

City Research Online

City, University of London Institutional Repository

Citation: Aversa, P. ORCID: 0000-0003-3175-9477, Hervas-Drane, A. and Evenou, M. (2018). Business model responses to digital piracy. California Management Review,

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: http://openaccess.city.ac.uk/20712/

Link to published version:

Copyright and reuse: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

City Research Online: http://openaccess.city.ac.uk/ publications@city.ac.uk

BUSINESS MODELS RESPONSES TO DIGITAL PIRACY

Paolo Aversa*, Andres Hervas-Drane, Morgane Evenou
Cass Business School, City, University of London

*Corresponding author: paolo.aversa.1@city.ac.uk

[CALIFORNIA MANAGEMENT REVIEW]

ACKNOWLEDGEMENTS

We are grateful to the journal editor Prof. David Vogel as well as the three anonymous reviewers for their expert and constructive guidance during the review process. We thank our colleagues Charles Baden-Fuller, Stefan Haefliger, and Alessandro Giudici for insightful and formative conversations on business models. We also thank the members of the research center on "Business Model and Technology", and the research center on "Digital Leadership" at Cass Business School for their knowledge and support. Finally, we gratefully acknowledge our expert informants and express our deep gratitude to Fratelli Barbieri for their priceless contribution to scholarly idea generation. Errors are our own.
This work was supported by the EPSRC UK Research Council (EP/K039695/1 Building Better Business Models).

BUSINESS MODEL RESPONSES TO DIGITAL PIRACY

SUMMARY

Digital piracy challenges firms by reducing revenues and shifting consumption habits. Recently, some firms have successfully leveraged business models against piracy, but the understanding about this phenomenon still lacks depth and structure. This study examines the characteristics of digital piracy in some of the most affected industries, presents comparative case studies of two iconic firms, Spotify and Netflix, and analyzes their digital business model responses. We generalize their adoption to generic digital content distributors and explain how they contribute to generate and capture value. Theoretical and practical implications for technological innovation, firm diversification, and network competition are also discussed.

Keywords: Digital Distribution; Piracy; Business Model; Innovation; Netflix; Spotify.

INTRODUCTION

It has been almost twenty years since, on June 1st, 1999, Napster hit the Internet and pioneered the global phenomenon of peer-to-peer file sharing, thus initiating a new era for digital piracy.[1] This was made possible by the digitalization of content paired with Internet connectivity for the masses, which enabled large-scale and easy access to copies (music in the case of Napster). Digital piracy has thrived in satisfying the public's demand for fast, convenient, and easy-to-access content: the primary feed for the so-called 'on-demand generation.'[2] Today, the effects of online piracy are 'both alarming and profound'[3] and its resilience is well proven in the face of fierce technical and legal attacks, as well as continuous educational campaigns.

Despite coordinated industry efforts through organizations such as the Recording Industry Association of America, the Intellectual Property Owners Association, or the more recent Alliance for Creativity and Entertainment, as well as policy interventions from governments, piracy has drastically overhauled various industries. Digital piracy enables consumers to substitute purchases from licensed distribution channels with copies from unlicensed Internet sources, and thus reduces the revenues of artists and producers unable or unwilling to engage with new solutions to compete against piracy.[4] The International Chamber of Commerce in 2017 estimated that the global value of digital piracy in movies, music, and software was $213 billion in 2015, and it is expected to raise between $384 and $856 billion by 2020.[5] While these rough

industry figures overestimate revenues losses (given that not every copy is a lost sale, as consumers engaged in piracy may not be willing purchase the content or in some cases may purchase it anyway) the impact has led industry incumbents to rethink their distribution strategies if not their entire business models.[6]

The digital piracy phenomenon is not only timely and compelling for business, but also relevant for academic purposes as it pushes organizations to embrace radical responses aimed at adapting their value creation and value capture activities. Prior research has examined individual incentives for consumers to engage in piracy, as well as organizational responses via pricing mechanisms, educational campaigns, and technical or legal actions. Yet, these countermeasures have proven unable to repress piracy practices; they are part of the solution, but as a matter of fact digital piracy is still widespread and will most likely continue to grow. We deem practitioners and scholars would benefit from a systematic understanding that, by being theoretically anchored, could offer an account of business model responses that is applicable across several sectors affected by piracy.

We have analyzed several of the domains where digital piracy operates and have studied the success and failure of companies competing against piracy: a broad and complex challenge which is affecting several industries.[7] Digital piracy offers consumers a convenient and cost-effective method to access desired content, often serving demand that is not fully addressed by traditional distribution. From a business model perspective, digital piracy thus offers a value proposition (free access to a large content library, in the best scenario) that is nonetheless associated with specific downsides such as lower quality copies, copies with incomplete functionality, or lack of complementary resources such as content discovery tools or community interactions. In this article we present an analysis of the digital piracy phenomenon to identify these factors and the strategic responses available to the firm. Scholars and practitioners have suggested that a possible response for firms lies in changing the companies' business models, the mechanisms of value creation and value capture to engage with the consumer.[8] More so, evidence seems to suggest that

the innovation necessary for such objective can possibly be achieved thanks to the very same digital technologies that help piracy flourish. However, to date research provides scarce and unstructured empirical evidence with regards to the potential of business model responses to counter digital piracy.

Our work addresses the following research question: *How can firms design their business model to minimize the negative impact of digital piracy?* In our endeavor, technological innovation remains a key aspect to understand the interplay between digital piracy and business model responses. Scholars affirm that "an important research agenda for technology strategy scholars is to unpick the interdependencies between business model choice, technology development, and success."[9] Our aim is precisely to contribute to this agenda by carefully accounting for the properties of digital piracy that have not been recognized or integrated in prior research and unveil how business models, enabled by digital technologies can provide the most effective response to the challenge. The iconic cases of Netflix and Spotify are analyzed and used to derive generalizable consideration for other industries affected by digital piracy.

THE CHALLENGES OF DIGITAL PIRACY

Digital piracy is enabled by advances in computing technology. This encompasses both software and hardware, with improvements in media encoding as well as widespread adoption of computing devices and Internet connectivity by the consumer population at large. Digital piracy takes place when consumers engage in unlicensed distribution of content in digital file formats, for example by sharing copyrighted music files which are commercially available in the marketplace. This is fundamentally different from other forms of piracy such as counterfeit of fake products, which is based on the production of physical replicas of original goods for commercial profit. We focus on digital piracy taking place online, that is, where the content is distributed over the Internet. This has superseded offline exchanges based on physical supports such as floppy disks or optical discs.

Digital piracy has evolved over several generations of Internet applications. These include newsgroups such as Usenet, centralized server-based exchanges on private or public hosting sites, and peer-to-peer file sharing (p2p). The latter became mainstream with the development of Napster, a music file sharing application that was shut down under legal challenge from the music industry.[10] But file sharing technology has evolved quickly. Subsequent applications such as BitTorrent can operate over decentralized network architectures with no single point of shutdown and facilitate the exchange of any type of content (including content in the public domain or authorized for public distribution) with greatly improved efficiency. The technology has matured to the point where it is a major driver of digital piracy and is relatively accessible to the average Internet user.[11]

Digital piracy has proven exceptionally resilient to both technical and legal attacks. Copyright holders have infiltrated file sharing networks with 'spoof' content to discourage users from downloading unauthorized material, but with limited success.[12] Technical attempts by Internet service providers to curb file sharing traffic have triggered an arms race between network engineers and p2p application designers. Users are also rerouting their Internet traffic to bypass monitoring, with facilitating services such as virtual private networks (i.e., VPN) or remote file sharing clients (i.e., Seedboxes) flourishing in some countries.

Legal attacks have also failed to curb illegal file sharing.[13] Major legal cases against proprietary p2p applications Napster in 2001 and Grokster in 2005 led to the successful development of open source p2p software initiatives. Copyright holders have sent warning letters and prosecuted file sharing users in several countries, with the media often describing large damage claims; yet, these initiatives have failed to significantly reduce online sharing traffic.[14] Some countries have enacted laws to penalize users engaging in digital piracy, with users mostly risking fines and temporal Internet disconnection. These initiatives have seen short-term falls in domestic file sharing traffic, but public resistance, technical workarounds by users, and legal procedures requiring judicial oversight on a case by case basis are perceived as blocks to their

effective application. For example, scholars have reported that graduated response programs (which penalize repeat file-sharing offenders) are not effective in raising box office revenues of new films.[15]

Several studies have analyzed the factors that draw consumers to digital piracy.[16] A key factor is the perception that piracy is free, or more precisely, that no monetary outlays are required to access the content. Consumers also highlight other factors that make piracy attractive, such as access to a large catalog of titles and the ability to bypass release windows and geographical restrictions in commercial distribution. Because Digital Rights Management (DRM) restrictions are removed from pirated content, consumers can also use the content on their own terms and on any compatible device. Nonetheless, consumers recognize the downsides of digital piracy. It requires some skills and dedication, some technical equipment (e.g., a computer that remains powered during downloading, Internet bandwidth, digital storage), it is often slow, and the quality of the content downloaded is inconsistent. Finally, its controversial or illegal nature might expose users to psychological stress, moral costs and legal penalties.

The academic literature has also analyzed the impact of digital piracy on industry revenues. A large number of studies have focused on the impact of file sharing on the music industry, given that the Napster phenomenon provided a unique time window to examine the effect of file sharing on traditional commercial distribution arrangements.[17] This literature strives to estimate sales displacement, that is, the volume of sales that is lost due to the presence of file sharing. A typical estimate is a 'rate of sales displacement' of circa 20%, though the estimated effect can vary significantly across studies. It is worth stressing that sales displacement is not a one-to-one relationship to the number of pirate copies downloaded, given that not all digital piracy users would be willing to purchase the content. Given the hurdles involved in precisely tracking piracy and its effects on commercial sales,[18] we echo other scholars' in suggesting that the estimates from any single study be taken with 'a grain of salt.'[19] Researchers and monitoring agencies often warn about the accuracy of data on piracy activity and suggest to focus on general trends rather

than precise assessments. Unavoidable estimation challenges and constraints have led to adopting alternative mathematical models and simulations of file sharing dynamics to analyze the optimal pricing strategy for commercial distribution.

Research has also analyzed the implications of digital piracy for content pricing and in the context of supply-side restrictions, where consumers in some regions lack access to specific content through domestic distribution channels (for instance due to release windows, content licensing or quota restrictions, or geographical coverage of online stores). [20] This strand of work finds that eradicating piracy through aggressive pricing may not be optimal and that the key to competing effectively is to match the aspects of the service valued by consumers and improve upon them.[21]

> *"Content providers must shift their response to piracy from being device-oriented, such as traditional conditional access systems and digital rights management to comprehensive service-oriented approaches and modern tools against piracy." (Sam Rosen, President at ABI Research – Cue Entertainment, 2017)*[22]

In other words, to better understand the extent to which firms can respond to digital piracy, one should not focus only on pricing but adopt a more comprehensive and holistic view, ideally encompassing the entire business model responses that organizations can deploy.

FIRM RESPONSES VIA BUSINESS MODELS

While the academic debate has developed a plethora of definitions of *business model*,[23] one of the most common by Teece terms it as "the design of a value creation, value delivery and value capture mechanisms employed by companies as mean to entice customers to pay for value and convert those payments into profits."[24] The business model concept can be usefully applied to any organization with some business purpose—including those engaging with digital piracy.

As means to more precisely distinguish and classify business models, Baden-Fuller and Haefliger advanced a conceptualization of four constitutive elements, namely: i. Customer identification; ii. Customer engagement; iii. Monetization; and iv. Value chain linkages.[25] *Customer identification* defines the firm's targeted user and customer groups. It specifies if the business model is dyadic (i.e., between the firm and a single type of customer) or multi-sided,

(i.e., it connects multiple groups and monetize from their interaction). The *customer engagement* explains the value proposition for each of the user or customer groups. The authors emphasize the difference between 'project-based systems' which create value by interacting with customers (e.g., consulting firms), and 'pre-designed (scale) based systems' (e.g., standardized products)—often described as the 'taxi' and 'bus' systems, respectively. The third element, *monetization*, is a key part of value capture and involves more than just pricing, as it includes systems determining timing of payment and methods for collecting revenues (i.e., free, freemium, subscription, work-for-hire, etc.). Finally, the *value chain linkages* are the mechanisms the firm uses to deliver its product or service to the customer, and it defines returns from adoption, for examples via network effects.

Firms often change their business models to adapt to new contingencies, including piracy, and establish a competitive advantage.[26] Changing a business model consists of adding or terminating activities, linking them in novel ways, or redefining the way in which the customer engagement takes place (e.g., from brick-and-mortar to online). Changing business models is often paired with innovation.[27] Yet, Teece argues that innovation does not only pertain to advancing new products but also to pursuing new ways of engaging with the customer—that is, "innovating" the business model. When sufficiently innovative and hard to imitate, business models can become key factors for superior returns and sustainable competitive advantage.[28] Technological innovation prompts opportunities for piracy empowerment, as well as for new business models design.[29] Evidence shows how some firms (i.e., Amazon, Apple, AirBnB, Facebook) have flourished through business model innovation that was in turn enabled by new digital technologies, while others (i.e., Nokia, Kodak, Atari) missed such opportunities and experienced severe performance drops.

Within the same industry, firms compete using different business models. For example, within the music and movie industries some firms focus on production (e.g., the movie and music majors) while others focus on distribution and customer engagement (e.g., online streaming

platforms, rental companies, music event planners). Recent studies have questioned traditional business models in these industries in light of technological change.[30] Our analysis focuses precisely on this last stage of the supply chain: the distribution and monetization of content. Spotify and Netflix, our two case studies, distribute content which is mostly produced and owned by others, namely the record labels and the movie studios. Our approach is based on the observation that the incentives of content distributors and those of content owners must be aligned with respect to the maximization of profits generated in distribution. Clearly, if content owners rely on outside distributors it must be the case that these firms excel in this area, as content owners would otherwise have every incentive to distribute the content themselves (and their past failures when launching digital distribution initiatives signal their difficulties to do so). Thus, our unit of analysis is superior performance in distribution and not the production or ownership of the content.[31] Some recent research already suggested that there seems to be a positive relationship between business model change and recovering revenues in the music industry.[32] Our goal is to further advance our understanding on these critical competitive dynamics vis-à-vis digital piracy.

METHOD

This study presents a qualitative analysis of the responses to digital piracy emerging from two case studies,[33] Netflix and Spotify. Several media recently reported how these two companies' business models have managed to invert the rise of digital piracy, and (for the first time) managed to even reduce illegal downloads.

> *"Internet streaming services such as Spotify and Netflix have resulted in online piracy falling to its lowest rate in years, an official report claims." (James Titcomb - The Telegraph, 2016).*
>
> *"A hacker who has unsuccessfully tried to hold Netflix for ransom has achieved an unexpected result: His failure shows that subscription-based business models in content distribution is making piracy pointless. Intellectual property owners' slowness in adopting these models is the only reason content is still being pirated." (Leonid Bershidsky - Bloomberg, 2017).*[34]

Yin explains that a case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context where the boundaries between the phenomenon and the

context are not clearly evident and in which multiple sources of evidence are used."[35] As such, the multiple case study design is the most relevant for our endeavor, as it allows for a detailed exploration of the different strategies implemented by firms as mean to overcome digital piracy's threats.

Our study builds on publicly available archival sources and databases, and the great majority of the findings we present are based on a theoretically-driven elaboration of such data. Yet some primary sources were also collected, mostly with the intent of obtaining external, objective opinions on the main issues, trends, and an additional validation of our interpretation.

First, we obtained archival data from a broad range of sources, and this allowed us to gain a nuanced understanding of the industries analyzed, and more specifically of the firms' different business models. Great attention was devoted to the issue of piracy, particularly in digital form. Documents include yearly reports from industry organizations such as the Recording Industry Association of America, the Intellectual Property Owners Association, and the Alliance for Creativity and Entertainment, but also media articles and data from sources such as Bloomberg, Financial Times, The Economist, The Wall Street Journal, and Reuters (among others), technical websites, piracy community discussions, experts' blogs, official investor relations and financial reports from Spotify and Netflix.[36] The final selection included 96 documents (235 pages) that directly addressed the topic with a sufficient level of specificity and reliability, while minimizing duplication of information. Industry data mostly informed us on digital piracy features and the business models of Netflix and Spotify. Academic papers mostly suggested information on general company responses and piracy value propositions, some of which included Netflix and Spotify.

Second, we gathered primary data from face-to-face semi-structured interviews. Nine extensive interviews were conducted for a total of 495 minutes of engagement (some interviewees asked to remain anonymous given the confidentiality of the topics). All interviewees are considered major experts in the movie and music business and have held executive positions

in the field for over 5 years. Seven interviewees work for incumbents (Warner Bros., Universal Pictures, Disney, Légende Films) whose business models are currently facing significant struggles against digital piracy. They were thus very useful in providing expert insights on the piracy challenges and the incumbents' efforts to respond to this threat, as well as an external perspective on digital industry newcomers. The remaining two interviewees were executives at Spotify and Netflix in charge of customer engagement and business modelling; beside their own views on the industry and digital piracy, they provided additional validation of the archival coding and the decisions that their companies implemented.[37] Interviews were taped and transcribed. All interviews were based on similar items that were designed to produce answers to the following question: *'What business models do firms use to minimize digital piracy?'*

We analyzed and compared our data with a cross-case research protocol,[38] seeking to identify similar constructs and topics in the data. As a result, we divided our findings into a comparative table that examined: (1) The most salient features of digital piracy across different content categories; (2) The most salient features of Netflix and Spotify's business models; (3) How the focal companies' business models respond to specific piracy value propositions; (4) The limitations and challenges such business models entail. Our analyses were framed by using the conceptualization of the business model's four constitutive elements proposed by Baden-Fuller and Haefliger.[39] We then condensed our findings using a 'causal loop diagram' following the methodology proposed by Casadesus-Masanell and Ricart. [40] This provides a systematic and parsimonious representation of the key elements identified in Netflix and Spotify's business models, which can be useful to both scholars and practitioners.

FRAMING DIGITAL PIRACY WITHIN CONTENT CATEGORIES

The evolution of digital piracy over the last two decades has varied across different content categories. Digital piracy exerted pressure on the music and movie industries earlier and with higher intensity than on the book publishing industry, for instance. We examine the drivers of these differences across the main categories of content, including audio (such as music albums), film (movies or TV shows), written works (books or comics), and interactive works (videogames

or software applications). This can explain how the threat to commercial distribution varies across categories, and we will build on these drivers to analyze the business model responses.

It is noteworthy that Daniel Ek, founder and CEO of Spotify, formerly owned uTorrent, one of the most popular software applications used to download content by users engaging in digital piracy.[41] He openly affirmed that the Spotify model was created as a response to piracy, a phenomenon he knew very well. This suggests that a profound understanding of the digital piracy phenomenon is a valuable basis to understand how to develop effective countermeasures.

Table 1 summarizes our findings. For each category, we focus on (1) The costs of producing the first unlicensed digital copy of a given piece of content, which is a prerequisite for large scale sharing; (2) The costs for consumers to locate and copy desired pieces of content; and (3) The costs and convenience to consume those digital copies. Taken together, these factors determine the size of the content catalog available through digital piracy to the average consumer in each category and its attractiveness to satisfy consumption.

[Insert Table 1 about here]

In summary, the table suggests that digital piracy should be more attractive for audio content than for film, and more attractive for both of these categories than for written and interactive works.[42] This is because copies of audio and video content are easier to create, share, and consume on different devices. For these reasons, content catalogues of pirated music and video are comparatively larger, easier to access, and often of higher quality.

It is therefore not surprising that the most innovative and effective business model responses have emerged in the music and movie industries, from players such as Spotify and Netflix, where the threat of digital piracy is stronger. Similar solutions have indeed also emerged for other categories, such as Amazon Kindle Unlimited for books or Sony's PlayStation Now for videogames (both of which are subscription-based services offering immediate access to content), but they are not major players in their respective categories and fall short of the offerings provided by Spotify or Netflix on several dimensions.[43]

SPOTIFY AND NETFLIX BUSINESS MODEL RESPONSES TO DIGITAL PIRACY

Spotify and Netflix are two of the most prominent and advanced digital distribution services emerged in the last decade, and those that have been more consistently associated with the anti-piracy trend. Their rise corresponded to a major cultural shift in consumers' behavior, who accepted the idea that they could buy music and movies without actually owning any physical support but only a license to reproduce the content.

> *"Sometime in the period between 2008 and 2012, consumers, or at least a significant number of them, started to accept the notion being promulgated by companies like Netflix and Spotify that they didn't really need to own music or movies; they were happy to lease them for a monthly subscription fee in exchange for unlimited access to a close-to-unlimited library." (Alan Wolk – The Guardian, 2015).*[44]

Both of these services offer real-time streaming of content, subscription plans, and attractive pricing. They are recognized as innovative players and are at the forefront of industry responses to digital piracy, as evidenced by their widespread appeal and large userbase. Spotify started to stream music over the Internet to consumers in 2008, and Netflix debuted its video streaming service in 2007. Both secured support in their respective category from content owners, record labels and film studios, and were launched on the back of earlier commercial initiatives that failed to catch on with consumers (in many cases launched by the content owners themselves). They are ultimately "a 'prototypical exemplar' of a category" and are often used in the media and in common language as a refence point to describe other businesses—see for example media statements like "Trader (…) the Netflix of Apparel" (CNBC); "Fiit, The Netflix Of Fitness" (Forbes), "SoundtrackYourBrand (…) the Spotify of Business" (Forbes) and "CKBK is the Spotify of cookbooks" (Quartzy). Accordingly to recent literature on business models emergence, they can thus be defined as "iconic business models."[45]

Table 2 provides a granular comparison of the characteristics of Spotify and Netflix's services according to the four constitutive elements proposed by Baden-Fuller and Haefliger. [46]

[Insert Table 2 about here]

Following the same framework, we next identify how the features of Spotify and Netflix's business models specifically respond to the main value propositions of digital piracy. Table 3 summarizes our findings.

[Insert Table 3 about here]

The main attraction of digital piracy lies in providing access to content without the need to incur monetary outlays. There are other costs involved in digital piracy for consumers (e.g., electricity bills, expanded storage, bandwidth usage, possible piracy penalties, delayed consumption etc.), but access to content is nonetheless perceived to be 'free.' This separates the experience afforded by digital piracy from traditional content pricing models (including those of early digital stores such as Apple iTunes) where each unit of content is accompanied by a price tag. Spotify and Netflix's subscription model provides a monetization avenue that responds to this challenge by matching a key perceived benefit of digital piracy: an 'all-you-can-eat' menu of music and movies.[47]

> *"All-you-can-eat content model. By providing access to a large variety of titles, like Netflix with streaming movies, or Hulu for TV shows, with new content added regularly, there is always a reason to keep up your subscription. If you already have many followers for some limited free offerings, this also becomes a natural freemium upgrade." (Marty Zwilling – Huffington Post, 2015)*[48]

The subscription model also simplifies the pricing proposition and payment processing for the firm. But this has the downside of limiting the extent of price discrimination that can be implemented. With traditional content pricing, each unit of content is independently priced and different versions of the same content can be offered at different price points (the deluxe version of a new music album or more popular movies can be priced at a price premium, for example). While the design of different subscription plans can enable some degree of price discrimination, as offered by Netflix based both on streaming quality and number of streams, effective monetization strategies against digital piracy often need to sacrifice the flexibility afforded by traditional content pricing models. In turn, this holds potential for major business growth.

> *"If we're able to transition the traditional radio behavior online, you're looking at a music industry that's much larger than it's ever been. (…) If you do that, and also add subscription to the mix, especially at Spotify's conversion rate, you'd be looking at a*

> *music industry that would be $100bn to $160bn in size." (Daniel Ek, CEO and founder at Spotify – Daily Mail, 2015).*[49]

Spotify's free tier further erodes the comparative attractiveness of digital piracy. Clearly, this free tier is inviting to consumers on the pricing dimension, but also needs to accommodate the preferences of advertisers. Because advertisers are paying, the free tier operates as a two-sided platform serving both users and advertisers. Thus, Spotify needs to respond to the preferences of both parties when resolving tradeoffs where there are conflicts of interest, such as the frequency and intensity of advertising or the songs associated with each commercial. As anticipated, Spotify views the free tier as a feeder for future paid subscribers, as noted by CFO McCarthy when stating that "*the ad-supported service is also a subsidy program that offsets the cost of new-user acquisition.*"[50]

The consumer experience also differs significantly when comparing digital piracy to commercial streaming services, particularly in the process of navigating and searching through the content catalog. Digital piracy is characterized by a complex and evolving constellation of communities and software that require skills and dedication on behalf of participants, resulting in a lower degree of convenience to the average user. Spotify and Netflix provide visual and intuitive interfaces that are much simpler to operate and stream content on-demand, immediately. The diffusion of smart TVs and other devices with built-in support for commercial streaming services further facilitates adoption and offers immediate gratification to consumer segments who are not familiar with the use of computers or tablets.

> *"Whereas an Internet service like YouTube or Netflix runs on all your devices. It runs on a big screen but it also runs on the small screen too. It has got an Internet sensibility in terms of application updates, and integration with other services, and you know, all the things that come along with it." (Reed Hastings, CEO and founder at Netflix – Financial Post, 2016)*[51]

The lack of DRM restrictions on pirated content offers several benefits. Content can be consumed on any compatible device without the need for Internet access. Early commercial initiatives in the digital space were burdened with DRM schemes that restricted consumption choices for consumers, for instance by limiting playback to a small set of trusted devices or

requiring an Internet connection at all times. Spotify and Netflix implement DRM in a fashion that is consumer-friendly; content can be accessed from a wide range of devices and download functionality for offline consumption is available (with some limitations). While the erosion of DRM restrictions can facilitate unauthorized consumption or even piracy, streaming service customers are the clear winners.

Digital piracy offers an extensive catalog in most content categories. Consumers can often find new releases and classics, as well as many back-catalog titles. Spotify offers a comprehensive music catalog that compares favorably against the catalog most consumers could access through piracy. This ensures the average consumer can access most of the music they are familiar with and discover new music they like on the service. Netflix's catalog does not fare as well as that of Spotify in this regard. While high profile titles are available and prominently featured it is not uncommon for the average consumer to discover that desired titles are missing, more so in countries where the local catalog is small. The fundamental challenge for Spotify and Netflix in this area is to sustain and expand licensing agreements with content owners, particularly the major record labels and film studios, concerning the titles offered and the conditions under which consumers can access them.

The desire for small file sizes in digital piracy can often lead to lower content quality or even corrupted files. While some piracy communities do focus on maintaining high quality standards for their files, finding acceptable copies can be the exception rather than the norm for the average user of digital piracy. Spotify and Netflix provide consumers with consistent streaming quality, and their advantage stands to further increase as Internet infrastructure improves. The quality provided by both services varies across subscription plans, and even though the highest available streaming qualities are technically inferior to those available on the best physical formats (CD audio or Blu-Ray video), quality consistency ensures customers an enjoyable experience.

Social interactions play a key role in today's media consumption. Consumers enjoy sharing their content consumption experiences, learning from those of others, and engaging in community

discussions. But the opportunity to do so in the context of digital piracy is limited by anonymity, heavy user churn, and limited community involvement. This provides an opportunity for commercial services to outperform piracy. Spotify and Netflix provide social media integration that facilitates social interactions and shared consumption. This value chain linkage strengthens the players (e.g., Facebook, Twitter) hosting the social interactions generated by content consumption, but also increases the size of the conversation by ensuring that non-subscribers can participate and perhaps become subscribers in the future. Spotify and Netflix also host some user generated content (e.g., ratings, reviews, playlists) on their services, though this is generally related to content scoring and mainly exploited for content discovery purposes.

> *"In order for a service to be social, you've really got to start from the ground up. The fact that almost a third of the U.S. population have even heard of Spotify is really because they've seen it on Facebook and friends have been sharing." (Daniel Ek, CEO and founder of Spotify – USA Today, 2012).*[52]

Content discovery also plays an important role in media consumption. With extensive digital catalogs providing an overwhelming abundance of options, it becomes key to help consumers discover new content in order to keep them engaged with the service. Digital piracy offers only primitive and non-customized tools for discovery, if any, as data collection and user profiling is a taboo for piracy users. Both Spotify and Netflix have seized this opportunity by implementing recommender systems and have invested substantial resources in the development of their proprietary algorithms. These systems exploit consumer service usage and ratings data to generate personalized content recommendations, and can also exploit the consumption patterns of connected users (e.g., 'friends' in social networking spaces) to foster shared experiences. Consumer feedback from both services suggest that these content recommendations are a valuable aspect of the service.

Finally, release windows and geographical restrictions that limit commercial availability of content have long been a major driver of piracy. This includes the delayed release of movies or television series in different regions, or geographical restrictions on purchasing from online stores

such as Apple iTunes. This generates a *dark zone* in regions where the content is not commercially available.

> *"Why would consumers wait that long for something they can have for free as soon as an illegal copy of the film is leaked? Our system is not working anymore and we have to listen to the consumer need in order to adapt it and reduce piracy […] The dark zone of a movie supply chain needs to completely disappear." (Trevor Albery. Vice President Strategy & Operations, EMEA Content Protection & Analytics at Warner Bros. – Source: interview).*

In their agreements with content owners, both Spotify and Netflix have secured much improved geographical access for consumers compared to early digital distribution initiatives. This ensures that many consumers now have a viable alternative to digital piracy for the first time. Nonetheless, as noted in the preceding section, the gap between the music and film categories is still significant in this regard.

COMPETITIVE ADVANTAGE AGAINST PIRACY VIA BUSINESS MODELS

In this section we present a causal loop diagram of the value creation and capture logic in our analysis above. Our goal is to illustrate how the strategic responses of Spotify and Netflix are internally consistent and how they feed the value generated (and captured) on these services over time. Figure 1 provides the representation.

[Insert Figure 1 about here]

The representation follows the methodology proposed by Casadesus-Masanell and Ricart (2010; 2011) which is a useful tool to highlight key implications for both theory and practice.[53] Underlined elements are choices made by the firm, and non-underlined elements are consequences. Arrows connect causes with consequences to identify positive feedback loops, and dashed arrows identify negative feedback loops. Elements inside a box are rigid consequences or stocks, which accumulate over time and change slowly in response to the feedback loops that cause them.

Departing from the digital distributor's revenues at the bottom of the diagram, a strategic choice by the firm is to offer a free tier with basic access to the service, either subject to advertising (Spotify's free tier) or for a limited time period (Netflix's free trial). The free tier

attracts new users to the service by matching a key perceived feature of digital piracy, namely free access to content, and therefore contributes to feed the userbase (i.e., the accumulated stock of users) over time. Sustaining the free tier is costly for the firm as it represents an investment to obtain future paid subscribers, so the choice is supported by the firm's revenues generated elsewhere, as well as advertisers when present. Moreover, the free tier can also deter from user willingness to pay for the service ("user WTP"), as some users may find that it satisfies their immediate needs and choose to remain on the free tier (or initiate additional free trials in the future) rather than become paid subscribers. The firm needs to address this tension by setting the subscription price accordingly and managing the perks and functionalities reserved to paid subscribers (e.g., higher quality streams, more simultaneous streams, offline consumption, etc.)

Content licensing agreements are essential to the firm's service. Content owners (record labels, movie studios) typically command a large share of the revenues generated in distribution, which is their main source of profits. The distributor's bargaining power vis-a-vis content owners increases with the userbase of the service. Given that most consumers within any content category subscribe to a single service, a dominant distributor becomes a gatekeeper for content owners seeking to monetize their content. Licensing agreements feed the content catalog available on the service, both in terms of the number of titles available as well as the conditions under which consumers can access them.

Next up, on the top part of the diagram, there are three strategic choices the firm makes to compete with digital piracy. First, the firm exploits the userbase by implementing community features such as ratings, reviews, playlists, and social media integration. These interactions and shared experiences stand to increase the enjoyment users derive from the content. The value generated by these features increases with the size of the userbase, as this facilitates interactions between like-minded users and grows the potential audience for content curators and playlist producers. These features are unmatched by digital piracy, where anonymity and user churn are stumbling blocks for the community.

Second, the firm develops personalization tools such as recommender systems that aid users in discovering content that matches their taste when navigating the catalog. These tools are based on collaborative filtering algorithms that exploit datasets of user preferences and content characteristics to select what to recommend to each user. The quality of the personalization offered by the firm therefore increases with the userbase and the variety present in the content catalog; services with more user activity and larger catalogs can produce better recommendations. Such personalization is also unmatched by digital piracy, given the proprietary nature of the algorithmic improvements developed by commercial services and consumers' reluctance to record consumption activity on pirate services.

Third, the firm devotes resources to improve the quality of the service. This includes reliable streaming, consistent content quality, responsive interfaces, and compatibility across devices. Maintaining quality of service with userbase growth requires sustained infrastructure and software investment by the firm. Both Spotify and Netflix delivered substantial improvements in these areas compared to earlier services, and in content categories such as videogaming the technical challenges for reliable streaming are yet to be successfully deployed in the mass market.

The firm's strategic choices outlined above generate value for users and increase their willingness to pay ("User WTP" at the top of the diagram). This value is captured by the firm through the subscription tier, which commands a price for full access to the service and is the main source of revenue (most of Netflix revenues and close to 90% those of Spotify).

It is important to note that some of the feedback loops present in the business model are in fact virtuous cycles. Given that the firm stands to accumulate a larger userbase and a larger content catalog over time, the potential to generate value also increases. This reinforces the firm's choices to feed the userbase and the catalog, and to exploit them through personalization and community features. This enables the firm to capture more value, by sustaining higher subscription prices and reducing royalty payments to content owners, and eventually become the 'go to' place for content consumption and discovery within its category. The value potential of

scaling up the service was recently summarized as follows by Barry McCarthy, CFO at Spotify and previously at Netflix:

> *"The point here is that scale can be a great enabler of margin expansion, particularly if you couple it with greater data insights to drive a better user interface, add a better content experience, and in the process come to 'own' demand creation and the margin that comes with 'owning' demand creation." (Barry McCharty, CFO at Spotify – MusicBusinessWorldwide.com 2013)* [54]

In the same intervention, McCarthy noted that Spotify was prioritizing growth over profitability but expected to eventually have gross margins of 30 to 35%. This is consistent with the business model logic described above, as well as investor expectations that Spotify and Netflix hold potential to become profitable businesses in the long term.

This business model logic generates a competitive advantage against digital piracy, not by competing purely on price or in terms of available content, but by enriching the experience of navigating, discovering, consuming, and interacting with others. This competitive advantage can be considered in terms of market segmentation. There is a segment of consumers who value convenience and simplicity above other factors and will readily pay for subscription services. Similarly, there is a segment of consumers who are long term users of digital piracy, familiar with the benefits and limitations it affords and who will resist the switch to paid subscriptions. In the middle ground, there are consumers who may be familiar with digital piracy but willing to explore alternatives and perhaps subscribe to services that offer enough added value. It is this middle ground of the market that subscription services stand to conquer over time.

The reader may have noticed that a factor missing in our representation above is the role of exclusive content, such as Netflix exclusive series that are not available on competing services (e.g., "House of Cards" or "Narcos"). There are two reasons for this. First, exclusive content is still a small share of the content pool, though it is heavily promoted by services as a differentiator. Third party content is critical to the success of any mass market service and will continue to play a major role in the foreseeable future. And second, while exclusive content certainly plays an important role in competition among commercial services, this is not the case when competing against digital piracy because exclusive titles are available to piracy users on the

same terms as non-exclusive titles. If anything, exclusive titles can lower the attractiveness of commercial offerings as a whole; if consumers find that several separate subscriptions are required to access the content they wish to consume, digital piracy becomes more attractive as a one-stop-shop. [55] While the market forces driving supply of exclusive content on these services are unlikely to change anytime soon, this type of content has limited effect against digital piracy.

DISCUSSION

We have analyzed how two iconic companies, Spotify and Netflix, effectively responded to the challenges of digital piracy by deploying innovative business models through their online platforms.

> *"Since the launch of streaming solutions such as Netflix and Spotify, they have become alternatives to piracy. Sweden had many problems with music piracy and the arrival of Spotify reversed this curve." (Debora Bona, Media Executive at Google Brazil – Torrent Freak, 2017)*[56]

More generally, by using a common theory-driven conceptualization of business models across four elements,[57] we carefully identified how the different constituents of their business models (i.e., customer identification, customer engagement, monetization, and value chain linkages) were engineered to compete against piracy's multifaceted value proposition. From our research endeavor, multiple noteworthy insights emerged, which we believe might inform and inspire both scholars and practitioners in further exploring the complex nuances of this phenomenon.

We posit that such strategic responses can and should be considered in a multi-level fashion.[58] In the following paragraphs, we explore some of the main implications for domains at the intersection with business models and digital piracy across three level or analysis: (1) technological innovation, (2) firm's diversification, and (3) network competition.[59]

Implications for technological innovation

As we reflect on the complex interplay between 'legit' businesses and digital piracy, one contribution stands-out from our study, which aims to answer to one of the key questions in our research domain: *"How do technology and business models interact?"* Scholars voice that *"we*

need a more precise appreciation of how innovation links to performance through the business model, and how changes in the business model influence technological innovation."[60] It is noteworthy that competition between firms has been traditionally conceived as a race for the acquisition and protection of unique and valuable resources and capabilities;[61] among those, technology (particularly in the digital domain) more often than not has represented a key driver for firm competitive advantage.[62] Evidence suggests that mass diffusion of technological innovations in the digital era has enabled piracy organizations to flourish, expand the proselytism among users, and become a significant and perhaps unavoidable threat to all those firms whose content can be digitized, copied, and easily transferred (often thanks to peer-to-peer sharing technologies).[63] And yet, evidence suggests that digital technology here represents both 'the poison and the antidote', as, if properly leveraged, it can offer firms the basis for a better engagement with their customers, and a proficient response to piracy-driven innovation.

> *"It's not Netflix that's making the changes. It's the Internet. We're figuring out every year how to use the Internet to make a great consumer experience. Every year is an experiment." (Reed Hastings, CEO and founder at Netflix – 2016)*[64]

Our analysis elaborates this intuition in a structured way, by connecting how different technological solutions feed both the piracy value proposition and possible firm's business model responses.

Isolating and understanding these technological factors is timely and relevant for both theory and practice. Scholars could use the aforementioned elements to granularly explore (perhaps in a more quantitative fashion) causes and effects of innovation within business models, within and beyond the gamut of responses to digital piracy. Research warns that not all types of innovation hold the same benefit for business model performance, and its impact is contingent and complementary to the type of content, the industry, and other traditional competitive strategies including pricing schemes, and ecosystems. For example, we know that, despite its exponential growth, Spotify has yet to report positive profits,[65] while Netflix only recently reported positive profits after a long period of growth.[66] Beside academic research, practitioners could use our

systematization to assess their firms' digital offerings and reflect on how diverse choices might offer barriers or disincentives to piracy alternatives.

Implications for firm diversification

Spotify and Netflix business models present evident similarities to other firms—such as Apple Music, Amazon Prime, Pandora, Hulu, or HBO, among others. All these organizations distribute digital content and engage with their audiences through online platforms. Such similarities represent the underlying basis to claim that, with all due limitations, a generalization of our implications to other businesses is possible, particularly in the digital domain (e.g., software and gaming platforms, etc.). Yet, we also recommend caution when applying our model to firms whose offering might be highly diversified. Research suggests diversification can at least encompass four aspects: products, geographical areas, vertical integration, and business models.[67] Most firms adopt diversification strategies, and in such cases the implication for firm performance might be strongly influenced by the complementarities across multiple aspects—consider for example the impact of the overall Amazon or Apple product and services ecosystem on their businesses for music and videos (i.e., Apple Store and Apple Music; Amazon Music and Amazon Prime Video, respectively). And in the case of Netflix, initial success can also be explained by considering its pivoting between dual business models (i.e., DVD-by-mail first and online streaming later).[68] There is evidence that this was Netflix executives' original strategy.

> *"Movies over the Internet are coming, and at some point it will become big business. (…) We started investing 1 percent to 2 percent of revenue every year in downloading, and I think it's tremendously exciting because it will fundamentally lower our mailing costs. We want to be ready when video-on-demand happens. That's why the company is called Netflix, not DVD-by-Mail." (Reed Hastings, CEO and founder at Netflix – 2005)*[69]

But as commercial online ecosystems as well as digital piracy continue to evolve, businesses are finding additional opportunities within different dimensions of diversification, particularly in the offline domain. For example, given the revenue drop from music albums and movies sales, entertainment companies have started to more strongly engage with offline experiences, where digital plays a minor role (if any), such as spectacular music concerts whose futuristic stages and settings offer 'a show within the show' to the audience.[70] Further, movie majors have also

commercialized experiences that showcase film settings and equipment (such as the Harry Potter Museum or HBO's Game of Throne exhibition), or offer viewers a direct interaction with movie stars (e.g., with actors and directors roundtables at ComicCon and similar events). We purposefully decided to focus on companies whose business model is relatively simple and where product/industry diversification is limited, insofar we can possibly reduce concerns for intervening effects outside the scope of our study. We acknowledge this represents a limitation, and future research could address more complex cases by exploring such portfolio effects.[71] Further, practitioners should adopt frameworks for business model diversification to fully appreciate and assess the full gamut of firm responses to digital piracy.[72]

Implications for network competition

Our study offers an appreciation of network effects and related implications for new business models with network-to-network competition. Digital piracy has grown as a community-based activity, where social interactions represent not only an incentive but also a source of guidance for users.[73] In order to spread the piracy practice, chat-rooms, forums, private communities, and ultimately peer-to-peer sharing are in fact some of the most common and successful solutions, which businesses are constantly trying to offset and eradicate.

Digital business models, however, display features that can advance a viable counter-offer. In fact, they share similarities to piracy platforms: they too are often designed as multi-sided platforms that connect multiple users of the same group (through recommendations and reviews, in-app chats, social networking etc.) and different groups (e.g., by linking content producers with users; advertisers with potential buyers etc.). Hence, in these domains customer complementarities and network opportunities do not merely represent a peripheral feature, but are progressively elevated to become major drivers for user adoption—for example research and practice claims that review systems have played a major role in the success of companies such as Amazon, Netflix, EBay, AirBnB, and TripAdvisor.[74]

If network effects become one of the main sources of competitive advantage, it is plausible that competition in such industries might be ruled by 'winner takes all' dynamics between alternative offers.[75] Simply put, if product and costs are perceived as undifferentiated across competitors, users might decide to engage with one company rather than another because of the social network and ecosystem complementors they offer.[76] As an example, users might decide to use a specific music platform where they can find and enjoy their peers' playlists and related recommendations, as well as useful complementary apps (see for example DJ mixing apps like Algoiddim or Pacemaker sourcing music from Spotify). Executives from the industry echo this reflection and underline how:

> *"…Enhancing the customer experience is the key element to rival with piracy." (Executive at Warner Bros. France – Authors' Interviews, 2017)*

Another interesting reflection related to network effects comes from comparing responses to piracy, deployed by traditional incumbents vs. digital newcomers. Evidence and quotes from the industry revealed that incumbents' responses to piracy have long been confined to mostly off-line actions aimed to improve value chain processes within their traditional (often dyadic) business models—for example by reducing the users' waiting time between theatre release and CD/DVD release. Despite valuable, it is evident that most of these responses cannot fully offset the networked value propositions offered by digital piracy. This in part explains why newcomers such as Spotify, Netflix, and others (whose digital offers did respond to such needs) emerged as the fastest growing companies in their respective markets, leapfrogging incumbents such as Blockbuster and distribution initiatives by music and movie majors, which nonetheless were favored by their dominant positions, superior resources, and direct access to market.[77] Digital engagement helped rather small players to spread their pervasiveness and reach competitive scale in a relatively short time.

> *"For Netflix, the idea was to be 'there' and to be everywhere, just like piracy is." (Executive at Warner Bros. France – Authors' Interviews, 2017)*

CONCLUSION

Digital piracy represents a timely and complex challenge for many organizations. Our work aims to clarify how leveraging business models in the digital space can 'change the game', by offering a new consumption paradigm and an effective response to digital piracy. Our analysis started by identifying three main aspects of digital piracy: the creation of a first digital copy, general access to digital copies, and consumption of digital copies. Our analysis of business model responses suggests that digital distribution can outperform piracy mainly by improving upon the latter of the three, the consumption experience. This implies a strong focus on accessibility and convenience, better navigation and guidance, and facilitating social interactions and the opportunity for shared experiences absent in digital piracy.

Our analysis builds on our case studies of Spotify and Netflix. Yet, we expect our findings to extend beyond music and film to other content categories such as written and interactive works. Early commercial initiatives such as Amazon's Kindle Unlimited for books or Sony's PlayStation Now for videogames share common characteristics to our cases. This includes licensing agreements with third-party content owners, free tiers (trial periods), and incipient personalization and community features (personalized recommendations and sharing of notes and highlights on Amazon's Kindle, for instance). Further, one can expect consumer expectations and technological advances to drive convergence across content categories over time.

Still, we acknowledge our setting presents clear idiosyncrasies which need to be taken into account. More work is needed to fully understand this phenomenon across other industries, and boundary conditions in each industry need to be carefully assessed to avoid acritical generalizations of our findings.

We hope that our work will contribute to spur further research and understanding in this area as well as encourage business model innovation and performance optimization within established organizations. In particular, we hope our contribution is helpful to those working in the several industries where content protection and monetization remains a paramount priority for financial sustainability. The cases we explored identify viable templates for business model responses in

major industries, but also suggest that existing incumbents are far from saturating the scope for business model innovation.

TABLE 1. Characteristics of different media categories and digital piracy

Content category	Container	Costs to produce the first digital copy	Accessing digital copies	Using digital copies
Audio (Music albums, live recordings...)	Physical: long play records, compact cassettes, CDs	- Dedicated hardware (cassette player, CD drive). - Basic skills and software required. - Re-encoding of content for distribution.	- Collective consumption facilitates sharing of copies. - Excellent digital availability of back-catalog. - Medium storage and bandwidth requirements for digital copies.	- Broad software support. - Low hardware playback requirements.
	Digital: audio files (MP3, FLAC), streaming[1]	- General computing device. - DRM and watermarking removal.		
Film (Movies, TV shows, documentaries...)	Physical: video cassettes, DVDs, Blu-ray	- Dedicated hardware (VHS player and capture system, DVD/Blu-ray drive). - Basic skills and software required. - Re-encoding of content for distribution.	- Collective consumption facilitates sharing of copies. - Good digital availability of back-catalog. - High storage and bandwidth requirements for digital copies.	- Broad software support. - Average hardware playback requirements.
	Digital: video files (AVI, MKV), streaming[2]	- General computing device. - DRM and watermarking removal.		
Written works (Books, magazines, comics...)	Physical: print	- Dedicated hardware (scanner). - OCR and formatting. - Medium skills and substantial workload	- Individual consumption does not facilitate sharing. - Limited digital availability of back-catalog. - Low storage and bandwidth requirements for digital copies.	- Average software support. - Inferior copies can worsen. experience (format conversions, lack of OCR/navigation). - Specialized hardware (e-reader or tablet) required for comfortable consumption.
	Digital: eBooks (EPUB, MOBI)[3], documents (PDF)[4]	- General computing device. - DRM and watermarking removal. - Format conversion for distribution.		
Interactive works (Videogames, software applications...)	Physical: cartridges, cassettes, floppy disks, Optical disks	- Dedicated hardware (modified consoles, advanced CD/DVD burner). - Advanced skills and dedicated software required.	- Individual consumption (generally) does not facilitate sharing. - Full digital availability of back-	- Usage of digital copies requires specific skills (applying cracks, malware risks). - Digital copies have limited

	Digital: downloads	- General computing device. - Complex DRM removal. - Re-packaging of content for distribution. - Updates require incremental DRM removal efforts.	catalog. - Updates require access to new copies. - Storage and bandwidth requirements for digital copies varies.	online functionality or may lack updates. - Specialized hardware (modified console) may be required for consumption.

Legend: Technical terms used in Table 1

1. "MP3 (formally MPEG-1 Audio Layer III or MPEG-2 Audio Layer III) is an audio coding format for digital audio. MP3 (or mp3) as a file format commonly designates files containing an elementary stream of MPEG-1 audio and video encoded data, without other complexities of the MP3 standard." "FLAC (Free Lossless Audio Codec) is an audio coding format for lossless compression of digital audio, and is also the name of the free software project producing the FLAC tools, the reference software package that includes a codec implementation." (Source: Wikipedia.org).
2. "Audio Video Interleaved (also Audio Video Interleave), known by its initials AVI, is a multimedia container format introduced by Microsoft in November 1992 as part of its Video for Windows software. AVI files can contain both audio and video data in a file container that allows synchronous audio-with-video playback." "The MKV (Matroska Multimedia Container) is an open standard, free container format, a file format that can hold an unlimited number of video, audio, picture, or subtitle tracks in one file. It is intended to serve as a universal format for storing common multimedia content, like movies or TV shows. Matroska is similar in concept to other containers like AVI, MP4, or Advanced Systems Format (ASF), but is entirely open in specification, with implementations consisting mostly of open source software." Source: Wikipedia.org
3. "EPUB is an e-book file format with the extension .epub that can be downloaded and read on devices like smartphones, tablets, computers, or e-readers." "Mobipocket SA is a French company incorporated in March 2000 that created the .mobi e-book file format and produces the Mobipocket Reader software for mobile phones, personal digital assistants (PDA) and desktop operating systems. The Mobipocket software package is free and consists of various publishing and reading tools for PDAs, smartphones, mobile phones, the e-readers Kindle and iLiad, and applications on devices using Symbian, Windows, Palm OS, Java ME and Psion." (Source: Wikipedia.org).
4. "The Portable Document Format (PDF) is a file format used to present documents in a manner independent of application software, hardware, and operating systems. Each PDF file encapsulates a complete description of a fixed-layout flat document, including the text, fonts, graphics, and other information needed to display it." (Source: Wikipedia.org).

TABLE 2. Comparison of Spotify and Netflix business models

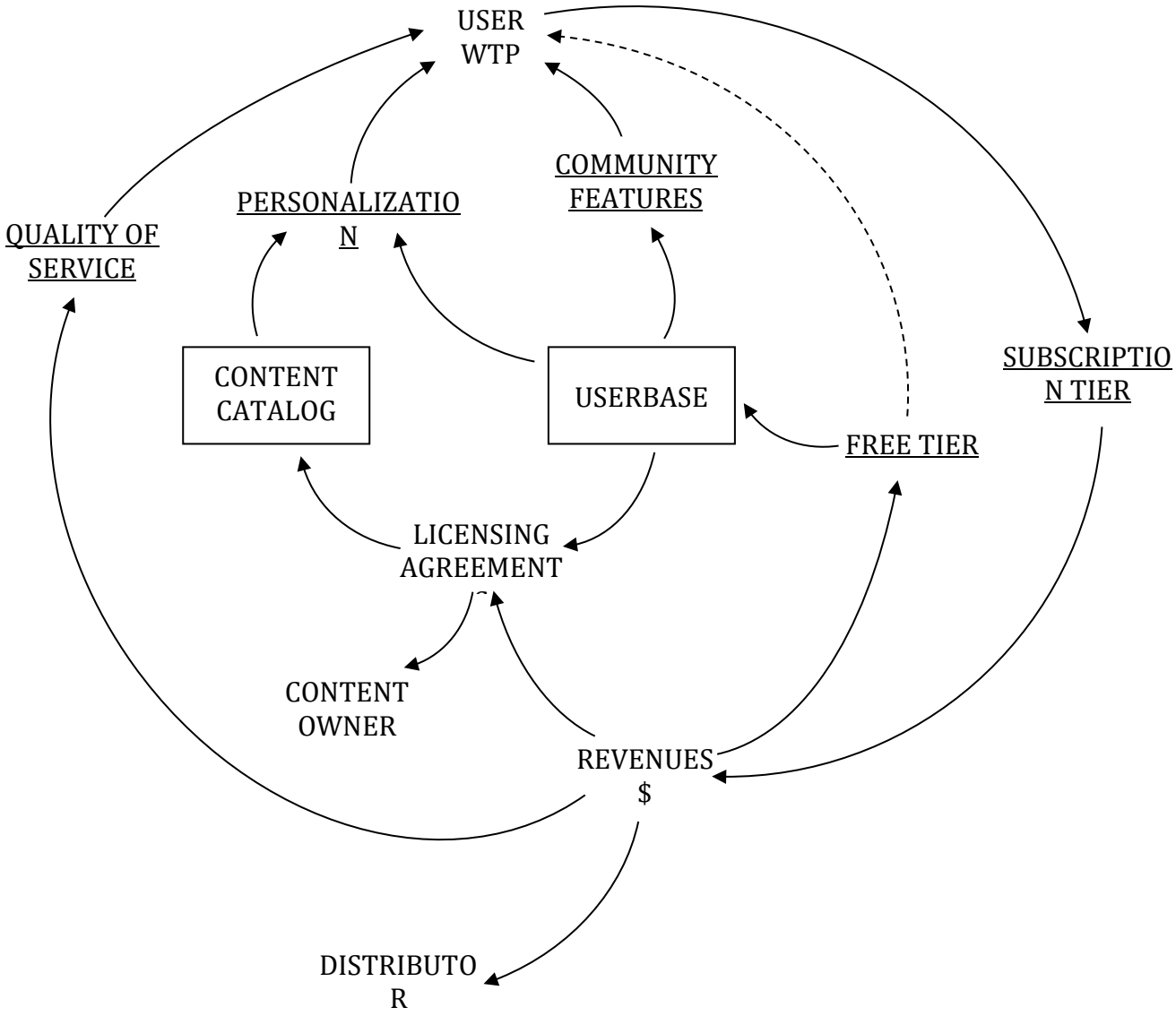
Business Model Elements	Features	Spotify	Netflix
Customer identification	*Customer groups*	Freemium (Free with Ads) + Subscription: - Free tier: two-sided business model with advertisers and users who enjoy free basic service with ads. - Subscription tier: single sided business model, consumers pay and enjoy access to premium functionality. Spotify's goal is to convert free users to pay subscribers.	Subscription only: - Subscription tier: single sided business model, consumers pay for full access to the service. - Free 30-day trial available. - Subscription DVD-by-mail (USA only): single sided business model, consumers pay for rental DVDs via post shipping. Netflix's goal is to reduce and possibly terminate the DVD-by-mail model.
Customer engagement	*Geographical coverage*	- Spotify subscriptions are available in 60 countries. - Subscribers can stream content while traveling without restrictions.	- Netflix subscriptions are available in over 190 countries. - Subscribers can stream content while traveling, but are restricted to the catalog of the destination country.
	Content navigation	- Intuitive and visual interface. - Users can create their personal library and playlists. - Recommender system generates personalized content recommendations based on usage of service.	- Intuitive and visual interface. - Users can create playlists. - Recommender system generates personalized content recommendations based on usage of service.
	Catalog size	- Comprehensive. Over 30 million songs from artists worldwide. - Music supplied by record labels and/or distributors. Aggregators collect royalties for independent artists.	- Limited and varies per country. US catalog is largest with 4593 movies and 1157 series. Most countries have a smaller catalog due to content agreements and/or localization limitations (e.g., average catalog size in European countries is 1/3 of US catalog) (2) - Movies and series generally supplied by providers, distributors, producers and creators.

	Exclusive content	- No exclusive music, but promotes independent artists and selected playlists. Some exclusive registrations of live concerts.	- Produces original content for exclusive distribution. Also co-produces or licenses content for exclusive distribution in some countries.
Monetization	*Pricing*	- Free tier. Ad-sponsored, basic audio streaming quality, no offline listening. - Subscription tier. No ads, higher audio streaming quality, offline listening. Individual and family plans (up to 6 accounts) available.	- Subscription only. Basic, standard and premium plans which differ in video streaming quality (standard definition, high definition, ultra-high definition) and number of simultaneous streams for family usage (one, two, or four streams). (1)
Value chain linkages	*Content consumption*	-The streaming service can be accessed from PCs and laptops, smartphones and tablets, game consoles, and specialized devices (smart TVs, media streamers, sound systems, wearables). - Subscribers can download content on their devices for offline consumption.	- The streaming service can be accessed from PCs and laptops, smartphones and tablets, game consoles, and specialized devices (smart TVs, Blu-ray players, media streamers, set-top boxes) - Subscribers can download selected content on their devices for offline consumption.
	Streaming quality	- Lossy audio encoding in the bitrate range 96-320 kbps. High bitrates (available only on subscription tier) are transparent to most users when compared to CD quality.	-Lossy video and audio encoding with resolutions in the 480p-2160p range. Quality perceived to be close to DVD/Blu-ray by most users.
	Networked effects	- User ratings and popularity feedback through play counts and thumbs-up rates. - Playlists and channels by content curators. - Integration with social media services (e.g. Facebook, Twitter) to share what you are listening to, links to content/playlists.	- User ratings and reviews. - Integration with social media services (e.g. Facebook, Twitter) to share what you are watching, links to content.

TABLE 3. Business model responses to digital piracy, limitations and challenges

Business model elements	Digital piracy	Firm responses (Spotify, Netflix)	Limitations and challenges
Customer identification	**Subsidized by ads:** advertisers pay for the costs.	**Free tier:** freemium option with ads; or time-limited free trial**.**	Advertising bias, subscriber conversion to paid tiers.
Customer engagement.	**Access convenience:** slow downloads, requires skills and dedication.	**Streaming:** one-click playback, instantaneous gratification, simple and intuitive interface.	Internet infrastructure and quality of service requirements.
	Consumption convenience: no DRM or device restrictions.	**Broad accessibility:** comprehensive support across devices, offline consumption.	Unauthorized consumption or sharing of content.
	Content variety: extensive catalog, high search costs.	**Rich catalog:** comprehensive catalog, updated and well organized, effective navigation.	Licensing agreements with content owners.
	Content quality: inconsistent, difficult to anticipate.	**Consistent quality:** adequate to high quality, depending on subscription tier.	Inability to upsell higher quality content.
Monetization.	**Monetary outlays:** low costs for users.	**Subscription model:** simple tariff, pay once for access, low transaction costs.	Limits price discrimination across segments.
Value chain linkages .	**Community component:** sharing ethos, limited user interactions.	**Networked response:** social media integration, community features, personalized content recommendations.	Value appropriated by social media providers.
	Commercial restrictions: bypasses release windows and geographical restrictions.	**Global reach:** large geographical footprint, global simultaneous releases.	Limited price discrimination across regions.

FIGURE 1. Causal loop representation of business model responses



NOTES

1. D. Gopal, D. Ram, G.L. Sanders and S.C. Wagner, “A Behavioural Model of Digital Music Piracy,” *Journal of Organizational Computing and Electronic Commerce*,14/2 (June 2004): 89-105.
2. L. Lapan, “Network Television and the Digital Threat,” *UCLA Entertainment Law Review*, 16/2 (2009): 346.
3. D.Y. Choi and A. Perez, “Online Piracy, Innovation, and Legitimate Business Models,” *Technovation*, 27/4 (2007): 168-178.
4. N. Granados, "How Online Piracy Hurts Emerging Artists," *Forbes.com* https://www.forbes.com/sites/nelsongranados/2016/02/01/how-online-piracy-hurts-emerging-artists/#72c097547774 (2016).
5. Frontier Economics Network. "The Economic Costs of Counterfeiting and Piracy," *Report prepared for BASCAP and INTA* https://cms.iccwbo.org/content/uploads/sites/3/2017/02/ICC-BASCAP-Frontier-report-2016-Executive-Summary.pdf (2017).
6. M. Peitz and P. Waelbroeck, “Piracy of Digital Products: A Critical Review of the Theoretical Literature,” *Information Economics and Policy*, 18 (2006): 449-476.
7. We focus on media industries in this article, but digital piracy increasingly affects other industries. See Krok, Andrew. "Farmers Are Hacking Their Tractors So They Can Actually Fix Them," *Road Show by CNet* https://www.cnet.com/roadshow/news/farmers-using-hacked-firmware-to-bypass-john-deeres-software-stranglehold/ (2017); TV, Dubai or "The Banking Sector Is One of the Highest Targeted Sectors of Piracy," *PWC Middle East* https://www.pwc.com/m1/en/media-centre/tv-radio-interviews/banking-sector-is-one-of-the-highest-targeted-sectors-of-piracy.html (2017).
8. D. Y. Choi and A. Perez, op. cit. D. J. Teece. “Business Models, Business Strategy and Innovation,” *Long Range Planning*, 43/2-3 (April 2010): 172–194; A. Currah, op. cit.; S. Haber et al., op. cit.; S. Jungels, op. cit.
9. C. Baden-Fuller and S. Haefliger, “Business Models and Technological Innovation,” *Long Range Planning*,46/6 (2013): 419-426; see also C. Baden-Fuller, and V. Mangematin, "Business Models: A Challenging Agenda," *Strategic Organization*, 11/4 (2013): 418-27.
10. R. S. R. Ku, "The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology," *The University of Chicago Law Review*, 69/1 (2002): 263-324.
11. Half of the experts consulted in a 2005 Pew Internet survey on ‘The future of the Internet’ believed that file sharing would still be easy by 2015, a forecast which has been validated.
12. In the context of network security, a spoofing attack is a situation in which one person or program successfully masquerades as another by falsifying data, thereby gaining an illegitimate advantage (Source: Wikipedia).
13. P. Dootson, K. Pappalardo, and N. Suzor, “Blocking Access to Illegal File-Share Websites Won’t Stop Illegal Downloading,” *TheConversation.com* https://theconversation.com/blocking-access-to-illegal-file-share-websites-wont-stop-illegal-downloading-70473 (2016).
14. E. Van Der Sar, "The Pirate Bay Remains Resilient, 11 Years after the Raid," *Torrentfreak.com* https://torrentfreak.com/the-pirate-bay-remains-on-top-11-years-after-the-raid-170531/ (2017).
15. J. McKenzie, "Graduated Response Policies to Digital Piracy: Do They Increase Box Office Revenues of Movies?" *Information Economics and* Policy, 38 (2017): 1-11.
16. J. Cox, A. Collins, and S. Drinkwater, "Seeders, Leechers and Social Norms: Evidence from the Market for Illicit Digital Downloading," *Information Economics and Policy*, 22/4 (2010): 299-305; R. K. Sinha, F. S. Machado, C. Sellman, “Don't Think Twice, It's All Right: Music Piracy and Pricing in a DRM-Free Environment,” *Journal of Marketing*, 74/2 (2010): 40-54.

17. For an overview of the empirical literature on sales displacement, see S. J. Liebowitz. "File Sharing: Creative Destruction or Just Plain Destruction?" *The Journal of Law and Economics*, 49/1 (2006): 1-28; see also F. Oberholzer-Gee, and S. Koleman, "File Sharing and Copyright." *Innovation Policy and the Economy*, 10/1 (2010): 19-55.

18. A. Edström-Frejman, "Ecommerce Rhetoric and Reality in the Music Industry: Estimating the Real Impact of File-Sharing Activities on Cd-Sales" in *Expanding the Knowledge Economy: Issues, Applications, Case Studies.* Edited by P. Cunningham and M. Cunningham. Amsterdam: IOS Press, 2007.

19. S. Al-Rafee and T.P. Cronan. op. cit.

20. R. Casadesus-Masanell and A. Hervas-Drane, "Peer-to-Peer File Sharing and the Market for Digital Information Goods," *Journal of Economics & Management Strategy*, 19/2 (2010): 333-73; R. Casadesus-Masanell and A. Hervas-Drane, "Competing against Online Sharing," *Management Decision* 48/8 (2010): 1247-60; A. Hervas-Drane and E. Noam, "Peer-to-Peer File Sharing and Cultural Trade Protectionism," *Information Economics and Policy*, 41 (2017): 15-27.

21. S. Andrews, "Piracy Costing Industry up to $8 Billion Annually." *CueEntertaiment.com* http://www.cueentertainment.com/piracy-costing-industry-up-to-8-billion-annually/ (2017).

22. S. Andrews, op. cit.

23. For recent reviews see N. J. Foss, and T. Saebi, "Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go?" *Journal of Management*, 43/1 (2017): 200-27; and L. Massa, C. Tucci, and A. Afuah. "A Critical Assessment of Business Model Research," *Academy of Management Annals*, 11/1 (2017): 73-104.

24. D. J. Teece, op. cit.

25. C. Baden-Fuller and S. Haefliger, op. cit. C. Baden-Fuller and V. Mangematin, op. cit.

26. P. Aversa, Paolo, S. Haefliger, A. Rossi, and C. Baden-Fuller, "From Business Model to Business Modeling: Modularity and Manipulation," *Advances in Strategic Management*, 33 (2015): 151-85; S. Kortmann, and F. Piller. "Open Business Models and Closed-Loop Value Chains," *California Management Review*, 58/3 (2016): 88-108.

27. R. Amit, Raphael, and C. Zott, "Creating Value through Business Model Innovation," *MIT Sloan Management Review*, 53/3 (2012): 41; H. Chesbrough, "Business Model Innovation: Opportunities and Barriers," *Long range planning*, 43/2 (2010): 354-63.

28. See D. J. Teece, op. cit. and H. Chesbrough, and R. S. Rosenbloom. "The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spin-Off Companies," *Industrial and Corporate Change*, 11/3 (2002): 529-55.

29. C. Baden-Fuller and S. Haefliger. op. cit.

30. O.F. Bustinza et al., "Music business models and piracy," *Data Systems Industrial Management*, 113/1 (2013): 4-22; R. Caves, "The Creative Industries: Contracts between Art and Commerce," *Harvard University Press*, (2000); Choi and Perez, op.cit.; J. Eliashberg et al., "The MotionPicture Industry: Critical Issues in Practice, Current Research, and New Research Directions," *Marketing Science*, 25/6 (2006): 638-661.

31. We acknowledge that the separation of ownership and distribution generates significant tension to appropriate the profits generated in distribution. The exceedingly complex royalty schemes for streaming negotiated by Spotify and the labels, and by Netflix and the studios, are evidence of this. Nonetheless, we believe that the drivers of superior performance in distribution can be analyzed separately from these tensions within the supply chain.

32. See for example work by O.F. Bustinza et al., op. cit.

33. K. M. Eisenhardt, "Building Theories from Case Study Research," *The Academy of Management Review*, 14/4 (1989): 532-50; R.K. Yin, "Case study research: design and methods," *Applied Social Research Methods*, 5 (2008).

34. J. Titcomb, "Internet Piracy Falls to Record Lows Amid Rise of Spotify and Netflix," *Telegraph.co.uk* http://www.telegraph.co.uk/technology/2016/07/04/internet-piracy-falls-to-

record-lows-amid-rise-of-spotify-and-ne/ (2016); and L. Bershidski. "Why Netflix Is Winning the Online Piracy Wars," *Bloomberg.com* https://www.bloomberg.com/view/articles/2017-05-02/why-netflix-is-winning-the-online-piracy-wars (2017).

35. R.K. Yin, op. cit., p.13

36. Netflix and Spotify investor relations are available at: https://ir.netflix.com/investor-relations and https://investors.spotify.com/home/default.aspx, respectively.

37. Obtaining the attention and time of top executives and leaders in the field was not easy and the data collection via interviews took more than 3 months, despite the relatively limited number of meetings.

38. Ibid.

39. C. Baden-Fuller and S. Haefliger, op. cit.; and C. Baden-Fuller and V. Mangematin, op. cit.

40. See works by Casadesus-Masanell, Ricart. "From Strategy to Business Models and onto Tactics," *Long Range Planning*, 43/2 (2010): 195-215; the use of the tool is explained in Casadesus-Masanell, Ramon, and Joan E Ricart. "How to Design a Winning Business Model," *Harvard Business Review*, 89/1-2 (2011): 100-07 as a valuable protocol for both theory and practice.

41. D. Lowery, "A Tale of Two Pirates? Daniel Ek (Utorrent) and Kim Dotcom (Megaupload)," *TheThricordist.com* https://thetrichordist.com/2014/10/06/a-tale-of-two-pirates-daniel-ek-utorrent-and-kim-dotcom-megaupload/ (2014).

42. It is important to notice how, for example, the advent of Napster and its impact on the music and movie industry preceded the growth of digital piracy on movies or books, which might also in part explain the major diffusion of piracy in these domains.

43. Both Amazon Kindle Unlimited and Sony PlayStation Now are available only in selected countries, offer a restricted catalog which often excludes best sellers, and are accessible only on a few devices (though this includes PCs).

44. A. Wolk, "Netflix and Spotify's Digital Deluge Is Eroding Content's Value," *TheGuardian.co.uk* https://www.theguardian.com/media-network/2015/jul/20/netflix-spotify-streams-diminishing-value-digital-content (2015).

45. T. Mikhalkina, and L. Cabantous, "Business Model Innovation: How Iconic Business Models Emerge," *Advances in Strategic Management*, 33/1 (2015): 59-95.

46. C. Baden-Fuller and S. Haefliger, 2013, op. cit.

47. A. Hill, "How a Subscription Model Could Benefit Your Business," *Financial Times* https://www.ft.com/content/98618ef4-150e-11e5-a587-00144feabdc0 (2015).

48. M. Zwilling, "Subscription Business Models Are Startup Favorites," *HuffigtonPost.com* https://www.huffingtonpost.com/author/marty-517 (2015).

49. J. Smith, "Free Songs Won't Kill the Music Industry but Will Make It 10 Times Bigger Says Head of Streaming Service Spotify," *DailyMail.co.uk* http://www.dailymail.co.uk/news/article-3114315/Free-songs-won-t-kill-music-industry-make-10-times-bigger-says-head-streaming-service-Spotify.html#ixzz52YJ8lxwa (2015).

50. M. Cardy, "Spotify's free version loses so much money that it takes 12 months for a paying user to cover the cost of the free music they previously listened to," *BusinessInsider.com* http://www.businessinsider.com/spotify-loses-money-on-free-subscribers-2018-3

51. E. C. Baig. "Q and A: Spotify CEO Talks Metallica and Music Discovery," *USA Today* https://www.usatoday.com/story/tech/columnist/baig/2012/12/06/spotify-ceo-daniel-ek-q-and-a/1751703/ (2012).

52. R. Casadesus-Masanell, and J.E. Ricart, 2010, 2011, op. cit.

53. T. Ingham, "The exec who took Netflix public just gave a storming defence of Spotify's future business plan," *MusicBusinessWorldwide.com* https://www.musicbusinessworldwide.com/the-exec-who-took-netflix-public-just-gave-a-storming-defence-of-spotifys-hopes-of-being-profitable/(2018)

54. T. M. Andrews, "'Game of Thrones' Was Pirated More Than a Billion Times — Far More Than It Was Watched Legally," *WashingtonPost.com*

https://www.washingtonpost.com/news/morning-mix/wp/2017/09/08/game-of-thrones-was-pirated-more-than-a-billion-times-far-more-than-it-was-watched-legally/?utm_term=.6fed1d803ed6 (2017).
P. Aversa, "Game of Thrones Pirates Offer a Useful Lesson in TV Money Making," *TheConversation.com* https://theconversation.com/game-of-thrones-pirates-offer-a-useful-lesson-in-tv-money-making-40173 (2015).

55. Andy. "Google: Netflix Searches Outweigh Those for Pirate Alternatives," *Torrentfreak.com* https://torrentfreak.com/google-netflix-searches-outweigh-those-for-pirate-alternatives-171112/ (2017).

56. C. Baden-Fuller and S. Haefliger, 2013, op. cit.

57. M. A. Hitt, A. Michael, P. W. Beamish, S. E. Jackson, and J. Mathieu, "Building Theoretical and Empirical Bridges across Levels: Multilevel Research in Management," *Academy of Management* Journal, 50/6 (2007): 1385-99.

58. Scholars remind us the important of adopting a multi-level approach when reasoning on the implication of partially-understood phenomena—se for example M. A. Hitt, P. W. Beamish, S. E. Jackson, and J. E. Mathieu. "Building Theoretical and Empirical Bridges across Levels: Multilevel Research in Management," *Academy of Management* Journal, 50/6 (2007): 1385-99.

59. See C. Baden Fuller and S. Haefliger op. cit. pages 419-20.

60. J.B. Barney, "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, 17/1 (1991): 99-120; D.J. Teece, G. Pisano, A. Shuen, "Dynamic Capabilities and Strategic Management," *Strategic Management Journal*, 18/7 (1997): 509-33.

61. G. P. Pisano, and D. J. Teece. "How to Capture Value from Innovation: Shaping Intellectual Property and Industry Architecture," *California Management Review*, 50/1 (2007): 278-96.

62. See the SIIA's (Software and Information Industry Association), which conducts a comprehensive, industry-wide campaign to protect and enforce the intellectual property rights of participating software and content companies.
https://www.siia.net/Divisions/IP-Protection-Services/About/Internet-Piracy

63. C. O'Brien, "My Conversation with Netflix CEO Reed Hastings," *BusinessInsider.com* http://www.businessinsider.com/my-conversation-with-netflix-ceo-reed-hastings-2016-5?IR=T (2016).

64. E. Christman, "Inside Spotify's Financials: Is There a Path to Profitability or an Ipo?" *billboard.com* https://www.billboard.com/articles/business/7841155/spotify-financial-analysis-profitability-ipo (2017).

65. B. Popper, "Netflix Books a Healthy Profit Thanks to Higher Prices," *TheVerge.com* https://www.theverge.com/2017/4/17/15327840/netflix-earnings-report-q1-2017-subscribers-quarterly-release (2017).

66. P. Aversa, S. Haefliger, and D. Reza, "Building a Winning a Business Model Portfolio," *MIT Sloan Management Review*, 58/4 (2017): 49-54.

67. See implications for multiple business models in G. Ahuja, and E. Novelli. op. cit.; and D. J. Teece, op. cit.; Velu and Stiles, op. cit.

68. P. J. Sauer, " How I Did It: Reed Hastings, Netflix," *Inc.com* https://www.inc.com/magazine/20051201/qa-hastings.html (2005).

69. P. Aversa, "Game of Thrones Pirates Offer a Useful Lesson in Tv Money Making," *TheConversation.com* https://theconversation.com/game-of-thrones-pirates-offer-a-useful-lesson-in-tv-money-making-40173 (2015).

70. For some valuable reflections and cases on companies running heterogeneous business model portfolio see R. Casadesus-Masanell, Ramon, and J. Tarzijan, "When One Business Model Isn't Enough," *Harvard Business Review* 90 (2012): 132-37; Y. Snihur, and J. Tarzijan, "Managing Complexity in a Multi-Business-Model Organization," *Long Range Planning* (2017); and C. Markides, and D. Oyon. "What to Do against Disruptive Business Models (When and How to Play Two Games at Once)," *MIT Sloan Management Review*, 51/4 (2010): 25.

71. See for example P. Aversa, S. Furnari, S. Haefliger, "Business model configurations and performance: A qualitative comparative analysis in Formula One racing, 2005-2013," *Industrial and Corporate Change*, 24/3 (2015): 655–676; and Ahuja and Novelli op. cit.; C.C. Markides, and C.D. Charitou, "Competing with Dual Business Models: A Contingency Approach," *The Academy of Management Executive*, 18/3 (2004): 22-36; C. Velu, and P. Stiles, "Managing Decision-Making and Cannibalization for Parallel Business Models," *Long Range Planning*, 46/6 (2013): 443-58; Y. Snihur, Y., and J. Tarzijan, "Managing complexity in a multi-business-model organization," *Long Range Planning*, 51/1 (2018): 50-63.

72. D. Lee, J. Y. Park, J. Kim, and J. Moon, "Understanding Music Sharing Behaviour on Social Network Services," *Online Information Review*, 35/5 (2011): 716-33.

73. P. O'Connor, "User-Generated Content and Travel: A Case Study on Tripadvisor. Com," *Information and communication technologies in tourism*, (2008): 47-58; P. Resnick, and R. Zeckhauser, "Trust among Strangers in Internet Transactions: Empirical Analysis of EBay's Reputation System," In *the Economics of the Internet and E-Commerce*, 127-57: Emerald Group Publishing Limited, 2002.

74. M. A. Schilling, "Technology Success and Failure in Winner-Take-All Markets: The Impact of Learning Orientation, Timing, and Network Externalities," *Academy of Management Journal*, 45/2 (2002): 387-98.

75. G. Ahuja and E. Novelli, op. cit.

76. M. G. Jacobides, C. Carmelo Cennamo, and A. Gawer, "Towards a Theory of Ecosystems," *Strategic Management Journal*, 39/8 (2018): 2255-76.