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Strategies for Digital Music Markets: Pricing and the Effectiveness of Measures Against Pirate Copies - Results of an Empirical Study

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STRATEGIES FOR DIGITAL MUSIC MARKETS: PRICING AND THE EFFECTIVENESS OF MEASURES AGAINST PIRATE COPIES – RESULTS OF AN EMPIRICAL STUDY

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Abstract

The recording industry is still facing a global decline in revenues and record sales. Paid music services have failed to deliver on their promise of a full-catalog shopping experience so far, and file-sharing platforms are still widely used for obtaining online music. In this context we conducted an empirical study via the Internet with 2.260 participants. The main results are:

Neither the installation of copy protection measures nor legal actions against users of file-sharing platforms seem to be appropriate means to increase sales of CDs and online music.

Potential consumers' willingness to pay is distinctly lower than the prices currently set by the available paid music services.

Our study's results suggest that a price cut for music downloads would lead to increased sales, thus creating benefits for both suppliers and consumers.

Keywords: File-sharing platforms, paid music services, online music, copy protection, willingness to pay, empirical study.

1 INTRODUCTION

Since the year 2000, the music industry has suffered from a global loss of 20% in sales in nearly all major markets. Even though this decrease has turned out to be lower in 2004, the crisis is still not overcome. Representatives of the music industry often name the combined effect of digital and physical piracy as one of the main reasons for the loss. According to a study of the International Federation of the Phonographic Industry (IFPI), the global pirate market for recorded music totaled 1.7 billion units in 2003, while disc piracy increased by 45 million units compared to 2002 - a rise of 4% (IFPI 2004a, p. 2).

The critical situation of the music industry is particularly shown by the recent massive reduction in jobs. In 2004, Warner Music Group dismissed one fifth of its global staff and consolidated the business divisions of its Elektra and Atlantic Group labels. EMI UK laid off 20% of its employees and as a response to shrinking sales, the artist roster has been trimmed down by the same percentage.

However, evidence suggests that the music market faces a slow process of recovery. The DVD as a medium for both music and video shows a remarkable growth. Moreover, the business model of legal digital music downloads has gained in importance. In the U.S., music downloads outsold physical singles by three to one in the second half of 2003 (IFPI 2004b, p. 3). A growing number of both major and independent-labels license their catalogs to various online-services for music downloads. A rapidly expanding online music market can also be observed in Europe, where services like iTunes or MSN Music have entered the market. Apart from this, many enterprises use online music as a marketing tool, such as Coca-Cola, which gave away 100,000 downloads for advertising purposes.

With regard to the assessment of the digital music revolution on the Internet, no consistent opinion exists among the artists. David Bowie provided several albums for free downloading, while in 1999, Peter Gabriel founded OD2 (On Demand Distribution), one of the first service providers for digital music. In contrast to this, Klaus Meine, front man of the German rock band "The Scorpions", complains about the serious financial damage due to copyright violations, and the Irish musician Andrea Corr feels deprived of the result of her creative work.

The music industry has reacted with delay to the digital challenge and is now applying a twofold strategy. On the one hand, users should be kept from file-sharing by restrictive measures like legal complaints or technological protection of copyrighted music. On the other hand, the music industry has developed numerous legal alternatives of its own and licenses digital music to intermediaries, such as Apple or Real Networks. The IFPI (2004a, p. 8) interprets the slight recovery of the music market in the first half of 2004 as a confirmation of this strategy.

There are a number of publications dealing with online music and file-sharing. Peitz and Waelbroeck (2004) examine how the music industry could use peer-to-peer (P2P) networks as information channels for their commercial purposes. Kwok, Lang and Tam (2002) show the chances and risks of a business model based on P2P technology in a three layer model. They conclude that P2P is only suitable for the sale of information goods if the adherence to copyrights can be monitored by the suppliers. Naghavi and Schulze (2001) compare the consequences of bootlegging and piracy, concluding that bootlegging did neither harm the music industry nor the artists at the time of their study. Bootlegging only represents an addition to the product range for a restricted user group.

In this article we examine to what extent legal actions against users and operators of file-sharing platforms as well as the implementation of copy protection technologies are promising strategies to overcome the current crisis. Moreover, alternative pricing strategies for music download platforms will be analyzed. The article is based on an empirical study which was conducted among 2,260 Internet users between December 2003 and January 2004.

In the second section, we will introduce the basic data of our empirical study. The effectiveness of the restrictive measures taken by the music industry will be discussed in the third section. The fourth

section deals with both the willingness to pay for digital music and pricing strategies. The article closes with a summary of the main results and some future prospects.

2 OVERVIEW OF THE EMPIRICAL STUDY

Our explorative survey was conducted over the Internet from December 8th, 2003 until January 19th, 2004. Next to questions about the purchase of physical sound storage media and online music, the main emphases of the evaluation were the download behavior of the participants, the assessment of restrictive measures, as well as differentiated willingness to pay for digital music. The complete processing of the questionnaire took about 15 minutes.

In total, we received 2,260 usable questionnaires. The age distribution within the sample is given in table 1.

15 years and below	16 to 19 years	20 to 24 years	25 to 29 years	30 to 39 years	40 to 49 years	50 years and older
1.7%	14.7%	26.6%	18.7%	23.1%	11.9%	3.2%

Table 1. Age distribution within the sample

86.4% of the participants were male and 13.6% female.

In the interpretation of the results, it should be noted that studies which are conducted exclusively over the Internet are not representative for the total population, since only those who are connected to the Internet can participate. This even more applies to passive recruitments.

For that reason and since the survey was conducted in German, we have no evidence that the sample is representative for the international music community. Nevertheless, we hope that the results can provide some insights for the evaluation of particular strategies in the digital music market. In our survey, we targeted those people who are both familiar with the Internet and show a strong affinity to music. However, we assume that within this group, attitudes towards issues like restrictive measures of the music industry or willingness to pay are likely to be similar. Therefore, the problem that our data reflect predominantly the opinions of German Internet users is put into perspective.

To reach as many participants of the target group as possible, the survey was announced in both online and offline media. Various web pages published editorial contributions, such as the computer magazine CHIP, the music magazine Rolling Stone, and the industry-specific specialist journal Musikwoche. Furthermore the survey was announced in the print version of the Musikwoche, the German newspaper Freie Presse as well as the teletext of the music TV channels Viva and Viva Plus. The server log files show that most of the participants were recruited through these channels.

Survey period	December 8th, 2003 – January 19th, 2004
Survey language	German
Number of participants	2260
Gender ratio	86.4% male, 13.6% female

Table 2. Overview of the study

3 RESTRICTIVE MEASURES BY THE MUSIC INDUSTRY

The music industry is not only facing the challenge posed by file-sharing networks by creating commercial download-platforms as a legal alternative, but also by implementing restrictive measures. Many CDs are equipped with copy protection mechanisms to aggravate the production of unauthorized copies. Furthermore, recording associations around the world are suing operators and users of file-sharing platforms alike. Thus, according to Varian (2004) the cost of illegal copies are increased so far that they become more and more unattractive to the consumer. In the following section we will examine to which extent these measures are promising.

3.1 Copy protection as a measure to increase sales of physical sound storage media

According to the music industry, in addition to file-sharing platforms the illegal copying of sound storage media is one of the main reasons for the decrease in sales (IFPI 2004a, p. 15). Therefore, the industry's efforts are intensive to develop measures against the unauthorized reproduction of copyrighted music and to enforce property rights. This in particular includes the utilization of copy protection mechanisms. However, consumers' acceptance of restrictions in the usability of CDs is rather low and subject to discussions between industry representatives and consumers. For instance, consumers often want to play the purchased recordings on other audio devices, like a computer's CD-ROM. If at all, this is mostly only possible after installing some additional software provided along with the CD, meaning an extra effort. But even with conventional audio devices there are often problems regarding playback. This, obviously, is one of the reasons why copy-protected CDs are rated inferior compared to those without such restrictive measures (Sundararajan 2004).

Shapiro and Varian (1998) show by means of plain demand functions that the application of liberal conditions (e. g. the abdication of a copy protection mechanism) increases a product's value for the customers, but reduces sales in turn. However, in our opinion it is by no means ensured though that the reverse case leads to an increase in sales.

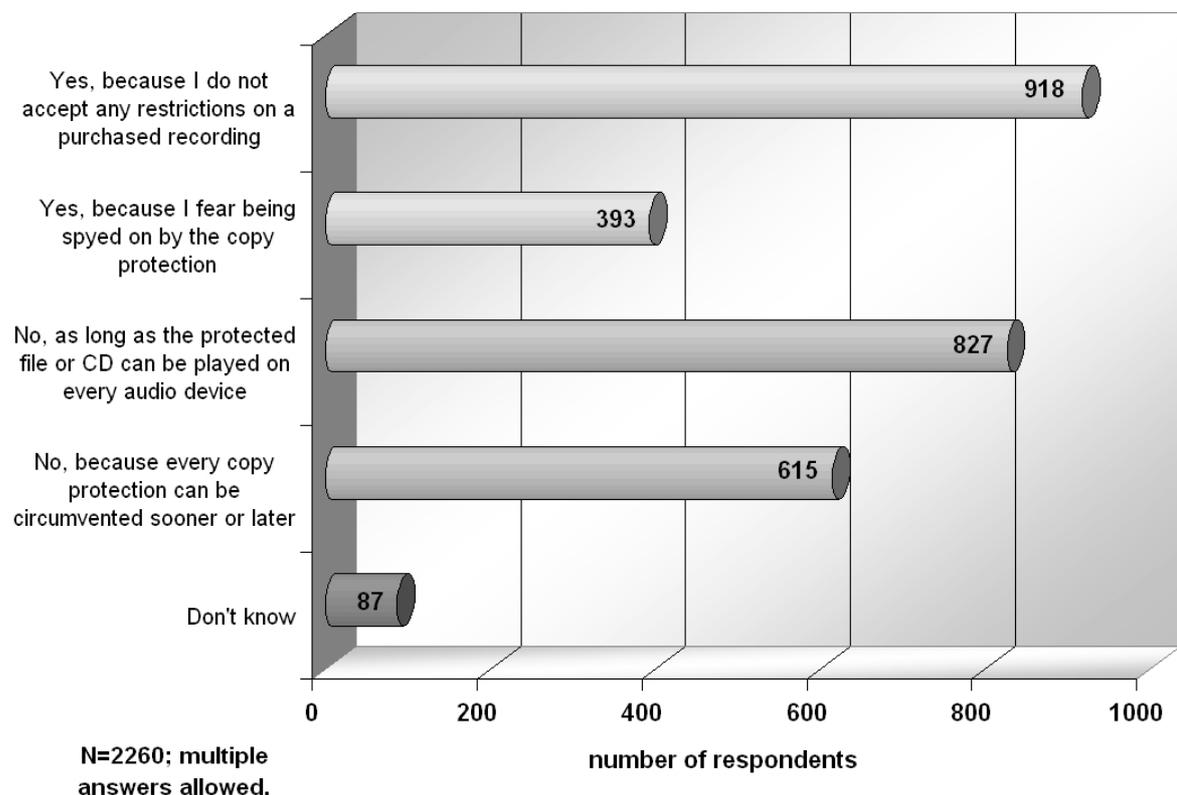


Figure 1. Do you refrain from buying copy protected recordings?

On the one hand, our data analysis shows that nearly half of the respondents (46.4%) do not buy copy-protected recordings (see figure 1). On the other hand, we have 53.6% of the respondents who claim that copy protection in principle does not stop them from purchasing a recording. This of course does not imply that the majority of our respondents will buy more music than before - thus affecting a net increase in sales - if the production of illegal copies is aggravated. Therefore, we cannot give a definitive statement based on the survey concerning the extent of changes in sales resulting from copy protection. The consumers' desire for unrestricted usability of purchased recordings, especially regarding the burning of CDs, is also mirrored by the demanded features of commercial download platforms: 72.7% of the respondents rate this as very important, an additional 20.5% as important. Taking this into account, it appears questionable that copy protection actually increases record sales. Against this background a lot of smaller labels, but also majors such as Universal Music Germany and Sony Music Japan, have re-thought their strategies and went back to selling their records without copy protection.

Sundararajan (2004) argues in this context that it can be expedient to fully utilize the technologically feasible copy protection, depending on the possibility of price discrimination. Even a partial implementation of copy protection measures can help to increase the value of a legal product for customers with a general willingness to pay. Shapiro and Varian (1998, p. 55; see also Alvisi & Argentesi & Carbonara 2003) discuss a similar idea using the term "versioning". They suggest examining digital goods in respect to such properties which might be important to different potential consumers. Properties influencing the perceived value of online music can be sound quality, the transferability to other media or audio devices, and the extent to which restrictive measures are enforced by digital rights management (Becker & Buhse & Günnewig & Rump 2003, Rosenblatt & Trippe & Mooney 2002).

3.2 Legal actions against operators and users of file-sharing platforms as a measure to increase sales of physical sound storage media

Another strategy pursued by the music industry contains legal actions against operators and users of file-sharing networks. A leading role was played by the Recording Industry Association of America (RIAA), initiating the respective lawsuits as early as 1999. In the meantime there have also been similar lawsuits in other countries around the world; e. g. the German National Group of IFPI successfully sued some 400 file-sharers. It is subject to critical discussion though whether prosecution actually reduces illegal downloading activity: A survey among 1,371 Internet users conducted by the Pew Internet Project shows that 14% who previously downloaded music files have turned away from downloading because of the suits brought against music file-sharers by the industry (Rainie & Madden 2004, p. 1). Furthermore, 60% of those Internet users who have never tried music downloading, say the RIAA lawsuits would keep them from downloading music files (Rainie & Madden 2004, p. 2). These results imply that the threat of possible legal action could be a successful means to deter users from file-sharing. However, we have no evidence that these consumers will now purchase more records instead of using file-sharing platforms.

How do those legal actions affect the number of people using file-sharing platforms? Although the user base of the popular file-sharing client KaZaA dropped notably during the survey period between February and March 2004 (Rainie & Madden 2004, p. 2), alternative peer-to-peer networks like BitTorrent, iMesh and eMule gained popularity as well as users (Rainie & Madden 2004, p. 4). According to this report, the number of people who download and swap music files online increased by 27% since December 2003, even though the Recording Industry Association of America had already brought several lawsuits against music file-sharers.

Looking at the impact of the novel German copyright legislation, our survey shows differentiated results as well: While 32.9% of the respondents plan to keep on using file-sharing networks, 25.1% claim to abandon illegal downloading in the future. Another 23.0% are still undecided, with an additional 19.0% giving no answer whatsoever.

Another aspect which has to be taken into account when discussing the effectiveness of legal actions against file-sharing users is the implementation of anonymization functionality in coming file-sharing applications. Furthermore, there are already several software vendors offering programs which prevent tracking a user's Internet or file-sharing behavior, e. g. "Secure Filesharing" by Steganos. This could also serve as an explanation why the vast majority (84.5%) believes that prosecution will hardly be able to totally prevent the existence of file-sharing networks.

Our results suggest that the restrictive measures currently taken by the music industry are not necessarily promising means against the decline in sales. Chen and Png (2003) show that it is welfare superior to manage piracy through lower prices rather than enforcement. Against this background we analyze the pricing of online music.

4 PRICING FOR ONLINE MUSIC

4.1 Willingness to pay for online music

Regarding the pricing of digital goods, it generally is assumed that cost orientation plays a subordinate role. On the one hand, the production leads to high fixed costs, which are "sunk costs" (Shapiro & Varian 1998, p. 21). On the other hand, digital goods can be reproduced with variable costs close to zero. Hence, even a low price contributes to the coverage of the fixed costs. A strategy for providers of

digital goods therefore can be to create turnover by selling large quantities at relatively low prices (Shapiro & Varian 1998, p. 21).

Which pricing models could be considered reasonable from the provider’s perspective? An optimal strategy would be first-degree price discrimination. In this case the products are sold to every customer at a price which corresponds to his or her maximum willingness to pay. However, the application of such a price model is unrealistic for the music industry, since it is hardly possible to detect the willingness to pay for every single (potential) customer. Furthermore, other alternatives for price discrimination exist, such as different prices charged for certain customer groups or product features (Shapiro & Varian 1998). In our study we have examined how far the willingness to pay varies for different kinds of music. We distinguish between four categories of songs, taking into account the criteria “novelty” and “availability”. These categories are “Current Hits” (songs currently ranked in the charts), “Older Titles” (songs which are no longer in the charts but have a high availability), “Rarities” (unpublished so far or being of low availability) and “Newcomer” (releases by new or still unknown artists).

When interpreting our results, it has to be taken into account that a direct query of a hypothetical willingness to pay might lead to the appearance of a hypothetical bias. This means that consumers tend to assess their willingness to pay higher than it would be the case, if a financial obligation was imposed (Nape & Frykblom & Harrison & Lesley 2002).

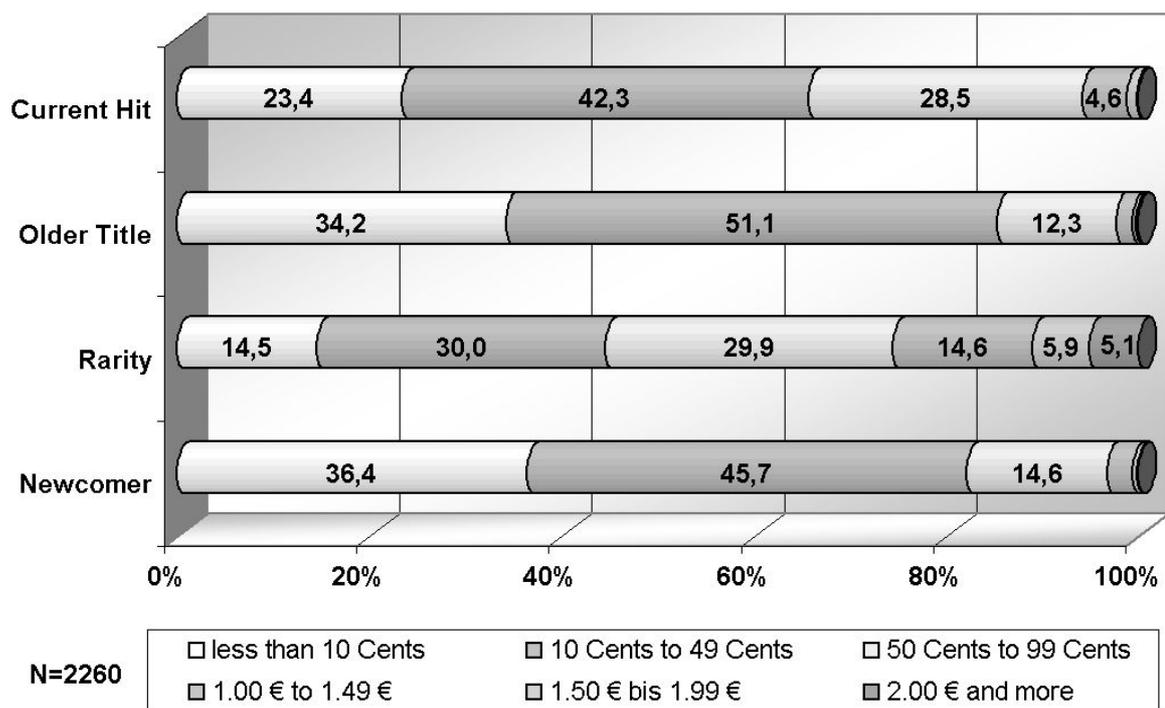


Figure 2. Willingness to pay for different categories of music

As shown in figure 2, most of the survey’s participants would not pay more than 99 Cents per music download. The only exceptions are rarities, for which 25.6% of respondents claim that their willingness to pay exceeds 1 €. Furthermore, 28.5% of the people questioned are willing to pay a price for current hits between 50 and 99 Cents, while only 12.3% and 14.6% would pay the same price for older titles respectively newcomers. Hence, price discrimination dependent on level of publicity and availability of recordings can be regarded as an interesting pricing strategy for providers of online music.

4.2 Estimating optimal prices

To further examine pricing strategies for online music, we analyze which price maximizes the provider's revenue based on the results presented in figure 2. By applying a regression analysis, we derive a demand function $DF(p)$ for each category.

The assumption of an exponential function

$$(1) \quad DF(p) = b_0 b_1^p$$

leads to the parameter values represented in table 2. Our results were calculated based on the respective mid-points of class (e. g. 74.5 Cents in the class from 50 to 99 Cents). The resulting demand functions indicate the demand in percent of the maximum demand. For example, at a price of 99 Cents 10.96% of the potential buyers would buy a current hit ($DF(99) = 1.48906 * 0.9740^{99} = 0.1096$).

	b_0	b_1	R-Square
DF for category "Current Hit"	1.48906	0.9740	0.98486
DF for category "Older Title"	0.93626	0.9738	0.95924
DF for category "Rarity"	1.17375	0.9874	0.98667
DF for category "Newcomer"	1.24575	0.9714	0.99401

Table 3. *Parameters and stability indexes of demand functions for different categories of music*

From the demand function (1) we now derive a sales function $S(p)$ for an arbitrary number of consumers N :

$$(2) \quad S(p) = p b_0 b_1^p N$$

The sales functions for the individual categories are represented in figure 3. We exemplarily assume that $N=10,000$ consumers are interested in buying a download; other values for N lead to similar graphs with varying ordinate values.

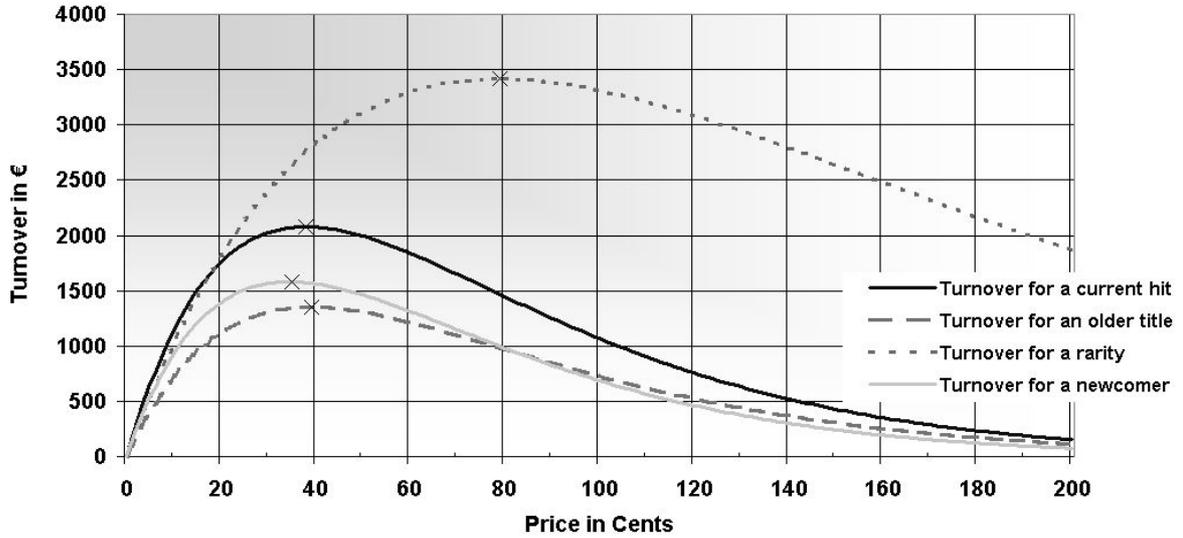


Figure 3. Sales function for music downloads of different categories ($N=10,000$)

We can now determine which price p_{opt} maximizes the turnover by differentiating (2) with respect to p and satisfying $S'(p)=0$:

$$(3) \quad p_{opt} = -\frac{1}{\ln(b_1)}$$

Hence, the optimal price for the category “Newcomer” is 35 Cents, 38 Cents for a current hit and 39 Cents for an older title (values rounded). The optimal price for rarities, however, is 79 Cents. In contrast to our results, current prices charged by online music stores often exceed the consumers’ willingness to pay.

So far our analysis was based on the assumption that we can neglect variable costs for digital goods. However, this assumption proves not to be correct in many practical cases, such as the music industry. To clarify this, let us take a look at an online store for digital music. This store has to bear costs for both technology and financial service providers. In the following, we denote these turnover dependent costs as $\beta \in [0,1]$. Moreover, variable costs c per download arise, e. g. for collecting societies.

Including these costs into the sales function (2) we derive the following profit function (4):

$$(4) \quad Y(p) = p b_0 b_1^p N(1 - \beta) - b_0 b_1^p N c$$

The first part of the profit function consists of the remaining sales after deduction of turnover dependent costs. From this value we subtract the second part, composed of the number of copies sold and variable costs per download.

We can now determine the profit-optimal price by differentiating (4) with respect to p and satisfying $Y'(p)=0$:

$$(5) \quad p_{opt} = \frac{\ln(b_1)c - (1 - \beta)}{\ln(b_1)(1 - \beta)}$$

In the following, let us now examine to what extent arising costs can have an effect on the profit-maximizing price. We assume a hypothetical setting where a provider of music downloads directly

pays the artists, and thus acts as an intermediary between musicians and consumers. In our example, the artists receive a share of 20% of the turnover. Furthermore, costs occur for a payment service provider proportional to the turnover. Conditions for these payment services vary; we assume an average 8% of the gross price. These costs add up to a β of 0.28. In our example, collecting societies demand 10 Cents per download. We estimate the additional costs per download charged by the technology service provider at 5 Cents. The variable costs c per download therefore sum up to a total of 15 Cents. By inserting these parameter values into (5), we determine the profit-maximizing prices for the supplier as shown in table 3.

	Current Hit	Older Title	Rarity	Newcomer
Optimal price	58.78 Cents	60.08 Cents	99.94 Cents	55.34 Cents

Table 4. Profit-maximizing prices for $\beta=0.28$; $c=15$

Even though we now obtain higher optimal values, these are still below the prices usually charged by most online platforms.

4.3 Implications for the music industry

As our results illustrate, a price cut would probably lead to increased revenues. However, such a low price strategy is currently not applicable for online shops due to the high variable costs. If, to give an example, an online shop offers downloads priced at 1.39 € it currently has to pay approximately 75 Cents per download to the respective label.

A prerequisite for the implementation of such a low price strategy is cooperation between the parties involved in the digital music supply chain, i. e. musicians/composers, labels, collecting societies, distributors as well as technological and financial service providers. If these parties considered themselves a cooperation network, this network could earn more money with a low price strategy than with the policy pursued until now.

The following simple example based on our survey data is meant to serve as an illustration: If an online music store offered a current hit at a price of 1.39 € 86 consumers of the 2,260 survey respondents would buy the song, thus creating a turnover of 119.54 €. Offered at the profit-maximizing price of 38 Cents, 1,236 of the respondents would buy the song. As a result, the turnover would increase to 469.68 € which corresponds to almost a quadruplication of the turnover. With an equivalent split of this enlarged turnover, all participants of the cooperation network could profit from a price reduction.

This result is still valid if arising variable costs are included. Thereby, only those variable costs have to be examined which have to be carried by the cooperation network, i. e. we only consider costs actually occurring. These include the expenses the service provider has to pay for each download and the expenses for the financial service provider per transaction. It is important to note that we do not include royalties charged by labels or collecting societies in our considerations, since they do not directly result in variable costs for the players. Let us assume that costs of 15 Cents per download actually arise for payment and technical processing of one single download. At a price of 1.39 € this would lead to a profit of 98.69 € which is divided between the partners of the cooperation network. According to our model, though, in the context of the same costs, an optimal price would be 53 Cents. At this price an amount of 833 downloads would be sold, which would result in a turnover of 441.49 €. In this case, a total of 124.95 € would occur as variable costs, which would lead to a profit of 316.54 € for the entire cooperation network.

These results show that the various players in the music industry would most likely profit from a reasonable price reduction. It is, however, a prerequisite that the parties involved act as a cooperation network, as established in the automobile supply chain for many years. Furthermore, a solution for splitting up the revenues is necessary which assures a fair share for the players involved.

5 SUMMARY

Our results suggest that neither the implementation of copy protection mechanisms nor legal actions taken against users and operators of file-sharing platforms seem to be effective means to overcome the still existing crisis of the music industry.

Furthermore, it becomes clear that a differentiated willingness to pay for digital music indeed does exist. It turns out that a price cut for music downloads would lead to increased sales, thus creating benefits for both suppliers and consumers. This result is supported by an experiment Real Networks conducted on their Rhapsody platform. Thereby, the service sold three times as many music downloads for 49 Cents as for 99 Cents (Anderson 2004).

Furthermore, a promising measure for music suppliers could consist in building up attractive online offers for the consumers. Though file-sharing platforms allow the more or less comfortable free download of music, a specific support for the users is, however, time and capital-intensive and for a service like KaZaA hardly feasible. In the digital music shop of the future, a customer ideally finds a choice of products tailored especially to his or her needs. This can include recommendations for songs and bands fitting the customers' taste as well as additional information about artists, concerts in the surrounding region or special offers, such as a "Happy Hour" with reduced prices, etc. Free music downloads, an online community or a discount system are other means which can make such a platform more interesting.

Price cuts as well as an improved customer orientation seem to be more promising strategies than restrictive measures like copy protection or lawsuits.

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