

## 2 Toward a History of Digital Music: New Technologies, Business Practices and Intellectual Property Regimes

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There is no *document* of civilization which is not at the same time a *document of barbarism*. WALTER BENJAMIN, 1969

### From Servility to Precarity: Music's Heterologous Cycles of Boom and Bust

This chapter outlines a brief history of the economics of music in an age of technological change. Instead of isolating the present as somehow exceptional, the chapter demonstrates both ruptures and continuities with the past. Drawing on methods from science and technology studies, legal theory, political economy, and musicology, it passes through a series of schematic reflections on the economics of musical production in the last two hundred and fifty years. The chapter attempts to historicise musical labour practices in the current age of technological automation, up to the implementation of lock-down technologies at the turn of the twenty-first century.

Music has long had a vexed relationship with modern economics. The industrial and agricultural revolutions of the late eighteenth and early nineteenth centuries, which had gradually created the conditions for higher material standards of living for a greater percentage of Europeans, for example, did not actually coincide with an uptick in support for professional musical composition and performance. In fact, due to the expense of music before the age of mechanical reproducibility, the changing political landscape – in particular the feudal reforms at the turn of the eighteenth century – led to a generalised *de*-escalation of paid cultural activity. Not only was music regarded as a luxury good (defined in economics as one whose consumption rises exponentially with increases in income), but it was expensive – tethered to what economists call a *derived demand* for additional goods, including instruments, teachers, sheet music, and therefore also academies of learning, publishing houses, and so on. The European courts – politically linked to various feudal principalities, local kingdoms and dukedoms after the Treaty of Westphalia (1648) – had provided significant economic support for composers and performers in the seventeenth and early eighteenth

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centuries. One of the consequences of feudal tenure reforms of the mid-eighteenth century was that wealthy feudal landlords and court nobility – once a significant support for musical talent – began to cut back on musical consumption. In the late eighteenth century, a host of court orchestras were shut down, for example, and a generalised ethos of frugality ensued (see Blum 1978, Moore 1987 and Baumol and Baumol 1994). According to the economist F. M. Scherer, it would take a century before the emergent capitalist class – solicitors, barristers, entrepreneurs, bankers, industrialists, government functionaries, financiers, and the like – had consolidated into a coherent enough bloc of private wealth to match the noble patronage of the previous century (Scherer 2004, 138, 141). Scherer demonstrates the way composers in the early freelance economy were enjoined to cultivate various precarious strategies for self-promotion, financial backing, press coverage and additional labours in excess of composing and performing. Remuneration varied wildly – a function of unpredictable access to commissions, performance opportunities and dedicated patrons. Piracy – including the illicit copying and theft of scores – placed an additional burden on composers in the period following the reign of the noble courts (who had hitherto owned the rights to all commissions extended to composers in their service). Wolfgang Amadeus Mozart, for example, eluded the theft of his works by giving only partial scores to copyists, forcing them to work in his apartment, and even defacing certain revisions – a kind of pre-modern *reverse-hack* in the context of rampant piracy. As a result, the livelihood of composers could be short-lived. Mozart, like many others – Franz Schubert, for example – was a well-known composer, but he was sick and debt-ridden, and he died in poverty in his early thirties. By the mid-nineteenth century, musical performance and composition had largely relocated from the noble courts to concert venues in a handful of free cities. It had also become a less servile and more precarious market-oriented economic activity – a kind of individual freelancing enclosed within large-scale cycles of boom and bust.

The various economic periods of expansion and contraction did not affect all sectors of music's economy equally. While modern boom economies are ordinarily associated with high employment and good investment returns, the reality is often considerably more complex, especially in the context of musical production and performance. Technological developments too – from innovations in instrument design and lithographic methods for music printing to infrastructure revolutions in transportation and large-scale networked communications – did not uniformly drive profitability or well-being for all stakeholders. The meteoric rise of upright piano production in the second half of the

nineteenth century, for example, reorganised the way music was consumed in the context of European and American family life. New mass production methods introduced in the 1850s resulted in both improvements in the quality of pianos and a decrease in their sale prices. By economically scaling piano production (first in the United States and then elsewhere), musical performance had spread from churches, noble courts and opera houses to civic buildings, concert halls, and finally ordinary homes. By the turn of the nineteenth century, the player piano, an automatic music inscription device, had also made its mark on both European and American middle-class markets. The demand for piano music soared; arias, cavatinas, even choruses, overtures and other popular forms were arranged for piano and received widespread distribution from networked publishing houses. The distribution records for Europe's then-leading music publisher, Breitkopf & Härtel in 1823, for example, indicated that works designed to be played at home by amateurs (sonatas, theme with variations, simple piano reductions, duets, songs, etc.) dominated the publishers' inventory holdings (Scherer 2004, 190; see also Clapham 1979). On the one hand, this demand for easier music was a financial boon for composers; on the other hand, these easy pieces, the least remunerative form of composition, also proffered diminishing returns. Publishers, who often bundled these smaller works into collections, largely held the upper hand over composers in matters of compensation (Scherer 2004, 189–90; see also Moore 1987, 331–3). An impressive roster of disaffected composers – from Johannes Brahms, who complained that his publisher Fritz Simrock was overcharging for his works (hence preventing them from wide circulation) to Richard Wagner, who was constantly wrangling with both Breitkopf & Härtel and Schott – testified to the asymmetric relations between (even the most famous) composers and their publishers in the economic heyday of the modern industrial piano. To be sure, in times of evident economic growth, stakeholders in the business of music did not fare equally.

The dramatic expansion of piano production during the second half of the nineteenth century would itself enter a period of sharp decline in the early twentieth century. This was a market fluctuation that could be correlated, on the one hand, to technological change – in particular, the emergence of radio as a broadcast medium and a shift from mechanical to electric phonography – and, on the other hand, to the stark economic fallout of the Great Depression. By the end of the 1920s, the piano market had all but dried up, arguably in response to diminished consumer demand. This decline cannot be attributed to automation alone. In sync with the declining demand for pianos, for example, the delivery of player pianos had halted completely in 1932, reportedly destroyed for fuel. (It is

no small irony that the last company to produce player pianos shut down in 2011, the era of algorithmically automated digital music services.) On the other hand, new habits of musical listening associated with the spread of domestic pianos had laid the foundation for the next generation of technologically enhanced passive music consumption in the domestic home, namely the (electric) phonograph and the radio. When the Marconi company first experimented with transmitting opera in June 1920, the commercial value of broadcasting was not yet widely understood. In fact, the shift from wireless telegraphy to radio seemed to mark a *reduction* in technical functionality – from an interactive (sender/receiver) communication technology to a non-interactive (broadcast) technology – which initially dissuaded investors. In the United States, the Westinghouse Electric Corporation first offered (free) broadcasts on KDKA in Pittsburgh as a marketing tool for delivering consumers to hardware – the purchase of their radio sets. ‘Toll broadcasting’ was only considered profitable in itself when AT&T established WEAJ in New York City two years later. This was an era in which radio reception also became dependable – the result of various technological improvements, including high-power transmitters, vacuum tubes, and in-built loudspeakers (instead of headphones). By 1927, radio sets had reached one-quarter of American households; three years later, nearly half the population owned one. A period of passive, or relaxed, musical listening had become normative and widespread (Starr 2004).

Although the structural arrangements and legal principles regulating radio differed from nation to nation, music transmission played a large role in the early days of broadcasting. The dissemination of radio had brought with it new political and legal regimes for the social management of sensory engagements with sound. In the United States, for example, radio was regarded as a scarce resource, grounded in a licensing system for private broadcasters, while, in Europe, radio was a largely government-run broadcasting system, financed by tax regulation. The legal construal of radio as a *public* service (on both sides of the Atlantic) placed certain restrictions on broadcasting content. In the Radio Act of 1927 in the United States, for example, the Federal Radio Commission (FRC) spelled out that licences could be granted to broadcasters only if the ‘public convenience, interest or necessity will be served thereby’, a position that oversaw the removal of purportedly controversial content – including anti-Semitic preaching, fortune-telling and fake science as well as birth control advocacy, opposition to lynching, and defence of civil rights (by, for example, the American Civil Liberties Union). One organic outcome of these legal regulations was a shift in content toward inoffensive, conventional and standardised broadcasts. The ethnic nationality hours, labour news and church services that characterised programming in the early

1920s were replaced by variety shows, soap operas, and above all *musical* performances directed toward a broad consumer market in the 1930s. Large networks removed anything potentially controversial or offensive for fear of alienating either their southern station affiliates or their advertisers (who refused to sponsor shows that did not align with their market brand). Aside from their ability to balance diverse political and cultural allegiances, the promotion of standardised songs (by lucrative stars) was also linked to new modes of financing culture within the legal contours of a new technological medium. This shift concerned the underwriting of radio broadcasts by sponsorship and advertising. Initially, advertising on the radio came under the same moral censorship as certain kinds of programming, but by the 1930s, radio became even more reliant than newspapers on advertising. By this time, advertising on radio had become direct and insistent – a kind of pervasive parallel auditory exposure to commercial products that interrupted (at regular intervals) both the ‘sustaining’ content (paid for by the network) and ‘sponsored’ content (paid for by advertisers) (Marchand 1985). Listeners came to experience radio music as a free service, underwritten by aural billboards that were linked either to corporate sponsors of the programme or advertising agencies (hired by corporations).

As a vehicle for financial returns, music was an ideal medium for early radio transmission. First, as a largely non-informational medium (and therefore uncontroversial practically by definition), music readily eluded the censorious dimensions of the Radio Act of 1927 (and its various revisions throughout the twentieth century). It should be noted, however, that music by black Americans, construed as ‘obscene’ and ‘indecent’ in the early days of radio, was the notable exception to this basic principle. Second, music was an ideal vehicle for product placement in the context of early prohibitions on radio advertising. Brand names were frequently inserted into dialogue, while songs and performers were often named after their sponsors. Examples of branded performers in the early Tin Pan Alley era included the Palmolivers (Frank Munn and Virginia Rea, known as Paul Oliver and Olive Palmer) and the Vicks Vaporub Quartet, whose music included light jazz, show tunes and easy opera. Third, music doubled as both the content of the programme and an advertisement promoting itself as a commodity. The dissemination of music on the radio thereby delivered listeners to a second-order (albeit more traditional) distribution network for both sheet music and (eventually also) gramophone record sales. Importantly, the sales figures for records actually decreased in the first two decades of the radio era. This dip reflected the perceptual elision of promotional material with owned content during straitened economic circumstances. As a result, the early struggle between the American Society of Composers, Authors and Publishers (ASCAP) and

the National Association of Broadcasters (NAB) involved selective references to the meaning of radio music – understood, on the one hand, as commercially purchased content, and, on the other, as a promotional vehicle for content. In other words, ASCAP sought a fee for licensed music that was programmed for radio, while the NAB argued that radio provided free exposure for music, thereby bolstering (sheet) music sales. By the mid-century, however, the tables had turned: far from soliciting a fee, record labels were actively soliciting (and even illegally paying for) airtime from radio executives and DJs. Phonograph production had burgeoned into a large-scale industry, underwritten by a business model that basically remained intact until the end of the twentieth century. Each technological shift – from the long-playing record (LP) to the compact disc (CD), by way of the cassette tape and a host of additional (often failed) formats – disrupted some aspect of the industry as much as it amplified another aspect. The wholesale shift to digital formats in the late 1980s, for example, produced an artificial boom in music sales, whereby consumers were enjoined to expand – and often duplicate – their existing vinyl collections on CD. But not all technological changes heralded sales increases. After the Second World War, it was sheet music sales that dipped, for example, emerging by the end of the century as a minor (if robust) sector of the music industry.

The meteoric rise of radio broadcasting in the 1920s would not have been possible without the advances made in recording technology some twenty years earlier. Emile Berliner's refinement of Thomas Edison's phonograph (talking machine) in the late nineteenth century – substituting Edison's tinfoil/wax cylinder with a flat metal disc, for instance, and etching the recording on both sides of the disc – greatly improved the recording quality of music, and furthermore cast the music in a more robust and reliable material form. The modern gramophone was now fixed, durable, affordable, mobile, and above all readily reproducible. Recorded music and sound became raw material for a host of additional industries, quickly migrating into cinemas, cafés, dance halls, and department stores, and, of course, onto radio. The traditional coordinates of musical culture had radically shifted. If the late nineteenth century marked a traditional period characterised, on the one hand, by amateur music-making in a domestic setting, and, on the other, by the rarefied ritual attendance of specialised musical concerts, professional operas, operettas, vaudeville, and so on, then the early twentieth century marked a musical culture that had transformed into a ubiquitous, commercially amplified soundscape of recorded music.

Over time, the de-skilling of a music-performing class of musical amateurs simultaneously produced a new class of skilled recordists,

songwriters, publishers, lyricists, arrangers, promoters, cover illustrators, brokers, broadcasters and businessmen. Commercial songwriting, for example, once a semi-skilled hobby involving meagre financial returns, became a lucrative business in the era of recorded sound (Suisman 2009). Stephen Foster, a well-known songwriter in the era before recorded sound, earned a meagre sum for his well-known songs, while Irving Berlin was heralded as a kind of superstar in the context of Tin Pan Alley a few decades later. This is because publishers, still the centre of economic power in the industry, strategically stimulated demand for recorded music by promoting a select group of branded songwriters (such as Berlin, Jerome Kern and George Gershwin) and performers (such as James Aldrich Libby and Virginia Rea), using novel techniques of distribution, repetition and promotion (or ‘plugging’) at baseball games, train stations, parks, dances, nickelodeons, restaurants, department stores and cafés. The standardised verse-chorus structure of popular songs was itself a calculated transformation of (largely chorus-free) vernacular song forms, designed to enhance sales (Suisman 2009). The mechanism was simple: Aided by ‘boosters’ (paid claquees integrated into groups, crowds and gatherings) that burst ‘spontaneously’ into the chorus of the song in public, commercial music could be promoted in the seemingly de-commercialised context of communal singing. By the late 1920s, boosters were largely replaced by radio transmission, which became a natural conduit for analogously promoting and amplifying a targeted set of songs by intermittent repetition.

In sum, in the early twentieth century, music – seemingly dematerialised by recording technologies – was actually radically *rematerialised* as a durable commodity, a fixed entity for private consumption. The legal insistence on a tangible medium to secure the benefit of copyright protection (about which more below) was extended from musical scores to phonograph recordings. Music’s modern materially documented form thereby dramatically expanded the archival scope and economic authority of its circulation. A once-ephemeral experience was transformed into a widely disseminated repeatable one, captured in a tangible medium that was legally vested in a host of property rights. The convergence of sound recording and radio broadcasting, which played a considerable role in disseminating commercial music into both domestic and commercial spaces, completely altered the contours of musical consumption and distribution. In America, the various Radio Acts of the 1920s, followed by the Communications Acts of the 1930s, became foundational pillars for media policy. Broadly speaking, though they were nationally owned, the radio airwaves were ultimately privatised on a model of trusteeship, which meant that networks could largely control the new electronic portals to the American public. In Europe, broadly speaking, radio

was a government-run broadcasting system, while in Britain, a quasi-independent public broadcast model was developed. In general, therefore, radio in America (and elsewhere) was primarily characterised, first, by a model of federal licensing and regulation; second, by monopolised network domination such as the National Broadcasting Corporation (NBC) and, by the late 1920s, also by the Columbia Phonograph Broadcasting System (CPBS, forerunner of CBS) in America; and, third, by the integration of programming with the interests of advertisers, sponsors and advertising agencies. Of course, the details were often more complex than this brief sketch permits. For instance, though they were largely private independent entities, American radio networks occasionally overlapped with music content providers as well – CBS, for example, was financed by the Columbia Record Company – thereby streamlining the dual economic imperatives of music recording and distribution.

To remain within the American context, the Federal Communications Commission (FCC – successor to the FRC) in the era of the New Deal adopted two important policies that reshaped the structure and content of radio for decades to come. First, the commission renounced the ban on editorials, adopting instead the Fairness Doctrine (which required broadcasters to offer reply-time for disagreement about controversial news or public affairs programming); and, second, the commission placed restrictions on radio ownership, effectively limiting each network to a single station in any geographical area. In 1943, for example, the Supreme Court upheld the FCC ruling, and NBC was forced to sell its 'blue' network to the American Broadcasting Company (ABC). It was in the context of radio regulations that emphasised localism, public interest and competition that rock 'n' roll came to flourish. But the pressure toward radio monopolies would persist until the end of the century. With the passing of the 1996 Telecommunications Act, restrictions on radio ownership were lifted once more. Within a few years, deregulated radio became vertically concentrated and horizontally integrated to an unprecedented degree. By 2002, Clear Channel Communications and Viacom alone controlled over 40 per cent of the US radio market. Clear Channel was also the world's largest broadcaster, concert promoter and billboard advertising firm.<sup>1</sup> The record industry, too, had become one of the most concentrated global media markets: six leading firms – PolyGram, EMI, Warner Music Group (a unit of AOL Time Warner), Sony Music Entertainment, BMG (a unit of Bertelsmann) and Universal Music Group (a unit of Vivendi) – controlled between 80 and 90 per cent of the global market (Herman and McChesney 1997, 43). Corporate consolidation between these firms had continued unabated in the years following, and by the end of the first decade of the twenty-first century, the six major labels had dwindled to three. But by



then, the Internet had ushered in an entirely different music delivery system, which would challenge the authority of music's centralised corporate blocs in an unanticipated new way – not by way of regulative measures passed by Congress or the FCC, but instead through social networks that took hold on the borderline between the legal and extra-legal.

### **Tragedy of the Commons: From Torrent to Stream**

As with the radio spectrum in the 1920s, the early Internet was also regarded as a public resource, initially developed in the context of American military strategy and thus funded by tax revenues. Unlike radio, however, the Internet was not considered as a medium marked by spectrum scarcity. Although it had the capacity to broadcast and disseminate information, the Internet was therefore legislated less by principles regulating radio and more by those regulating the telephone. The legal classification of the Internet actually intersected two technologies – telephony (characterised by bi-directional one-to-one communication), on the one hand, and radio (characterised, at least by century's end, as unidirectional one-to-many communication), on the other. As a result, online expression was protected by the First Amendment (and hence less censoriously handled than it was on radio or television) and broadband Internet access was classified on the model of 'common carriage' – a bedrock historical principle attendant to telephone signals. Due to the sheer volume of information and data aggregated online, it was impossible for any internet service operator to offer direct and complete end-to-end transmission between content providers and consumers, adopters, and end users. As a result, most content requested by users traversed several different networks, which potentially became a chokepoint for the flow of data. However, since the Internet was initially grounded in the telephone infrastructure, there was a prohibition on any form of broadband discrimination between either network operators, who offered hosting services to content providers, or internet service providers (ISPs), who offered internet connections. The common carriage principle – rooted in legal understandings of telephony, and later dubbed 'net neutrality' by Tim Wu (2003) – persisted until 2018, when the FCC, and then the US Congress, eventually voted to dismantle it.

The combination of open access and free speech protections brought with it the promise of a decentralised and disintermediated digital architecture (i.e. an economy in which middlemen are removed) grounded in new efficiencies of peer-to-peer (P2P) connectivity and search functionality. The record industry boom of the 1990s, aided by monopolist collusion in the context of the aforementioned shift from analogue (LPs) to digital

(CDs) – no less than the re-monopolised radio airwaves – reached a tipping point in 2000, after which it slid into a seemingly terminal economic decline. Within a single decade, an entire generation of young listeners was ripping, burning, downloading and sharing music files outside traditional circuits of exchange. Widespread downloading – dubbed ‘musical piracy’ by detractors – became associated with an entirely new cultural logic of music-making. The established music industry was being undermined on various fronts. For example, the legally indiscriminate use of samples in the form of remixes and mashups became a distinctive compositional practice in the early 2000s. At the same time, official industry releases were often pre-empted by leaks, excavated by insiders associated with digitally networked underground internet ‘scenes’ (sometimes known as the ‘darknet’). By 2002, for example, albums by Metallica, Tupac Shakur, Lil Wayne, Dr Dre, Jay-Z, Queens of the Stone Age, 3 Doors Down, Björk, Ashanti, Ja Rule, 50 Cent, Kanye West and many others had been leaked by Rabid Neurosis (RNS), an internet chat group associated with music piracy (Witt 2015, 73, 140, 220).

Artists and labels took various approaches to this new reality, often paradoxically benefiting from giving away music free, and paying the price for withholding it. One approach was a kind of reverse-hack, recalling some of the peculiar antics for undercutting piracy in the age before copyright protection – Mozart’s defacement of his own scores, for example, or his release of only partial scores to copyists. Likewise, in 2003 Madonna would upload a decoy MP3 onto some file-sharing networks, carrying a recording of her voice asking, ‘What the f\*\*\* do you think you’re doing?’ When users attempted (illegally) to download the song, they heard the scolding voiceover instead. In response, enraged music fans mounted an anti-Madonna campaign featuring an online contest for the best techno, trance or house remix of Madonna’s voiceover. One hacker even managed to post tracks from *American Life* for free download from Madonna’s own website (Scherzinger and Smith 2007). In stark contrast, Lil Wayne simply capitulated to the new reality of illegal downloads, and made his entire output available online for free download. In addition to legitimate album releases, Wayne then also released several free ‘mixtapes’ as ends in themselves. The mixtape had historically been a kind of demo tape crafted to secure a contract with a label; Wayne was using it to secure his freedom *from* a label. His strategy paid off, and by 2006, Wayne was earning accolades from established critics, less for his albums than for his mixtapes (Witt 2015, 201). While the informal trading of files initially produced a spike in record sales (indicating the promotional value of early online piracy in the absence of widespread portable MP3 players), the traditional music industry lost half

of its mass within seven years. The devaluation of recorded music in the first decade of the twenty-first century thereby recapitulated the decline in sales figures for phonograph records in the early era of radio a hundred years earlier; and, as it was for the radio era, the economic decline would turn out to be temporary.

The common narrative describing the emergence of online music circulation generally emphasises a period of crowdsourced mass piracy in the context of independent and open networks. The actual reasons for the decline of the traditional music industry, however, are complex and overdetermined – the result of contradictory actions and reactions from a range of technical and social actors, on the one hand, and political and economic stakeholders, on the other. Networks of regulatory agencies, legal personnel and standards bureaus confronted innovations by computer programmers, audio researchers and signal-processing specialists; while a new generation of online hackers, netizens and ordinary internet adopters confronted restrictions imposed by music industry executives, security officers and legal personnel. For example, one of the most forward-looking technological breakthroughs for transmitting high-fidelity music files using minimal data was initially deemed a commercial *failure*. In the early 1990s, the Fraunhofer Institute for Integrated Circuits developed a rule-governed system for compression-decompression that could transmit digital recordings using less than one-tenth of the bandwidth associated with the compact disc. Fraunhofer deployed a combination of psychoacoustic masking techniques (computational protocols for evacuating inessential frequencies of a sound signal) and a Huffman coding technique (an algorithmic routine for reducing pattern redundancy). This kind of low-bandwidth transmission was designed for the Internet-enabled personal computer market, which had grown considerably in the 1990s – a decade not unlike the 1920s, marked by the meteoric rise of household radio sets. The new technical format, known as the Moving Picture Experts Group, Audio Layer 3 (or MP3), was met with some limited success – MP3-bearing ‘Zephyr’ boxes, for example, broadcast the National Hockey League, and then about 70 per cent of all sports by the late 1990s – but, throughout the decade, the MP3 remained locked out of its target PC market. Large players in the record industry (such as BMG) rejected Fraunhofer’s vision of an online ‘digital jukebox’, and a rival format (the Philips-designed MP2) was favoured by the standards committees in the early 1990s. As a result, Fraunhofer designed a floppy disc encoder in 1995, known as L3Enc, which they promoted by giving it away *free* online, with the option of leaving a donation (Witt 2015, 21, 55; see also Sterne 2012).

As with MIDI-enabled keyboards in the 1980s, Fraunhofer’s was a ‘free’ product aimed at creating technological path-dependency for users and

adopters. The first MP3 player for Windows, known as WinPlay3, was released in 1995, also free, but disabled after a limited number of plays. By 1996, L3Enc software had been hacked and was being used to share (illegal) music files online; WinPlay3 was also hacked to enable full functionality; and serial numbers for L3Enc and WinPlay3 had been intercepted from links to the Fraunhofer FTP server (Witt 2015, 50). Newly networked online communities were deploying Internet Relay Chat (IRC) channels – privately operated servers using hashtags to indicate different interest groups – to disseminate pirated software (known as ‘warez’) and musical files (including pre-releases) online. RNS, mentioned above, was one such community involved in the dissemination of pirated music and software as well as various album leaks. In 1997, WinPlay, a derivative of the official Fraunhofer MP3 player, had been downloaded several million times, and by 1999 a single website, Napster, had connected twenty million users to a centralised library of songs. Downloading music online and file-sharing had moved from IRC channels into the mainstream. This presented a dramatic challenge to the classical economic model for the music industry and unleashed a series of lawsuits against all manner of potential lawbreakers – including individual users, P2P operators and hardware suppliers. For example, the Record Industry Association of America (RIAA) sued Diamond Multimedia Systems, the MP3 device makers; and a conglomeration of record companies sued Napster for copyright infringement across its P2P network. Napster lost their case, but – because of Section 512 of Title 17 of the US code, known as the ‘safe harbour’ provision of the 1998 Digital Millennium Copyright Act (DMCA) – Diamond won their case, and portable MP3 players could still be sold. Fraunhofer might have failed to secure official international recognition for the MP3 as a technical standard, but the sale of portable MP3 devices in the wake of *RIAA v. Diamond* brought the company considerable success.

In 2002, Apple’s online iTunes Store also took advantage of the court’s ruling, and began to offer legal downloads of songs (sold on a per-unit basis) for their portable devices. Napster, still operating in a kind of networked gift economy, had effectively laid the groundwork for Apple’s rise to market dominance, forging the way toward an efficient and interactive new model for musical listening. As it was for Westinghouse in the 1920s, Apple was as vested in delivering consumers to hardware as it was in promoting and selling music. Two key points illustrate this additional economic prerogative. First, Apple tailored the launch of iTunes with a business plan aimed at creating a ‘balance between the industry and music listeners’, tethered to a marketing campaign deploying the cool rhetoric of interactivity and freedom (Cosentino 2006, 196). The first Apple

advertising campaign, revealingly titled ‘Rip, Mix, Burn’, was thus able to gain traction on the tactile, mostly illegal, behaviour of a generation of online users (already habituated to P2P sharing, free downloading, and self-curated playlisting). Apple thereby channelled an informal, but widespread, millennial *habitus* of (illegal) online music stockpiling toward the purchasing of licensed music. As a result, they also cornered the early market on a generation of mobile music devices that operated on the basis of downloads instead of CDs. Second, Apple initially disabled the MP3 format, locking users into the AAC format instead, and even deploying a DRM system called ‘FairPlay’ to block MP3s from playing on their devices. However, they eventually capitulated to the widespread demand for MP3 functionality – no less than repeated attempts to disable their DRM system, including the infamous ‘PlayFair’ hack – in the context of vast online reservoirs of MP3s.

The second major entity to take advantage of the safe harbour ruling was Google, a ‘web crawler’ that had by then become the world’s leading search engine. Between 2002 and 2007 Google had grown by a factor of forty with annual revenues reaching into tens of billions of dollars. Indeed, the word ‘google’ had transformed into a verb, synonymous with online search itself. In 2006, the company purchased YouTube, an online video community platform launched as a small start-up in 2005. The purchase marked a turning point for Google, who were expanding their operations from a search-based delivery system to curated online content provision. This evolving structure recalled alliances such as that between CBS and the Columbia Record Company, one of only two great monopolies effectively controlling music distribution in the late 1920s and the 1930s. Just as radio ownership had consolidated in a few years into a monopolised structure, so too was the Internet of the early 2000s coalescing around a handful of powerful companies. A few years later, industry commentators increasingly recognised the rising value of gigantic, easily searchable databases for music: ‘Eventually, the most successful music companies may not be the ones that create, play, or sell music. Rather, they may be the ones to collect the most music data.’<sup>2</sup> But back in 2006, YouTube – a kind of Napster for video – was still a small start-up, fast growing a reputation for the non-commercial hosting of user-generated content (UGC). Within a year, the site was delivering over 100 million video views per day, and hosting tens of thousands of daily uploads (Wasko and Erickson 2009, 374). YouTube was perhaps the *locus classicus* of online services that characterised what came to be known as Web 2.0. Web 2.0 described a set of internet applications – enabled by new technologies, such as RSS, Wiki and Flash – that facilitated interaction, sharing and exchange among users. Internet users during this period increasingly shared files, uploaded videos,

edited encyclopaedias, forwarded information and socialised online. This kind of UGC upended the traditional distributor model for content provision – largely controlled by intellectual property rights – to a network model that operated in a kind of parallel gift economy. Again, as with early radio in the 1920s, YouTube was, at first, an advertisement-free and community-driven content provider. With the purchase by Google, however, advertising soon became the central model for financing the platform. Furthermore, YouTube soon began to integrate its operations with music labels and other media industries. By 2008 YouTube had signed licensing deals with many major players in the content industries – including Universal, Sony BMG, EMI, Warner, CBS, NBC and others – but its business model was primarily tethered to a rapidly expanding internet audience that provided vast swaths of self-generated, *free* content.

Individual users whose videos went viral – early examples included Lonelygirl15 and Happyslip – were signed by YouTube directly, and paid a percentage of the advertising revenue associated with their views. For musicians, the platform held the advantage of bypassing the traditional contractual dependence on the music industry. Artists ranging from Ingrid Michaelson, White Stripes, OK Go, Jonathan Coulton, Arcade Fire, Cactus Cuties and Samantha Morton in the first decade of the twenty-first century to Macklemore, Ryan Lewis, Gotye, Justin Bieber, Carly Rae Jepsen, Milly Rock and The Weeknd in the second decade testified to the success of self-launched musicians in the twenty-first century (Espejo 2009, 7; LaPlante 2009, 28). Not surprisingly, musicians like David Byrne (lead singer of Talking Heads) offered an upbeat assessment of the changing circumstances for creative musicians in the context of Web 2.0 applications such as YouTube. Musicians, Byrne argued, were no longer beholden to producers, promoters, marketers and managers (such as the ‘360’, or equity, deal), but could function entirely independently – their music could be ‘self-produced, self-written, self-played, and self-marketed’. Byrne concluded: ‘For existing and emerging artists – who read about the music business going down the drain – this is actually a great time, full of options and possibilities.’<sup>3</sup> The sentiment was echoed by Michael Bracy of the Future of Music Coalition, a nonprofit organisation dedicated to the livelihood of musicians: ‘Who needs major labels, and Rolling Stone, and MTV? . . . Hundreds of bands, not a single superstar among them, all have significant followings and fanbases thanks to technology’ (quoted in LaPlante 2009, 29).

In the early years of Web 2.0, an ethos of decentralised, disintermediated and democratic cultural production came to be understood as a genuine technical possibility. Yochai Benkler, for example, argued that

the decrease in computational costs, enhancements in digital signal processing, and network architecture would issue a new model of production sustained by sharing and collaborative volunteerism (2006, 87, 59). Benkler labelled this model 'commons-based peer production', characterised by a digitally networked environment that 'makes possible a new modality of organizing production: radically decentralized, collaborative, and nonproprietary; based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals or managerial demands' (60). In 2006, the jury was still out as to whether platforms like YouTube were a democratising force for culture or a massive reservoir of economic exploitation.

Following the shutdown of Napster, a series of additional P2P networks emerged, including Grokster, KaZaa, eDonkey, BearShare, Gnutella, LimeWire and Oink. Aside from services like Oink – a sophisticated and exclusive index of pirated material run by audiophiles – most of these services failed to match the scope and quality of Napster. However, the lawsuits against both networks and individuals intensified. In 2003, over 200 individuals were targeted (and fined \$150,000 per song); and by 2005, the RIAA had bought lawsuits against tens of thousands of individual file sharers. Mostly, the heavy-handed nature of the punishment was self-defeating and the RIAA was condemned for its arbitrary and vindictive approach to litigation. In one infamous case – *Capitol Records v. Jammie Thomas* (2007) – the defendant (a single mother) was fined \$222,000 in damages for sharing twenty-four songs via KaZaa. These individual lawsuits mostly targeted relatively innocent and naïve offenders, thereby evoking sympathy for the accused and antipathy for the record label. A download on Napster, for example, also involved a simultaneous upload (linked to an IP address) by default – a preset that could easily be disabled by tech-savvy users. In the manner of pre-modern punishments, following Michel Foucault's analysis, the music industry was lashing out at the wrong targets in exaggerated fashion. Nonetheless, file-sharing and downloading persisted throughout the first decade of the twenty-first century. Indeed, the introduction of an open-source technology known as BitTorrent – which broke up and distributed files into hundreds of small 'bits' – alleviated some of the bottleneck problems associated with traditional P2P traffic. New sites emerged (such as Mininova, Pirate Bay and BTJunkie) hosting torrents linked to thousands of computers across the globe; Oink too shifted its protocols for file production to BitTorrent. These sites were also eventually taken down or raided. But by then the CD had become obsolete and online music distribution had become the norm. Record labels, which had long resisted new models for generating revenue, finally began to cut licensing deals for streaming media, a form of

musical consumption that, from the perspective of the user, resonated with the decade-long practice of building personalised playlists from file-sharing and downloading.

### **Dialectics of Rights Management: An Allomorphism of the Law**

For all the appearance of anarchic circulation of free culture, however, this period also witnessed the unprecedented arrogation of cultural practice by major multinational corporate entities in two – mostly contradictory – senses. On the one hand, the rapacious capacities of search engines, social networks, retail outlets and other online platforms for the surveillance and collection of free data supplied by the public reflected a novel way of instrumentalising capacities that were historically considered non-instrumental. In other words, the very act of musical listening, associated in the twentieth century with affective enjoyment and leisure time, was transformed, in the twenty-first century, into a revenue-generating resource for large corporations – a new form of digital labour, extracted by technical interfaces designed for the capture of data. Far from simply enhancing efficiencies in search functionality, social networking, recommendation algorithms, and so on, the gathering and mining of big data (ravaged from an unprotected public domain) cast light on the paradoxical financial investment corporations had in the *free* flow of culture. Curiously, the progressive embrace of distributed free content (no less than the resistance to the enclosure of the commons) marched in uncanny step with the demands of these economic stakeholders. Designed to externalise every desire, maximise access, proliferate consumption and hasten click-rates, platforms controlled by this corporate sector reflected a vested interest in a friction-free flow of information, grounded in affect. Datasets, in short, were enriched by unbounded subjectivity. One might call this the era of free culture for schizophrenic capital.

On the other hand, the increased institutionalisation of permission-based distribution and access controls undercut the cornucopian image of free content, shared by freely interacting and contributing users, however deftly the apparently unimpeded cornucopia was actually monetised in the age of big data. Once again, the paradox of the Internet – its potential for the surveillance of seemingly friction-free digital traces – had simultaneously intensified the scope and reach of digital rights management (DRM) of copyright-protected culture. Just as the Internet enabled high-speed copying with little quality loss, it also enabled enhanced detection of copying and new opportunities for control and enforcement.



Here, too, music lent itself especially well to this kind of legal encroachment on its public circulation. Most obviously, music – generally consumed by way of repeated listening – opened lucrative opportunities for companies offering pay-as-you-go listening services tethered to access-control protection systems. This rental model offered an opportunity to monetise affective investments – effectively commodifying intangible experience and sentiment in *real time*. In fact, with the passing of the DMCA, the use of technological protections facilitated a system of pay-per-use (view/listen/install), thereby linking access itself to an automatic debit mechanism. In their representations to Congress, the copyright lobby argued that, barring a set of precise circumstantial exceptions, any reproduction of a work was the exclusive right of the copyright holder. Since exceptions had not been enumerated for internet-based copies in the 1976 Act, copyright owners were entitled to monetise all digital copies online. Remarkably, copyright owners argued that this right should be extended to reproductions found anywhere on a computer, including the volatile Random Access Memory (RAM) (Litman 2006, 22–32). The policy manoeuvre was a transformation of traditional copyright law, which distinguished between fixed reproductions (such as phonograph records and books) and unfixed ones (such as broadcasts and exhibitions). Ephemeral copies, such as those found on radio or television broadcasts, reduced what economists call the ‘option value’ of the reproduction, and were not protected by copyright law. Since a reproduction of a work found in RAM could technically be saved to a hard drive, stakeholders in copyright protections argued that the copy was essentially fixed in a tangible medium. Concomitantly, its option value had become blurred. The fundamental right associated with the copyright owner was the right to authorise the reproduction of protected work that had been *fixed* in a sufficiently stable tangible medium. In the open network, therefore, ephemeral uses of a work were concretely transformed into traceable fixed ones. Consumption could now be regulated in accordance with the fundamental operation of computers. In a context of metered usage (or pay-per-use), music was now potentially becoming an enticing financial prospect for the industry.

It is important to note that the forms of enclosure upon cultural work outlined above were in fact in a contradictory relation with one another. If content industries were invested in cementing access-control protection systems and copy-control protection systems into technological devices and communicative platforms, service providers were invested in the opposite – the friction-free flow of unfettered data points. It is possible to describe the legal outcomes of this inter-industry struggle as a series of detailed negotiations between lobbyists for content industries, on the one hand, and ISPs, on the other. Indeed, with the passing of the DMCA in

1998, service providers were granted an exemption from liability for their users' uploads and posts on condition that they agreed to remove or block access to copyright-protected material when alerted to infringing files by content providers. The safe harbour was the direct result of a negotiated agreement during the 105th Congress on the question of liability for copyright infringement online. But it reflected a pattern of copyright-law-making in the United States that had long taken the form of negotiated settlements between powerful private parties, with sometimes competing vested interests. In the first decade of the twentieth century, for example, the interests of copyright holders (musicians, composers, publishers, and so on) conflicted with those of the then-new 'talking machine' (phonograph), motion picture and piano roll industries. Since the latter were absent from the negotiations in 1906, the bill that emerged did not favour them. As a result, in ensuing conferences, the proposals were modified to better reflect the operations of these industries: compulsory licences were granted for mechanical reproductions of musical compositions, on the one hand, and all jukebox operators were granted a complete exemption, on the other (Litman 2006, 70–7).

For all the appearance of balancing the conflicting demands of copyright law by way of negotiated concessions, these conferences historically facilitated interactions between copyright-intensive businesses and institutions increasingly at the expense of publicly oriented institutions of learning, public domain advocates, and the like. One may speak here of the inertial tendencies of copyright laws passed in the previous century, which generally bore the marks of a relatively narrow set of interests. The occasional benefits to the public (such as the broadcasting provision in the 1909 Act, or, arguably, the safe harbour provision in the 1998 Act) accrued as if by accident; they often represented the symptomatic fallout of an inter-corporate struggle more than a genuine confrontation within a public sphere. In this scenario, public interest was only served in the gaps opened by conflict between powerful industry players. In fact, the tendency to exclude direct discussion of public interests in the lead up to statutory action intensified in the age of the Internet. The decade leading up to the DMCA, for example, witnessed a marked increase in copyright-related campaign contributions to politicians, with the aim of gaining leverage over IP policy in Congress. Perhaps it was not surprising that the provisions of the DMCA witnessed the *de facto* erosion of a host of exemptions that had been historically granted to under-represented interest groups, public and private alike – jukebox operators, record companies, cable television systems, radio and satellite broadcasters, music stores, restaurants, libraries, educational institutions (such as schools and universities), and so on. The exemptions came under threat because the DMCA

included language prohibiting the manufacture and use of *any* device or service that could circumvent copyright protection. The underlying logic of this legal manoeuvre was ensnared in a *non sequitur* known as the *fallacy of the undistributed middle*. Simply put, just because all infringements involve copies does not mean that all copies involve infringements.

But the seemingly accidental legal benefits carried traces of the contradictory forces that brought them into being. It would not be difficult to list an array of logical problems with the provisions of the DMCA, insofar as it renovated the meaning, scope and authority of copyright protection with frequently contradictory effects in actual practice. Take, for example, the case of Napster discussed above. Recall that Napster's technology facilitated access to music collections of geographically remote users. Napster had a central search function, but, since collections were not posted online directly, the model for sharing was effectively decentralised. Napster's model thereby posed a direct challenge to the basic economic principles underlying the legal distribution of commercially valuable information, which had hitherto been controlled by corporate intermediaries (record labels, film companies, etc.). After the largest record labels brought suit against it in 1999 (*A&M v. Napster*), Napster was ordered to shut down its then-current operations and reconfigure itself as a commercial platform. The kind of defence that characterised the 1984 'Betamax' case (*Sony v. Universal*) failed in this new context primarily because it was argued that Napster had the technical capacity to circumvent infringing uses whereas Sony, in the 1980s, did not. In the case of the videocassette magnetic tape recording format, deployed in relatively closed social networks, infringing uses could not be as readily detected, which led the court to protect the substantial potential for non-infringing uses. Although the question concerning the illegality of non-commercial file-sharing was itself hotly contested and in doubt, *A&M v. Napster* effectively opened the door to the pre-emptive circumvention of *any* sharing. One logical consequence of this decision is that, de facto, *all* non-commercial exchange was judged illegal until proven legal. One can detect here not only a case of the fallacy of the undistributed middle, but also the logical impossibility for Napster, in practice, to divert users from infringing/non-commercial behaviour. This was a particularly surprising interpretation given the reluctance of the music industry in the late 1990s to move their retail operations to the Internet.

As Napster rose to prominence, the music industry, under the auspices of the Secure Digital Music Initiative (SDMI) coalition, was formulating technical rights management systems that could be incorporated into devices (MP3 players, CD or DVD drives, flash memory devices) and networks (internet or wireless networks, set-top boxes or modems). The

approach was multipronged, including both watermark and encryption technologies. Digital watermarks are sequences of binary digits (bits) associated with a work that enable its identification and tracking. A digital watermark could trigger a technological device to behave in certain ways. For example, it could prompt a device to offer a software upgrade. The upgraded version of the software could, in turn, technically distinguish between SDMI-protected content and non-compliant (unmarked) content, and disable playback for the latter. Even if an artist had released unmarked content, the SDMI upgrade could potentially restrict its playback. By using technological artefacts as themselves a site for legal intervention, DRM of this sort both perpetuated a syllogistic fallacy and automated its enforcement. Unable to register the situational domains that distinguish what was legally permissible to do with a copyrighted work from what was not legal, this kind of automated enforcement asymmetrically expanded the rights of some stakeholders and diminished, if not obliterated, the rights of others. It pre-emptively placed constraints on reproduction and distribution of digital information by embedding copy-protecting technical watermarks, digital locks, licence agreements and encryption technologies, effectively circumventing access controls or authorisation on specified devices, as well as preventing the copying, distribution, viewing, pausing, transferring, or syncing of copyright-protected material.

By shifting the focus from the adoption or *use* of content to the *design* of technical conduits for content, traditional copyright protection was thereby extended from the present into the future, speculatively circumventing *possible* infringement. Such auto-policing undermined uses formerly enabled by the copyright framework, which traditionally balanced the rights of authors and their publics. For example, DRM prevented uses that were in accordance with the 'first sale' doctrine (which permits the re-sale and sharing of works), the religious services exemption (which waives the public performance right in religious contexts), and the 'fair use' doctrine (which exempts a range of educational, domestic and other types of expressive uses of works). This kind of enclosure on sanctioned cultural uses of music paradoxically undermined the proper functioning of other aspects of the law. It had become a kind of *law-disabling law*. The fundamental character of copyright was thereby altered; its operational meanings metamorphosed into different forms even as it retained its justifications *under the auspices of the same basic law*. Like a chemical compound whose composition remains while its crystalline form alters, some of its guiding principles were quietly amplified, others were diminished, and still others abolished entirely. In short, DRM produced an *allomorhism* of the law.

As the details of the law mutated, it became less clear which institutions could appropriately be called upon to ensure its proper functioning. For example, the idea of a 'broadcast flag' – a copy protection system designed for digital televisions and receivers – was considered and assessed by the FCC in 2003 (Gillespie 2007). The traditional role of the FCC was to monitor content for broadcast media (such as radio and television) and to oversee the granting of licences for slices of the spectrum. The broadcast flag, however, was designed to be a government-mandated form of encryption that could detect and monitor the redistribution of television content in a networked environment. At stake in assessing the flag was not the type or quality of content that could be broadcast, but rather the technical character of a technical conduit for content. The commission was becoming caught up in issues that were historically beyond its remit. In the past, the FCC had never been tasked to arbitrate either the legality of technological functionality or the logic of algorithmic computation, such as that associated with the broadcast flag. Indeed, in 2005 the American Library Association (ALA), in conjunction with a collection of consumer and digital technology advocate groups, challenged the FCC's ruling on the flag (*American Library Association et al. v. Federal Communications Commission and United States of America*). The ALA argued that the ruling, which pertained to copyright, was beyond the FCC's jurisdiction, and, after some debate, the regulation was officially eliminated in 2011. Nonetheless, as computing and broadcasting converged (and thereby distribution increasingly coincided with consumption), DRM technologies continued to be assembled directly into networks and devices.

Scaled to the level of society as a whole, if technical barriers could be built directly into the communication platforms, devices and networks that were central to contemporary social life – participation in community, commerce, conversation, etc. – then social life itself could be pre-emptively regulated to prohibit circumvention of the law. For example, if manufacturers of DVD players were legally mandated to omit a recording function on their playback devices, or if DVDs encoded a 'regional' restriction on the playback of DVDs, circumvention of copyright protection could not, as a technical matter, take place on those devices. Basing the compensable unit of copyright protection on the *copy* itself – however ephemeral its actual distribution, or however volatile its term in a memory chip – entailed disabling (what many considered to be) a fundamental operation of networked computers: reproduction of files in stable digital form. Under this reading, a new construal of a law undermined a basic technical principle of a new technology.

This is not the only view. Some theorists argued that, far from proliferating copies by operational definition, the digital network in fact rendered

copies redundant. In this view, the fundamental principle of the global Internet necessitated the existence of only *one* file. Online streaming services for music and films operated on the basis of this idea: companies like Netflix and Spotify began to deliver content by granting access to a kind of master file in real time over a network (Lanier 2010). In the context of the open network, the need for multiple copies became technically redundant. Of course, this principle was fundamental only to the extent that the system was fast, fluid, widespread and openly accessible. DRM undermined the fundamental aspects of such a system. For all their conceptual differences, then, these interpretations of the digital architecture coincided on the question of DRM. Whether the Internet was construed as a 'giant copy machine', or its inverse, a zero-copy machine, DRM disabled its fundamental method of operation (Kelly in Lanier 2010, 221; Nimmer 2003, 157).

The disabling of technical functionality concomitantly disabled legal defences (such as fair use) which were recognised by a lengthy copyright tradition and a history of case law. Programming the machine to perform below capacity, copyright owners were thereby able to wall off legitimate uses of cultural information and also to remove from the public the very public domain material that was inevitably incorporated into protected works. Lodging the power to disable technical functionality in the hands of a subset of commercial actors, therefore, had significant implications for the future of cultural freedom, legal transparency and social equity. For example, *encoding law* pre-emptively in devices and platforms illegitimately expanded the legal scope of copyright, and even contradicted a fundamental principle of the law itself – the presumption of innocence. Under these conditions, it became quasi-mandatory for all cultural expression and exchange to be structured on the commodity form; music's overtly experiential and social values necessarily shoehorned into commercial terms. With automatic technical controls effectively substituting for legal controls, social life became increasingly operationalised to conform to market values.

Despite the evident encroachment of DRM in the early decades of the twenty-first century, the track record for its successful implementation was, in fact, strikingly mixed. As the *ALA et al. v. FCC & USA* case in 2011 indicates, the industry faced considerable setbacks when it came to the direct encoding of law in devices and networks. In the case of the broadcast flag, the pushback emerged from consumer and technology advocacy groups in an alliance with librarians. But the overall countervailing figures of agency actually cast a much wider net. From self-conscious activism and critical academic commentary to the deployment of circumvention technologies supplied by software engineers, wiki contributors, free software

advocates, and hackers, the attempt to impose technical restrictions on open networks frequently met its match in the general practice of the unruly everyday. It would not be an exaggeration to say that collaborative P2P networking and sharing, demonstrably indifferent to its legality, had become a dominant sociocultural technique in the first decade of the twenty-first century. The actions of a critical mass of listeners seemed to indicate an interest in music's affective, sentimental and experiential values over and above its monetary ones. As if locked in a constitutive dialectic with the encroachment of DRM itself, the efficiencies in distribution systems, search functionality, P2P connectivity, and so on – the conditions for the possibility of DRM – produced its antithesis, the encroachment of a free zone of decentralised everyday cultural practice. In short, the very attempt technologically to lock down an open network produced a host of unanticipated social effects that paradoxically undermined it.

The decrease in computational costs, enhancements in digital signal processing and networked architectures arguably ushered in a period of cultural production sustained more by collaborative volunteerism than by commodity exchange, market signals, or managerial strategies. Some of this activity operated by way of a strategic incorporation of the law. Examples included the institution of free, or open-source, software, which deployed copyright and licensing law (the GNU General Public License) to undermine its deleterious effects and to foster collaboration, as well as open, peer-produced online reference tools, such as Wikipedia, whose content was likewise released under a GNU Free Documentation License. But the vast majority of P2P production and sharing was simply set adrift from the institutionalised economic structures that were conceived to guide it. While this widespread anthropological reality challenged the economic interests of various content industries, new commercial interests actually capitalised on it. Indeed, the decentralised and nonproprietary practice of sharing and downloading information objects became ubiquitous, practically defining the fundamental features of major corporate sites like YouTube, MySpace, Facebook and Google+. Music played a prominent part in this transformation. In the first decade of the twenty-first century, MySpace integrated their platform with major music labels, Facebook built a partnership with the Spotify streaming service, Google built an online music store linked to Google+, and YouTube became the largest platform for music uploads. The new models for music consumption were built on the success of music in the context of early forms of online networking in the 1990s. Of all the informal exchange that characterised the early days of the Internet, music was perhaps the most successful example of commercial culture that began to circulate outside its market imperatives.

It is instructive to compare the attempts to impose DRM by the music industry with those of the film industry. When DVDs came to the market, the mainstream motion picture studios introduced a content scrambling system (CSS) to restrict their play on licensed DVD players. Manufacturers of DVD players were forced to license the key to unlock CSS descrambling software in their players. The licence specifications included restrictions on the geographical regions in which DVDs could be played and disabled the skipping function for commercials, trailers and copyright messaging that appeared before the movie. While it restricted access, digital encryption like CSS did not actually prevent copying. Manufacturers of hardware were thus additionally compelled to exclude a 'record' function on their players. In short, the DMCA successfully ensured that CSS was implemented as a matter of law. In contrast, recall that the RIAA responded to the rise in amateur file-trading in the late 1990s by introducing the Secure Digital Music Initiative (SDMI). SDMI sought to embed rights management information in musical works via digital watermarks, which could be detected by playback devices to make it impossible to play copies of an illicit file that was once SDMI protected. To ensure that devices were SDMI-compliant, the music industry argued that playback hardware needed to be standardised to trigger the disabling upgrade. The consumer electronics industry had no direct financial interest in imposing proprietary security solutions on their portable digital devices. And yet, despite the inter-industry conflict, an agreement was in fact reached in 1999, which outlined rights management specifications for mobile devices.

Nonetheless, SDMI did not succeed the way CSS did. The failure can be attributed to the unexpected rise of the MP3 as a dominant format for music, as well as the increasing importance of internet-enabled computers doubling as playback devices. The computer and software industries were faced with a different set of business opportunities from those of both the content industries and the consumer electronics manufacturers, and they emphasised the importance of open networks, efficient formats for content delivery, and optimal functionality. The agency of the music-listening public was another important factor contributing to the failure of SDMI. As mentioned, even advertising campaigns by computer manufacturers indicated an allegiance to a new kind of musical culture, characterised by P2P sharing, downloading and collaboration. It is noteworthy in this regard that Apple's relatively low-level digital rights restrictions played an important role in the initial success of iTunes in the early 2000s. Recall that Apple's FairPlay DRM system was eventually abandoned in favour of increased functionality (enabling the conversion of files to MP3 formats, and so on). In sum, music escaped the restrictions of DRM for a variety of intersecting reasons: unstable business models for different industrial



sectors; widespread adoption of new digital technology that allowed the public to communicate with a vast audience; the repeated hacking of encryption technologies; and a netizen worldview that emphasised the importance of equal citizens, free information and resource sharing in an open network. For a brief moment in the contemporary history of musical listening, public interest arguably trumped a narrowly proprietary one. The triumph of this kind of public interest, however, was short-lived. By the end of the first decade of the twenty-first century, a moment marked by the onset of streaming media – where online *habitus* was characterised less by interaction between users and more by interaction between algorithms and adopters – the era of Web 2.0 itself reached a turning point. Music's labour relations had mutated into new relations of power: the political economy of musical streaming.

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### Notes

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