstructed with what the company learns from its analysis of user interaction data.¹⁵⁶

Netflix builds out millions of user profiles with metadata based on what it calls “user actions.”¹⁵⁷ Some parameters that Netflix tracks include, but are likely not limited to, pause/rewind/fast-forward behavior; day of the week; date of viewing; time of viewing; zip code; preferred devices; completion rate; user ratings; user search behavior; and browsing and scrolling behavior.¹⁵⁸ A 2013 article on Netflix’s col-

¹⁴⁹ *Id.*

¹⁵⁰ Rebecca Greenfield, *The Economics of Netflix’s \$100 Million New Show*, ATLANTIC (Feb. 1, 2013), <https://www.theatlantic.com/technology/archive/2013/02/economics-netflixs-100-million-new-show/318706>.

¹⁵¹ *Briefing: The Television Will Be Revolutionised*, *supra* note 145, at 18.

¹⁵² See Carr, *supra* note 142.

¹⁵³ See *id.* (“Because we have a direct relationship with consumers, we know what people like to watch and that helps us understand how big the interest is going to be for a given show.” (quoting Jonathan Friedland)).

¹⁵⁴ Roberto Baldwin, *Netflix Gambles on Big Data to Become the HBO of Streaming*, WIRED (Nov. 29, 2012, 6:30 AM), <https://www.wired.com/2012/11/netflix-data-gamble>.

¹⁵⁵ Netflix US (@netflix), TWITTER (Aug. 8, 2013, 1:57 PM), <https://twitter.com/netflix/status/365577591563882496>.

¹⁵⁶ See Nicole Nguyen, *Netflix Wants to Change the Way You Chill*, BUZZFEED NEWS (Dec. 13, 2018, 3:45 PM), <https://www.buzzfeednews.com/article/nicolenguyen/netflix-recommendation-algorithm-explained-binge-watching>.

¹⁵⁷ See Shane Atchison & Jason Burby, *Big Data and Creativity: What We Can Learn from ‘House of Cards.’* NEXT WEB (Mar. 20, 2016), <https://thenextweb.com/insider/2016/03/20/data-inspires-creativity>.

¹⁵⁸ See Netflix, Inc., Annual Report (Form 10-K) 9 (Jan. 29, 2018) (discussing the collection of user data); Zach Bulygo, *How Netflix Uses Analytics to Select Movies, Create Content, and Make Multimillion Dollar Decisions*, NEIL PATEL, <https://neilpatel.com/blog/how-netflix-uses-analytics> (last visited Sept. 19, 2019).

lection and analysis of user action data describes the process in more detail:

I hit the pause button roughly one-third of the way through the first episode of “House of Cards,” the political drama premiering on Netflix Feb. 1. By doing so, I created what is known in the world of Big Data as an “event”—a discrete action that could be logged, recorded and analyzed. Every single day, Netflix . . . registers hundreds of millions of such events. As a consequence, the company knows more about our viewing habits than many of us realize. Netflix doesn’t know merely what we’re watching, but when, where and with what kind of device we’re watching. It keeps a record of every time we pause the action—or rewind, or fast-forward—and how many of us abandon a show entirely after watching for a few minutes.¹⁵⁹

At one point, Netflix apparently even monitored trends from pirate sites.¹⁶⁰ And alongside the firm’s analysis of user actions is a detailed system of content categorization, itself derived from Netflix’s viewer data. In 2014, *The Atlantic* scraped every tag in Netflix’s system and found 76,897 descriptors for movies, ranging from “Romantic Indian Crime Dramas” to “Post-Apocalyptic Comedies About Friendship.”¹⁶¹

Netflix’s categorization effort is broad (i.e., the firm uses data to construct a welter of content categories), but also conceptually deep, in that the firm is self-conscious about some of the pitfalls of categorization and uses data to avoid them. An example of such a pitfall is “genre bias”—the presumption that viewers who like one example of a genre will tend to like other examples.¹⁶² Netflix’s data suggests that this is often not true. The firm found, for example, that one in eight viewers of content from Marvel Entertainment never watched other content tagged with “superhero.”¹⁶³ Instead, Netflix tries to empha-

¹⁵⁹ Andrew Leonard, *How Netflix Is Turning Viewers into Puppets*, SALON (Feb. 1, 2013, 5:45 PM), https://www.salon.com/2013/02/01/how_netflix_is_turning_viewers_into_puppets.

¹⁶⁰ Atchison & Burby, *supra* note 157; see also Todd Spangler, *How Netflix Uses Piracy to Pick Its Programming*, VARIETY (Sept. 14, 2013, 9:54 AM), <http://variety.com/2013/digital/news/how-netflix-uses-piracy-to-pick-its-programming-1200611539> (noting that Netflix acquired the rights to *Prison Break* because of the show’s popularity on pirate sites).

¹⁶¹ Alexis C. Madrigal, *How Netflix Reverse-Engineered Hollywood*, ATLANTIC (Jan. 2, 2014), <https://www.theatlantic.com/technology/archive/2014/01/how-netflix-reverse-engineered-hollywood/282679>.

¹⁶² See Nick Lucchesi, *Netflix Says Its Algorithm Is Helping to Kill ‘Genre Bias,’* INVERSE (Aug. 22, 2017), <https://www.inverse.com/article/35780-netflix-genre-bias-data> (“Superheroes, science fiction, and horror have long suffered from ‘genre bias,’ but Netflix thinks its algorithm can turn skeptics into . . . true believers. ‘Genres are just wrappers,’ the company declared Tuesday.”).

¹⁶³ *Id.*

size the shared traits between shows of multiple genres: like the “smart humor” of *Jessica Jones* connecting to viewers of *Master of None*, or its “dark criminal world[.]” with *Making a Murderer*.¹⁶⁴

A major part of Netflix’s strategy is its use of categories to organize consumer preferences. Netflix categorizes its subscriber base into “taste clusters.”¹⁶⁵ There are almost 2000 clusters, and, unlike traditional advertising demographics (e.g., “single white women eighteen to twenty-four”), they are not organized by ascriptive characteristics but by streaming-derived viewing habits.¹⁶⁶ Taste clusters shape creative choices. But they also shape an important element of what a subscriber sees on her screen—the small square titles that suggest what you might like, which Netflix calls “row art.”¹⁶⁷ And not only do these taste clusters determine which options are presented, they also determine *how* the options are presented—i.e., which of the several row art options for each offering comes up on your screen.¹⁶⁸

Though less vocal today, for years Netflix loved touting its reliance on data—it was a major part of how the company portrayed itself to investors and to the public.¹⁶⁹ Netflix still maintains an impressively dense tech blog.¹⁷⁰ And the way it sources content is crucial to the firm’s branding. When Netflix buys a series, it does so before a single frame has been filmed.¹⁷¹ Netflix boasts that its data gives it enough confidence in its decisions that the service is able to depart from the usual industry practice of funding a pilot.¹⁷² Similarly, it argues that its

¹⁶⁴ *Decoding the Defenders: Netflix Unveils the Gateway Shows that Lead to a Heroic Binge*, NETFLIX (Aug. 22, 2017), <https://media.netflix.com/en/press-releases/decoding-the-defenders-netflix-unveils-the-gateway-shows-that-lead-to-a-heroic-binge>.

¹⁶⁵ Adalian, *supra* note 15.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ See, e.g., Niraj Chokshi, *Americans Are Watching Netflix at Work and in the Bathroom*, N.Y. TIMES (Nov. 17, 2017), <https://www.nytimes.com/2017/11/17/business/media/watch-netflix-at-work.html> (discussing survey results related to viewing habits that were released to the public by Netflix); Daniel Holloway, *Why Netflix’s Hype Makes TV’s Viewership Measurement Crisis Worse*, WRAP (Dec. 8, 2015, 6:35 AM), <https://www.thewrap.com/why-netflixs-hype-makes-tvs-viewership-measurement-crisis-worse> (providing examples of a Netflix executive discussing viewership at various events); *Netflix Research*, NETFLIX, <https://research.netflix.com> (last visited Sept. 5, 2019) (explaining how Netflix conducts research with the goal of improving their business practices and clearly displaying this information to the public).

¹⁷⁰ See *The Netflix Tech Blog*, MEDIUM, <https://medium.com/netflix-techblog> (last visited July 23, 2019).

¹⁷¹ Ramin Setoodeh, *Has Netflix’s Ted Sarandos Rescued (or Ruined) Hollywood?*, VARIETY (Aug. 15, 2017, 3:00 AM), <http://variety.com/2017/digital/features/ted-sarandos-netflix-original-movies-shonda-rhimes-1202527321>.

¹⁷² *Id.*; see also Markman, *supra* note 12 (noting that Netflix offered contracts to *House of Cards* director David Fincher and actor Kevin Spacey without having seen a pilot).

data indicates viewers are never hooked by pilots. Instead, viewers are hooked a handful of episodes in—two episodes for *Breaking Bad*, six for *Mad Men*, and four for *Unbreakable Kimmy Schmidt*.¹⁷³ This is exactly the sort of cost- and risk-reduction that we would expect from a company that is capitalizing on data-driven creativity.

Netflix's success suggests that streaming data has become the new competitive advantage in Hollywood—an industry that has always been plagued by uncertainty about popular response to its product and therefore prone to produce both hits and flops.¹⁷⁴ Companies like Netflix use viewer data to reduce the risk of failure by more precisely targeting content to known audience preferences. Indeed, other content producers, even those that lack Netflix's access to data, are trying to benefit from the same technique, in part by relying on specialist firms that aggregate and structure user data obtained from a variety of sources.¹⁷⁵

While highly successful, at this point Netflix's data strategy is limited in one very important way: The firm uses data to purchase content, to invest in production, to categorize the content, and to recommend it to viewers based on their past choices. However, Netflix does not appear—yet—to do much to shape the particulars of the content once the firm has green-lighted a project.¹⁷⁶

MindGeek uses data much like Netflix does. It knows what consumers watch and how they watch it. Like Netflix, MindGeek maintains an impressively data-rich blog that deploys user data to highlight new trends, compare viewing habits in different cities or regions, and generally parse the online behavior of millions of consumers.¹⁷⁷ Like Netflix, MindGeek's sites will often suggest what you might like based on prior viewing and will also categorize material based on data, revealing the terms that are most widely searched and that drive sus-

¹⁷³ *Do You Know When You Were Hooked? Netflix Does*, NETFLIX (Sept. 23, 2015), <https://media.netflix.com/en/press-releases/do-you-know-when-you-were-hooked-netflix-does>.

¹⁷⁴ See, e.g., Rebecca Rubin, *The Biggest Box Office Hits and Flops of 2018*, VARIETY (Dec. 12, 2018, 10:00 AM), <https://variety.com/2018/film/news/box-office-hits-flops-2018-1203079474>.

¹⁷⁵ See Paresh Dave, *Vertical Mass: Where the Entertainment Industry Goes to Store and Sell User Data*, L.A. TIMES (Oct. 18, 2016, 6:00 AM), <http://www.latimes.com/business/technology/la-fi-tn-la-tech-20161018-snap-htmlstory.html>.

¹⁷⁶ See Atchison & Burby, *supra* note 157 (“Netflix did not weigh in on creative questions at all.”).

¹⁷⁷ See PORNHUB: INSIGHTS, www.pornhub.com/insights (last visited July 23, 2019) (exploring viewer habits on Pornhub).

tained engagement.¹⁷⁸ MindGeek's sites will also show you the number of views of each film and aggregate viewer ratings—something Netflix never does. And in one crucial respect MindGeek goes further than Netflix does—it leverages its trove of user data to shape the particulars of content.¹⁷⁹

MindGeek produces upwards of 400 films a month, with the typical clip costing between \$5000 and \$8000 in total.¹⁸⁰ The firm has producers it works with regularly, and it harnesses the data it compiles and analyzes to write scripts and specify details in those shoots.¹⁸¹ Let us briefly illustrate this process with a script MindGeek confidentially shared with us. We cannot identify the writers or the title, nor share the full script, but the level of detail and overall approach illustrate the impact of MindGeek's analysis of user data on the content-creation process.

To begin, the script is a parody of a successful mainstream film, one that starred some of the biggest names in Hollywood. This is a familiar trope in adult entertainment; porn parodies have been popular for many years.¹⁸² But the original film really only serves as scaffolding for a series of sex scenes strung together. The script lays out scenes and dialogue—albeit very briefly—and illustrates the scenes with photos pulled off the internet and screenshots of the original film that is being parodied. There is substantial attention to the exact posture of the actors in various scenes. In one scene “Girl 2” “lies on her stomach and looks over her shoulder at the camera.” She stretches, flips over, and then “struts” toward the camera. Improvised dialogue is occasionally encouraged, but the movements of the actors, the exact positions, and the details of the prescribed sex acts are usually fixed in advance (critical features, bold in the original script, have been italicized):

Girl1 and Girl2 make Guy3 their sex toy. Guy3 does whatever they ask of him, eager to please them. The female performers are in com-

¹⁷⁸ See Joe Pinsker, *The Hidden Economics of Porn*, ATLANTIC (Apr. 4, 2016), <https://www.theatlantic.com/business/archive/2016/04/pornography-industry-economics-tarrant/476580> (discussing MindGeek's use of data).

¹⁷⁹ The rise of what we call “data-driven authorship” was, at a general level, prophesied by George Orwell's dystopian novel *1984*, in which the “versificator” creates music and similar machines create other content, including novels and pornography, for the proles to consume. GEORGE ORWELL, 1984, at 48 (Penguin Books 2003) (1949).

¹⁸⁰ Telephone Interview with Feras Antoon, *supra* note 22.

¹⁸¹ *Id.*

¹⁸² See, e.g., Sam Stryker, *18 Porn Parodies That Are Definitely Better than the Movies That Inspired Them*, BUZZFEED (May 1, 2014, 3:05 PM), <https://www.buzzfeed.com/samstryker/porn-parodies-that-are-definitely-better-than-the-movies> (detailing various parodies that have been made).

plete control for this scene, but at no point do they force Guy3 to do something he doesn't want to do.

Girl1 and Girl2's clothes remain ON during sex, while Guy3 is completely naked.

What MindGeek is doing here is catering to certain fetishes within the adult world and incorporating and highlighting elements of the scene that data suggests are essential to success within the “CFNM” (Clothed Female, Naked Male) genre.¹⁸³ In our interviews, MindGeek leadership stressed that some of these choices reflected the data-mining of millions of views, which allows MindGeek to determine what variables produce the highest viewership.¹⁸⁴ For MindGeek, these analyses revealed that certain dialogue, sex acts, and particular positions and camera angles drew in more viewers than did others. In other scripts, we were told, furniture, carpet styles, and other visual elements are sometimes specified as well.

What puts MindGeek in a position to leverage data so effectively? Two things. First, we noted at the outset the stunning viewership statistics for online pornography. The efficacy of MindGeek's use of viewer data relies not only on the sheer number of gigabytes of content available on the site but also on the way that data is distributed. There were approximately five million discrete videos uploaded to Pornhub in 2018.¹⁸⁵ (And bear in mind, Pornhub is only one, albeit the most well-known, of MindGeek's portfolio of adult sites.) One key advantage MindGeek has over Netflix in leveraging data about consumer preferences for the production of content is that Netflix has a far smaller portfolio of individual films—nothing even close to five million presented in a given year.

Second, the way in which MindGeek's users consume content matters significantly for its ability to produce useful data. While the videos on a site such as Pornhub vary widely in length, many are less than fifteen minutes. And with the average viewer staying on only ten minutes, and often toggling through multiple videos in those ten min-

¹⁸³ *CFNM*, WIKTIONARY, <https://en.wiktionary.org/wiki/cfnm> (last visited Sept. 19, 2019).

¹⁸⁴ Netflix does something similar with the icons that appear on your screen for different content; as noted above, “row art” varies not only in the specifics of which show appears but also in which version of a particular icon for a given show appears. See Adalian, *supra* note 15 (“Whenever a new original premieres on Netflix, Yellin's team will start off by randomly assigning different images to different subscribers, using those taste clusters as an initial guideline.”).

¹⁸⁵ *2018 Year in Review*, PORNHUB: INSIGHTS (Dec. 11, 2018), <https://www.pornhub.com/insights/2018-year-in-review>.

utes,¹⁸⁶ MindGeek can amass many data points from each visit. In this sense MindGeek's data collection is more like Spotify's than Netflix's. Consumers tend to listen to many songs when listening to music, and each song is short. That provides much more data than a consumer watching a single movie online. On the other hand, individual songs are often streamed many times by a single listener—sometimes dozens if not hundreds of times—whereas videos are far more likely to be watched only once or twice. Consequently, MindGeek has access to more and more varied consumer data than many other digital content providers.

The role of search terms and fads and fashions in adult genres is also critical. While there is a lot of consistency in what consumers of pornography want, there are occasional dramatic shifts in preferences¹⁸⁷ and even the advent of entire new genres.¹⁸⁸ MindGeek's data gives it some insight into these developments, and, because adult content is so cheap and fast to produce, MindGeek can rapidly adapt new content to meet these emerging preferences. For example, according to Pornhub's public data site, among the searches with the most increased popularity for last year were "romantic" (the top spot) and "tattooed women."¹⁸⁹ "Fortnite" also saw impressive growth.¹⁹⁰ These trends are surely fed by content on MindGeek platforms but are also identified (early), and then content commissioned and built around them.

MindGeek and Netflix are particularly powerful and popular digital distributors. But as the foregoing illustrates, the ability to distribute content digitally has a very significant feature that has been widely unappreciated. Streaming platforms are, at their core, two-way

¹⁸⁶ *The Long and Short of Porn Watching*, PORNHUB: INSIGHTS (June 6, 2016), <https://www.pornhub.com/insights/long-short-porn-watching>.

¹⁸⁷ One example is the increased prevalence in people reporting that they engage in heterosexual anal sex, which is reflected in (and is sometimes alleged to be linked to) the wide availability of pornography focused on the practice. See C. Marston & R. Lewis, *Anal Heterosex Among Young People and Implications for Health Promotion: A Qualitative Study in the UK*, BMJ OPEN (July 18, 2014), <http://bmjopen.bmj.com/content/4/8/e004996> (citing the availability of pornography as a possible explanation for experimentation with anal sex among young people in the United Kingdom); Kimberly R. McBride & J. Dennis Fortenberry, *Heterosexual Anal Sexuality and Anal Sex Behaviors: A Review*, 47 J. SEX RES. 123, 130 (2010) (citing the theory that pornography may be influencing the incidence of anal sex).

¹⁸⁸ A recent example of a new genre is "property sex"—i.e., pornography built around the narrative of a destitute female tenant avoiding eviction by having sex with her landlord in lieu of rent. Rick Paulas, *There's Now a Porn Genre About How Broke Millennials Are*, VICE (June 7, 2016, 12:00 AM), https://www.vice.com/en_uk/article/5gqp8a/theres-now-a-porn-genre-about-how-broke-millennials-are-456.

¹⁸⁹ *2018 Year in Review*, *supra* note 185.

¹⁹⁰ *Id.*

communication channels. This is the central feature of the second digital disruption. Information—content—flows out to consumers. But information about consumer preferences also flows in to the distributor. When coupled to rapid advances in data analysis techniques, this two-way communication becomes a very powerful tool for shaping content. So, when Netflix logs every stop and start you make while watching the most recent episode of *Bojack Horseman*, it is learning something about what bores you enough to get up and grab some more peanuts and also what rivets you to your seat. While there is a lot of noise in this data, the number of participants and discrete events is so large that meaningful patterns can be discerned.

Amazon appears to be on a similar path to data-driven creativity. Today, Amazon is the world's third most valuable company¹⁹¹ and sells everything from socks and automobile parts to fresh produce and even expensive artworks. Most importantly for our purposes, it also produces and streams television series and films.¹⁹² Amazon began as a bookstore. But, as an exhaustive 2014 profile by *New Yorker* writer George Packer makes clear, data harvesting was part of Amazon's business plan from the start.¹⁹³ In the profile, Packer describes how, in 1995, company founder Jeff Bezos

manned an Amazon booth at the annual conclave of the publishing industry, which is now called BookExpo America. Roger Doeren, from a Kansas City store called Rainy Day Books, was stopped short by Amazon's sign: "Earth's Biggest Bookstore." Approaching Bezos, he asked, "Where is Earth's biggest bookstore?"

"Cyberspace," Bezos replied.¹⁹⁴

After the two booksellers discussed suppliers and websites, Doeren asked Bezos what his business model was.¹⁹⁵ As Packer recounts,

Bezos said that Amazon intended to sell books as a way of gathering data on affluent, educated shoppers. The books would be priced close to cost, in order to increase sales volume. After collecting data on millions of customers, Amazon could figure out how to sell everything else dirt cheap on the Internet.

¹⁹¹ Flora Carr, *Amazon Is Now More Valuable than Microsoft and Only 2 Other Companies Are Worth More*, FORTUNE (Feb. 15, 2018), <https://fortune.com/2018/02/15/amazon-microsoft-third-most-valuable-company>.

¹⁹² *Alpha House* is an example of an original Amazon program streamed exclusively on Amazon, starring John Goodman. *Alpha House* (Amazon Studios 2013). See generally *Prime Video: Amazon Original Series*, AMAZON, <https://www.amazon.com/s?rh=n%3A16048854011&brr=1&rd=1> (last visited Aug. 14, 2019).

¹⁹³ George Packer, *Cheap Words*, NEW YORKER (Feb. 9, 2014), <https://www.newyorker.com/magazine/2014/02/17/cheap-words>.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

Afterward, Doeren told his partner at Rainy Day Books, Vivien Jennings, “I just met the world’s biggest snake-oil salesman. It’s going to be really bad for books.”¹⁹⁶

Whether Doeren was right or wrong about Amazon being “really bad for books” is a question that, even with twenty-plus years hindsight, cannot be answered without serious debate. But one thing is clear. Amazon collects vast amounts of data on what consumers want. Like Netflix, Amazon uses consumer data to shape the video content that it produces on its Amazon Prime Video platform.¹⁹⁷ However, Amazon appears to deploy this data differently than Netflix does. For example, when considering whether to invest in new programming, Amazon first creates and releases pilot episodes.¹⁹⁸ Amazon then collects data on viewing patterns and comments on the site to produce “about 20 pages of data detailing, among other things, how much a pilot was viewed, how many users gave it a 5-star rating and how many shared it with friends.”¹⁹⁹ This method allows Amazon to collect not only data on what people thought about the shows but also a “range of metrics unique to its service, such as whether members of its Prime service liked particular shows.”²⁰⁰

Amazon’s use of data reflects its larger business strategy, which is distinct. Amazon’s goal is to use Prime Video to “convert viewers into shoppers.”²⁰¹ The only way to access Prime Video content is to sign up as a Prime member.²⁰² The content, in short, is primarily a lure. CEO Jeff Bezos has been up-front about Amazon’s aim to use “entertainment to drive merchandise sales,” stating in 2016 that “[w]hen [Amazon] win[s] a Golden Globe, it helps [Amazon] sell more shoes” because film and TV customers renew subscriptions at a higher rate and convert to Prime members from free trials at a higher rate.²⁰³ This strategy is reminiscent of the adult industry’s use of freely streamed video content to create personal brands and followings for specific

¹⁹⁶ *Id.*

¹⁹⁷ See Amol Sharma, *Amazon Mines Its Data Trove to Bet on TV’s Next Hit*, WALL ST. J. (Nov. 1, 2013), <https://www.wsj.com/articles/amazon-mines-its-data-trove-to-bet-on-tv-8217s-next-hit-1383361270>.

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

²⁰¹ Jeffrey Dastin, *Amazon’s Bet on Original Video Is Converting Viewers into Shoppers*, REUTERS: VENTUREBEAT (Mar. 15, 2018, 4:37 AM), <https://venturebeat.com/2018/03/15/amazons-bet-on-original-video-is-converting-viewers-into-shoppers>.

²⁰² Jeffrey Dastin, *Exclusive: Amazon’s Internal Numbers on Prime Video, Revealed*, REUTERS (Mar. 15, 2018, 1:11 AM), <https://www.reuters.com/article/us-amazon-com-ratings-exclusive/exclusive-amazons-internal-numbers-on-prime-video-revealed-idUSKCN1GR0FX>.

²⁰³ *Id.*

performers and thereby sell merchandise, private Snapchat access, and the like.²⁰⁴

Amazon's story illustrates an important point about the effects of digitization on creative output and, in turn, on intellectual property theory and policy. Creative output was once deeply constrained by physical scarcities—of distribution capacity; of retailer shelf space; of the cost of physical media. Today these constraints are evaporating.²⁰⁵ Many more works can be brought to market in a digital environment. And in such an environment, where physical scarcities are disappearing, what's left is the central question of how to produce content that people want to consume. Amazon's ability to collect data puts it in a position to select promising projects in the same way (at a general level) that Netflix does. And as with Netflix, the logical path forward for Amazon would be toward what MindGeek is already doing now: i.e., using data to directly craft content.

These trends are not limited to streaming video. We see evidence that Spotify is moving in this direction too. Spotify has some 200 million active monthly users.²⁰⁶ Given the huge number of songs a user can listen to in a month, Spotify is in a position to collect tremendous amounts of subscriber data and expand from content distribution into content production. Spotify already uses a process called “collaborative filtering” to leverage its massive trove of user listening data to construct music recommendations: “Essentially, Spotify takes the songs that listeners repeatedly play or thumbs-up and matches that information to that of other listeners around the world who have the same tastes. Odds are, you'll probably like your internet soul mate's other music selections, and vice versa.”²⁰⁷

Spotify also does something that falls in between suggesting content based on personal consumption data and full data-driven creativity: the playlist. About half of listening on Spotify is now of playlists.²⁰⁸ Many playlists are consumer-created, but Spotify's own lists dominate, and in particular its most famous, *Today's Top Hits*. *Today's Top Hits* has nearly 15 million subscribers as well as many other listeners who do not subscribe.²⁰⁹ Inclusion of a song on the list

²⁰⁴ See discussion *supra* Part II.

²⁰⁵ Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460, 461 (2015).

²⁰⁶ *Spotify Investors*, SPOTIFY, <https://investors.spotify.com/home/default.aspx> (last visited Aug. 14, 2019). One hundred million are paid subscribers. *Id.*

²⁰⁷ Jasmine Garnett, *Algorithm and Blues: Why Discover Weekly Might Not Be Showing You Anything New*, DAILY CALIFORNIAN: CULTURE SHOT (May 23, 2018), <http://www.dailycal.org/2018/05/23/algorithm-discover-weekly>.

²⁰⁸ David Pierce, *The Secret Hit-Making Power of the Spotify Playlist*, WIRED (May 3, 2017, 7:30 AM), <https://www.wired.com/2017/05/secret-hit-making-power-spotify-playlist>.

²⁰⁹ *Id.*

is worth, according to one recent econometric analysis, between \$116,000 and \$163,000 and creates an additional 19.4 million streams on average.²¹⁰ Spotify carefully selects what goes on the playlist. As *Wired* describes the process: “Think of it as the moneyball of music, a ruthlessly data-driven approach to introducing listeners to songs. Just as Facebook loves rolling out new features to a tiny subset of its users, killing what doesn’t work and expanding on what does, Spotify considers every track a beta test.”²¹¹

Playlists, in short, create hits. But they do so based on data and decisions Spotify makes about what is likely to be a hit at a given point in time. This ability to leverage its data is a key element of Spotify’s appeal. As Aguiar and Waldfogel argue, “Beyond getting consumers access to a large catalog, a major value-creating function of a platform is helping consumers to discover music that they like.”²¹²

Perhaps more importantly in the long run, Spotify may exploit its data to give it the same sort of competitive advantage in music production that (currently) Netflix and MindGeek enjoy. Spotify has every incentive to do so—by offering appealing content that it owns, it will reduce its costs of licensing content from others. And by leveraging its unique access to consumer data, it can drive creative choices in ways that allow it to develop uniquely compelling content.

There are signs, moreover, that Spotify is exploring a long-range strategy that pushes data-driven creativity to what may be its ultimate expression. In 2017, Spotify hired Francois Pachet, an AI specialist formerly at Sony and a leading expert in the science of AI-assisted music creation.²¹³ Because music uses a narrower range of inputs relative to video—there are only twelve notes in a chromatic scale (although other elements such as rhythm, chord structure, and timbre widen the range of possible combinations very significantly)—music is more readily susceptible to creation by AI or AI-assisted systems that use a massive corpus of existing recorded music as training data.²¹⁴

²¹⁰ Luis Aguiar & Joel Waldfogel, *Platforms, Promotions, and Product Discovery: Evidence from Spotify Playlists* 15 (Joint Research Ctr., Digital Economy Working Paper No. 2018-04, 2018), <https://pdfs.semanticscholar.org/d874/8f4aa49ffc3ac25a93fa44f60cd94f340b38.pdf>.

²¹¹ Pierce, *supra* note 208.

²¹² Aguiar & Waldfogel, *supra* note 210, at 2.

²¹³ Tim Ingham, *Spotify’s Scientist: Artificial Intelligence Should Be Embraced, Not Feared, by the Music Business*, MUSIC BUS. WORLDWIDE (Jan. 22, 2018), <https://www.musicbusinessworldwide.com/spotify-scientist-artificial-intelligence-should-be-embraced-not-feared-by-the-music-business>.

²¹⁴ David Cassel, *Could AI Algorithms One Day Make Better Art than Humans?*, NEW STACK (May 21, 2017, 9:00 AM), <https://thenewstack.io/ai-algorithms-one-day-make-better-art-humans/> (“Of all forms of art, music is probably the most susceptible to Big Data analysis, because both inputs and outputs lend themselves to mathematical depiction.”).

While at Sony, Pachet developed AI technologies that could generate new music. A catalog of 13,000 songs was used to train statistical models that represent how “atomic musical events,” like individual notes and chords, are related to one another across different musical styles.²¹⁵ “These statistical models are then used to generate new melodic and harmonic sequences” that fit within a specified musical genre.²¹⁶

Pachet is now running Spotify’s Creator Technology Research Lab, which aims to create an AI that can be a “songwriting partner” to human artists.²¹⁷ But there is a possibility that lies beyond “AI-assisted” music, which is that data-derived, AI-generated music may one day begin to displace human-produced music, especially in genres, like electronic dance music and “ambient” or “mood” music, which tend toward relative simplicity in composition, instrumentation, and tone. In the past couple of years several AI-generated albums have been released, such as “Hello World” and “I AM AI.”²¹⁸ AI music-creation technologies are still in their very early days. That said, considering the amount of user data Spotify collects, and the sheer amount of music available as training data for machine learning, one can readily imagine machine-generated music of increasing sonic complexity and audience appeal.

B. *A Continuum of Data-Driven Creativity*

One can array the various data strategies of the major content firms we have surveyed along a continuum. At one end, the most basic, is the use of consumer data to organize and suggest content for future consumption. Netflix, Amazon, and indeed all the firms we have discussed use data this way.²¹⁹ By carefully analyzing usage patterns firms can determine that if consumers liked X, they probably will like Y. Similar, and equally widespread, is the use of consumer usage data to target advertising. This is most common on platforms

²¹⁵ *War Against the Machines: How AI Is Changing the Way We Make Music*, ELECTRONIC BEATS (Feb. 5, 2018), <http://www.electronicbeats.net/war-against-the-machines-how-ai-is-changing-the-way-we-make-music>.

²¹⁶ *Id.*

²¹⁷ Kevin Maney, *Spotify, IBM and Google Using AI to Make Human Musicians Extinct?*, NEWSWEEK (Feb. 6, 2018), <http://www.newsweek.com/artificial-intelligence-changing-music-799794>.

²¹⁸ See, e.g., Alex Marshall, *Is This the World’s First Good Robot Album?*, BBC (Jan. 12, 2018), <http://www.bbc.com/culture/story/20180112-is-this-the-worlds-first-good-robot-album> (reviewing the production of the AI-generated album “Hello World”); Kathleen Walch, *Will the Next Pop Music Hit Be Completely AI Generated?*, FORBES (Aug. 27, 2019, 6:32 AM), <https://www.forbes.com/sites/cognitiveworld/2019/08/27/will-the-next-pop-music-hit-be-completely-ai-generated> (discussing the AI-generated album “I AM AI”).

²¹⁹ See, e.g., Pinsker, *supra* note 178.

such as Facebook but can also be seen in some streaming markets, especially those that rely (e.g., Spotify) on a freemium model.²²⁰

A bit further along the spectrum are data-driven playlists such as *Today's Top Hits*. These are not targeting content at an individual based on that individual's past consumption data. Instead, Spotify is in essence broadcasting to a wide set of subscribers a batch of soon-to-be hits, determined via data analysis. (In a sort of self-fulfilling prophecy, the songs are more likely to become hits due to their inclusion on the hit list.)

Still further along the spectrum is the use of streaming data to make investments in creative content. When Netflix spent \$100 million on *House of Cards* without seeing a pilot, it broke with decades of television norms and practices. But it was not making a gut decision; instead Netflix was basing that investment decision on a deep analysis of consumer preferences.

At the furthest end of the spectrum are firms that take consumer data and directly base creative decisions upon it. MindGeek commissions specific scenes and, as illustrated above, provides data-driven particulars to its producers. It appears that Spotify is also exploring ways to use its data to shape decisions about content. And it seems possible that as both data collection and the capacities of data analysis tools expand, an ever-wider range of content might become susceptible to data-driven creativity. As Jeanne Fromer has pointed out, a growing number of studies have shown that the most popular content within a wide range of genres (there have been studies on classical music, poetry, short stories, lyrics, and paintings, among other things) is only mildly different than previous popular and highly-rated content.²²¹ Basically, consumers like some newness—but not too much. And this suggests that the essence of data-driven creativity, the search for patterns that lead to popularity, might be a rich vein that runs across a wide area.

At the most basic level what Netflix, Amazon, MindGeek, and Spotify are doing is not wholly new. The move to digital streaming did not create the ability to gather data on consumer preferences; that data has long existed. Movie theaters still gather box office receipts to be digested in the industry trades on Monday morning; television ratings systems such as Nielsen did the same for the small screen; and the RIAA gathers detailed sales data for recorded music much as it has

²²⁰ On advertising, see generally TIM WU, *THE ATTENTION MERCHANTS: THE EPIC STRUGGLE TO GET INSIDE OUR HEADS* (2016), which describes the market for attention. On freemium models, see Anderson, *supra* note 30.

²²¹ Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 Nw. U. L. REV. 1441, 1479–83 (2010).

done since the early 1970s.²²² Even in pornography, producers have long tried to assess and react to consumers' revealed preferences.²²³ In a perhaps apocryphal but illustrative scene in HBO's *The Deuce*, a period drama about the adult industry set in 1970s New York based on stories from a participant in the early industry, coins from coin-operated peep show reels are put into bags and weighed in an effort to determine which categories customers like best.²²⁴

Compared with what streaming firms are able to do now, the pre-streaming era was a data Bronze Age. Following the move to digital streaming, firms were able to address the long-standing desire for insights into consumer tastes by dramatically increasing the amount of data available for analysis and keying that data to other characteristics of known viewers/subscribers. When combined with vastly cheaper computing power, which permitted a depth of analysis that was previously impossible, producers who were also digital distributors could now determine with far greater rigor what viewers really watch and how they watch it.

We'll add a word about Apple, a tech giant that has long been in the content distribution business, first via iTunes and more recently with its Apple Music streaming service. Apple has not figured much in this narrative, but it is almost sure to in the future. Apple owns a massive platform integrated with its popular devices, and there are signs that the company is moving toward producing content rather than simply distributing it. In 2017 Apple announced the hiring of two executives from Sony Pictures Television as part of an effort to "oversee[] all aspects of video programming."²²⁵ Since hiring these executives, Apple has recruited "heavy hitters from the television pro-

²²² *TV Ratings*, NIELSEN, <https://www.nielsen.com/bh/en/solutions/measurement/television> (last visited Aug. 14, 2019); *U.S. Sales Database*, *supra* note 2.

²²³ See, e.g., Christopher Jackson, *From ASCII to Streaming Video: How the Internet Created a Multi-Billion Dollar Porn Industry*, NEXT WEB (Oct. 7, 2012), <https://thenextweb.com/insider/2012/10/07/cybersex-ascii-pinups-celebrity-fakes-how-the-internet-created-a-97-billion-porn-industry> ("The Internet allowed for any niche, no matter how deviant, to be represented. Porn magazines and companies creating porn films already catered to the more 'mainstream' fetishes . . . but now anyone could create or find a group of anonymous, like-minded individuals, and share and discuss erotic material.").

²²⁴ Dan Barry, *'The Deuce' Recalls Sex and Sleaze in 1970s Times Square*, N.Y. TIMES (Aug. 24, 2017), <https://www.nytimes.com/2017/08/24/arts/television/the-deuce-hbo-david-simon.html> (discussing the stories that inspired the show); *The Deuce: My Name Is Ruby* (HBO television broadcast Oct. 29, 2017).

²²⁵ Press Release, Apple Inc., Jamie Erlicht and Zack Van Amburg Joining Apple to Lead Video Programming (June 16, 2017), <https://www.apple.com/newsroom/2017/06/jamie-erlicht-and-zack-van-amburg-joining-apple-to-lead-video-programming>.

gramming and development world,”²²⁶ purchased an animated feature and at least eighteen original series, and has come to some kind of programming agreement with Oprah.²²⁷ Apple has reportedly allotted their video team “a \$1 billion pool from which they can draw from [sic] to help develop, produce, and acquire original content.”²²⁸ Some have speculated that Apple will launch a standalone video service to compete with Netflix and Amazon Prime.²²⁹

Apple is projected to spend \$4.2 billion cumulatively on original programming by 2022.²³⁰ Beyond these hints there is little to say yet about how Apple will use data to shape its content offerings. Thus far, Apple appears to have treated content mostly as a way to sell hardware.²³¹ Apple’s initial investments in proprietary content suggest that it may shift from that strategy.²³²

Finally, we would be remiss not to note briefly that consumption data analytics are also shaping one of the fastest-growing and biggest streaming sectors of entertainment today: gaming. In a typical month, Electronic Arts, the gaming behemoth, hosts about 2.5 billion game sessions.²³³ All of this online activity produces a huge amount of data, which allows developers substantial insight into every action that

²²⁶ Jason Snell, *Imagining How Apple Will Roll Out Its New TV Service*, MACWORLD (June 20, 2018), <https://www.macworld.com/article/3282427/streaming-services/imagining-how-apple-will-roll-out-its-new-tv-service.html>.

²²⁷ *Id.*

²²⁸ Yoni Heisler, *Apple’s Streaming TV Service Remains Shrouded in Mystery*, BGR (Apr. 22, 2018, 3:30 PM), <https://bgr.com/2018/04/22/apple-tv-streaming-service-cost-release-mystery>.

²²⁹ Peter Kafka, *Oprah Will Make Stuff for Apple’s Big, Ambitious TV Plans. But What Are Apple’s TV Plans?*, RECODE (June 15, 2018, 1:00 PM), <https://www.recode.net/2018/6/15/17468350/oprah-winfrey-apple-tv>; Evan Niu, *There’s No Way Apple Isn’t Building a Video-Streaming Service*, MOTLEY FOOL (June 22, 2018, 5:55 PM), <https://www.fool.com/investing/2018/06/22/theres-no-way-apple-isnt-building-a-video-streamin.aspx>; Snell, *supra* note 226.

²³⁰ Andrew Wallenstein, *Apple Projected to Spend \$4.2 Billion on Original Content by 2022*, VARIETY (Nov. 24, 2017), <https://variety.com/2017/digital/news/apple-projected-to-spend-4-2-billion-on-original-content-by-2022-1202622459>; *see also* Julia Alexander, *Apple TV Plus Can Afford to Gamble \$6 Billion in a Way That Disney and Hulu Can’t*, VERGE (Aug. 20, 2019, 3:33 PM), <https://www.theverge.com/2019/8/20/20813761/apple-tv-plus-budget-money-disney-netflix-hulu-warnermedia-hbo-amazon> (discussing Apple’s expenditure on its streaming service).

²³¹ *See* Allen Adamson, *Why Apple’s Shift from Hardware to Hollywood Is Critical – and Four Reasons It Will Likely Succeed*, FORBES (Mar. 26, 2019, 11:04 AM), <https://www.forbes.com/sites/allenadamson/2019/03/26/why-apples-shift-from-hardware-to-hollywood-is-critical-and-4-reasons-it-will-likely-succeed> (discussing Apple’s previous business strategy centered around hardware and its subsequent shift towards content).

²³² *See id.*

²³³ Kevin Rands, *How Big Data Is Disrupting the Gaming Industry*, CIO (Jan. 26, 2018, 7:24 AM), <https://www.cio.com/article/3251172/big-data/how-big-data-is-disrupting-the-gaming-industry.html>.

occurs in a game. In 2018, Electronic Arts announced the launch of what it called “cloud gaming,” which is essentially streaming games that can be played on any device.²³⁴ Entertainment trade publications such as *Variety* swiftly dubbed this the “Netflix of [v]ideo [g]ames.”²³⁵ Rather than buying games, the expectation is the public will increasingly subscribe and stream—a model which allows for greater consumer experimentation and therefore broader data collection.

The same principles we have discussed above apply in the gaming world. Indeed, the line between the two is getting blurry: Netflix’s recent *Black Mirror: Bandersnatch* release allowed for an interactive element that, in addition to engendering a trademark lawsuit,²³⁶ allowed viewers to pick and choose different scenarios, shifting Netflix’s content closer to a game than a film. Data obtained through streaming allows game developers not only to develop better, more popular games but—since games often have in-game purchase opportunities—also to maximize revenues by targeting when consumers most frequently purchase extras.²³⁷

C. Algorithms, Authorship, and the Economics of Creativity

In the foregoing we described how streaming data is beginning to change the way content investment and production decisions are made. As Time Warner argued with regard to its merger with AT&T, success in the media world of the future will depend on access to data on consumer behavior.²³⁸ If Time Warner’s prediction is right and if the early developments we see come to fruition, the result will be an acceleration of the transformation of the relationship between producer, distributor, and consumer that we have described. That transformation will shift the economics of creativity. It is likely also to shift how we think about the relationship between intellectual property, competition, and innovation.

Let us start with intellectual property law. Grounded in depictions of Romantic authorship, copyright theory and doctrine have developed in the shadow of a particular and persistent conception of authorship. Copyright law traditionally presumes what might be called

²³⁴ Brian Crecente, *EA Bets Big on Creating Netflix of Video Games*, VARIETY (June 10, 2018, 8:07 AM), <https://variety.com/2018/gaming/features/ea-cloud-gaming-2-1202839087>.

²³⁵ *Id.*

²³⁶ Complaint at 1, *Chooseco LLC v. Netflix, Inc.*, No. 2:19-cv-00008 (D. Vt. Jan. 11, 2019); Eriq Gardner, *Netflix’s ‘Black Mirror: Bandersnatch’ Leads to “Choose Your Own Adventure” Trademark Lawsuit*, HOLLYWOOD REP. (Jan. 11, 2019), <https://www.hollywoodreporter.com/thr-esq/netflix-sued-exploiting-choose-your-own-adventure-black-mirror-bandersnatch-1175428>.

²³⁷ Rands, *supra* note 233.

²³⁸ See *supra* notes 7–8 and accompanying text.

a “Promethean” model of creativity: one in which artists are viewed as lone geniuses who create according to their muse with consumers purchasing or not according to their individual tastes.²³⁹ Seen through this lens, creativity is a deeply individual act of expression, rather than the collective product of a particular culture or community. Of course, this understanding of the creative process has always been an oversimplification, as many scholars have pointed out.²⁴⁰ But this general framing has long dominated the views of lawmakers and the public alike. And it is supportive of a traditional understanding of copyright as a set of rights possessed by individual authors. The authors’ rights framework has been justified by both rights-based and consequentialist arguments. We’ll consider the consequentialist arguments first, as they predominate historically in American legal doctrine.

According to the consequentialist justification, strong copyright is necessary because creative production is by its nature a high-risk enterprise. The primary role of copyright is to protect against copying so that the often large up-front investment in creative work can be more safely made.²⁴¹ In the absence of such protections, the theory holds, the prospect of unrestrained competition from copyists will deter investment in the production of new creative works. The result

²³⁹ See, e.g., Peter Jaszi, *On the Author Effect: Contemporary Copyright and Collective Creativity*, 10 CARDOZO ARTS & ENT. L.J. 293 (1992) [hereinafter Jaszi, *The Author Effect*] (discussing the “author-genius” model); Peter Jaszi, *Toward a Theory of Copyright: The Metamorphoses of “Authorship,”* 1991 DUKE L.J. 455, 455 (“During the eighteenth century, ‘authorship’ became intimately associated with the Romantic movement in literature and art, expressing ‘an extreme assertion of the self and the value of individual experience . . . together with the sense of the infinite and the transcendental.’” (citation omitted)); Mark Rose, *The Author as Proprietor: Donaldson v. Becket and the Genealogy of Modern Authorship*, 23 REPRESENTATIONS 51, 56 (1988) (“The concept of the author as the originator of a literary text rather than as the reproducer of traditional truths also had to be more fully realized[.] . . . and this involved a major aesthetic realignment in which such concepts as ‘art,’ ‘genius,’ and ‘originality’ were transvalued.”).

²⁴⁰ See MARK ROSE, *AUTHORS AND OWNERS: THE INVENTION OF COPYRIGHT* 2 (1993) (“Copyright is founded on the concept of the unique individual who creates something original and is entitled to reap a profit from those labors. Until recently, the dominant modes of aesthetic thinking have shared the romantic and individualistic assumptions inscribed in copyright. But these assumptions obscure important truths about the processes of cultural production.”); Jaszi, *The Author Effect*, *supra* note 239, at 295 (“[T]he persistence of the notion of ‘authorship’ in American copyright law makes it difficult for any new legal synthesis, which would focus on the reality of collective creativity, to emerge.”); Martha Woodmansee, *On the Author Effect: Recovering Collectivity*, 10 CARDOZO ARTS & ENT. L.J. 279, 292 (1992) (“[T]he law has yet to be affected by the ‘critique of authorship’ initiated by Foucault [I]t would seem that as creative production becomes more corporate, collective, and collaborative, the law invokes the Romantic author all the more insistently.”).

²⁴¹ See, e.g., Sprigman, *supra* note 77, at 451 (“Without copyright, it is claimed, copyists will compete away the profits from new artistic and literary creativity, thereby suppressing incentives to create new artistic and literary works in the first place.”).

will be a persistent undersupply of creative works. Intellectual property, in short, is fundamentally about ensuring that innovators are rewarded for their risks. This comes at a cost of course—higher prices, and more restraints on the use of existing works to create new ones—but the prevailing view is that these costs are more than outweighed by the benefits.

Despite its dominance in the U.S. legal discourse, this consequentialist justification is contestable and the evidence supporting it surprisingly thin.²⁴² But for our current purposes, we will accept the general framing. Our point here is that the rise of data-driven creativity should cause us to think anew about the strength of the consequentialist arguments for copyright protection. In particular, we should again ask how much copyright is necessary to motivate the optimal amount of creative output. There are important reasons to think that in a world of data-driven creativity less copyright will suffice—i.e., that we will be able to achieve the same incentive effect with copyrights of shorter duration or narrower scope.

To see why, consider first the two principal risks faced by authors. The first, and most serious, is the *risk of failure*. This is the risk that no one wants to read, watch, or listen to a work that an author creates. Every year many books, songs, films, and other sorts of artistic and literary works are released, and most fail. They receive little to no attention and languish in obscurity. The second is the *risk of success*. This is the risk that a work in fact proves to be popular, and that popularity attracts pirates whose unauthorized copies steal away potential customers for the author's work. The fundamental purpose of IP rights is to reduce this risk of success—to ensure that any market success inures to the benefit of the creator of the original. This, in turn, will incentivize investment in new creative work. To the degree creators are externally motivated by the prospect of financial gain (rather than primarily internally motivated by the pleasure of creation or some other factor unrelated to externally-supplied incentives),²⁴³ copyright protection is expected to raise investment in the production of new creative works relative to a world in which copyists are left free to compete with originators.

In contrast, copyright (and IP rules generally) have no effect whatsoever on the risk of failure. IP rules cannot create market

²⁴² See generally *id.*

²⁴³ See Christopher Buccafusco & Christopher Jon Sprigman, *Experiments in Intellectual Property*, in 2 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW: ANALYTICAL METHODS (Peter Menell & David Schwartz eds.) (forthcoming 2019) (manuscript at 3–5) (on file with authors), <https://ssrn.com/abstract=2838317> (discussing “extrinsic” and “intrinsic” incentives to engage in creative work).

demand where there is none. And for most creative works, the problem is not piracy but unpopularity. A work that is pirated is a successful work. Few consumers would want to pirate works for which there is no demand. (This basic fact skews debate over IP policy, where those who care about piracy—successful creators and those who share their profits—dominate debate and unsuccessful creators, a much larger group, are absent.)

As a consequence, the risk of failure is at least as important to authors' creative incentives as is the risk of success. In economic terms, both types of risk drive down the return that the author expects *ex ante* on her investment in creation. This is true whether that investment is understood in terms of the monetary cost of creativity or the opportunity cost of engaging in creative work versus some other work with a more predictable return. Indeed, in the real world, often it is the risk of failure that looms largest—many more works fail in the market than succeed and are pirated.

The risk of failure was, until recently, thought of as something largely exogenous, unpredictable, and addressable only by hunches and market experience. As legendary Hollywood screenwriter William Goldman famously put it, in the motion picture industry “[n]obody knows anything.”²⁴⁴ But what if creators did know something? What if consumer preferences could be discerned to a very high degree, and content better matched to consumer demand, so that failure is less likely?

That is the world of data-driven creativity that we are entering. In this world, producers—at least producers who have access to massive quantities of consumer preference data—are likely to invest with greater confidence. This advantage is precisely why Time Warner and AT&T fought so hard to merge in 2018.²⁴⁵ Data helps reduce the mismatch between creative work and consumer tastes. And by identifying and helping producers satisfy heterogeneous preferences, data increases the value of creative work to consumers overall. Data is likely, therefore, to have an invigorating effect on creative incentives.

That fact is significant for our understanding of the relationship between copyright law and creative incentives. If those who can access the vast amounts of data streaming produces are better positioned to match the content they create to existing market demand, we need less copyright to provide the same level of creative incentive. That is, in a world of data-driven creativity, we can realize the same level of

²⁴⁴ Peter Debruge, *With One Line, William Goldman Taught Hollywood Everything It Needed to Know*, VARIETY (Nov. 16, 2018, 12:29 PM), <https://variety.com/2018/film/opinion/william-goldman-dies-appreciation-1203030781>.

²⁴⁵ See *supra* notes 7–8 and accompanying text.

creative incentive with copyright terms that are shorter, or copyright rights that are narrower, than they are presently. If we believe that the current level of creative incentive is properly calibrated, the proper policy response may be to shrink copyright terms or narrow the scope of copyright rights. And if we think that current copyright doctrine is already too protective, the advent of data-driven creativity only adds force to the arguments that we ought to rebalance copyright protection.²⁴⁶

Why is it important to reduce the length of scope of copyright if technological developments reduce the risk of investing in the production of creative works? Because, as noted before, copyright provides its incentive to create at a price.²⁴⁷ Copyright owners are given the exclusive right to control their works. These rights, when used to limit copying that would otherwise be lawful, have the effect, in general, of raising prices. The result is a transfer of resources from consumers to producers—which is the entire point. But there is a downside. Some consumers are priced out. By maintaining prices above what some can afford, intellectual property rights create what economists call “dead-weight loss.”

This effect can be captured in economic terms only in part. Copyright is, as the British historian and Whig politician Thomas Macaulay said in 1841, “a tax on readers for the purpose of giving a bounty to writers.”²⁴⁸ And, Macaulay added, “[t]he tax is an exceedingly bad one; it is a tax on one of the most innocent and most salutary of human pleasures.”²⁴⁹ By pricing some people out of art and literature they would otherwise consume, copyright can impede the spread of learning and culture. Indeed, it can even impede the creation of new works. The latter is true because many new works build upon existing works: Think of *West Side Story* and *Romeo and Juliet* or the many cover songs that are released each year. The more stringent the protection older works receive, the harder it is to incorporate, remix, and generally riff on existing works to create new works. Copyright, in other words, encourages some creativity while inhibiting other creativity. It is always a tradeoff.

²⁴⁶ See, e.g., MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* (2008) (stating out strong arguments against IP laws generally); NEIL WEINSTOCK NETANEL, *COPYRIGHT: WHAT EVERYONE NEEDS TO KNOW* 107–62 (2018) (presenting an overview of current controversies and policy debates in copyright industries).

²⁴⁷ See *supra* text accompanying note 241.

²⁴⁸ Thomas Babington Macaulay, Speech to the House of Commons (Feb. 5, 1841).

²⁴⁹ *Id.*

Let us return to the distinction between the risk of failure (the risk that creative works will languish because no one wants to consume them) and the risk of success (the risk that successful works will be copied by others). Copyright law is solely focused on the risk of success. It does nothing to address the risk of failure. Data-driven creativity, conversely, lessens the risk of failure; it does not in itself reduce the risk of success. However, data-driven creativity tends to be accompanied by market changes that reduce the incentive for others to engage in the piracy of successful works. Indeed, these market changes are driven, in part, by the possibility of data-driven creativity. And so even if data-driven creativity does not address the risk of success directly, it indirectly helps to mitigate it.

We see this most clearly in the case of Spotify and other large digital music streaming services. As legitimate music streaming services have risen to market prominence, piracy rates have declined.²⁵⁰ The reason for this is not difficult to discern: Digital music streaming services are built around “all-you-can-eat” pricing where the user pays a fee per month to access the streaming service’s catalog. So long as that catalog contains most of the music that the user wants to hear, and so long as the price is low enough that most consumers are willing to pay, there is less incentive to pirate music. Piracy is time-consuming, requires some technical knowledge, and can be risky—both legally and in terms of exposure to viruses and malware. With an all-you-can-eat streaming service of sufficient scope (about which we say more later) the incentive to pirate, already low for many individuals, effectively goes to zero.²⁵¹

This effect is dependent on streaming services that offer a catalog comprehensive enough to satisfy a large share of consumer demand.

²⁵⁰ See, e.g., Mike Masnick, *Our Response to the White House’s Request for Comments on Its Intellectual Property Enforcement Strategy*, TECHDIRT (Oct. 16, 2015, 11:44 AM), <https://www.techdirt.com/articles/20151014/19000832535/our-response-to-white-houses-request-comments-intellectual-property-enforcement-strategy.shtml> (noting that piracy rates dropped rapidly and permanently when Spotify was introduced in Sweden); Tarun Mazumdar, *The Pirate Bay in Australia: ISPs Join Forces to Cripple TPB*, INT’L BUS. TIMES AU EDITION (Sept. 11, 2014, 3:08 AM), <https://www.ibtimes.com.au/pirate-bay-australia-isps-join-forces-cripple-tpb-1353631> (noting that music piracy in Australia has come down twenty percent since the introduction of Spotify); Adam Sherwin, *Music and Film Industries Winning War on Piracy, Says Report*, INDEPENDENT (July 17, 2013, 5:26 PM), <https://www.independent.co.uk/arts-entertainment/music/news/music-and-film-industries-winning-war-on-piracy-says-report-8714499.html> (noting that music piracy had dropped by 82.5% in Norway in the prior four years, due in part to Spotify).

²⁵¹ The advent of iTunes showed that a well-organized, easily searched, and comprehensive catalog of music will deter piracy markedly even when consumers pay piecemeal for content. The rise of subscription streaming, with huge catalogs available for one price, meaning each new piece of content consumed comes at zero marginal cost, deters far more.

Underlying this point is a key characteristic that we are likely to see generally in markets for content produced via data-driven authorship: *scale*. That is, firms that engage in data-driven creativity are likely to be large firms and perhaps even dominant ones in their fields. We see already that the leading digital distribution platforms—Amazon, Netflix, Spotify, Apple Music, and MindGeek—are large, powerful firms. As they deploy consumer data more expansively, and move further down the road to data-driven creativity, and as the returns to massive data gathering grow, we can expect these firms to grow larger. There is a countervailing trend at the moment in the market for video streaming toward more, rather than fewer firms. As noted earlier, Disney has entered the market, and Apple is set to do so as well. In the short term, the market for video streaming may become more fragmented and competitive. We are speculating here, but in the long term, we suspect that returns to scale will move the market toward consolidation. The question is whether returns to scale begin, at some size, to flatten. If so, then pressure toward consolidation may have a limit, and we may see a stable market equilibrium emerge of several large firms. In any event, these firms are likely to exercise substantial market power, both because they will control “must-have” content and because the need for competitors to be large enough to collect the data necessary to create appealing content efficiently may emerge as a key barrier to entry.

The advantages of scale are well-known in the technology world.²⁵² Many digital companies exhibit returns to scale based on network effects.²⁵³ Facebook, for example, is successful in large part because it is successful: With so many people on the network, others want to be on too. The dynamic for streaming platforms is similar but distinct. There are no comparably powerful network effects operating for digital streaming services (though some try to introduce them via social media-style sharing features). But the returns to scale for streaming are substantial. This is true both because the all-you-can-eat model is much more attractive when the buffet is large and varied and because more subscribers mean more data. These elements can come together into a positive feedback loop: More choices leads to more

²⁵² Indeed it is almost an obsession in Silicon Valley. For example, see REID HOFFMAN & CHRIS YEH, *BLITZSCALING: THE LIGHTNING-FAST PATH TO BUILDING MASSIVELY VALUABLE BUSINESSES* (2018), co-written by the co-founder of LinkedIn, for an overview of the numerous business model, strategy, and management advantages that organizations can attain via aggressive growth strategies aimed at achieving massive expansion at record speed.

²⁵³ For a primer on network effects, see Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479 (1998).

subscribers, which leads to more data, which produces in turn better cues on content and, over time, a lower risk of failure, which attracts more investment and increases the efficient scale of the firm and the number of choices it offers subscribers.

Of course, the fact that the use of data will tend to drive up the efficient scale of content production and distribution platforms is not an entirely happy story, for what often follows in the wake of scale is market power—i.e., the power of a firm to charge a supra-competitive price for its products or services. This is especially likely to be true in the case of data-driven creativity, because, as has already been noted, the shift to data-driven creativity is likely to erect new barriers to competition. Firms wishing to enter a content market where data mining is central to success must build a large distribution platform and acquire and analyze the data that allows them to shape content that is at least as attractive as that offered by rivals. Would-be competitors, in other words, will have to enter at scale.

The upshot is that large production and distribution firms engaged in data-driven creativity are likely to face less pressure from competition over time. And the consequences of that are two-faced. On the one hand, insulation from competition may mean that these firms can more easily support creative production. A firm's scale can substitute, to some extent, for the insulation from competition that copyright provides. But, combined with the barriers to entry that data-driven creativity is likely to raise, this could also allow these platforms to exercise significant pricing power.

This presents a puzzle—one which we believe will arise inexorably as the effects of the second digital disruption take root and drive the reorganization of markets and firms. In moving toward data-driven creativity, firms are likely to gain both scale and meaningful market power. And that market power can, to a degree, substitute for copyright protection, such that we can do with less restrictive copyright rules while realizing the same level of creative output. At the same time, the rise of data-driven creativity raises the possibility that incumbents in content production and distribution markets will exercise significant power over both price and the terms (e.g., quality of service, usage caps, etc.) on which they will deal with consumers. If incumbents exploit that power fully to maximize their profits, that could lead to the same deadweight losses that we generally fear from copyright protection—i.e., substantially supra-competitive prices, which leads to the pricing out of consumers who can only afford content at a lower, competitive price, or even at a lower but still supra-competitive price.

The standard response to such (ab)use of market power is anti-trust law.²⁵⁴ But antitrust intervention—at least based on current doctrine—is unlikely to be an effective countermeasure to the market power that data-driven creativity can enable.²⁵⁵ Crucially, modern antitrust is based on a consumer welfare standard. It trains its sights on concentration that can be shown to harm consumers (as distinguished from competitors).²⁵⁶ As a result it is generally not hostile to bigness as such. Firms that benefit from the virtuous feedback loop that data-driven creativity can provide will be able to point to efficiencies which, they will say, with significant justification, are pro-competitive. These same efficiencies will, on the other hand, raise barriers to entry. But the competitor who didn't enter is like the dog that didn't bark: It is very difficult to identify. So antitrust enforcers will be faced with certain benefits and uncertain harms, a combination that often leads to inaction.

There is an antitrust tool, the so-called “essential facilities doctrine,” that could conceivably be used to force firms to share data with rivals. The essential facilities doctrine is a theory of antitrust liability that seeks to bar a monopolist from leveraging its monopoly power to obtain a competitive advantage by denying its rivals access to some resource or facility that is (a) impracticable or impossible to replicate, and (b) essential to the rival's capacity to compete.²⁵⁷ The remedy is the imposition on the monopolist of an obligation to grant access to the essential facility.²⁵⁸

²⁵⁴ There is a lively debate within antitrust circles regarding the extent to which antitrust should intervene to police the market power of dominant technology platforms and what strategies antitrust should employ when it does intervene. *See, e.g.*, OECD, *RETHINKING ANTITRUST TOOLS FOR MULTI-SIDED PLATFORMS* 2018, at 227 (2018), <https://www.oecd.org/daf/competition/Rethinking-antitrust-tools-for-multi-sided-platforms-2018.pdf> (“[T]he appropriate response is not to call for a separate toolkit for the analysis of vertical restraints in multi-sided markets. On the contrary, most multi-sided markets can be reinterpreted for the purposes of analysis in antitrust cases as a standard contracting problem in vertically related markets.”); TIM WU, *THE CURSE OF BIGNESS: ANTITRUST IN THE NEW GILDED AGE* (2018) (arguing in favor of robust antitrust enforcement).

²⁵⁵ *See* Lina M. Khan, Note, *Amazon's Antitrust Paradox*, 126 *YALE L.J.* 710, 710 (2017) (“[T]he current framework in antitrust—specifically its pegging competition to ‘consumer welfare,’ defined as short-term price effects—is unequipped to capture the architecture of market power in the modern economy.”).

²⁵⁶ *See* *Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 225 (1993) (“It is axiomatic that the antitrust laws were passed for ‘the protection of competition, not competitors.’” (emphasis omitted)); *Reiter v. Sonotone Corp.*, 442 U.S. 330, 343 (1979) (“Congress designed the Sherman Act as a ‘consumer welfare prescription.’”).

²⁵⁷ *See generally* Robert Pitofsky et al., *The Essential Facilities Doctrine Under U.S. Antitrust Law*, 70 *ANTITRUST L.J.* 443 (2002) (articulating the essential facilities doctrine's history and elements as well as relevant policy concerns).

²⁵⁸ *See id.*

We are deeply skeptical that antitrust's essential facilities doctrine could serve as a meaningful brake on the market power that data-driven creativity may create. First, the doctrine is seldom used, and its validity is uncertain. The Supreme Court has explicitly reserved judgment on whether the essential facilities doctrine exists at all.²⁵⁹ Second, application of the doctrine is limited to firms that are classified as possessing "monopoly power."²⁶⁰ This is a very demanding threshold criterion—generally, firms must enjoy market share of at least 50%²⁶¹ in a properly defined relevant product market, as well as substantial barriers to entry. A number of courts have demanded a substantially higher share. The Fifth Circuit observed that "monopolization is rarely found when the defendant's share of the relevant market is below 70%."²⁶² Similarly, the Tenth Circuit noted that to establish "monopoly power, lower courts generally require a minimum market share of between 70% and 80%."²⁶³ Likewise, the Third Circuit stated that "a share significantly larger than 55% has been required to establish[] prima facie market power"²⁶⁴ and held that a market share between 75% and 80% of sales is "more than adequate to establish a prima facie case of power."²⁶⁵

Given these constraints, it is unlikely that (absent substantial reform) the essential facilities doctrine would provide a route to resolve the competition issues that data-driven creativity might raise. More broadly, we believe that the bottom line with respect to antitrust is clear—absent either a fundamental shift in doctrine²⁶⁶ or evidence

²⁵⁹ See *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398, 410–11 (2004) ("We have never recognized such a doctrine[.] . . . and we find no need either to recognize it or to repudiate it here.").

²⁶⁰ See *MCI Commc'ns Corp. v. AT&T Co.*, 708 F.2d 1081, 1132–33 (7th Cir. 1983) (listing the four elements necessary to establish liability under the doctrine as: "(1) control of the essential facility by a monopolist; (2) a competitor's inability practically or reasonably to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility").

²⁶¹ See *Monopolization Defined*, FED. TRADE COMMISSION, <https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/single-firm-conduct/monopolization-defined> (last visited Aug. 15, 2019) ("Courts look at the firm's market share, but typically do not find monopoly power if the firm (or a group of firms acting in concert) has less than 50 percent of the sales of a particular product or service within a certain geographic area.").

²⁶² *Exxon Corp. v. Berwick Bay Real Estates Partners*, 748 F.2d 937, 940 (5th Cir. 1984) (per curiam).

²⁶³ *Colo. Interstate Gas Co. v. Nat. Gas Pipeline Co. of Am.*, 885 F.2d 683, 694 n.18 (10th Cir. 1989) (citation omitted).

²⁶⁴ *United States v. Dentsply Int'l, Inc.*, 399 F.3d 181, 187 (3d Cir. 2005).

²⁶⁵ *Id.* at 188.

²⁶⁶ There is currently considerable foment within antitrust circles regarding whether to jettison the consumer welfare standard and to expand antitrust doctrine in a way that would allow it to attack bigness as such. For an account of the current debates, see Daniel

of cartelization or of single-firm activity that meets the current very demanding standards for Sherman Act monopolization liability, antitrust is unlikely to arrest the move toward larger scale in the digital content production and distribution markets that data-driven creativity reinforces.

Yet antitrust intervention is not the only discipline on the market power of such content distribution firms. *Piracy* is another. If incumbents seek to exploit the full measure of their market power, some consumers are likely to defect from legal streaming services and resume pirating content. In this sense, piracy may act as an “invisible competitor.”²⁶⁷ For similar reasons, piracy may also be a constraint on the potential for fragmentation of the market for video streaming that some have suggested would result from the entry of Disney and Apple. If fragmentation leads to a set of streaming services each of which has a catalog too small to satisfy a large share of demand for a large population of consumers, then marginal incentives to pirate will rise.²⁶⁸

None of this is to suggest that piracy should be ignored entirely or that copyright protection should be removed. But, if the logic of data-driven creativity unfolds in a way that provides content production and distribution incumbents with very substantial market power, then the ability of consumers to exit streaming services and use digital file-sharing techniques to share pirated content will serve as a kind of brake. To be sure, many consumers will not engage in extensive copyright infringement, especially when legal alternatives exist. But the history of Napster, Grokster, and similar firms shows that piracy of creative content can become accepted and entrenched among consumers when lawful means of obtaining content are cumbersome or overly expensive.²⁶⁹

The potential utility of piracy leads to a broader point about the role of copyright in a world of data-driven content. In that world, already emerging as we write, market power, and the access to data that achieving scale as a digital distributor enables, may prove to be

A. Crane, *Antitrust's Unconventional Politics*, REGULATION, Summer 2018, at 18, 18, which details recent shifts on both the left and right towards antitrust populism.

²⁶⁷ Karl Bode, *Streaming Exclusives Could Double Piracy Rates, Study Warns*, VICE (Oct. 1, 2019, 8:00 AM), https://www.vice.com/en_us/article/xwe4x7/streaming-exclusives-could-double-piracy-rates-study-warns.

²⁶⁸ See *id.*

²⁶⁹ See, e.g., Hugh McIntyre, *The Piracy Sites That Nearly Destroyed the Music Industry: What Happened to Napster*, FORBES (Mar. 21, 2018), <https://www.forbes.com/sites/hughmcintyre/2018/03/21/what-happened-to-the-piracy-sites-that-nearly-destroyed-the-music-industry-part-1-napster> (describing the once-pervasive practice of music piracy among the masses).

the new marginal criterion for success in the marketplace for creative works. That was the essence of the argument of Time Warner and AT&T in their response to the DOJ antitrust challenge to their merger.²⁷⁰ There is an additional complexity: The minimum efficient scale of streaming firms is likely to vary along with firms' business models. For firms, like Netflix, that are streaming pure-plays, the returns to data are one-dimensional—the data is valuable to the extent it increases the value of the content that Netflix produces and distributes. But for some firms, content may only be a selective incentive or loss leader whose aim is to help achieve something else. That is true of Amazon, which spent \$4.5 billion on non-sports content production in 2017,²⁷¹ and for which content appears to be primarily a lure for its larger strategy: maximizing Prime memberships.²⁷² Ultimately, diversified firms like Amazon—the “Everything Store”²⁷³—may prove to be more efficient than content pure-plays like Netflix at converting data into profits. If that is the case, then we are likely to see increasing returns not only to scale, but to scope—i.e., returns that increase as more types of goods are produced. In markets for content subject to scope efficiencies, we should see content increasingly produced and distributed by firms that offer products and services other than the content itself.

At bottom, data-driven content producers like MindGeek, Netflix, and Amazon are doing to their respective fields what the forces of competition and innovation are meant to do: reduce the cost of producing and distributing something consumers want. It isn't particularly surprising that the same trends we see in a range of markets, especially in the technology field, are beginning to affect markets for creative production. What is less appreciated is what technology-driven cost-reduction means for our traditional theories and doctrines of intellectual property. As we noted above, intellectual property law works by creating government-sanctioned and enforced monopolies for creators, so they and only they can reap the returns from their creations.²⁷⁴ Yet as Mark Lemley notes,

the development of cost-reducing technologies [via digital technologies] may actually weaken the case for IP. If people are intrinsically motivated to create (as they seem to be), then the easier it is to

²⁷⁰ See *supra* notes 7–8 and accompanying text.

²⁷¹ Molla, *supra* note 138.

²⁷² See Dastin, *supra* note 202 (describing how Amazon customers who stream Amazon video content renew their Prime subscriptions more frequently than those who do not).

²⁷³ BRAD STONE, *THE EVERYTHING STORE: JEFF BEZOS AND THE AGE OF AMAZON* (2013).

²⁷⁴ See *supra* text accompanying notes 241–43.

create and distribute content, the more content is likely to be available even in the absence of IP. And if the point of IP is to encourage either the creation or the distribution of that content, cost-reducing technologies may actually mean we have less, not more, need for IP.²⁷⁵

The rise of data-driven creativity represents the thin end of the wedge that Lemley describes. What role will intellectual property rights play in a world in which the risk, and therefore the cost, of producing creative works has fallen substantially? A world in which creative content may serve primarily as advertisements for other goods and services rather than as products that are themselves the focus of monetization? A world in which maximum viewership, rather than maximum direct revenues, is the primary goal? What changes when content becomes no longer the product but a loss leader or selective benefit that is really aimed at securing the brand loyalty, patronage, and data of as many consumers as possible?

In this world, copyright protection is far less central, because content is far less central. But as we have repeatedly stressed, this does not mean that we can do without copyright. Copyright will often still be necessary to prevent rivals from copying and thereby undercutting incumbents' investments. For example, some amount of copyright protection would be necessary to prevent would-be entrants from jump-starting entry into the streaming market by populating their platform with copied content. The question is what *degree* of copyright protection is necessary to accomplish that. For example, consider copyright terms. Currently U.S. copyright lasts for the life of the author plus seventy years—a substantial increase over the statutory limits granted in the past.²⁷⁶ It seems possible that, as data-driven creativity takes hold, copyright of shorter duration might be sufficient both to deter piracy by rivals and to maintain adequate incentives to produce new work, given the reduction in risk that data-driven authorship promotes. Gauging the optimal length of copyright is an exceedingly difficult problem and certainly beyond the scope of this Article; the central point is that the second digital disruption, by altering the creative process, ought to have commensurate impact on the legal regime undergirding creativity.

²⁷⁵ Lemley, *supra* note 205, at 464.

²⁷⁶ This is the term for the works of natural authors. See 17 U.S.C. § 302(b) (2012). For anonymous works, pseudonymous works, and works made for hire, the term is ninety-five years from the year of the work's first publication, or 120 years from the year of the work's creation, whichever expires first. See *id.* § 302(c).

D. *Data-Driven Creativity and the Moral Case for Copyright*

We close with some thoughts about the implications of the second digital disruption for the moral intuitions that undergird copyright law. The traditional account of authorship—and the account that underlies much of copyright law—is *Promethean*: That is, the creator is viewed as a lone genius, a benefactor of humankind, a hero who brings something transformative from the heavens to man, as Prometheus brought fire.²⁷⁷

This Promethean account has been central to Anglo-American copyright law since the first modern copyright statute, the British Statute of Anne of 1710.²⁷⁸ The full title of the Statute of Anne—“An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned”²⁷⁹—speaks clearly of the statute’s framing as a scheme to incentivize authors to create new works. In alignment with this purpose, the Statute of Anne granted rights to *authors*, rather than to *publishers*, as had been the norm under the Licensing Act that preceded the Statute of Anne under English law.²⁸⁰

From its inception, U.S. copyright law took the same author-centric approach. It began with the articulation in the Constitution’s grant to Congress of the power to make copyright and patent laws: “The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”²⁸¹ Note that Congress is limited to granting copyrights only to “Authors,” and the authors’ rights grounding of copyright is again linked to the achievement of a consequentialist purpose (the “promot[ion of] . . . Progress”).²⁸² The first U.S. copyright statute, the Copyright Act of 1790, was, like the Statute of Anne on which it was modeled, titled “an act for the encouragement of learning.”²⁸³ And

²⁷⁷ And one whose efforts to improve human existence might end in tragedy: For his trouble, the gods chained Prometheus to a rock and sentenced him to an exquisite form of eternal torment, sending an eagle to make daily visits to feed on his liver, which would grow back each night.

²⁷⁸ 8 Ann. c. 19. A critical issue, of course, is who or what counts as an author. For examples of early and influential treatments of this issue, see generally the essays collected in *THE CONSTRUCTION OF AUTHORSHIP: TEXTUAL APPROPRIATION IN LAW AND LITERATURE* (Martha Woodmansee & Peter Jaszi eds., 1994).

²⁷⁹ 8 Ann. c. 19.

²⁸⁰ Compare 8 Ann. c. 19, § 2 (giving rights to “the author of any book”), with Licensing of the Press Act 1662, 13 & 14 Car. 2 c. 33, § 3 (focusing on the authority of printers to license books for printing).

²⁸¹ U.S. CONST. art. I, § 8, cl. 8.

²⁸² *Id.*

²⁸³ Copyright Act of 1790, 1 Stat. 124, 124.

also like the Statute of Anne, the 1790 Copyright Act granted rights to authors and not to publishers.²⁸⁴

Although the Anglo-American understanding of copyright as a system for incentivizing authorship is consistent with the Promethean model of authorship, it is not the *only* justification for copyright that is consistent with that model. Copyright systems, such as those in continental Europe, that emphasize the rights of authors to control the products of their labor or to own those works which reflect their individual personality,²⁸⁵ are also fully consistent with the Promethean model.

Despite the strong focus on economic incentives in U.S. law, in practice many Americans seem to view intellectual property protections in moral terms more akin to the continental European perspective. There is very little empirical research investigating the roots of public support for intellectual property rights. But it is far from clear that concerns about incentives actually motivate the public much in the United States. A significant, and suggestive, exception to this dearth of research is Gregory Mandel's experimental work assessing lay and expert perceptions of the justifications for intellectual property law.²⁸⁶ Mandel finds that while experts (intellectual property lawyers) overwhelmingly tended to identify incentives as the rationale for IP laws (82.8% in Mandel's study),²⁸⁷ lay perceptions differed dramatically. Mandel found that lay participants "tended to have a strong, negative reaction to copying another person's work," and that "[t]his reaction was rooted in moral and ethical disapproval of copying, not legal concerns."²⁸⁸ Only 25.9% of lay respondents identified incentives to create as the chief justification for intellectual property laws.²⁸⁹ In contrast, more than 74% identified some form of moral or ethical concern as the justification for laws restricting the copying of creative works.²⁹⁰ Importantly, respondents' moral and ethical concerns appeared to be rooted in two intuitions: (1) respect for the rights of authors (37.1% of respondents identified either authors' natural rights [25.9%] or authors' rights of free expression [11.2%] as the basis for IP law)²⁹¹, and (2) objections to falsely taking credit for

²⁸⁴ § 1, 1 Stat. at 124.

²⁸⁵ See generally PETER BALDWIN, *THE COPYRIGHT WARS: THREE CENTURIES OF TRANS-ATLANTIC BATTLE* 15 (2014) (describing the European "authors' rights" model).

²⁸⁶ Gregory N. Mandel, *What Is IP for? Experiments in Lay and Expert Perceptions*, 90 ST. JOHN'S L. REV. 659 (2016).

²⁸⁷ *Id.* at 670.

²⁸⁸ *Id.* at 668.

²⁸⁹ *Id.* at 669.

²⁹⁰ See *id.*

²⁹¹ *Id.*

another's work—i.e., *plagiarism*—which was identified by 37.1% of respondents as the justification for intellectual property law.²⁹²

Mandel concludes from this data that lay people are suffering from a “plagiarism fallacy.” In his words, “the popular perception of IP rights is that they are designed to prevent plagiarism, not to provide incentives or to protect creators’ natural or expressive rights.”²⁹³ Plagiarism—the taking of ideas or expression without proper credit—is not what intellectual property laws are, in fact, designed to address. Copyright law, for example, expressly *permits* the taking of ideas,²⁹⁴ and nothing in U.S. copyright law requires that one who takes an idea from another provide any form of credit.²⁹⁵ But our take-away from Mandel’s work is somewhat different. For our purposes here, we are not concerned with the accuracy of lay perceptions about intellectual property law. We are focused on whether the rise of data-driven creativity is likely to *undermine or strengthen* those perceptions. And it seems likely to us that data-driven creativity is likely to undermine each of the moral perceptions underlying intellectual property protection and, in the process, ultimately weaken the Promethean model of authorship.

For example, the use of data to create content is likely to blur the plagiarism intuition. In the Promethean model, the author expresses herself via a creative work. The copyist then takes that expression, sometimes without credit. That taking without credit is the harm that many perceive—harm through free-riding on the creative effort of others without acknowledgement. But in a world of data-driven creativity the author is both expressing herself and simultaneously doing something that looks like plagiarism—she is taking inputs provided by others and using it in her work without credit. The work is in a sense *collective* but also *reflective* of the many inputs of others. The author, like the copyist, is consequently taking from others without credit, and that shift in agency may well revise intuitions in a way that scrambles the association between the work and its “author.” The nature of authorship moves from a relatively straightforward and heroic model

²⁹² *Id.*

²⁹³ *Id.*

²⁹⁴ See 17 U.S.C. § 102(b) (2012) (“In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.”).

²⁹⁵ See Christopher Jon Sprigman, Christopher Buccafusco & Zachary Burns, *What’s a Name Worth?: Experimental Tests of the Value of Attribution in Intellectual Property*, 93 B.U. L. REV. 1389, 1399 (2013) (explaining that “U.S. IP law accords [attribution] very little recognition” and that “[a]tribution is not one of the exclusive rights that U.S. copyright law gives to authors”).

of the solitary genius to one in which authors are able to do their work because they are fed by—and free-ride on—streams of information about consumer preferences.²⁹⁶

Data-driven creativity is likely also to complicate public intuitions that authors deserve to own works which they have created through their labor. In the case of a data-driven content production, who, precisely, is laboring? Again, there is no simple binary; even in a world where data-driven creativity is the norm, we would still recognize that authors are laboring—at least where authors are assisted by data and algorithms, rather than being entirely displaced by them. But authorial labor will be guided by data, and the public's intuition may be that the individuals whose decisions and actions produce the data have an interest in that data and in the creative work that is fed by it. Individuals' interests in their data are of uncertain provenance; perhaps those interests sound in privacy more than in labor. The technological changes that actuate data-driven creativity are too recent for any firm conclusions about their social meaning. But regardless of the source of others' claims, the fact that they exist complicates the narrative about authorial labor because the author's labor is in part dependent on, or made effective by, something generated by someone else.

Finally, to the extent that public intuitions about the justification for copyright law have focused on the idea that works of authorship are stamped indelibly with the personality of their author, the rise of data-driven creativity also blurs this “personality” justification (made famous by Margaret Radin²⁹⁷) for authorial property rights. Works of data-driven creativity reflect not just the personality of their putative author. They also reflect the revealed preferences—and, in a sense, the “personality”—of the audience. While we may be hesitant to equate mere preferences with personality, a work of data-driven creativity may well be perceived as reflecting as much about its audience as about its author. The exact ratio is unlikely to matter. The point is that data-driven creativity cannot plausibly be described simply as the author impressing his personality upon the world—a conceit that, frankly, is contestable even for the most traditional works of author-

²⁹⁶ See, e.g., JAMES BOYLE, *SHAMANS, SOFTWARE, AND SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY*, at x–xiii (1997) (noting that invocations of the “romantic author” have contributed to a proliferation of intellectual property rights); ROSEMARY J. COOMBE, *THE CULTURAL LIFE OF INTELLECTUAL PROPERTIES: AUTHORSHIP, APPROPRIATION, AND THE LAW* 219 (1998) (describing how the Lockean theory of the origin of property “enabled the author to claim not merely the physical object produced, but the literary or artistic expression itself: the ‘work’ legally defined”).

²⁹⁷ Margaret Jane Radin, *Property and Personhood*, 34 *STAN. L. REV.* 957 (1982).

ship. But it retains little intuitive traction when a work is deeply shaped by data collection and analysis.

This is not to predict that people will abandon the idea that there are individual authors or conclude that works of data-driven creativity are not creative. Nor will they necessarily perceive that the creative elements of a work are no longer linked to an identifiable author, or that, as a consequence, authors do not have a justifiable property claim in their works. But the strength of all of these entwined intuitions may well ebb.

What may rise in place of the Promethean model of creativity—or at least alongside it—is something we will call the “Panoptian” model. Our term invokes Argus Panoptes, the hundred-eyed giant of Greek mythology who served as an unsleeping watchman for Hera.²⁹⁸ Argus lives on in modern English in the phrase “argus-eyed,” which means “vigilant.”²⁹⁹ And this gets to the heart of how data-driven creativity, as it becomes embedded in content creation, may change popular impressions of the nature of creativity and, as a consequence, popular intuitions about the moral standing of creators to claim legal rights in their work.

In the Panoptian model, creators are no longer Promethean geniuses who bring something previously unknown from the heavens down to earth. Instead, they are unsleeping watchers. Put differently, they are integral parts of a system of surveillance—constantly gathering information about what we like and desire. Data-driven content producers are not Promethean authors impressing their personalities on the world but rather watchful Panoptian “authors” gathering cues from our preferences and using those cues to construct creative works that, in large part, re-transmit ourselves to ourselves.

In short, a world of pervasive streaming is one with a system of preference-surveillance, although it is a system that we, as consumers, have for the most part bought into willingly. But, in the wake of recent privacy controversies, the public may come to view the process of data-driven creativity as both less than entirely beneficent and productive of content that is not entirely “new.” At the moment, public intuitions founded in a Promethean model of authorship undergird our current system of powerful intellectual property rights.³⁰⁰ A

²⁹⁸ For a catalogue of ancient authors’ uses of the epithet “Panoptes” (all-seeing), see *Argos Panoptes*, THEOI, <https://www.theoi.com/Gigante/GiganteArgosPanoptes.html> (last visited July 25, 2019).

²⁹⁹ *Argus-Eyed*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/thesaurus/Argus-eyed> (last visited Aug. 15, 2019).

³⁰⁰ See ROSE, *supra* note 240, at 2.

revised understanding based in a Panoptian model of authorship may nudge us toward a more limited copyright regime.

How is copyright law likely to account for these shifts in the public's intuitions about creativity? We can again only speculate, but we see two broad possibilities. One is that the public commitment to authors' rights weakens across the board. In this case, copyright law is likely to contract as both the economic justification and the moral intuitions that underlie it ebb. The second possibility is the growth of a commitment to preserve legal protection for Promethean authorship, which may be perceived as under threat given the many market advantages Panoptian (and often corporate) authorship confers. It is possible that people will wish to preserve and protect more individual, Promethean creativity. Perhaps as a society we will make a value judgment about the worth of human authorship. We may seek to vindicate authorship that does not rely so heavily on data about others' preferences, based, perhaps, on a normative stance that art should transcend the mere question of what people want.

Such a position is defensible, though we do not attempt to defend it here. The immediate question is how, if we were to adopt a normative stance in favor of Promethean creativity, we would shape policy to counterbalance the market advantages of data-driven creativity. Copyright policy is unlikely to play much more than a symbolic role. As we noted earlier, intellectual property rights can protect works once they achieve market success. But they do nothing to guarantee that success. As advances in data collection and analysis expand to additional forms of content, Promethean authors are likely, on the whole and over time, to face a competitive disadvantage.

CONCLUSION

The dawn of digital file-sharing in the 1990s ushered in a rapid and indeed revolutionary series of changes in many creative industries. This first digital disruption, most intensely focused on music, engendered significant consumer piracy and in turn significant efforts to deploy copyright law in an ultimately quixotic effort to protect entrenched but aging business models. The second digital disruption is deeper. The advent of streaming has transformed how creative content such as music and film is distributed and, increasingly, how it is made. Streaming enables a form of communication between consumer and creator that has profound effects on not only the ecology of innovation but also on the foundational assumptions of intellectual property law.

The central feature of the second digital disruption is the ability to gather data about consumer preferences, data that can be used by producers in variety of ways. As we have described, the most basic approach is simply to categorize and suggest content to consumers based on past consumption patterns—what many of us are familiar with from shopping on Amazon or browsing Netflix. Ads targeted to us based on our consumption patterns are similarly familiar. Further along the pathway, firms such as Netflix use their data troves to make investment decisions about what content to acquire. And at the extreme end of a road that leads toward ever more pervasive data-driven creativity, MindGeek uses its billions of monthly views not only to invest but also to make decisions about specific features of adult content. All these practices rely on access to fine-grained data and the scale to gather that data. Firms such as Netflix, Spotify, Amazon, and Apple also rely on the tendency of consumers, once they have purchased a subscription streaming service, to graze at the vast all-you-can-eat buffet of content rather than seek out illicit copies in the darker corners of the internet.

The result is twofold. What we have called the “risk of failure”—the risk that a creative work will not find an audience—is reduced, perhaps markedly, when audience tastes can be discerned and monitored over time and content finely calibrated to push the right buttons. And what we have termed the “risk of success”—the risk that a creative work that *does* reach an audience will, absent well-enforced intellectual property rights, be copied by others—is also reduced when many consumers can access all the content they desire via their streaming subscriptions. Both these risk-reduction effects are a product of the second digital disruption, as both depend on mass digital distribution technologies for their impact. Together, they promise to create a more predictable world for content creators.

These developments have major economic implications, as Time Warner’s expensive courtroom battle to merge with AT&T illustrates.³⁰¹ But we also see major legal implications. As content becomes more predictable in its market success, and piracy less likely, the need for broad and durable intellectual property rights is reduced. Copyright law still has an important role. But since the expected return on investment in creative works is more secure in this new world, the need for government intervention to prop up creator investment (or, more precisely, *expectations* about investment) via

³⁰¹ See John Eggerton, *AT&T, Time Warner Cleared to Merge*, MULTICHANNEL NEWS (June 12, 2018), <https://www.multichannel.com/news/at-t-time-warner-cleared-merge> (describing the “epic” court battle of the two companies).

legal rights is lower. In short, the impact on intellectual property law from the second digital disruption is quite distinct from the first. Rather than increase the need for intellectual property protection, as many content firms argued was necessary in the first disruption, the second digital disruption has reduced it.

We also expect that the widespread use of data will increase returns to both scale and scope in many markets for new creative work. This is likely, we believe, to raise additional concerns about competition and innovation in markets already dominated by a small number of large firms. We are skeptical that antitrust law, at least under current doctrine, will exercise effective superintendence of the market power that data-driven creativity is likely to create. Somewhat counterintuitively, we believe that the most effective break on the market power of powerful streaming platforms may be the prospect of renewed piracy should those firms exploit their market power in ways that cause consumers to bridle.

The exact contours of the legal implications of the second digital disruption remain to be seen. We are still in the early stages. But it is clear that the move to digital is not just a move to a new form of distribution. It is as much about the inflow of information as the outflow. As a result, it augurs a new form of communication and of creation that is likely to change our intuitions and rules about intellectual property in many ways, only some of which we can dimly perceive today.