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The Disruptive Nature of Digitization: The Case of the Recorded Music Industry¹

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Abstract. This article draws on the theory of disruption to analyze the impact of digital technology on the recorded music industry and to explain the delay of dominant firms in reacting to this technological discontinuity. It shows that digitization matches the characteristics of disruptive innovation as described in the literature. It explains why established firms initially paid little heed to an innovation leading to a product (digital music files) that is cheaper and lower-quality than their existing product (CDs) and ill-suited to their mainstream consumers. The reaction of these firms has been typical of the behavior adopted by firms facing disruptive innovation. Confronted with an innovation that they see as more of a threat than an opportunity, incumbent firms have found it extremely difficult to accept the need for a radical rethinking of their business model.

Key-Words: Recorded Music Industry; Digitization; Disruption

1. Introduction

According to the Record Industry of America Association (RIAA), the market share of online music (downloaded via the Internet or mobile phones) as a percentage of total sales of recorded music rose in the US from 1.5% in 2004 to 50% in 2011. And yet, although online sales did not become significant until 2004, digital music itself has a much longer story. MP3 technology, or more precisely MPEG-1 Layer Three, was developed in 1992 by the German Fraunhofer laboratories and originally designed for transforming videos into small-size digital files. It very quickly became apparent that this

¹ The comments and suggestions from two anonymous referees are gratefully acknowledged.

technology could also be used to compress music.² Of course, this possibility of “dematerializing” music has led to the development of peer-to-peer networks and the free downloading of digital music files (with Napster in 1999). However, as early as 1993, the Internet Underground Music Archive (IUMA), a database of songs of unknown artists, was created. 1998 saw the launch of eMusic, a legal online music service with a subscription model but with a catalog limited to independent labels. The latter have indeed been much less reluctant than the dominant firms to sell music online (Easley et al., 2003; see Box 1 for a presentation of market structure and strategies in the music industry). Although the MP3 format was presented to the major record labels in the early 1990s (Coleman, 2005), it took more than 10 years for the majors to resolutely accept to enter the digital era by letting iTunes Music Store access their music catalogues (in 2003), and several more years for them to accept business models that really take into account the economic specificities of digital goods, such as models based on unlimited access with a flat rate (see section 3).

The aim of this paper is to explain why it has taken so much time for the dominant firms in the music industry to adapt to digitization. Of course, majors were afraid of encouraging piracy by putting digital files on line (Krasilovsky and Shemel, 2003). So although many labels were present on the Internet at the end of the 1990s, they preferred to offer low-quality samples online rather than MP3 files that might compete with their own CDs (Easley et al., 2003). On its own, however, this fear of piracy cannot explain the majors’ attitude. Like digital technology today, the audiocassette was initially also perceived as a source of piracy. Thus, at the beginning of the 1980s, the Recording Industry of America Association was quick to blame blank tapes for the decline in sales of vinyl records, launching a campaign with the slogan “home taping is killing music”. And yet an independent study conducted by the Copyright Royalty Tribunal showed that the consumers who copied onto cassettes were also the biggest buyers of records. Moreover, between 1980 and 1986, total sales of albums and pre-recorded cassettes increased in volume by 13% (Coleman, 2005). So the industry has already succeeded in accommodating discontinuities that were initially seen as disastrous for the leading firms (Huygens et al., 2002). In this paper, I argue that the dominant firms in the music industry have been slow to adapt to digitization because this innovation is disruptive. Therefore, incumbent firms in the late 1990s saw neither the need nor the interest to adopt this new technology. The article is organized as follows. Section 2 gives an overview of the literature on the theory of disruption. Section 3 shows that digital technology can indeed be considered a disruptive innovation in the recorded music industry, which explains the delay of response to digitization by the major record labels. Finally, section 4 provides a brief conclusion.

² Before the 1990s, the only delivery formats for internet music were WAV and MIDI files. These files provided high quality sound because they were not compressed, but for the same reason, with WAVs, it took hours to download a few minutes of music.

Box 1 - The recorded music industry: market structure and strategies

The recorded music industry is an oligopoly with a competitive fringe. Several companies, often referred to as the “majors” (Universal Music, Warner Music, EMI, Sony Music and BMG, the last two of which merged in 2004, while Universal Music announced the purchase of EMI in 2011), produce three-quarters of world turnover, while a cloud of independent labels (the “indies”) orbits round them (Table 1). This market structure is the result of important economies of scale at two key stages in the value chain: distribution and promotion. Supplying a large number of wholesalers and retailers with CDs requires a huge distribution network, the source of substantial fixed costs that only the majors can afford. Majors then control an essential link in the access to end consumers and can extract a rent from this activity by imposing their tariffs and conditions on the independent labels, the vast majority of which are now distributed by the majors (Passman, 2003; Krasilovsky and Shemel, 2003). The activity of promotion also generates economies of scale. Most marketing is carried out when an album is released. Further, the dynamics of success is cumulative. Growth in sales, intensification of radio and television broadcasts and word-of-mouth (WOM) amongst consumers are reciprocal causes and effects. High initial expenditure on marketing allows to reduce the variable costs of promotion considerably, with a proportional reduction in promotion costs per unit sold, thus creating obvious economies of scale in marketing. Furthermore, promotional opportunities are rare in comparison to the number of new releases that need to be promoted (Bourreau and Gensollen, 2006). The majors therefore seek to pre-empt these promotional channels, particularly two of the main ones that are radio and television. A survey conducted in Great Britain in 2008 by RadioCentre, for example, shows that 68% of music purchasers quote the radio as their main source of influence.

Table 1 – Market share of the dominant firms on the worldwide recorded music market (%)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Universal	21.7	22.9	23.5	25.4	23.5	25.5	25.6	25.7	28.8	28.6	27.7
Sony	17.1	14.6	14.7	13.8	13.2	21.5	19.0	21.2	20.1	21.2	23.1
BMG	10.0	8.7	8.1	9.6	11.9						
EMI	12.0	13.6	13.3	12.2	13.4	13.4	13.6	12.8	10.9	9.6	10.0
Warner	11.4	12.1	12.0	11.8	12.7	11.3	12.8	13.8	14.4	14.9	15.3
Total Majors	72.2	71.9	75.6	72.8	74.7	71.7	71.0	72.5	74.2	74.3	76.1
Indies	27.8	28.1	24.4	27.2	25.3	28.3	29.0	27.5	25.8	25.7	23.9
CR4	62.2	63.2	67.5	63.2	62.8	71.7	71.0	72.5	74.2	74.3	76.1

Source: Ifpi; Music & Copyright

The huge economies of scale achieved at the levels of distribution and promotion therefore constitute an undeniable entry barrier to the recorded music industry (Alexander, 1994a). Majors and independent labels thus adopt very contrasted strategies. The dominant economic model of the majors is the “star system”, in which spending on the search for new talent is sacrificed to promotion, and the aim is to concentrate demand on a few stars, to maximize economies of scale. Therefore, the majors focus their promotion expenses on the mass media. The distribution of roles between independent and major labels is therefore quite clearly defined (Burnett, 1996; Burke, 1997). The independent labels, with the reputation of treating their artists better, enjoy a competitive advantage in the search for new talent. They play the role of talent scouts. The majors, on the other hand, are considered more capable of managing the careers of stars, thanks to their control over distribution networks and the scale of their marketing resources. Thus, it is common for artists to follow a career path where they start with an independent label and then sign with one of the majors if they meet with commercial success.

2. The theory of disruption

A technological discontinuity is defined as an innovation producing a *critical* advance (a leap) in the price-performance frontier of an industry and a significant change in the form of products or

processes (Tushman and Anderson, 1986). The literature devoted to technological discontinuities has investigated the conditions under which such discontinuities could bring about changes in sector hierarchy (leadership turnover), bringing to light notably the crucial role of radical architectural innovations (Henderson and Clark, 1990)³ or competency-destroying innovations (Tushman and Anderson, 1986).⁴ However, Christensen and Rosenbloom (1995) and Christensen (1997), studying the industry of the hard disk drive, subject to numerous and frequent changes in sector hierarchy, observed that none of the traditional explanations appeared to be relevant. In the industry of the hard disk drive, incumbent firms have carried out both incremental and radical innovations, architectural innovations and competency-destroying innovations. This led to the distinction between *disruptive* innovations, likely to result in leadership turnover to the detriment of the established leaders, and *sustaining* innovations, which, on the contrary, simply strengthen existing firms, even when they are radical, architectural and competency-destroying.

The characterization of disruptive technologies

The value network is defined as the context within which the firm meets consumer demands (Christensen, 1997). In particular, it expresses the needs of the firm's main consumer group or groups. As a general rule, the more a firm grows and improves its competitiveness in a given value network, by better meeting the needs of the consumers concerned, the less able it becomes to meet needs in other segments of the market. This leads to an atrophy of its capacity and desire to develop new applications, and therefore new value networks. Likewise, if the existing firms become more and more efficient in gathering and processing information about the value networks in which they are active, they will encounter growing difficulties in doing the same with information about other value

³ For Henderson and Clark (1990), a technological discontinuity can generate a change in the hierarchy of a sector if it is of an architectural nature. That is to say if it leads to a reconfiguration of the relations between the components of a product without actually modifying those components. Such an innovation may then lead to cognitive biases for established firms, because their existing organizational routines do not allow them to identify the technological change taking place. Christensen and Rosenbloom (1995) cite the case of RCA and Ampex, which, at the end of the 1970s, had access to all the competencies needed to become leaders in the tape recorder industry, but which were prevented by deep-rooted beliefs and unsuitable organizational structures.

⁴ Tushman and Anderson (1986) draw a distinction between technological changes that strengthen the core competencies of established firms (competency-enhancing) and those that make them obsolete (competency-destroying). The competencies possessed by the manufacturers of mechanical calculators, for example, (creating precision arithmetical machinery made of cogs, gears, levers, and springs) proved to be of no use whatsoever for producing calculators with electronic components. Such major changes in the know-how required, in specific competencies and in production processes generally generate a profound upheaval in the distribution of control and power to the detriment of established firms, which, prisoners of their tradition, sunk costs and internal political constraints, remain faithful to an outmoded technology. Thus, while competency-enhancing technological discontinuities are initiated by established firms, it is the new entrants – not constrained by their existing competencies or history – that initiate competency-destroying technological discontinuities.

networks. The key question for an established firm is then to determine whether the new innovation can be exploited within its current value networks, or if other value networks need to be targeted, or even created, to exploit the full potential of this innovation. Christensen (1997) argues that incumbent firms are capable of being leaders in all sorts of radical innovations from the moment that those innovations meet needs expressed within their value networks, when their importance and applications are obvious. Conversely, incumbent firms are likely to lag behind in the development of technologies, even when they appear intrinsically simple, that meet the needs of consumers in newly-emerging value networks.

On the basis of works pioneered by Clayton Christensen (Christensen and Rosenbloom, 1995; Christensen, 1997, 2006; Christensen et al., 2001; Christensen and Raynor, 2003) and the critical responses they have provoked – see notably Danneels (2004), Henderson (2006), Govindarajan and Kopalle (2006), Tellis (2006) or Schmidt and Druehl (2008) – a disruptive innovation can be defined as follows:

(1) The product resulting from the innovation underperforms compared to the existing product, as far as the attributes appreciated by mainstream consumers are concerned. Conversely, innovations targeting the segment of high-end consumers, i.e., those who are the most willing to pay, are sustaining, because their impact on the continuity of the current business model of established firms is obvious (Schmidt and Druehl, 2008). Christensen and Raynor (2003) draw a distinction between new market disruption and low-end disruption. The former corresponds to innovations that introduce a new dimension of performance and so create a new market for new consumers. The latter corresponds to innovations that enable firms to supply a less expensive solution – often in a trade-off for reduced performance – targeting customers who do not value the extra features/high performance of the existing product or simply cannot afford it.

(2) The product resulting from the innovation is usually simpler, cheaper to produce and sold at a lower price than the existing products, but the new possibilities or characteristics that it offers are not appreciated by mainstream consumers unless it attains a minimum performance level in terms of historical attributes. This is true to such an extent that when the innovation is introduced, the most profitable consumers of the incumbent firms generally do not want to and very often are unable to use the products resulting from the disruptive technology.

(3) These products are therefore usually introduced into niche markets, where the new technology can mature and improve in a protected competitive environment. This sort of niche may be either an emerging market or a segment of a mainstream market composed of “over-served” consumers receptive to a low-cost offer.

(4) From points (1), (2) and (3), incumbent firms draw the conclusion that investing in the disruptive technology is not a financially rational decision. Even if the disruptive technology can offer a better unit margin, the small size of the market reduces profit prospects.

(5) Over time, the performance of the product of disruptive innovation improves sufficiently, in terms of the attributes valued by mainstream consumers, for these latter to start taking it up. “Disruptive innovations do not necessarily improve to surpass the performance of the prior technology. They generally do not, and need not [...]. The trajectories of technological progress are parallel. They do not intersect. The salient question is whether the disruptive technology will improve to the point that it becomes good enough to be used in a given tier of the market” (Christensen, 2006). For Henderson (2006), it is not necessarily the performance of the disruptive technology that improves but consumer preferences that evolve. Many disruptive innovations tend to redefine the pattern of preferences in a market.

A technological problem or a problem in perceiving and understanding demand?

Christensen’s approach to the modification of sector hierarchy differs from previous ones in its focus on the demand side rather than on supply side and technology. Thus, radicality is a technological dimension of innovations, whereas disruptiveness is a market-based dimension (Govindarajan and Kopalle, 2006). Likewise, for Adner (2002) and Adner and Zemsky (2005), the structure of demand – combined with technological progress – certainly explains a large part of the phenomenon of disruption. On this point, it is interesting to note that whereas Christensen and Rosenbloom (1995) or Christensen (1997) used the term disruptive technology, more recent works (Christensen and Raynor 2003; Christensen, 2006) prefer the term disruptive innovation. Indeed, the technology in itself is not necessarily disruptive. Many established firms, when faced with disruptive technology, have proved capable of developing prototypes that exploit it, showing that they possess the necessary R&D skills. Where they have failed is in trying to sell the disruptive technology to their regular consumers and in not building up relations with other consumers, hitherto unserved but who appreciate the attributes of this new technology (Danneels, 2002). It is therefore not the technology in itself that causes difficulties for the established firm, but the fact that a disruptive innovation renders obsolete the business model on which the firm has based its development. This explains why an innovation can be disruptive for certain firms but sustaining for others.

This thesis that disruption results from incumbent firms concentrating too narrowly on the needs of their existing consumers can be extended to firms focusing on the needs of their value network in a broader sense, that is to say when the value network is defined, following Clayton Christensen, as the upstream suppliers, downstream channels to market, and ancillary providers that

support a common business model within an industry. The inability of dominant firms to implement disruptive innovation can then be related to the fact that it would render obsolete the resources and skills not only of its consumers, but also of its suppliers, distributors and “complementors” (Afuah, 2000; Rosenbloom and Christensen, 1994). Moreover, in the face of disruptive innovation, vertical integration constitutes a strategic handicap. When the disruptive nature of an innovation stems from the modification of a product’s value chain, firms that are vertically integrated in the new technology succeed better than those that are not. Conversely, firms that are vertically integrated in the old technology succeed worse than those that are not (Afuah, 2001).

Thus, the explanations of leadership turnover in terms of the theory of disruption go beyond a lack of strategic vision among managers (Tellis, 2006) or the cognitive, political or organizational obstacles they face (Henderson, 2006). The management of a disruptive innovation is complex, because its value and potential applications are highly uncertain in terms of the usual criteria applied by the established firm. It is tricky for an incumbent firm to dedicate resources to innovations that do not meet the needs of today’s main consumers. Established firms are the victims of rational inertia (Robertson and Langlois, 1994).

3. The disruptive nature of digital technology in the recorded music industry

From its birth, at the end of the 19th century, the recorded music industry experienced many technological innovations that impacted the way recorded music is distributed (and consumed) as well as, though more rarely, the way it is promoted (Table 2). In the 1920s, the emergence of music broadcasting on the radio made the majors fear a substitution effect at the expense of 78 rpm sales. However, music broadcasting on the radio quickly appeared to be a very efficient promotion tool for recorded music. The major Decca allegedly “invented” the “star system” in 1929 by massively broadcasting a few artists from its roster on the radio (Huygens et al., 2002). Later, the vinyl disc, the audiocassette and finally the CD, as well as the Walkman that introduced the portability of music, were all innovations that impacted the way music was packaged but not the way it was distributed and promoted. Therefore, the competitive advantage of the majors (see Box 1) was never challenged. However, during the 1950s, the rise of new music genres (especially rock’n’roll and R&B), coupled with the possibility for small independent record companies to create their own studios and recordings at an affordable cost (thanks to tape recording and the development of the two-track system), challenged the position of dominant firms. The majors of the time (Columbia, Decca, RCA Victor and Capitol) were slow to catch on to the emerging market of rock’n’roll, which required them to reorganize and adapt their strategy, and this led to a collapse in their US market share from 75% in 1955 to 25% in 1962 (Alexander, 1994b). In the 1960s, however, the majors realized that the music

styles of R&B and rock'n'roll were not just passing fads. They recognized the importance of discovering and developing new talent, which led to the creation of specialized departments. They also invested heavily to intensify their relationships with radio and the newly emerging TV (Peterson and Berger, 1975; Huygens et al., 2002). All these innovations, whether incremental (change in the music support) or radical (radio, new music genres), share a common feature: they impacted the mainstream market – the present value network – and thus were quickly taken into account by dominant firms, although with a delay as far as the rise of rock'n'roll and R&B were concerned.

The technological revolution experienced by the recorded music industry since the 1990s with the emergence of ICT and the Internet is specific. It simultaneously affects both of the competitive advantages of the majors: distribution and promotion (Bourreau and Labarthe-Piol, 2004). As regards distribution, digital revolution is characterized by major improvements in compression, broadband Internet access and storage capacity. As far as promotion is concerned, ICT and the Internet allow the rise of consumer-to-consumer promotion, with automated recommender systems and online WOM (Chevalier and Mayzlin, 2006). Fleder et al. (2010) quote statistics according to which 35% of sales at Amazon originate from recommendations. The value that the recommenders offer, in contrast to mass media, is personalization. Social networks also became powerful promotional tools in the music industry, with the potential to challenge mass media promotion and especially radio broadcasting.

Table 2 – The main technological innovations in the recorded music industry

Year	Innovation	Impact on distribution	Impact on promotion
1877 – 1887	Phonograph (cylinder), gramophone	Birth of the recorded music market with the introduction of the 78 rpm in 1906	
1920	Radio	None	“Star system” created by Decca in 1929 (massive use of radio broadcasting to promote records sales)
1948	Vinyl disc (33 ^{1/3} rpm, 45 rpm)	None, only a change in the support	None, radio broadcasting still the dominant model of promotion. However singles (45 rpm) sales promote albums sales
1962	Audiocassette	None, only a change in the support	None
1979	Walkman	None, only introduction of listening in mobility	None
1982	CD	None, only a change in the support	None
1990s	Internet & ICT	Change in the support (digital files) and in business models (streaming, subscription)	Recommender systems, online word-of-mouth, social networks

Source: Coleman (2005), Huygens et al. (2002)

Digital technology therefore constitutes a radical innovation for the recorded music industry and is indeed competency-destroying, in the sense of Tushman and Anderson (1986), because control of distribution and promotion was one of the key elements in the majors' strategy, enabling them to erect powerful entry barriers to the market (see Box 1). Nevertheless, as Christensen (1997) pointed out, this is not sufficient to make the innovation of digital technology a source of leadership turnover. The majors knew about this technology very early on in its development. Moreover, the transition to digital distribution did not present any technological difficulty. In December 1999, for example, Sony was already offering a service for downloading music, limited to a part of its own catalogue. Likewise, the major companies were quick to use the new tools of online promotion, for example to test the success of new artists or songs before launching a massive promotion in the traditional media. Thus, in the music industry, and in keeping with the theory of disruption, the problem that digital technology posed for established firms was not of a technological nature – the competence-destroying aspect could be overcome – but rather, as we shall see, related to a profound challenge to the industry's business model.

Digitization in the recorded music industry fulfills the five conditions of a disruptive innovation

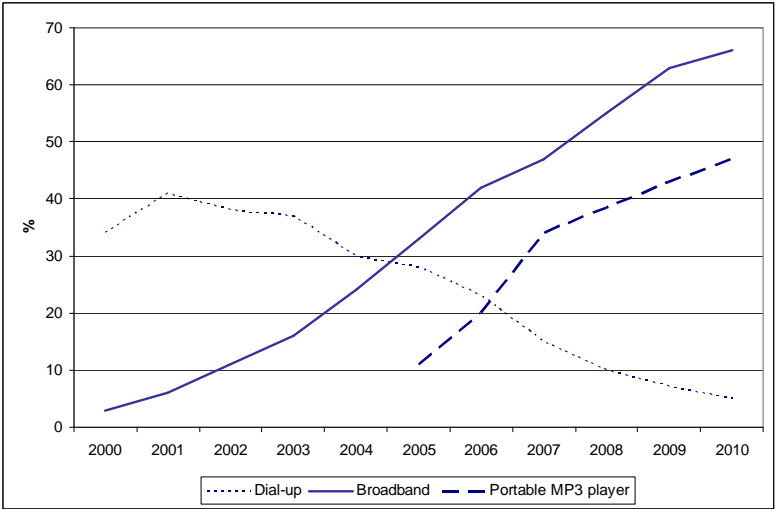
Let us return to the five criteria of disruptive innovation defined in the previous section.

(1) Firstly, from the established firms' point of view, digital technology underperforms compared to the traditional CD for the mainstream market comprising middle-age consumers rather than students (see below). The absence of sleeves, booklets, lyrics, and photos and the inferior quality of MP3 files make the digital product undeniably of a lower quality than the CD. Especially since, historically, every support change from 78 rpm through vinyl to the CD has been synonymous with improving the quality of sound. *"The quest for sonic perfection – high fidelity – is a definite non-starter in the internet age [...]. Perhaps the search for the Holy Grail of high fidelity ended with the CD."* (Coleman, 2005, p. xvi).

(2) Secondly, digital files are much easier and cheaper to produce than CDs. By eliminating CD manufacturing and distribution costs, the cost is reduced by about 35% (Curien and Moreau, 2006). Digital files are also offered for sale to the consumer at a much lower price. In 2010, according to the RIAA, the average retail price of a digital album was \$9.97, whereas the average price of a physical album (CD) was \$14.89. Initially, however, digital technology was considered a low-end innovation, unsuitable for the mainstream market. In the late 1990s, with a dial-up connection and a 56kb/s modem, it took fifteen minutes to download a single song in the MP3 format, which was evidently low performance, unlikely to attract music consumers. However, from the early 2000s, the download took an average of two minutes for someone equipped with a broadband connection (cable or DSL);

it could even be less than one minute in the case of a powerful broadband connection like those supplied to universities and businesses. Moreover, since the advent of the Walkman in 1979, mobile music consumption has become the dominant mode.⁵ *“Headphones became ubiquitous on urban streets. [...] Almost, overnight, portability turned into a crucial issue for audio consumers. People now expected freedom of movement while playing back prerecorded music [...]”* (Coleman, 2005, p. 158). The first portable MP3 Player, the RIO PMP 300, was launched on the market in 1998. However, it can only store 60 minutes of music, because of a flash memory limited to 32Mo. This was clearly not *“the freedom of movement”* while listening music that consumers expected. Because of weaknesses in both download speed and portability, digital files were considered to be of interest only to a small segment of the market: technophiles already equipped with broadband and MP3 players, notably students downloading on P2P networks from their university. Indeed, in 2001, less than 10% of American households had broadband internet access (Figure 1). Furthermore, Apple launched the iPod – which could hold about 1000 songs – in late 2001, but by 2005 the penetration of the portable MP3 player was still lower than 10% (Figure 1). As these two technologies were not widespread, there were no real opportunities for online music to reach the mainstream market.

Figure 1 – Broadband, Dial-up and portable MP3 Player adoption in the US (2000-2010)



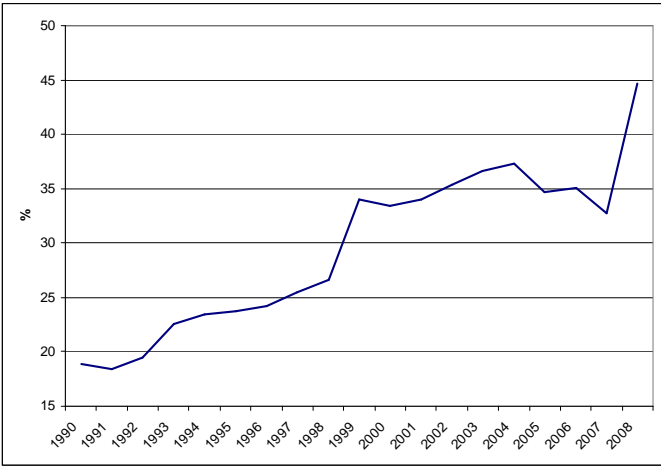
Source: Pew Internet & American Life Project surveys

Two additional reasons could make the recording music industry believe that the consumers involved (students) were not really mainstream consumers. Firstly, as purchases of recorded music are positively correlated with income (Liebowitz, 2004), the potential public for digital music was

⁵ Portable music player penetration has had a great influence on the growth of music sales in the 80s and the 90s. For instance, the growth of CD sales in the 90s, which was multiplied by 3.8 between 1990 and 2000 according to the RIAA, is clearly correlated to the growth of portable CD player penetration, which leapt from less than 10% to 63% over the same period of time (Liebowitz, 2004).

constituted rather of low-end consumers of the CD market. Secondly, the 1990s witnessed a trend of an aging population of consumers of recorded music. Between 1990 and 1999, before the development of P2P file-sharing, the share of purchases of recorded music made by consumers aged over 40 increased from 19% to 34% (Figure 2). Thus, for the majors, digital files were simply an instrument of piracy through P2P networks, and not the support for a real market of online sales. Besides, when MP3 - and with it file-sharing through P2P networks - became widespread at the end of the 1990s, CD sales were still growing. In the US, CD album sales started to fall only in 2001.

Figure 2 – Share of recorded music purchases made by US consumers aged 40 and over



Source: RIAA

(3) The development of online music has been favored by the existence of niche markets. One notable example is that of new artists putting their music online for free as a sort of “loss leader” to increase their reputation and possibly get signed up or to intensify their live activity (this was, on its creation in 1998, the objective of the web site MP3.com). From its launch in 2003, the social network MySpace has been recognized as an important tool for musicians to present their songs to their fans and promote events. In May 2009, more than 5 million rock, pop, hip-hop and punk musicians or bands were registered on MySpace (Ifpi, 2010).⁶ Another niche market is composed of consumers who are “over-served” by the mainstream market. From 2003, the strong growth in online sales of singles on iTunes Music Store revealed the existence of consumer needs that were not satisfied by the majors’ strategy of favoring album sales. According to Coleman (2005, p. 175), “CDs have stretched the album concept out of shape. In short, CDs hold too many songs. [...] Simply put, seventy-four minutes and forty-two seconds are far better suited to a symphony than a

⁶ However, spam proliferation and user interface issues have made MySpace less popular as the popularity of Facebook explodes. See, for instance: “Music Promotion with Facebook: A Guide for Artists”, <http://devblog.lp33.tv/2009/11/music-promotion-with-facebook-a-guide-for-artists/>

collection of popular songs." As shown by figures provided by the RIAA, singles represent less than 0.1% of the total number of songs sold in the CD format, whereas, although it has decreased since 2004, the figure is around 60% for online sales. Besides the fact that consumers now have the choice of buying only the songs they really appreciate, it is also true that online, singles costs ten times less than albums, whereas the ratio is only one to six for physical CDs.⁷

(4) So at the end of the 1990s, the recorded music industry, and particularly the majors, concluded that it was not financially rational to invest wholeheartedly in online music. Even if the unit margin can be higher for the sale of one song in the form of a digital file than in CD form, the idea of only selling a few songs at a retail price of \$0.99 rather than a whole album at about \$15 was clearly not financially attractive. For a physical album at a retail price of €15, the wholesale price, net of VAT and retail margin, is €8.80 (assuming an average retail margin of 30%). Thus a margin net of VAT, retail margin and author's copyright of 53% is to be compared with the 70% margin obtained with iTunes. Since manufacturing costs disappear and distribution costs are now borne by the online seller, the profitability of an album is higher in the digital channel than in the physical one. However, as noted above, record companies usually do not sell a whole album online but only a few songs. To be as profitable as a physical album sale, more than seven songs from the album would have to be sold online.

(5) However, the fast growth in broadband internet access and portable MP3 players has transformed online music from a niche market to a market of interest to mainstream consumers. In the U.S., broadband adoption started timidly in 2000, and it was not until 2005 that the number of households equipped with high-speed internet overtook the number fitted with a simple dial-up connection (Figure 1). And yet, at that time, only a third of U.S. adults had access to a broadband connection. In 2010, this figure reached 66%. Likewise, the market for portable MP3 players (such as iPod and mobile phones) experienced strong growth, but which only really began in 2005 (Figure 1). In 2010, the penetration rate of portable MP3 players reached 47%. In parallel, the market share of online music (via internet or mobile phones) as a percentage of total sales of recorded music rose in the US from 1.5% in 2004 to 47% in 2010.

A radical challenge to the present value network and the traditional business model

As pointed out above, the disruptive character of an innovation derives from the challenge it represents to the present value network of the firm and thus to the standard business model. In the

⁷ The calculations are based on data provided by the RIAA for physical CDs (bearing in mind that a single contains two songs) and on the base price of iTunes Music Store for online music (\$0.99 per song compared with \$9.99, usually, for an album).

past, the majors survived the appearance of the pre-recorded cassette and then the CD without harm, because these were sustaining innovations. There was no challenge to the business model: the value generated by the content was still captured through a physical support (cassette, CD) sold at a price far higher than its marginal cost, the distribution network remained unchanged, and promotion through the media remained essential. But digitization called for a profound rethinking of the business model of the recorded music industry, because a new value network is emerging.

Digital content possesses the two characteristics of a pure collective good (Samuelson, 1954): non-rivalry and non-excludability. The possibility of reproducing a digital file at almost zero cost does away with the property of rivalry possessed by the physical support. As for excludability, although it can still theoretically be achieved *ex post* by the strict application of intellectual property rights and/or *ex ante* by technological systems of protection (digital rights management – DRM), in practice the sheer scale of traffic on peer-to-peer networks shows that digital content possesses the property of non-excludability. Besides the direct protection of digital content by means of DRM and legal tools, the efficacy of which appears to be relative at the very best (Bhattacharjee et al., 2006; Maffioletti and Ramello, 2004; Liebowitz and Watt, 2006), other strategies have to be envisaged to valorize content in a digital environment, strategies that exploit a *shift* in value from content to the consumption of related goods (Varian, 2005; Liebowitz and Watt, 2006; Bourreau et al., 2012). A subscription model with flat rate and unlimited access, or at least very low cost per song, proves to be the model that maximizes the collective surplus (ensuring that the marginal selling price is equal to the marginal cost, i.e., zero). Furthermore, this mode of selling is akin to bundling, which turns out to be the most appropriate model for selling information goods in general (Bakos and Brynjolfsson, 1999) and online music in particular (Zhu and MacQuarrie, 2003). Not only does bundling enable firms to increase their profits, by smoothing the willingness-to-pay of consumers with heterogeneous preferences and so capturing more of their surplus, but it can also help to reduce the number of individuals excluded from consumption, compared to separate sales, and so augment collective welfare. It should be recalled that music downloading thrives on the Internet not only because it is free, but also because it offers unlimited scope and endless selection (Coleman, 2005). Yet the majors – unlike the independent labels – have been more than reluctant to deal with firms whose business model is based on a rationale of unlimited access or bundling, such as MP3.com or eMusic, which proposed this kind of service as early as 1998.⁸ It was not until 2008 that the majors began to favor – by agreeing to open up their catalogues of rights – the development of a “new subscription model based on the concept of ‘bundling’ music with other services or devices – be it an ISP

⁸ eMusic, launched in 1998, has become the biggest seller of online music for the independent labels, and the second biggest for all record labels taken together (behind iTunes). It operates on the principle of a monthly subscription of up to \$20.99 for 75 songs. The majors have never agreed to make their content available on eMusic.

subscription, a mobile phone or a portable player. While the music comes virtually 'free' to consumers under this model, record companies and artists get paid out of the sale of services or devices" (IFPI, 2008).⁹ The business model of streaming music services should indeed be more favorable to independent labels. When music is unbundled and paid for at a flat rate or through advertising, the cost of discovering music that has not had any airplay disappears. Deezer, created in 2007 in France (20 million users and 1.4 million paying subscribers in Europe in late 2011), and Spotify, launched in 2006 in Sweden (a total active user base of ten million with about 3 million paying subscribers in 2011), both offer a free version supported by advertising and a premium version at €9.99/month for unlimited downloads and transfer of playlists to portable MP3 players or mobile phones. In France in 2011, streaming revenues already accounted for 35% of digital sales (source: SNEP) while in Sweden, boosted by Spotify, streaming by subscription accounted for more than 80% of digital sales over the same period.

Furthermore, the digital revolution in the record industry called into question the value network of the music industry defined in its broader sense (i.e all the upstream, downstream and ancillary firms that support a common business model). According to the OECD (2005): "*The dominance by the music majors of the physical distribution system and the promotional value chain has significantly delayed a move to digital distribution*". The majors clearly feared an organizational shake-up that would result in the under-use of their distribution network and harm their traditional retailers (Krasilovsky and Shemel, 2003). This leads us back to Afuah's (2001) argument that vertically integrated firms have greater difficulty in adapting to an innovation that radically transforms the value chain. Even for those who considered digital distribution to be the future of the record industry, the objective was clearly to minimize the upheaval. So even if the majors knew that "*at some time in the future, recorded music will be widely available online [...] [their] challenge, in terms of developing rights for producers, is how to get from here to there, with an industry intact*".¹⁰

The development of decentralized promotion, notably by electronic word-of-mouth, in place of promotion by the classic media (radio and television), also represents a possible threat to the leadership of the majors. According to the Long Tail theory (Anderson 2006), the fall in production and storage costs leads to an increase in the number of different items supplied to consumers, thus extending the tail of the very asymmetrical distribution of sales by item. And then the greater possibilities offered by decentralized promotion and online distribution for discovering and accessing

⁹ This reluctance of the majors should be compared with their swiftness in signing with Apple, in 2003, to make their music available on iTunes Music Store (which incidentally, unlike the above sites, did not initially include the catalogues of the independent labels). The pricing on iTunes Music Store – \$0.99 per song or \$9.99 per album – was no different from the traditional business model of the recorded music industry, where value is captured on a support that is rival (initially, the possibilities of copying or transferring the files bought were restricted).

¹⁰ In IFPI in 1995, *For the Record*, p. 1, quoted by Burnett (1996) and underlined by us.

niche products make the tail fatter, to the detriment of star products.¹¹ This then disrupts the traditional complementarity between innovative SMEs and big companies capable of transforming small emerging markets into large markets of mass consumption, a complementarity observed both in recorded music and in many other industries (Markides and Geroski, 2005). With the undermining of centralized promotion and the disappearance of physical distribution, which are both sources of high entry barriers to the industry, the small firms no longer need the big ones. Thus, the Long Tail model seems to be made-to-measure for the independent labels and their talent-spotting skills rather than the majors, who have based their domination on centralized promotion and control of physical distribution networks.

Hence, digitization does indeed challenge the way music is sold, distributed and promoted – that is to say the core of the competitive advantage of the major companies in the industry – and requires a change in the dominant firms’ value network. The unwillingness of the majors to “ride the wave” of the disruptive innovation is thus consistent with the theoretical analyses. Oddly enough, figures about the worldwide music market show that the collective market share of the majors has rather increased since the beginning of the digital revolution (see Table 1). However, this paradox disappears when one considers solely the online market. For instance, according to Nielsen statistics, for both 2009 and 2010, the US album market share for independent labels is 57% greater for digital as compared with physical sales.¹² Moreover, besides a possible fall in market share, an important issue of the digital revolution for the majors is the lost of control of music distribution, which was an important source of profit on the physical market (see Box 1). The majors used to charge small independent labels up to 40% of the wholesale price for the distribution of a CD. It is now online retailers, such as Apple, that could extract this rent from independent labels.

4. Conclusion

In online music, the majors could have been the pioneers, and above all the leaders. The online distribution of music has all the attributes of a winner-take-all activity, as demonstrated by the hegemonic market share held by Apple in the United States in this market. They could have held onto their leadership in physical distribution at the same time. In this way, they could have made the technological leap and used the financial resources provided by their dominant position in the old technology to overcome their handicap in competencies, as suggested by Malerba et al. (1999). But

¹¹ However, it should be emphasized that Internet might also reinforce the popularity of products that are already bestsellers and thus increase concentration and lead to a superstar effect (Rosen, 1981). Brynjolfsson et al. (2010) discuss the conditions of existence of both long tail and superstar effects and Elberse and Oberholzer-Gee (2008) empirically show that both effects might coexist in cultural markets.

¹² Source: The Nielsen Company & Billboard’s 2010 Music Industry Report.

their inertia left the field open for other actors to take control of distribution (Apple and the mobile telephone operators, essentially).

According to Huygens et al. (2002), the majors have always proved capable of adapting “by shaking off old habits and routines, and renewing their search for novel capabilities through radical processes of organizational change, eventually resulting in new organization forms and business models”. Nevertheless, the main crises of the past show that this organizational change has often required a modification in the control of the majors. For instance, the decline in record sales in the 1920s, allegedly due to the boom in the broadcasting of free music on the radio, led to the disappearance of many small firms and the takeover of the historic players by radio corporations (Victor by RCA and Columbia by CBS). Later, in the 1950s, the emerging market of rock’n’roll required the majors to reorganize and adapt their strategy. However, although this reorganization was successful for Columbia and Capitol, it was a failure for both RCA, which fell from first to tenth place among US record labels, and Decca, despite having been one of the pioneers of the star system. Only the purchase of these two companies, by Bertelsmann and Matsushita respectively, enabled them to re-establish their competitive position (Huygens et al., 2002). So, as in the past episodes of turbulence in the record industry, the question today is whether the established firms can re-organize on their own, or will they need the exogenous shock of a takeover?

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