Music as a Service as an Alternative to Music Piracy?

An Empirical Investigation of the Intention to Use Music Streaming Services

Although there are no final results of music piracy's influence on music industry revenues, music pirates are an important target group for the music industry. Music as a Service (MaaS) represents a new form of consuming music. The streaming service is offered on a monthly subscription or an ad-financed basis. Initial user surveys indicated that many music pirates also use such streaming offers. For this empirical study, we questioned 132 music pirates. We conclude that music pirates have a positive attitude towards MaaS. Although the free consumption of music received higher approval, MaaS – owing to social sharing functions and a new pricing model – is a viable alternative to illegal music consumption.

The Authors

Dr. Jonathan Dörr
Dipl.-Volksw. Thomas Wagner (✉)
Prof. Dr. Thomas Hess
Munich School of Management
Institute for Information Systems
and New Media
Ludwig Maximilians University
Munich (LMU)
Ludwigstrasse 28
80539 Munich
Germany
thomas.wagner@bwl.lmu.de
url: http://www.wim.bwl.lmu.de

Prof. Dr. Alexander Benlian
Department of Law and Economics
Chair of Information Systems
& Electronic Services
Darmstadt University of Technology
(TU Darmstadt)
Hochschulstrasse 1
64289 Darmstadt
Germany

1 Introduction

In 2011, record labels generated 32 % of their global turnover via digital sales channels, a year-on-year growth of 8 %. Despite this positive development, global music industry revenues decreased by 31 % between 2004 and 2010 (IFPI 2012, p. 6). Meanwhile, 29.8 million users shared illegal and free music in Europe's top five markets in 2009 (IFPI 2010, p. 11). At the same time, only 35 % of members of illegal networks also paid for music (IFPI 2012, p. 16). Within the past few years, the initially very popular peer-to-peer exchanges such as BitTorrent and eDonkey (Grasmugg et al. 2003) have begun to be replaced by so-called share-hosters such as Rapidshare for distributing digital music illegally (IFPI 2010, p. 19).

Besides the primary question of the correlation between the drop in sales and music piracy (Liebowitz 2006; Zentner 2006), studies have focused on aspects of illegal music downloads. In the literature, two main types of music pirates are identified. The first group – the so-called savers – experience the current prices of legal music as unfair and too expensive (Al-Rafee and Cronan 2006; Levin et al. 2004). The second group – the so-called samplers – use illegal downloads mainly to preview a song in order to buy it later if they like it (Bhattacharjee et al. 2003b; Peitz and Waelbroeck 2004).

There have been numerous discussions about illegal copying. Digital rights management systems (DRMS) seek to protect digitally saved music from unauthorized sharing via the internet. DRMS consist of encryptions, authorization definition languages, and watermarks. These security mechanisms were introduced to regulate the access and usage of the digital content for a specific group as well as to prosecute violations of laws (Hess and Ünlü 2004). However, the customer now experiences restrictions while using the music file (Buxmann et al. 2005). While pirates are skilled at circumventing DRMS, legal users are scared off by the technical restrictions resulting from the file protection, such as the limited choices of mobile devices or the limited distribution options (Sinha et al. 2010). Therefore, the application of DRMS may result in a drop in sales (Jaisingh 2007).

By means of warnings and lawsuits, record labels early attempted to stop illegal downloading. Already in 2000,

Recording Association of America sued the illegal music provider Napster (then just two years old). At the time, Napster had already managed to acquire a user base of 44.6 million (Freedman 2003; Liebowitz 2006). Music pirates have considered themselves safe because the labels' legal departments do not have the capacity to properly prosecute each case (Al-Rafee and Cronan 2006; Plowman and Goode 2009).

Besides the protection of music, legal download offers have been steadily improved. For instance, consumers can illegally download songs from exchange platforms or from other websites and can then decide whether to purchase them afterwards. The literature describes this aspect as sampling (Peitz and Waelbroeck 2006). Bounie et al. (2007) and Gopal et al. (2006) discovered that better sampling may reduce illegal downloads. It has also been shown that individuals tend to buy music recommended by contacts in their personal networks (Bounie et al. 2007; Hinz and Eckert 2010). With the integration of the social network Ping in 2010, Apple tried to serve these customer needs.

Price-setting has also been investigated several times, since the vast amount of music pirates seek to legitimize their illegal downloading by pointing to the music industry's unfair price policy (Al-Rafee and Cronan 2006). With a price of €0.99 per download, Buxmann et al. (2007) propose a reduction of the price in order to increase profits. Deviating from the initial uniform price-setting strategy, the literature contains recommendations for differentiating the price for different customer groups (Sandulli and Martin-Barbero 2007; Sinha et al. 2010) or the songs offered to them (Buxmann et al. 2005). Danaher et al. (2010) were

able to empirically show that legal music download platforms such as Apple's iTunes store are perceived as a substitute to music piracy owing to their adequate price-quality ratio.

To date, piracy's de facto impact on the revenues of the content industry cannot be clearly identified. On the one hand, several studies postulate a negative correlation (e.g., Sinha and Mandel 2008; Upshaw and Babin 2010; Woolley 2010), while some studies do not see any effect or a positive effect on revenues (e.g., Oberholzer-Gee and Strumpf 2007; Peukert and Claussen 2012).

A new way to consume digital music is now available in the form of MaaS. In contrast to known music offers, so-called à-la-carte downloads such as the iTunes Store or Amazonmp3, MaaS is characterized by two features: instead of downloading a song, music is streamed while it is consumed, and users pay a subscription fee instead of paying per download. Hence, purchasing and downloading are substituted by a monthly subscription fee or an ad-financed streaming service. First results show that music pirates also use MaaS, and some have subsequently given up illegal downloading (IFPI 2010, p. 9). Our study examines whether MaaS offers are accepted by music pirates as a purchase option; therefore, it contributes to new technology acceptance research. To date, acceptance studies have examined a new technology's adaptability. In this context, it was disregarded that comparable technologies were already in use, which would make technology substitution more suitable (Polites and Karahanna 2012, p. 22). Such product usage will be considered in our study, since we consider the relative advantage of a new product – MaaS – in comparison to an existing product – illegal downloading.

The remainder of this study is structured along seven sections. First, we state our motivation. Section 2 provides an overview of online music offers in general, and especially MaaS. In Sect. 3, we present the Theory of Planned Behavior as well as our research hypotheses and, in Sect. 4, the methodological approach. Section 5 contains our empirical results, Sect. 6 our results and an assessment of the limitations, while Sect. 7 summarizes the results and future research opportunities.

2 Background Information: Current Music Offers on the Internet

2.1 Online Music Offers

Currently there are three legal distribution channels for digital music on the internet which allow users to choose directly from a range of titles, albums, and interpretations. In this context, services similar to web radio outlets such as last.fm and Pandora are not considered, since here users are unable to alter prearranged playlists. **Figure 1** provides an overview of the three legal services – differentiated along consumption, payment method, and recommendation system. The offers are arranged from left to right, following their occurrence.

After a strong drop in revenues at the turn of the millennium, the music industry began to license digital music for downloading via the internet. Such consumption is called download-to-own and it is mainly charged for by pay-per-download. Initially secured by DRMS, since 2009 songs can be downloaded on any device without authentication procedures; they can also be shared without

Fig. 1 Current online music consumption services

	Download-to-own	Download-to-rent	Music as a Service
Distribution	Download	Download	Streaming
Payment model	Pay-per-download	Flat rate	Free / Flat rate
Recommendation systems	Several	Several	Many
Examples	iTunes, musicload, amazonmp3	Napster, Nokia comes with music	Simfy, Spotify, Deezer, rara, MOG

restriction. However, songs can still contain a watermark to detect their origin on exchange platforms (Dörr et al. 2009). DRMS is still included in consumption via download-to-rent. In this case, music files are also located on the user's device, but may only be played after an online check of the legal situation. These offers usually apply a subscription model with recurring payment. During the subscription period, the user is able to download and play the songs without limitations.

MaaS streams a music file to the user's device while s/he is consuming the music. Songs are not permanently saved on the user's device. MaaS services are usually free of charge. In most cases, there is also a fee-based premium MaaS offer. The prevailing payment method is subscription. Both download-to-own (e.g., iTunes) and download-to-rent (e.g., Napster) often offer users streaming options. In this context, MaaS services only provide music streaming in combination with freemium as revenue model. Music streaming offers such as Google or Amazon are not considered MaaS, since customers purchase download-to-own music and then transfer it into the provider's cloud storage.

MaaS offers extended recommendation systems in comparison to older, technically limited recommendation systems. Users are now able to recommend music as well as receive recommendations. Generated playlists and direct recommendations can also be shared via social networks like Facebook or Twitter, and via e-mail.

2.2 Music as a Service as a Distribution Concept

Immateriality, simultaneous production and consumption (the uno-actu principle), and integration of the user as external factor are considered substantial characteristics of a service (Buhl and Weinhardt 2009, p. 469).

MaaS establishes immateriality through digital distribution of music as a whole and, as a result thereof, its intangibility. In contrast to traditional services (e.g., booking a holiday), production and consumption do not coincide. Music provided by a MaaS vendor is first produced in a studio. Here, a first copy is created that will then be distributed. However, the MaaS provider is not the content producer but a broker. Considering the music industry value chain, a

MaaS provider's core competency is content distribution through which it can now be considered a media company in the broad sense (Schumann and Hess 2009, p. 12). The distribution coincides with the consumption, since the content is streamed and only available during the consumption period. Finally, the user of the MaaS service is included as external factor in the distribution process by him or her actively streaming the content.

Most MaaS providers use freemium as their revenue model (Anderson 2009), according to which MaaS service customers can choose between a free, ad-financed and a fee-based alternative. The fee-based premium offer, which costs up to €10 per month, for instance, includes additional features such as improved sound quality, applications for mobile devices, offline accessibility, and no advertisements. With offline accessibility, the user can listen to the music in any country and without any data plan. Currently, out of its 10 million registered users, Spotify has a paying customer base of 2.5 million. The company has a 15 % conversion rate (IFPI 2012, p. 12). On average the freemium service's conversion rate is around 5 % (Anderson 2009, p. 28).

Besides web radio stations and some national providers, Spotify, which made its debut in 2008 and is based in Sweden, is the first successful international on-demand streaming service. Spotify has a user base of 13 million with a presence in Germany, the U.S., Belgium, the Netherlands, Great Britain, Sweden, France, Spain, Denmark, Finland, Switzerland, and many more (Spotify 2011). In 2009, Steereo made its debut in Germany, and it was taken over by Simfy, the most popular German provider, by the end of 2010. Simfy was restructured in 2010 and has a user base of 1.7 million and a library of 17 million music songs (Simfy 2011). Currently, there are approximately a dozen MaaS providers. Due to country-specific legal regulation for music, most of the services are not transnational.

Despite MaaS's relative success, there is a limited amount of research and studies dealing with the question why users pay for services, while the service's basic functionality is offered for free (Oestreicher-Singer and Zalmanson 2009, p. 3). Dörr et al. (2010) examined 132 MaaS users in a survey concerning the influence of service functionalities on users' willingness to pay. From their results, they conclude that willingness to pay is signifi-

cantly influenced especially by the music quality offered and the contract duration. After analyzing data on the web radio outlet last.fm, Oestreicher-Singer and Zalmanson (2009) identified a correlation between willingness to pay and community activities. Whether a service is fully accepted by users and why, has not yet been investigated. Our study seeks to close this research gap by attempting to explain MaaS acceptance by music pirates, an important target group for the music industry.

3 Model Development

3.1 Theory Selection

Our study asks whether MaaS is an attractive music distribution model for music pirates and why. The essential question is more about the acceptance of a technology than of the acceptance of a service. Service acceptance studies include the integration of the user in co-production as an essential factor (Meuter et al. 2005). MaaS requires the active streaming of content. In contrast to other so-called self-service technologies (e.g., self check-in at airports), MaaS does not require any deeper user involvement. In information systems, the Theory of Planned Behavior (TPB) (Ajzen 1991), the Technology Acceptance Model (TAM) (Davis 1989), and the Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2) (Venkatesh et al. 2003, 2012) – as a combination of established theories – are usually applied to analyze a new technology's acceptance. We chose TPB as the conceptual framework, since we consider a component of social influence of third parties and seek to ascertain attitudes towards MaaS.

Previous studies were able to demonstrate that music pirates' attitudes are influenced by social norms (e.g., d'Astous et al. 2005; Kwong and Park 2008; Plowman and Goode 2009; Wang et al. 2009). While identifying social influence as relevant construct, we consider previous studies' results. At the same time, the theoretical framework will provide the opportunity for a context-specific extension. Since UTAUT has emerged from established theories, an extension may not be appropriate. Furthermore, constructs such as performance expectancy are difficult to apply in the context of an entertainment medium. However, TAM and
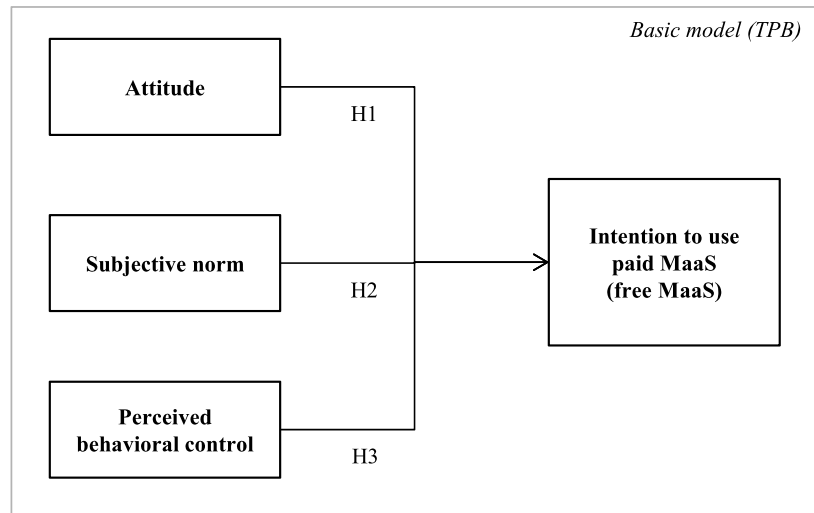
TPB are often extended or even combined. Dibbern et al. (2007) combine TPB and TAM to obtain a different perspective on users. Thus, user classifications in three perspectives – consumer, technology user, and network member – were achieved. To answer our research question, we focus on attitudes towards MaaS. We will therefore only apply TPB. Yet, this theory includes the technical dimension via an observed behavioral check, the social dimension in form of a construct of subjective norm, and the consumption-oriented component in form of a construct of attitude. The study thus focuses on the consumption-orientated component.

TPB is a general theory from the social sciences that seeks to predict and explain individuals' behavior (Ajzen 1991). The dependent variable is behavioral intention, which is explained by three independent variables: attitude, subjective norm, and perceived behavioral control. A meta-analysis of 83 studies shows an average correlation of 0.53 between intention and actual behavior (Sheppard et al. 1988). TPB is a further development of the Theory of Reasoned Action (TRA) (Ajzen and Fishbein 1980), while adding perceived behavioral control as additional predictor of user intention (Ajzen 1991). TRA is the most influential theory in terms of explaining and predicting human behavior. It has been successfully applied in various contexts (Sheppard et al. 1988), such as information systems usage research (Benlian et al. 2009; Hildenbrand et al. 2007; Pavlou and Fygenson 2006).

3.2 The Theory of Planned Behavior

TPB assumes that attitudes towards the examined object influence behavior (in this case, MaaS usage) based on the assumption that attitude already includes the essential conviction and assessment of the behavior's expected results. In our case, music pirates affectively evaluate MaaS services and their various characteristics and thus adopt an approach towards them. Therefore, we hypothesize:

H1: Attitude towards MaaS is positively related to intention to use MaaS.

The subjective norm describes the most important reference persons' expectations of individual behavior. These expectations constitute a form of social pressure and are considered relevant intention formation factors (Ajzen 1991). Especially in the context of illegal actions

Fig. 2 Basic research model to explain MaaS acceptance

the influence factor plays an important role. However, existing studies on digital music show mixed results. While in a student sample, LaRose and Kim (2007) do not discover a significant influence of subjective norm on intention, this correlation is shown in other studies (d'Astous et al. 2005; Kwong and Park 2008; Levin et al. 2007; Plowman and Goode 2009; Wang et al. 2009). In the past few years, music labels initiated campaigns against copyright violations in order to raise public awareness of music piracy. Although music pirates seek to trivialize their crimes, they are aware that parents, teachers, and some opinion-formers consider illegal music downloading to be morally reprehensible and that they regard legal alternatives as preferable. Thus, we derive our second hypothesis:

H2: Subjective norm is positively related to intention to use MaaS.

The last predictor of TPB is perceived behavioral control, which describes the subjectively perceived difficulty of an action. This includes both external factors such as time, situational opportunities, and the cooperation of others involved, as well as internal factors such as personal skills to meet the object's demands (Ajzen 2002). In the case of MaaS, perceived behavioral control represents both the individual's mental ability to handle MaaS and his or her technical equipment for using the service. If an individual posses the necessary knowledge and/or the necessary equipment (e.g., a smartphone for mobile usage), this will positively affect the intention to use MaaS. Thus, we hypothesize:

H3: Perceived behavioral control is positively related to intention to use MaaS.

Figure 2 summarizes the basic research model, which is based on TPB.

3.3 Extension for Specifics of MaaS

A pirate must decide whether s/he wants to use MaaS or to continue to obtain music illegally. Both sources can be free, while MaaS is a legal offer. During the evaluation of the new offer, s/he will compare the offers' characteristics in both absolute and relative terms (Rogers 1995, p. 212).

Interviews in a previous study demonstrate that MaaS recommendation features are perceived as particularly appealing. Students who already used the service were asked which features they consider innovative and useful. The feature of sharing entire playlists with friends on social networks such as Facebook was considered particularly valuable. Online recommendations can be understood as online word of mouth (Hennig-Thurau et al. 2004; Sun et al. 2006) and therefore as a special form of conventional word of mouth. The key aspects of this model are the constructs online opinion leadership and online opinion search. Online opinion leadership describes the characteristic of an individual distributing his or her opinion over the internet. Online opinion search refers to the search for recommendations. This approach has already been applied in the context of digital music (Sun et al. 2006). In the process, music recommendations are given or received

in social networks or via e-mail. As described in Sect. 2, MaaS offers have comprehensive recommendation systems that facilitate social exchange, especially on social networks such as Facebook. Several providers have already introduced a mandatory Facebook link to fully integrate social recommendations into the service. Individuals who like to give or receive music recommendations will be positively influenced regarding their attitudes towards MaaS. We therefore derive the following hypotheses:

H4: Submission of music recommendations is positively related to attitude towards MaaS.

H5: Search for music recommendations is positively related to attitude towards MaaS.

While streaming the music, no music files are stored on the user's device and therefore no right of use is granted. Past studies have investigated collectors and their desire to own media such as video cassettes, DVDs, or music CDs (Henke and Donohue 1989; Mann 2010; Sullivan and Hibbert 2006). Despite advancing digitization, some collectors still prefer possession of digital content such as music (Burkart 2008). Since a MaaS user who likes to own music only has the right to access the music library during subscription, s/he will tend to have a negative attitude towards MaaS. We therefore hypothesize:

H6: The desire to own music is negatively related to attitude towards MaaS.

To test the payment model's influence on the attitude towards MaaS, we introduce the construct flat rate preference. This construct is found in the taxi meter effect and can be traced back to the approach of mental accounts (Heath and Soll 1996; Thaler 2008). According to this approach, a consumer possesses mental accounts or budgets, where costs and the utility of a good are registered. Hence, a customer enjoys his or her products more when paying a usage-independent (flat) rate compared to a usage-dependent rate. The costs occur only during selection and not during consumption (Prelec and Loewenstein 1998). In contrast to usage-dependent pay-per-download, MaaS offers such a usage-independent plan. We therefore derive the following hypothesis:

H7: Flat rate preference is positively related to attitude towards MaaS.

A qualitative prestudy questioning students on MaaS acceptance demonstrated that MaaS was compared with the previously used sourcing channel in several aspects. Also a music pirate compares the new opportunity of receiving music with his or her existing ones. Since there is no construct in the literature to describe the comparison of legal and illegal music sourcing, we have developed a new construct in this context, referred to as relative advantage of MaaS. However, the construct's aspects are based on the characteristics identified as important influences on music piracy in the academic literature: sound quality (e.g., Bhattacharjee et al. 2003a, 2003b, Fetscherin and Zaugg 2004; Gopal et al. 2006; Plowman and Goode 2009), search costs (e.g. Jaisingh 2007; Peitz and Waelbroeck 2006), law-abiding actions (e.g., Al-Rafee and Cronan 2006; Chiang and Assane 2008; Chiou et al. 2005; Kwong and Lee 2002; Nandedkar and Midha 2009; Plowman and Goode 2009), and moral scruples (e.g., Chen et al. 2008; Chiou et al. 2005; Coyle et al. 2009; Fraedrich and Ferrell 1992; Kwong and Lee 2002; Plowman and Goode 2009).

The compression of digital music in MP3 format reduces sound quality. This is of great importance for users that consume a lot of music (Gopal and Sanders 2003; Plowman and Goode 2009). Depending on the provider and the pricing model, MaaS services offer bit rates between 128 kB/s and 320 kB/s. Illegal music platforms offer various bit rates. It was shown that music rates were above 128 kB/s and that the sound quality increased over time (Bhattacharjee et al. 2003a; Fetscherin and Zaugg 2004). However, the sound quality (caused by bit rate fluctuation) and failure-free functioning (caused by strategic distribution of flawed files of record labels) of illegally downloaded music files remain a problem of illegal platforms. Therefore, MaaS is more advantageous here than the illegal channels.

Search costs refer to the time invested by an individual to meet his or her search objective. In literature, search costs are considered the most decisive costs of illegal music consumption and are integrated as a negative influence into several theoretical models (Jaisingh 2007; Peitz and Waelbroeck 2004, 2006). Besides the time invested in the search, a user must sometimes repeat a search owing to incorrect or faulty music files. In legal offers, searching is quicker and mostly limited to one provider. Thus, MaaS user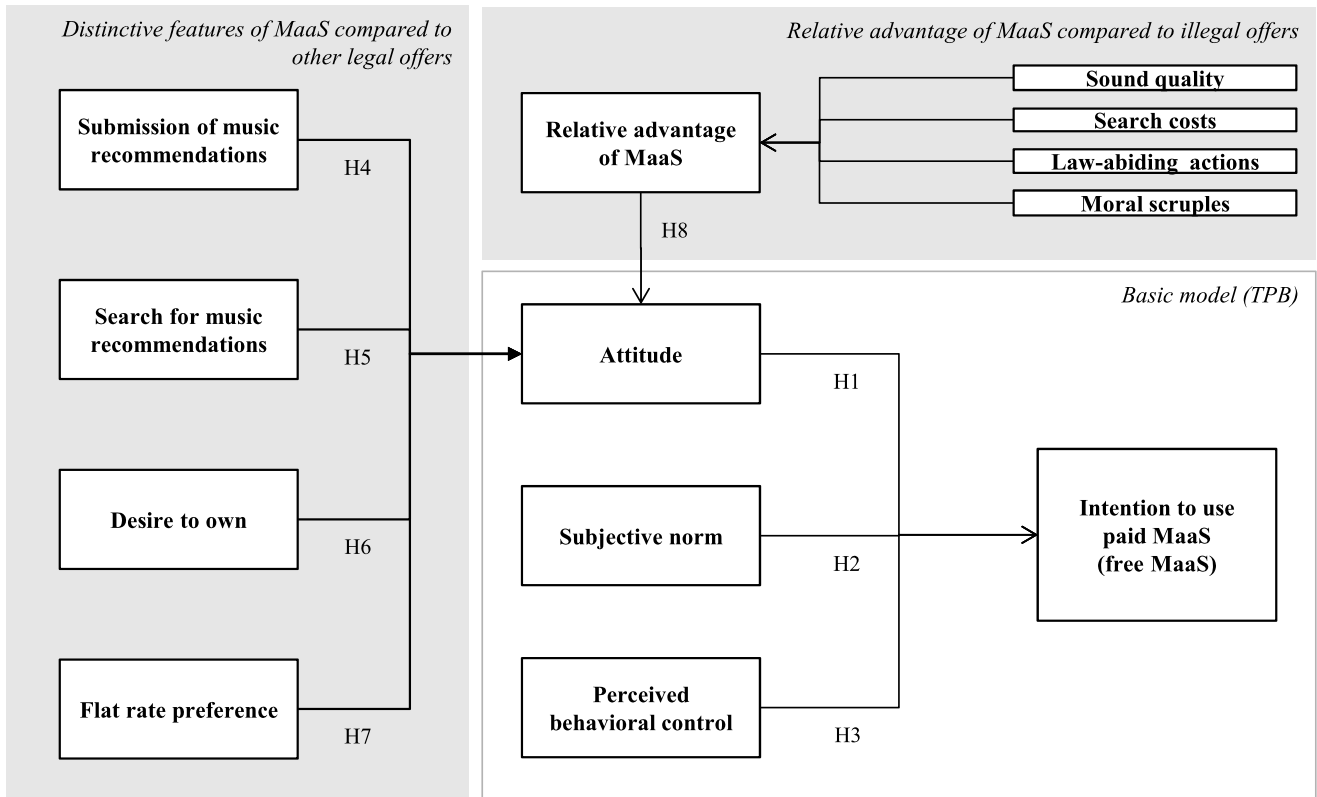s can expect considerably lower search costs compared to illegal offers. Based on this idea, Danaher et al. (2010) demonstrate, in the case of TV shows, that individuals are willing to pay small amounts rather than accept lengthy searches in illegal networks.

A measure against an unlawful act is usually a criminal proceeding, which is considered to have a preventive effect on the intention to commit a criminal offense (Straub 1990). Depending on the assessment of the law-abiding actions, music pirates consider their actions risky. It has been shown empirically that a higher perceived risk of criminal prosecution has a negative influence on illegal downloading behavior (Chiang and Assane 2008; Chiou et al. 2005; Nandedkar and Midha 2009). If an individual believes that a legal norm contradicts illegal music acquisition, s/he considers his or her action to be risky and will prefer legal music offers.

Based on equity theory (Adams 1963; Kabanoff 1991), the perceived fairness results from an individual's assessment of own accomplishments, compared to others' achievements (Glass and Wood 1996). In the context of software piracy, Douglas et al. (2007) identify reciprocal influencing variables such as sense of guilt as the most influential determinants of perceived fairness. Music pirates perceive the price-setting as unfair and assess the value of music to be lower. They are of the opinion that illegal downloading is neither unethical nor criminal (Chen et al. 2008; Coyle et al. 2009). As a result, the positive attitude towards illegal music sources rises with a lacking sense of fairness (Kwong and Lee 2002; Plowman and Goode 2009). If a music pirate considers his or her behavior as unfair, this takes the form of moral concerns. Because MaaS is a legal music offer, consumers need no longer worry about unfair behavior. MaaS therefore offers a further advantage in this aspect compared to illegal downloading.

From an objective perspective, MaaS offers advantages in the aforementioned dimensions compared to music piracy. Overall, the dimensions have a positive influence on attitude towards MaaS. We have combined these aspects in one construct which we have added as a further determinant of attitude. Therefore, we derive the following, last hypothesis:

H8: Relative advantage of MaaS is positively related to attitude towards MaaS.

Distinctive features of MaaS compared to other legal offers

Relative advantage of MaaS compared to illegal offers

Submission of music recommendations — H4

Search for music recommendations — H5

Desire to own — H6

Flat rate preference — H7

Relative advantage of MaaS — Sound quality / Search costs / Law-abiding actions / Moral scruples

Basic model (TPB)

Attitude — H1

Subjective norm — H2

Perceived behavioral control — H3

H8

Intention to use paid MaaS (free MaaS)

Fig. 3 Extended research model to explain MaaS acceptance

Figure 3 summarizes our extended research model. It consists of $2 \times 8 = 16$ hypotheses.

4 Research Methodology

4.1 Data Collection and Sample Selection

To test our hypotheses, we developed an online questionnaire. At the outset of the survey, we showed a short video explaining the functionality and main features of MaaS to ensure that all participants had the same knowledge base. The questions followed. We used the survey software Unipark by Globalpark to create our online survey, which was active for two weeks during August 2010. We sent an invitation link via e-mail to 8,000 students of a German university. Our survey followed the usual approach of asking students about their habits regarding illegal downloading from the internet (e.g., Chen et al. 2008; Gopal et al. 2006; Plowman and Goode 2009; Sinha et al. 2010). We collected 926 primary datasets. We then considered only those 132 datasets where students stated that they had downloaded music mainly via illegal channels (illegal exchange platforms or websites) during the past month. For this purpose, at the start of the survey, participants were asked about their usage of various (legal and illegal) providers. 28 % of the sample stated that they downloaded music mainly via illegal exchange services, while 72 % used illegal websites. Besides the illegal downloading, 37.1 % bought music via legal download platforms such as iTunes. 57.6 % bought CDs in retail stores and 74.2 % used legal streaming portals such as YouTube. At this point, it already becomes evident that the streaming service, generally free of charge, is a favorite distribution channel of music pirates.

The average age was 24, while 59 % of respondents were men and 41 % were women. Participants took approximately 15 minutes to complete the survey. Missing values were replaced with the linear trend for that point. This procedure is used for the calculation of values by means of the assigned forecast values. We subsequently estimated approximately 5 % of the answers.[1] Furthermore, we tested answers for a nonresponse bias by comparing the answers of the last 25 % of participants with the answers of the remaining participants (Armstrong and Overton 1977; Lambert and Harrington 1990). The results showed no significant differences and we could therefore rule out a nonresponse bias.

4.2 Measures

To operationalize our constructs, we only applied questions that were used in previous studies and adopted them to the context of MaaS. Since the items were used in previous studies without any validity problems, we thus ensured that content validity was not a concern. All questions were rated on a Likert scale ranging from 1 to 5 (where 1 refers to the lowest score on the item scale and 5 the highest score). Attitude towards MaaS was measured with bipolar pairs of opposites. In the literature, the relevant aspects of MaaS's relative advantage can be derived as identifiable, separate, and independent constructs. These aspects (sound quality, search costs, actions low in compli-

---

[1]The results also remain robust when using other replacement approaches and a case-based exclusion of data sets.

ance with laws, and moral scruples) were measured effectively in the past. In total, they explain the higher-order construct relative advantage of MaaS and are therefore regarded as formative indicators, being independent of each other. According to Polites et al. (2012), thus the prerequisites of a higher-order model are given. These models represent multilevel constructs, which are represented by constructs of their own (here: the aspects of sound quality, search costs, law-abiding actions, and moral scruples) instead of by observable indicators (Jarvis et al. 2003). Our study uses a multidimensional construct reflective first-order, formative second-order and can therefore be classified as a Type II conception (Becker et al. 2012).

Table 1 shows the items and the sources they were drawn from.

4.3 Validation of the Reflective Measurement Model

To establish content validity, we adopted only constructs used in previous studies. Factor loadings should be above 0.70 to establish an indicator reliability of at least 50 % (Hair et al. 1998). A violation of this threshold for subjective norm and perceived behavioral control can be accepted, since factor loadings are above 0.40 while satisfying all other following thresholds (Götz and Liehr-Gobbers 2004, p. 723). All constructs showed a composite reliability significantly above the critical value of 0.70. Furthermore, the average variance extracted (AVE) values all exceeded the 0.50 thresholds (Chin 1998). Discriminant validity was assessed by investigating the latent construct correlations and the square root of their specific AVE. The square root of the AVE for each construct was much larger than the specific construct's correlation with any of the other constructs in the model; the condition for discriminant validity can thus be regarded as fulfilled (Fornell and Larcker 1981). To summarize, all constructs satisfied the abovementioned reliability and validity criteria. The summarized results can be found in Tables 2 and 3.

4.4 Validation of the Construct Relative Advantage of MaaS

The construct relative advantage of MaaS describes a higher-order construct with the structure reflective first and formative second. There are two suitable approaches for validating such constructs (Becker et al. 2012): 1. In the two-stage approach (Becker et al. 2012; Ringle et al. 2012), factor scores are generated for each of the first-order dimensions, which are then used as formative measures of the second-order aggregate constructs. 2. In the indicator re-use technique (Becker et al. 2012; Ringle et al. 2012; Wetzels et al. 2009), a higher-order construct can be designed by specifying a latent construct that includes all the manifest indicators of the underlying lower-order latent constructs. Becker et al. (2012) recognize the superiority of the two-step approach in cases where the researcher is especially interested in the higher-level estimates. Since we are especially interested in the influence of relative advantage of MaaS on attitude, we decided to use a two-step approach, following the procedures of Benlian and Hess (2010), Choudhury and Karahanna (2008), Lin et al. (2005), as well as Polites and Karahanna (2012).

To validate the higher-order construct, we first conducted a confirmatory factor analysis of the four constructs of the first dimension (sound quality, search costs, law-abiding actions, and moral scruples) (Diamantopoulos and Winklhofer 2001). We then used these calculated factors as formative indicators for the higher-order construct (Jöreskog et al. 2006).

For the confirmatory factor analysis, we used LISREL 8.8. The theoretically derived constructs could mostly be supported by the empirical data. The model shows a Chi-squared value 48.25 and a p-value of 0.12 at 38 degrees of freedom. The higher-order model therefore represents the data structure well (Jöreskog 1993, p. 298). Furthermore, fit indexes should be considered in the evaluation of the model. The absolute fit index (root mean square error of approximation / RMSEA) (0.043) as well as the comparative fit index / CFI (0.99) fulfill the requirements and provide support for a good model fit (Hu and Bentler 1999).

The factor values of the factor analysis were then included in the final dataset as formative indicators for the structural equation model. To validate the formative construct, we consider the significances of the path weights and the variance inflation factor (VIF) to test for multicollinearity. The indicators sound quality and law-abiding actions show no significant path weights, while the indicators search costs and moral scruples do. The VIF value, which should not exceed 5, shows that multicollinearity between the remaining indicators is not a concern (Henseler et al. 2009).

Table 4 summarizes the described results.[2]

4.5 Validation of the Structural Equation Model

Since our study includes formative as well as reflective constructs and due to a relative small sample size, we decided to use the partial least squares (PLS) approach for the empirical validation of our model. PLS is a modeling technique well suited to assessing complex predictive models. Compared to other procedures, PLS offers the advantage of modeling latent constructs under conditions of non-normality and small sample sizes. The PLS algorithm minimizes residual variances to enhance optimal predictive power (Chin 1998; Fornell and Bookstein 1982). To reach this goal, PLS estimation is performed by iterations of regression, which is why no further sample distribution assumptions needed to be made (Lohmöller 1989). We used SmartPLS version 2.0 M3 for the path analysis and as a bootstrap re-sampling tool to determine the significance of the paths within the model (Ringle et al. 2005).

To test the validity of the structural equation model, we used R^2, Ball's Q^2 as an indicator for predictive relevance, significance levels of the path weights, and effect size f^2. A $Q^2 > 0$ indicates the model's predictive relevance. The Stone-Geisser test shows that all reflective measured constructs have a $Q^2 > 0$ and are therefore relevant for the model's predictive power. We computed Cohen's f^2 to check each construct's effect size. A value of 0.02 indicates a small, a value of 0.15 a medium, and a value of 0.35 a large effect size (Cohen 1988). All our

---

[2]In order to assure that the chosen methodical approach is not subject to systematic errors we also applied the item re-use technique (Mode B). Here, the results also show that moral scruples and search costs are the most important influence factors within the construct. The remaining path coefficients of the structural equation model did not result in significant changes confirming the robustness of the results.

Table 1 Items and their origins

Construct		Items	Source
	Intention to use MaaS (paid and free)	I intend to use MaaS in its premium (free) version in the next three months.	Kwong and Park (2008), Venkatesh et al. (2003)
		I predict that I will use MaaS in its premium (free) version in the next three months.	
		I plan to use MaaS in its premium (free) version in the next three months.	
	Attitude	The idea of using MaaS	Ajzen and Fishbein (1980), Graf (2007)
		(…) I like – I dislike*	
		(…) is boring – is exciting	
		(…) is valuable – is worthless*	
		(…) is favorable – is unfavorable*	
		(…) is good – is bad*	
	Subjective norm	People who are important to me think I should use MaaS.	Ajzen and Fishbein (1980), Mathieson (1991)
		People who influence my behavior think I should use MaaS.	
		People whose opinions I value recommend that I use MaaS.	
	Perceived behavioral control	I have the necessary resources to use MaaS.	Venkatesh (2000)
		I have the necessary knowledge to use MaaS.	
		With the necessary devices, the possibility of access, and the necessary knowledge provided, it would be easy to use MaaS.	
	Submission of recommendations	My friends think that I am a good source of information for new music in the internet.	Sun et al. (2006)
		Compared to my friends I am asked more frequently about recommendations for music via the internet.	
		I tend to influence the opinions of others regarding music via the internet.	
	Search for recommendations	I tend to search in the internet for others' opinions to find new music.	Sun et al. (2006)
		I tend to search for the latest information about music on the internet before purchasing music.	
		When I am interested in new music, I search for recommendations via e-mail, chat rooms, or ratings on the internet.	
	Desire to own	I would be not sad if I lost my digital music library due to technical issues.*	Belk (1985)
		Compared to others, I do not care as much about saving my digital music library.*	
	Flat rate preference	I like the flat rate, because I do not have to think about my music consumption costs.	Lambrecht and Skiera (2006)
		I feel more comfortable when listening to music when I pay a flat rate.	
Relative advantage of MaaS	Sound quality	My decision to download music legally or illegally is strongly linked with the music's sound quality.	Plowman and Goode (2009)
		The sound quality of downloaded music is better when downloading it from legal providers than from illegal ones.	
	Search costs	Interesting and rare titles are easier to find via legal music providers.	Trepte et al. (2004)
		The music I am looking for is easier to find via legal providers than illegal ones.	
		Especially new and the latest titles are easier to find via legal providers than illegal ones.	
	Law-abiding actions	Existing laws prohibit effectively illegal music sharing.	Kwong and Lee (2002)
		Existing laws effectively deter illegal downloading.	
		The current prosecution of illegal music sharing is effective.	
	Moral scruples	Downloading songs illegally is (…) ethically incorrect.	Coyle et al. (2009)
		(…) the same as theft.	
		(…) a reason to feel guilty.	

*Reverse item

Table 2 Factor loadings, means, standard deviations, and construct reliabilities

Construct	Indicators	Standardized factor loadings	Mean		Standard deviation		Construct reliability
Intention to use MaaS (I)	I_1	0.974 (0.963)	1.710 (3.507)	1.65 (3.57)	1.251 (1.483)	1.18 (1.41)	0.988 (0.978)
	I_2	0.987 (0.973)	1.641 (3.643)		1.166 (1.435)		
	I_3	0.986 (0.971)	1.611 (3.564)		1.189 (1.471)		
Attitude (Att)	Att_1	0.773 (0.793)	4.377	3.95	0.813	0.79	0.907 (0.908)
	Att_2	0.780 (0.812)	4.153		1.115		
	Att_3	0.818 (0.799)	3.569		1.026		
	Att_4	0.833 (0.833)	3.902		0.929		
	Att_5	0.861 (0.841)	3.754		0.963		
Subjective norm (SN)	SN_1	0.625 (0.745)	3.789	2.99	1.025	0.99	0.864 (0.866)
	SN_2	0.895 (0.870)	2.710		1.316		
	SN_3	0.931 (0.861)	2.500		1.234		
Perceived behavioral control (PBC)	PBC_1	0.777 (0.630)	4.669	4.63	0.647	0.57	0.854 (0.833)
	PBC_2	0.837 (0.870)	4.555		0.782		
	PBC_3	0.825 (0.858)	4.680		0.665		
Submission of music recommendations (OOL)	OOL_1	0.893 (0.893)	3.200	2.82	1.377	1.23	0.921 (0.921)
	OOL_2	0.873 (0.870)	2.663		1.376		
	OOL_3	0.912 (0.914)	2.624		1.398		
Search for music recommendations (OOS)	OOS_1	0.879 (0.875)	2.916	2.79	1.493	1.27	0.887 (0.887)
	OOS_2	0.929 (0.827)	3.137		1.517		
	OOS_3	0.844 (0.849)	2.322		1.479		
Desire to own (DO)	DO_1	0.867 (0.872)	1.660	1.89	1.102	1.10	0.875 (0.875)
	DO_2	0.896 (0.892)	2.130		1.401		
Flat rate preference (FP)	FP_1	0.958 (0.957)	4.189	4.13	1.089	1.06	0.949 (0.949)
	FP_2	0.943 (0.943)	4.090		1.143		
Sound quality (SQ)	SQ_1	0.897 (0.896)	2.910	2.89	1.359	1.20	0.906 (0.906)
	SQ_2	0.923 (0.923)	2.886		1.289		
Search costs (SC)	SC_1	0.901 (0.901)	3.035	2.85	1.306	1.11	0.901 (0.901)
	SC_2	0.907 (0.909)	2.795		1.340		
	SC_3	0.789 (0.786)	2.957		1.373		
Law-abiding actions (LA)	LA_1	0.873 (0.701)	2.180	2.14	1.316	1.02	0.861 (0.845)
	LA_2	0.876 (0.934)	2.297		1.268		
	LA_3	0.706 (0.854)	1.971		1.088		
Moral scruples (MS)	MS_1	0.895 (0.895)	2.653	2.49	1.372	1.26	0.935 (0.935)
	MS_2	0.928 (0.928)	2.390		1.366		
	MS_3	0.903 (0.903)	2.456		1.446		

Notes: Values (in brackets) refer to the measurement model including the intention to use paid (free) MaaS. Since intention to use MaaS was measured for paid MaaS as well as free MaaS, the means and standard deviation values are provided for both constructs. Values of SQ, SC, LA, and MS were calculated by using the indicator re-use technique (Mode B)

significant variables showed at least a small effect size. **Table 5** summarizes the results.

5 Results

5.1 Descriptive Results

Concerning the descriptive results, we are especially interested in the results for attitude and intentions. Music pirates show a clearly positive approach to MaaS. The mean of attitude was 3.95 on a five-point scale. Questions regarding the intention to use MaaS were asked for the free version and for the premium paid version – with significant differences in the answers. While most pirates would use the free version (mean = 3.57), few would pay for MaaS (mean = 1.65). Strikingly high are the means of perceived behavioral control (4.63) and flat rate preference (4.13). The first result shows that music pirates are able to use MaaS from a cognitive perspective and a technical perspective, while the latter shows a broad acceptance of a flat rate pricing model for music.

5.2 Results from the Structural Equation Model

Our main model regarding usage intention comprises $2 \times 3 = 6$ hypotheses. Overall, we found support of five of these

Table 3 Correlations and AVEs

	1	2	3	4	5	6	7	8	9	10	11	12
I	**0.965** **(0.938)**											
Att	0.387** (0.681**)	**0.662** **(0.665)**										
SN	0.536** (0.492**)	0.481** (0.505**)	**0.686** **(0.684)**									
PBC	0.023 (0.285**)	0.189* (0.198*)	0.181* (0.176*)	**0.661** **(0.630)**								
OOL	0.359** (0.312**)	0.302** (0.286**)	0.469** (0.451**)	0.280** (0.275**)	**0.796** **(0.796)**							
OOS	0.324** (0284**)	0.369** (0.350**)	0.462** (0.447**)	0.160 (0.151)	0.595** (0.596**)	**0.724** **(0.723)**						
DO	0.189* (0.041)	−0.073 (−0.072)	−0.083 (−0.110)	−0.361** (−0.359**)	−0.273** (−0.273**)	−0.210* (−0.208*)	**0.777** **(0.777)**					
FP	0.126 (0.246**)	0.332** (0.336**)	0.321** (0.325**)	0.168 (0.155)	0.231** (0.232**)	0.275** (0.277**)	−0.021 (0.020)	**0.903** **(0.903)**				
SQ	0.380** (0.114)	0.181** (0.184*)	0.445** (0.439**)	−0.041 (−0.050)	0.190* (0.189*)	0.191* (0.192*)	0.152 (0.154)	0.195* (0.195*)	**0.827** **(0.827)**			
SC	0.357** (0.147)	0.238** (0.236**)	0.435** (0.429**)	0.001 (0.000)	0.054 (0.056)	0.213* (0.215*)	0.088 (0.088)	0.130 (0.130)	0.434** (0.435**)	**0.752** **(0.752)**		
LA	0.244** (0.018)	−0.014 (0.013)	−0.042 (−0.013)	−0.132 (−0.089)	−0.126 (−0.112)	−0.053 (−0.100)	0.345** (0.338**)	0.163 (0.110)	0.182* (0.151)	0.145 (0.159)	**0.676** **(0.652)**	
MS	0.410** (0.267**)	0.324** (0.314**)	0.375** (0.348**)	0.070 (0.064)	0.266** (0.266**)	0.313** (0.314**)	0.097 (0.098)	0.231** (0.231**)	0.330** (0.329**)	0.375** (0.376**)	0.281** (0.277**)	**0.826** **(0.826)**

Notes: Diagonal elements are AVEs and off-diagonal elements are correlations between constructs. Values (in brackets) refer to the measurement model, including the intention to use paid (free) MaaS. Values of SQ, SC, LA, and MS were calculated by using the indicator re-use technique (Mode B)

$*p < 0.05$; $**p < 0.01$; all other correlations are insignificant

Table 4 Validation of the formative measurement model

	Sound quality	Search costs	Law-abiding actions	Moral scruples
Standardized factor loadings	ns	0.403* (0.416*)	ns	0.745*** (0.734***)
Variance inflationfactor (VIF)	–	1.28	–	1.28

Notes: Values (in brackets) refer to the measurement model, including the intention to use paid (free) MaaS

$*p < 0.05$; $**p < 0.01$; $***p < 0.001$; ns = not significant

six hypotheses. Only the influence of perceived behavioral control on intention in the case of paid MaaS was found to be not significant. This might be explained by the low variance in the variable.

In our model for paid MaaS, subjective norm and attitude were found to positively influence usage intention. We could thus explain approximately 32 % of the variance of intention paid. Regarding the model for free MaaS, attitude was found to have the strongest influence, followed by subjective norm and perceived behavioral control. These three constructs were able to explain 51 % of the variance of intention to use free MaaS. We can observe a strong difference between the influence of attitude on intention to use free MaaS and the intention to use paid MaaS: building a strong attitude therefore does not lead directly to high willingness to pay; instead, it is the intention to test free MaaS that is influenced by attitudes.

Our extended model focused on the attitude towards MaaS. Since we ran two models (one for free MaaS usage intention, one for paid MaaS usage intention) we had $2 \times 5 = 10$ hypotheses. There are only small differences between the path coefficients, since attitude was only asked for once – for MaaS in general. Out of these 10 hypotheses, we found support for six. We could explain 24 % respectively 23 % of the variance of attitude towards MaaS. We found that the search for music recommendations and the flat rate preference influence the attitude towards MaaS positively and significantly. The new recommendation functions and the pricing model are therefore functions users rated highly and which can help build a strongly positive attitude towards MaaS.

The most important influence, however, can be found in the relative advantage of MaaS compared to illegal channels. Reduced search costs and prevention of moral scruples are seen as considerable advantages of MaaS. As shown, sound quality and law-abiding actions are not regarded as advantages by the music pirates. Pirates seem satisfied with the sound quality of tracks provided via illegal networks and seem to feel safe

Table 5 Structural equation model results

Predictor		Paid MaaS		Free MaaS	
		Intention $R^2 = 0.32$		Intention $R^2 = 0.51$	
		Path coefficient	Effect size	Path coefficient	Effect size
H1	Attitude	0.181***	0.04	0.561***	0.48
H2	Subjective norm	0.466***	0.24	0.184***	0.07
H3	Perceived behavioral control	−0.095ns	–	0.141**	0.05
Predictor		**Attitude towards MaaS** $R^2 = 0.24$		**Attitude towards MaaS** $R^2 = 0.23$	
		Path coefficient	Effect size	Path coefficient	Effect size
H4	Submission of music recommendations	0.078ns	–	0.068ns	–
H5	Search for music recommendations	0.179*	0.03	0.162*	0.02
H6	Desire to own	−0.034ns	–	−0.040ns	–
H7	Flat rate preference	0.213*	0.04	0.224*	0.05
H8	Relative advantage of MaaS	0.219***	0.05	0.217***	0.05

$^{*}p < 0.05;\ ^{**}p < 0.01;\ ^{***}p < 0.005;$

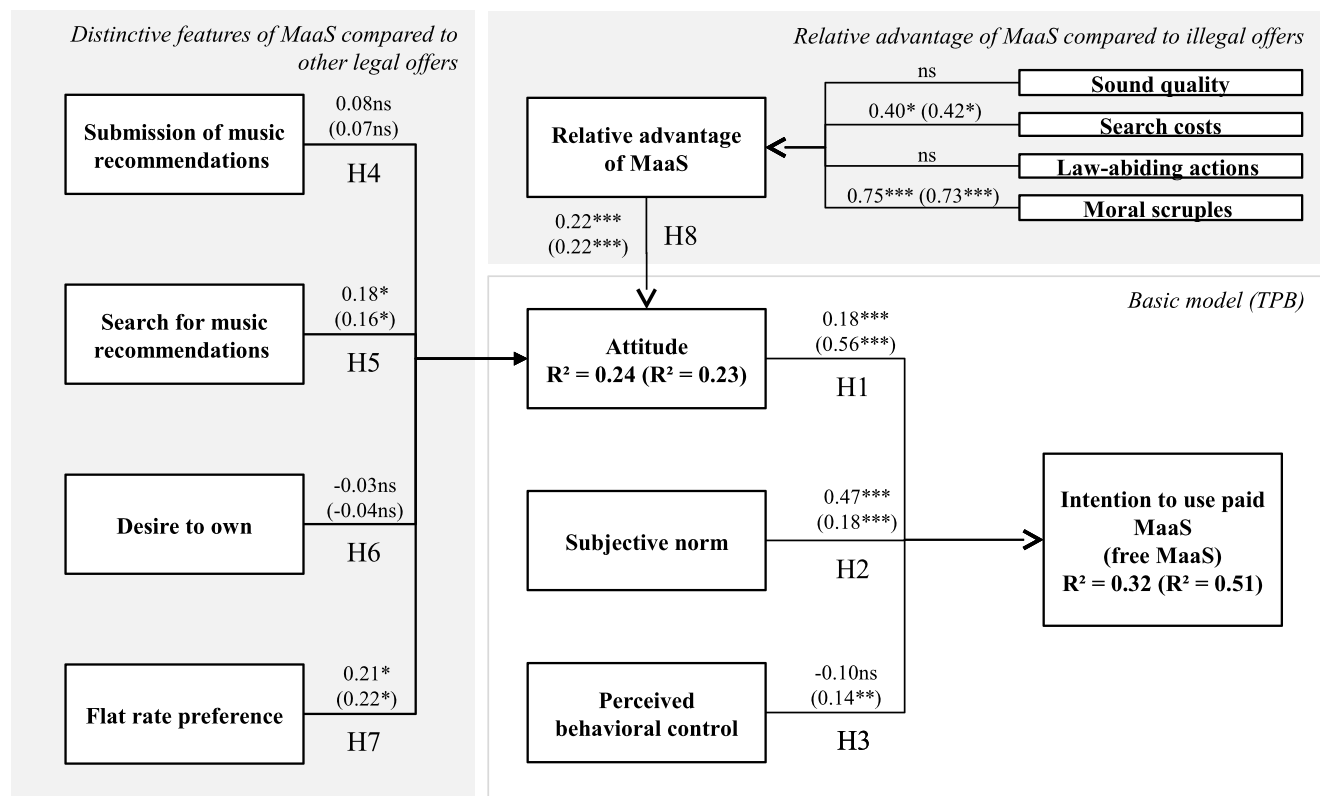^{ns}Not significant: $n = 132$. Effect size: $f^2 > 0.02 =$ small; $f^2 > 0.15 =$ medium; $f^2 > 0.35 =$ large

from prosecution. **Figure 4** summarizes our results.

6 Implications and Limitations

Our study demonstrated the attractiveness of MaaS offers to music pirates. Nevertheless, most music pirates prefer free MaaS. In this context, providers can generate advertising-based revenues. The integration of fee-based services seems particularly profitable for MaaS providers. While configuring the service, the pricing model and additional features offered are of great importance.

We showed that flat rates are regarded as an attractive pricing model by music pirates and that this constitutes a suitable alternative to pay-per-download, which is often considered too expensive (Al-Rafee and Cronan 2006). Although a flat rate is not the only reason for music pirates to use MaaS offers, it influences the general attitude towards the service. Users who do not consider music piracy owing to moral scruples and higher search costs also show a positive

* p < 0.05; ** p < 0.01; *** p < 0.005; ns not significant // n = 132
Values (in brackets) refer to the measurement model, including the intention to use paid (free) MaaS.

Fig. 4 Structural equation model results

Abstract

Jonathan Dörr, Thomas Wagner, Alexander Benlian, Thomas Hess

Music as a Service as an Alternative to Music Piracy?

An Empirical Investigation of the Intention to Use Music Streaming Services

Despite increasing acceptance of digital channels, total sales in the music business decreased by 31 % from 2004 to 2010. Music piracy is still considered one of the main causes for this. However, several studies found no effects or even positive effects of illegal downloading on record sales. In the past, piracy has been counteracted especially by prosecution and legal offers. Music as a Service (MaaS) represents a new, differing distribution approach in digital music. In contrast to the well-known music platforms for so-called à-la-carte downloads, such as the iTunes Store, MaaS possesses two important characteristics: transmission (streaming instead of downloading) and pricing model (flat rate instead of pay-per-download). Therefore, the consumption of music by means of purchasing and downloading is replaced by a monthly payment service (paid MaaS) and an ad-supported (free MaaS) service. First user surveys suggest that many music pirates are making use of these offers. To find out if MaaS is an attractive distribution channel for music pirates, we developed a model to explain the intention to use MaaS based on the Theory of Planned Behavior. To empirically test this model, we surveyed 132 music pirates. Among others, the outcome shows that the intention to use free MaaS is mainly affected by the attitude towards MaaS, while using paid MaaS is predominantly a result of the influence of users' closest peers. The attitude towards MaaS is positively influenced by the desire to receive music recommendations, the payment type (in the form of a flat rate model), and the relative advantage of MaaS compared to illegal choices.

Keywords: Music as a Service, MaaS, Digital goods, Music streaming, Music piracy, Business models, Theory of planned behavior

attitude towards MaaS. This positive effect may be strengthened by the social environment, such as close friends and relatives who disapprove of music piracy. A reason for the increased willingness to pay may also relate to hedonistic social benefits, established by integrating social features into recommendation systems. Childers et al. (2001) concluded, among others, that users experience far more enjoyment in a pleasant and entertaining online shopping environment. Customers also developed a positive attitude towards a service that has strong design features and is easy to use. Technically and in terms of design, MaaS offers differ from existing services; they match the desired requirements. MaaS providers should therefore focus on comprehensive, user-friendly recommendation systems that support social exchanges between MaaS users. Our study results clearly demonstrate that a platform's features positively influence the attitude towards MaaS. Besides direct recommendations from friends, users can receive recommendations based on tagged music channels or collaborative filtering. Further measures based in this relative advantage, such as adequate search functions, positively influence attitudes towards MaaS. Our study also derives that measures which make music pirates feel that they are behaving unfairly shall be continued. However, this is more within the power of the industry than of a single online music provider.

From a research perspective, our study contributes to the existing academic literature by analyzing the acceptance of MaaS as a new technology. TPB's explanatory power was confirmed. Our paper also uses MaaS as an example to explain attitudes towards new technology more precisely by comparing alternatives (see **Fig. 3**). To date, acceptance studies have solely focused on the intention to use a new service or product, while ignoring other services or products being used by customers (Polites and Karahanna 2012). Our study includes prior use of other products by adding the new product's relative advantage. The study therefore contributes to both the practical relevance of and the general research on acceptance.

Some limitations must be considered for the results' interpretation. A student sample cannot be considered representative of the population of music pirates. Therefore, a generalization of the results is not possible due to a sample bias. Implications for the general acceptance of MaaS cannot be derived from a survey among music pirates. Thus, future studies should try to develop and empirically test a general, valid research model. The limitation to German-speaking areas further prevents a generalization of the results. Also, mobile network coverage plays a crucial role in the mobile use of MaaS. Furthermore, MaaS providers have to deal with different national music rights protection authorities (e.g., GEMA in Germany). Although we provided an information video about MaaS, it must be considered that the surveyed students did not have equal knowledge about MaaS. Future studies should therefore directly focus on MaaS users in order to ensure sufficient knowledge about MaaS. The survey participants were asked about their usage intention rather than their de facto MaaS use. Therefore, there may be a parallel use of MaaS and illegal platforms. Especially German MaaS providers do not always have the latest music tracks available on their portal. This fact may encourage to continue using illegal downloads in the first place.

7 Summary and Outlook

MaaS is a business model for the distribution of digital music. The presented study demonstrates that new offers of music consumption can also be an attractive alternative for music pirates. Although there is no indication of the reduction of illegal downloads in general, music pirates consider the free ad-based version of MaaS an alternative. Music pirates who have rejected legal music consumption due to high prices in the past may well switch to legal consumption.

Not only music is offered via streaming services. Streaming portals for videos, games, and e-books are being developed along the same principle as MaaS. In this context, this represents a significant change in property rights. Rather than paying for possession, the user pays for unlimited access to content. After the transmission from physical carrier media to the internet, these offers may be the next large change in the consumption of digital goods.

8 Remarks

A previous version of the paper has been published in German within the cumulative thesis by Dörr (2012).

References

Adams JS (1963) Toward an understanding of inequity. Journal of Abnormal and Social Psychology 67(5):422–436

Ajzen I (1991) The theory of planned behavior. Organizational Behavior and Human Decision Processes 50(2):179–211

Ajzen I (2002) Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. Journal of Applied Social Psychology 32(4):665–683

Ajzen I, Fishbein M (1980) Understanding attitudes and predicting social behavior. Prentice Hall, New York

Al-Rafee S, Cronan T (2006) Digital piracy: factors that influence attitude toward behavior. Journal of Business Ethics 63(3):237–259

Anderson C (2009) Free – the future of a radical price. Random House, London

Armstrong JS, Overton TS (1977) Estimating nonresponse bias in mail surveys. Journal of Marketing Research 14(3):396–402

Arndt J (1967) Role of product-related conversations in the diffusion of a new product. Journal of Marketing Research 4(3):291–295

Becker J-M, Klein K, Wetzels M (2012) Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models. Long Range Planning 45(5–6):359–394

Belk RW (1985) Materialism: trait aspects of living in the material world. Journal of Consumer Research 12(3):265–280

Benlian A, Hess T (2010) IT standard implementation and business process outcomes – an empirical analysis of XML in the publishing industry. In: Proceedings of the 31st international conference on information systems, St. Louis, p 21

Benlian A, Hess T, Buxmann P (2009) Drivers of saas-adoption: an empirical study of different application types. Business & Information Systems Engineering 1(5):357–369

Bhattacharjee S, Gopal RD, Lertwachara K, Marsden JR (2003a) No more shadow boxing with online music piracy: strategic business models to enhance revenues. In: Proceedings of the 36th annual Hawaii international conference on system sciences, Hawaii, p 11

Bhattacharjee S, Gopal RD, Sanders GL (2003b) Digital music and online sharing: software piracy 2.0? Communications of the ACM 46(7):107–111

Bounie D, Bourrreau M, Waelbroeck P (2007) Pirates or explorers? Analysis of music consumption in French graduate schools. Brussels Economic Review 50(2):167–192

Buhl HU, Weinhardt C (2009) BISE's responsibility in service research. Business & Information Systems Engineering 1(6):405–407

Burkart P (2008) Trends in digital music archiving. Information Society 24(4):246–250

Buxmann P, Pohl G, Johnscher P, Strube J (2005) Strategien für den digitalen Musikmarkt – Preissetzung und Effektivität von Maßnahmen gegen Raubkopien. WIRTSCHAFTSINFORMATIK 47(2):118–125

Buxmann P, Strube J, Pohl G (2007) Cooperative pricing in digital value chains – the case of online music. Journal of Electronic Commerce Research 8(1):32–40

Chen Y-C, Shang R-A, Lin A-K (2008) The intention to download music files in a P2P environment: consumption value, fashion, and ethical decision perspectives. Electronic Commerce Research & Applications 7(4):411–422

Chiang EP, Assane D (2008) Music piracy among students on the university campus: do males and females react differently? Journal of Socio-Economics 37(4):1371–1380

Childers TL, Carr CL, Peckc J, Carson S (2001) Hedonic and utilitarian motivations for online retail shopping behavior. Journal of Retailing 77(4):511–535

Chin WW (1998) The partial least squares approach for structural equation modeling. In: Marcoulides GA (ed) Modern methods for business research. Lawrence Erlbaum, Hillsdale, pp 295–336

Chiou J-S, Huang C-Y, Lee H-H (2005) The antecedents of music piracy attitudes and intentions. Journal of Business Ethics 57(2):161–174

Choudhury V, Karahanna E (2008) The relative advantage of electronic channels: a multidimensional view. MIS Quarterly 32(1):179–200

Cohen J (1988) Statistical power and analysis for behavioral sciences. Lawrence Erlbaum, Hillsdale

Coyle JR, Gould SJ, Gupta P, Gupta R (2009) To buy or to pirate: the matrix of music consumers' acquisition-mode decision-making. Journal of Business Research 62(10):1031–1037

d'Astous A, Colbert FO, Montpetit D (2005) Music piracy on the web – how effective are anti-piracy arguments? Evidence from the theory of planned behaviour. Journal of Consumer Policy 28(3):289–310

Danaher B, Dhanasobhon S, Smith MD, Telang R (2010) Converting pirates without cannibalizing purchasers: the impact of digital distribution on physical sales and Internet piracy. Marketing Science 29(6):1138–1151

Davis FD (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 13(3):319–340

Diamantopoulos A, Winklhofer HM (2001) Index construction with formative indicators: an alternative to scale development. Journal of Marketing Research 38(2):269–277

Dibbern J, Heinzl A, Schaub N (2007) Determinanten der Akzeptanz von mobilen Bankdiensten: Test eines Drei-Perspektiven-Modells. In: Bayón T, Herrmann A, Huber F (eds) Vielfalt und Einheit in der Marketingwissenschaft. Gabler, Wiesbaden, pp 449–478

Dörr J (2012) Music as a Service – Ein neues Geschäftsmodell für digitale Musik. epubli, Berlin

Dörr J, Benlian A, Grau C, Wilde T (2009) Musikdistribution ohne Digital Rights Management – Eine empirische Analyse der Lock-in- und Netzeffekte im Ecosystem iTunes. In: Proceedings of the 9th international conference Wirtschaftsinformatik, Vienna, p 9

Dörr J, Benlian A, Vetter J, Hess T (2010) Pricing of content services – an empirical investigation of music as a service. In: Proceedings of the 16th Americas conference on information systems, Lima, p 9

Douglas DE, Cronan TP, Behel JD (2007) Equity perceptions as a deterrent to software piracy behavior. Information & Management 44(5):503–512

Fetscherin M, Zaugg S (2004) Music piracy on peer-to-peer networks. In: Proceedings of the 2004 IEEE international conference on e-technology, e-commerce and e-service, Taipei, p 9

Fornell C, Bookstein F (1982) Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. Journal of Marketing Research 19(4):440–452

Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research 18(1):39–50

Fraedrich JP, Ferrell OC (1992) The impact of perceived risk and moral philosophy type on ethical decision making in business organizations. Journal of Business Research 24(4):283–295

Freedman D (2003) Managing pirate culture: corporate responses to peer-to-peer networking. The International Journal on Media Management 5(3):173–179

Glass RS, Wood WA (1996) Situational determinants of software piracy: an equity theory perspective. Journal of Business Ethics 15(11):1189–1198

Gopal R, Bhattacharjee S, Sanders L (2006) Do artists benefit from online music sharing? Journal of Business 79(3):1503–1533

Gopal RD, Sanders GL (2003) Digital music and online sharing: software piracy 2.0? Communications of the ACM 46(7):107–111

Götz O, Liehr-Gobbers K (2004) Analyse von Strukturgleichungsmodellen mit Hilfe der Partial-Least-Squares(PLS)-Methode. Betriebswirtschaft 64(6):714–738

Graf D (2007) Die Theorie des geplanten Verhaltens. In: Krüger D, Vogt G (eds) Theorien in der biologiedidaktischen Forschung. Springer, Heidelberg, pp 33–43

Grasmugg S, Schmitt C, Veit D (2003) Internet-Quellen zu Peer-to-Peer (P2P)-Systemen. WIRTSCHAFTSINFORMATIK 45(3):335–344

Hair J, Anderson R, Tatham R, Black W (1998) Multivariate data analyses with readings. Prentice Hall, Englewood Cliffs

Heath C, Soll JB (1996) Mental budgeting and consumer decisions. Journal of Consumer Research 23(1):40–52

Henke LL, Donohue TR (1989) Functional displacement of traditional TV viewing by VCR owners. Journal of Advertising Research 29(2):18–23

Hennig-Thurau T, Gwinner KP, Walsh G, Gremler DD (2004) Electronic word-of-mouth via consumer-opinion platforms: what motivates consumers to articulate themselves on the Internet. Journal of Interactive Marketing 18(1):38–52

Henseler J, Ringle CM, Sinkovics RR (2009) The use of partial least squares path modeling in international marketing. Advances in International Marketing 20(4):277–319

Hess T, Ünlü V (2004) Systeme für das Management digitaler Rechte. WIRTSCHAFTSINFORMATIK 46(4):273–280

Hildenbrand T, Korchminskaya A, Oswald S, Bieber E, Berchez J-P, Maché N (2007) Konzeption einer Kollaborationsplattform für die zwischenbetriebliche Softwareerstellung. WIRTSCHAFTSINFORMATIK 49(4):247–256

Hinz O, Eckert J (2010) The impact of search and recommendation systems on sales in electronic commerce. Business & Information Systems Engineering 2(2):67–77

Hu L, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis. Structural Equation Modeling 6(1):1–55

IFPI (2010) IFPI digital music report 2010 – music how, when, where you want it. London

IFPI (2012) IFPI digital music report 2012 – expanding choice. Going Global, London

Jaisingh J (2007) Piracy on file-sharing networks: strategies for recording companies. Journal of Organizational Computing & Electronic Commerce 17(4):329–348

Jarvis CB, Mackenzie SB, Podsakoff PM (2003) A critical review of construct indicators and measurement model misspecification in marketing and consumer research. Journal of Consumer Research 30(2):199–218

Jöreskog K (1993) Testing structural equation models. In: Bollen KA, Long JS (eds) Testing structural equation models. Sage, Newbury Park, pp 294–316

Jöreskog KG, Sörbom D, Wallentin FY (2006) Latent variable scores and observational residuals. http://www.ssicentral.com/lisrel/techdocs/obsres.pdf. Accessed 2012-12-02

Kabanoff B (1991) Equity, equality, power and conflict. Academy of Management Review 16(2):416–441

Kwong SW, Park J (2008) Digital music services: consumer intention and adoption. Service Industries Journal 28(10):1463–1481

Kwong TCH, Lee MKO (2002) Behavioral intention model for the exchange mode Internet music piracy. In: Proceedings of the 35th Hawaii international conference on system sciences, Hawaii, p 10

Lambert DM, Harrington TC (1990) Measuring nonresponse bias in customer service mail surveys. Journal of Business Logistics 11(2):5–25

Lambrecht A, Skiera B (2006) Ursachen eines Flatrate-Bias – Systematisierung und Messung der Einflussfaktoren. Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung 58(5):588–617

LaRose R, Kim J (2007) Share, steal, or buy? A social cognitive perspective of music downloading. CyberPsychology & Behavior 10(2):267–277

Levin AM, Dato-On MC, Manolis C (2007) Deterring illegal downloading: the effects of threat appeals, past behavior, subjective norms, and attributions of harm. Journal of Consumer Behavior 6(2–3):111–122

Levin AM, Dato-On MC, Rhee K (2004) Money for nothing and hits for free: the ethics of downloading music from peer-to-peer web sites. Journal of Marketing Theory and Practice 12(1):48–60

Liebowitz SJ (2006) File sharing: creative destruction or just plain destruction? Journal of Law & Economics 49(1):1–28

Lin C-H, Sher PJ, Shih H-Y (2005) Past progress and future directions in conceptualizing customer perceived value. International Journal of Service Industry Management 16(4):318–336

Lohmöller J-B (1989) Latent variable path modeling with partial least squares. Springer, Heidelberg

Mann F (2010) Filmdistribution über internetbasierte Abrufdienste. epubli, München

Mathieson K (1991) Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. Information Systems Research 2(3):173–191

Meuter ML, Bitner MJ, Ostrom AL, Brown SW (2005) Choosing among alternative service delivery modes: an investigation of customer trial of self-service technologies. Journal of Marketing 69(2):61–83

Nandedkar A, Midha V (2009) Optimism in music piracy: a pilot study. In: Proceedings of the 30th international conference on information systems, Phoenix, p 10

Oberholzer-Gee F, Strumpf K (2007) The effect of file sharing on record sales: an empirical analysis. Journal of Political Economy 115(1):1–42

Oestreicher-Singer G, Zalmanson L (2009) "Paying for content or paying for community?" The effect of social involvement on subscribing to media web sites. In: Proceedings of the 30th international conference on information systems, Phoenix, p 17

Pavlou PA, Fygenson M (2006) Understanding and prediction electronic commerce adoption: an extension of the theory of planned behavior. MIS Quarterly 30(1):115–143

Peitz M, Waelbroeck P (2004) The effect of Internet piracy on CD sales – cross section evidence. Review of the Economic Research on Copyright Issues 1(2):71–79

Peitz M, Waelbroeck P (2006) Why the music industry may gain from free downloading – the role of sampling. International Journal of Industrial Organization 24(5):907–913

Peukert C, Claussen J (2012) Piracy and movie revenues: evidence from megaupload. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2176246. Accessed 2012-12-01

Plowman S, Goode S (2009) Factors affecting the intention to download music: quality perceptions and downloading intensity. Journal of Computer Information Systems 49(4):84–97

Polites GL, Karahanna E (2012) Shackled to the status quo: the inhibiting effects of incumbent system habit, switching costs, and inertia on new system acceptance. MIS Quarterly 36(1):21–42

Polites GL, Roberts N, Thatcher J (2012) Conceptualizing models using multidimensional constructs: a review and guidelines for their use. European Journal of Information Systems 21(1):22–48

Prelec D, Loewenstein G (1998) The red and the black: mental accounting of savings and debt. Marketing Science 17(1):4–28

Ringle CM, Wende S, Will S (2005). SmartPLS 2.0 (M3) beta. Hamburg. http://www.smartpls.de

Ringle CM, Sarstedt M, Straub DW (2012) A critical look at the use of PLS-SEM in MIS Quarterly. MIS Quarterly 36(1):iiv-8

Rogers EM (1995) Diffusion of innovations. Free Press, New York

Sandulli FD, Martin-Barbero S (2007) 68 cents per song: a socio-economic survey on the Internet. The International Journal of Research into New Media Technologies 13(1):63–78

Schumann M, Hess T (2009) Grundfragen der Medienwirtschaft. Springer, Heidelberg

Sheppard BH, Hartwick J, Warshaw P (1988) The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research. Journal of Consumer Research 15(3):325–343

Simfy (2011) Simfy – a music networx company. http://corporate.simfy.de/. Accessed 2011-11-25

Sinha RK, Mandel N (2008) Preventing digital music piracy: the carrot or the stick? Journal of Marketing 72(1):1–15

Sinha RK, Machado FS, Sellman C (2010) Don't think twice, it's all right: music piracy and pricing in a DRM-free environment. Journal of Marketing 74(2):40–54

Straub DW Jr. (1990) Effective IS security: an empirical study. Information Systems Research 1(3):255–276

Sullivan M, Hibbert S (2006) The music collector. In: Advances in consumer research – 7th European conference proceedings, pp 285–291

Sun T, Youn S, Wu G, Kuntaraporn M (2006) Online word-of-mouth (or mouse): an exploration of its antecedents and consequences. Journal of Computer-Mediated Communication 11(4):1104–1127

Thaler RH (2008) Mental accounting and consumer choice. Marketing Science 27(1):15–25

Trepte S, Reinecke L, Richter-Matthies A, Adelberger C, Fittkau J-T (2004) Von Jägern und Sammlern. Motive des MP3-Sharings in Abgrenzung zum CD-Kauf. In: Hasebrink U, Mikos L, Pommer E (eds) Mediennutzung in konvergierenden Medienumgebungen. Reinhardt Fischer, München, pp 199–219

Upshaw D, Babin LA (2010) Music downloading: competing against online piracy. International Journal of Business & Public Administration 7(1):14–26

Venkatesh V (2000) Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model. Information Systems Research 11(4):342–365

Venkatesh V, Thong JYL, Xu X (2012) Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. MIS Quarterly 36(1):157–178

Venkatesh V, Morris MG, Davis GB, Davis FD (2003) User acceptance of information technology: toward a unified view. MIS Quarterly 27(3):425–478

Wang C-C, Chen C-T, Yang S-C, Farn C-K (2009) Pirate or buy? The moderating effect of idolatry. Journal of Business Ethics 90(1):81–93

Wetzels M, Odekerken-Schröder G, Van Oppen C (2009) Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration. MIS Quarterly 33(1):177–195

Woolley DJ (2010) The cynical pirate: how cynicsm effects music piracy. Academy of Information & Management Sciences Journal 13(1):31–43

Zentner A (2006) Measuring the effect of file sharing on music purchases. Journal of Law and Economics 49(4):63–90