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ABSTRACT

In the last years new concepts of digital music distribution have been developed. One of them is Music as a Service, which provides music streaming over the internet as a service - without transferring ownership for the content. This differentiates Music as a Service from Download to Own, which is used by music download platforms predominantly and is the most widely studied concept in academic research. The aim of this paper is to receive first research implications about customers' attitudes towards MaaS.

Based on an empirical survey of 132 Music as a Service users, this research explores the effects of product configurations on consumers' utility and their willingness to pay (WTP) for premium offers. We can show that next to price, contract duration and music quality as the most important product attributes, there is a high WTP for overcoming insufficient mobile internet coverage.

Keywords

Music as a Service, Content as a Service, music streaming, digital distribution, willingness to pay, pricing, business model.

INTRODUCTION

It seems that the market for legal music downloads is about to establish itself. In 2009, 27 per cent of industry's revenue was generated in digital channels through over 400 licensed music services worldwide. However, in the time from 2004-2009, the music industry's global sales fell by 30% (IFPI 2010). There are two main reasons for that, which have been empirically demonstrated. First, there is significant revenue lost, due to 29.8 million frequent users of file-sharing services in the top five EU markets alone (Zentner 2006). Second, the digitization of music allows the unbundling of albums and in the digital world customers download singles increasingly. This means that the downloads are not as rewarding as previous CD sales were (Elberse 2010). To address these two problems, there are a number of new distribution concepts, one of which is Music as a Service (MaaS). The first music platforms, which use MaaS, e.g. Spotify, Grooveshark, Deezer and Steereo, already started their business.

The current revenue source of MaaS is a combination of ad-based financing and a model referred to as "freemium". In the freemium model, services can be used both for free or with a paid subscription to obtain premium content. In the case of MaaS the free version is also financed by advertising. Other popular services in the Internet such as Flickr, LinkedIn and Skype already use the freemium model. Here, users who are willing to pay for additional services are clearly outnumbered and move usually at five per cent (Anderson 2009). According to estimates, there are only four per cent premium subscribers on the MaaS platform Spotify, as well (Jackson and Mitton 2010). But what is behind MaaS and where is it located on the research map?

There are new opportunities for content distribution in the Internet. One of these new distribution concepts is Content as a Service (CaaS), whose technical foundation is referred to as data-streaming and which is analog to the concept of the much discussed Software as a Service (SaaS). CaaS describes a type of business model which provides content over the internet as

a service - without transferring ownership. This differentiates CaaS from "rent or buy models" in the internet. MaaS represents the CaaS concept on music platforms.

CaaS as a new form of content distribution has not yet been explored and therefore requires, in addition to the technological investigation, a scientific investigation of economic issues. One of these issues is the design of viable business models for providers of such services. MaaS, which is represented with first offers on the market, is therefore a suitable subject of study. The premium offer, as an important revenue stream of the current business models, stands in the center of attention. This paper examines from a customer perspective, the importance of the different features of premium offers. It shows the preferred features and the WTP for the different product attributes. The results will specifically shed light on current business models in the field of MaaS, but will be transferable to CaaS as a whole.

The structure of the paper is as follows. In the next section, a review of the relevant literature on the configuration and the WTP for digital music offers is presented, pointing out a research gap in empirically testing these questions for MaaS. Subsequently we illustrate the state of the art of MaaS by showing the characteristics and business models of these services and close this chapter with the research questions and framework. We then proceed by describing the methodological approach to measure consumer utility and WTP. The empirical results of the study are shown in the following chapter. Thereafter, we discuss our results and suggest implications for other researchers and the music industry. The paper closes with an assessment of the limitations of our study and future research in this area.

LITERATURE REVIEW

As mentioned before music streaming platforms can be seen as a service. In contrast to the Download-to-Own (DtO) business model, the customer doesn't buy the song and therefore doesn't acquire any property rights. Instead, the customer uses a service which is specified by the characteristics immateriality and the uno-actu-priciple, which means that production and consumption happen simultaneously. This is due to the integration of the user (as an external factor) into the production process (Chesbrough and Spohrer 2006; Rai and Sambamurthy 2006). In case of MaaS, immateriality doesn't stand for the digital good itself but the service of provision. Production and consumption don't stand for the real production of a song in the studio but rather for the process of listening to music. Due to the music streaming, the consumer is included in the production process which wouldn't happen without him.

For the MaaS user the payment method changes as well. Instead of paying for each song separately as it is common in the Pay-per-Download (PpD) business models, the user pays periodic fees for a subscription. These subscription or rental fees, are also often used on SaaS solutions (Cusumano 2007). Usually this monthly fee is well below the one-time payment for the license. Contrary to SaaS the content supply with MaaS increases due to the release of new songs without an increase of the monthly fee. The assessment base for the fee in current services is independent of the usage and builds on the flat-rate principle.

Current research on the design of services and the WTP in the area of digital music distribution is mostly based on PpD-models of DtO. Using a conjoint measurement of music downloads, Bamert et al. argue that the price is the most important attribute for the purchase decision of consumers (Bamert, Meier-Bickel and Rüdt 2005). The study of Buxmann et al. shows that the willingness to pay for current hits, older songs, rarities and newcomer differs (Buxmann et al. 2005). Also based on a conjoint measurement Breidert and Hahsler investigate the WTP for different product configurations of music downloads. They used the attributes price, package (number of songs in the subscription), sound quality, distribution channel and booklet. Price and package were by far the most important attributes for the subjects. Furthermore they showed that the WTP per title decreases with larger package sizes, which is an argument against a linear pricing strategy for flat-rate models (Breidert and Hahsler 2006). In 2007 Buxmann et al. conducted an empirical investigation with internet users that showed that a better part of consumers evaluate the price for music downloads as to high. Furthermore, they argued that price reductions could seriously increase the revenues in the market segment of online music (Buxmann, Strube and Pohl 2007). An alternative form of payment in DtO-offers was analyzed by Regner und Barria. They investigated the payment behavior on a platform were customers may pay what they want for albums, as long as the payment is within a given price range. They concluded that the fact that consumers do pay voluntarily, can be explained with a sufficiently high level of social preferences (Regner and Barria 2009). Chiang and Assane explored the influential factors on the WTP for digital music and concluded with the indication of consumer acceptance of fee-based music services (Chiang and Assane 2009). Current research analyzes the effect of the disappearance of digital rights management (DRM) on the price. The results confirm earlier studies and show that the WTP rises with the disappearance of DRM (Sinha, Machado and Sellman 2010).

Some publications indicate that there are plenty of pricing strategies for digital goods that partially suit online music very well. Especially, consumers show different WTP that could be perfectly exploited with new pricing strategies and alternative licensing procedures (Bhattacharjee et al. 2006). Nonetheless, the mentioned studies almost exclusively focus on PpD for

DtO. Hence, there is a research gap concerning the design of music streaming services or rather fee-based services as well as the WTP for these services. This research gap will be covered in the paper at hand.

BUSINESS MODEL AND CHARACTERISTICS OF MUSIC AS A SERVICE

The technical concept of streaming music is not new and is used in lots of services like e.g. last.fm. Such services usually show the characteristics of radio stations. They do not offer the possibility to listen directly and on-demand to the music. The central point of MaaS is not the sale or lending of music, but the service of making all the music available all the time. Offerings like Spotify, Grooveshark, Deezer and Steereo are the first providers using the concept of MaaS.

Because the music is on demand accessible, MaaS follows the concept of classical DtO offers. For a first classification of MaaS, a comparison of these two is therefore obvious. This classification is based on a content analysis of the current music platform providers. The differences between the two distribution concepts are presented in Table 1.

Characteristics	Download to Own platforms (e.g. iTunes)	Music as a Service platforms (e.g. Spotify)
Payment	Pay per Download	Free (advertising-based) and flat rate
Consumption	Download to Own / Offline	Streaming / Online
Server environment	Client-server model	Client-server model and Peer-to-Peer model
Device synchronization	Synchronization after download	Streaming with mobile application
Ownership	Ownership (without DRM)	Without ownership (with DRM)
Community features	Not available	Available, e.g. Playlist sharing
User registration	Required	Required for subscription model only

Table 1. Comparison of Download to Own- und Music as a Service-platforms

The biggest difference between DtO and MaaS is the payment. The concept of the DTO adopted the sales model of physical music distribution. The customer pays an amount per song or album, mostly US$ 0.99 or US$ 9.99. In the case of MaaS, the customer uses the platform entirely free or she pays a monthly subscription fee, mostly US$ 9.99. In contrast to downloads, MaaS users have to be online to receive their music by streaming. To reduce the transmission costs, MaaS platforms use both client-server and the peer-to-peer concepts. For mobile consumption, the user of DtO has to synchronize the music with his mobile device. In the case of the MaaS the music gets streamed to the mobile device with the help of a mobile application. Some of these applications allow the offline availability of selected titles, as well. They are stored in the cache of the device.

With the help of community features, MaaS users have the ability to share their playlists and favorite tracks for example on social networks. Some MaaS providers require the users registration only when signing a contract for a premium product. Other characteristics such as music quality, music recommendation, search functions, etc., are the same or similar for both distribution concepts and will be not discussed at this point.

RESEARCH FRAMEWORK: DETERMINANTS OF CUSTOMER VALUE

Previous research models of customer value of digital goods have traditionally included price, quality, distribution channel, DRM and related attributes (Breidert and Hahsler 2006; Mann et al. 2008). In terms of MaaS we also use price, quality and the distribution channel as attributes. Regarding a subscription fee, the attribute price is to be extended by the contract duration that we also add as an attribute. The attribute music quality is operationalized as in the reference papers. The distribution channel focuses on the MaaS provider's choice to offer its service via an internet browser on a website or via special software. Furthermore, we add four attributes to our research framework which are regarded as additional features in a premium offer: application for mobile devices, offline access, community features to share playlists or favorites with friends in social networks and personalized music recommendations, generated for example trough collaborative filtering. Figure 1 depicts the attributes and their influence on the customer value, which in turn influence the WTP, and thus determines the pricing.

On the basis of our framework, we formulated three research questions. They all deal with the issues discussed in the introduction of this paper and aim on the one hand at receiving first research implications about customers' attitudes towards MaaS, and on the other hand at getting information for MaaS providers about a proper product configuration.

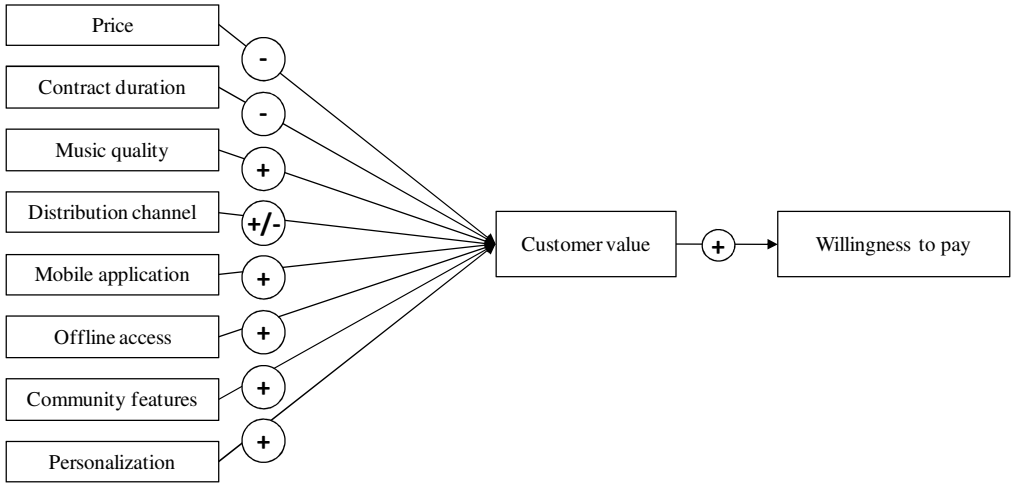

Figure 1. Research framework: Determinants of customer value

The first research question concerns the relative importance of each attribute in customers' estimation of total utility.

RQ1: How important is each attribute in customers' estimation of total utility of MaaS premium offers?

The second research question investigates the specifications of the attributes. For example, which distribution channel is preferred (Browser or Software) and how does it influence the buying decision?

RQ2: Which attribute levels are preferred and how does it influence the buying decision?

In terms of sensitivity analysis, the third research question clarifies the customers' WTP for each attribute of a MaaS premium offer.

RQ3: How much would customers' WTP for MaaS premium offers rise or fall with changing attribute levels?

RESEARCH METHODOLOGY AND ANALYSIS

Adaptive Conjoint Analysis

The Conjoint analysis (CA) is a method for the measurement of costumer value and preferences for so-called multi-attribute objects. These are goods that are composed of certain product attributes, which each have specific attribute levels. In our study, the adaptive conjoint analysis (ACA) was used. This represents a hybrid model in which the holistic to be evaluated alternative product configurations will be generated due to the previously queried the relevance and importance of individual attributes and attribute levels (Vriens 1995). ACA is an advancement of the classical full profile CA, because it incorporates the advantages of letting respondents evaluate complete product configurations, but does not require every possible combination to be presented and thus significantly reduces complexity and drop-outs (Johnson 1987).

ACA in general is based on four assumptions: First, products, in this case, a MaaS premium offer, are bundles of attributes, which in turn are sales incentives. Each attribute has a number of possible attribute levels. An individual's total utility from a product configuration is equal to the sum of the utilities received from each one of the specifications comprised therein. Formally, the total utility can be expressed as:

$$u_{it} = u_i(a_1) + u_i(a_2) + u_i(a_3) + u_i(a_4) + u_i(a_5) + u_i(a_6) + u_i(a_7) + u_i(a_8) \quad (1)$$

Let u_{it} denote consumer i's *total utility* from product configuration t. We assume the attributes to be compensatory in nature, thus justifying a simple addition approach. The *total utility* is a function of $u_i(k_t)$, consumer i's *part worth utility* from the specification of the attribute k in product configuration t. The attributes and exact specifications defined for this study are: a_1 Price *(*2.00/6.00/10.00 Euro), a_2 Contract duration (1/6/12 Month), a_3 Music quality (128/256/320 kbit/s), a_4 Distribution channel (Software/Browser), a_5 Offline access (Yes/No), a_6 Mobile application *(Yes/No)*, a_7 Personalization (Yes/No) and a_8 Community features (Yes/No).

The second assumption of the ACA is that preferences for the incentives given vary by those interviewed. The different preferences are described by the term part worth utilities. The third assumption is that the sum of the part worth utilities from an offer configuration is equal to customers' total utility who have subscribed to this service. The fourth assumption is that adoption of third can also be applied conversely. If there is information about references to different products, then, we could get the part worth utilities derived for each attribute (Johnson 1987).

The ACA is divided in four steps. The aim of the first step is to find out the preferences of respondents for specific attribute levels. Subsequently, the investigation of the attributes importance occurs. Respondents must specify for each attribute how important the difference between the least and the most preferred attribute level is. In the next step, respondents are faced with paired comparisons to find the better product configuration. The last step is the calibration. The respondent states his purchase intention as a percentage value for different product configurations, which consist of the most important attributes. The results are the calibrated part worth utilities that reflect the utility of each attribute level. Critical to the importance of an attribute is the total interval and not the absolute level of the part worth utility. It is a measure of attribute importance to the preference change (Johnson 1987).

Deriving willingness to pay from conjoint data

As the price is included in our conjoint measurement we can calculate the WTP for each possible product configuration using the following method. The method developed by Kohli and Mahajan has already been used in other research papers (Mann et al. 2008; Strube, Pohl and Buxmann 2008). The total utility of a certain product configuration is compared with a reference product. The WTP for the fictitious product is equal with that of the reference product when the worth utility is equal or bigger. The related utilities can be expressed as follows:

$$u_{it|-p} + u_i(p_{it}) = u_{ir|-p} + u_{ir}(p_{ir}) + \varepsilon_i \quad (2)$$

As the total utility of a product is defined as the sum of its part worth utility it can be disjointed as follows: $u_{it|-p}$ is an individual i's total utility of any product configuration t without the price attribute. $u_i(p_t)$ is the individual's part worth utility of a specification of the price attribute. $u_{ir|-p}$ is the individual's total utility of the reference product r without the price attribute, $u_{ir}(p_{ir})$ is the individual's part worth utility of a specification of the price attribute of the reference product, ε_i is any small positive number.

With the ACA we investigated three price points. Using a linear interpolation we could also calculate the utility values $u_i(p_t)$ for additional price points (Kohli and Mahajan 1991; Mann et al. 2008; Strube, Pohl and Buxmann 2008). We conducted the interpolation in steps of 25 cents. If the equation is satisfied, p_{it} reflects the individual's WTP for product configuration t. In the first place, for each consumer a WTP of zero is assumed for the product configuration t. This WTP increases step by step as long as ε_i reaches a minimum or 0. In our analysis only one attribute at a time is changed in its level to ascribe the change of the WTP to this attribute. The reference product can either be an individual's most strongly preferred product or a status quo product (Wübker and Mahajan 1999). In this study we used a product that is currently commercially available as the status quo product. This reference product is mostly bought from the provider Steereo.

Data collection and analysis

Our data was collected using a quantitative standardized online survey from the 1st to the 31st December 2009 on the website of the German MaaS platform Steereo. Steereo is the only MaaS provider in Germany and a typical service comparable to the French Deezer. The only difference between those two and other MaaS platforms is the browser as the distribution channel. The data set of respondents was therefore a passively recruited sample that is subject to self-selection bias and therefore exhibits limited external validity. We used Globalpark's EFS Survey Center 7.0 with the Conjoint Extension 2.0, which facilitated the software assisted adaptive conjoint analysis. The survey was subjected to a pretest, after which the wording and

structure of multiple questions were refined. In order to stimulate the response rate, an incentive sweepstake for 50 free trial subscriptions was included. The questionnaire starts with the phases of conjoint analysis. Following the participants were asked to give socio-demographic information and to answer questions about their music consumption habits. Analyses of the exported data were performed using SPSS version 17.0.

RESULTS

Sample description

A total of 134 participants filled out the questionnaire completely. Two data sets had to be excluded from further analysis because of inconsistent response behavior, so that the adjusted sample consists of 132 participants. The average processing time was 9 minutes and 42 seconds. Among the participants were 98 men and 34 women. 63 per cent were 20 to 29-year-old, followed by the 30 to 39-year-old with approximately 21 per cent. The average age was 28 years, with the youngest participant 16 and the oldest 63 years old. We have 46 per cent employees and 34 per cent students in our data set. Nearly 61 per cent of respondents own a smartphone. The subjects also specified that they daily (13%), several times a week (36%), several times a month (18%) and occasionally (34%) use Steereo. In addition to the use of Steereo, 48 per cent of respondents purchase music on DtO services. Half of these users cannot imagine giving up downloading completely.

Part worth utilities of the attribute levels and importance of the attributes

The coefficient of determination of the regression of utilities and WTP (R^2) is 0.745. First, the relative importance and then the part worth utilities of the attributes presented, summarized in Table 2.

Price (20%)	Utility mean	Std. Dev.	**Contract duration (16%)**	Utility mean	Std. Dev.	**Music quality (14%)**	Utility mean	Std. Dev.
2.00 Euro	0.59	0.39	1 Month	0.36	0.30	320 kbit/s	0.26	0.43
6.00 Euro	-0.15	0.18	6 Month	-0.07	0.21	256 kbit/s	-0.02	0.20
10.00 Euro	-0.78	0.31	12 Month	-0.63	0.30	128 kbit/s	-0.59	0.38
Offline access (12%)	Utility mean	Std. Dev.	**Distribution channel (11%)**	Utility mean	Std. Dev.	**Personalization (10%)**	Utility mean	Std. Dev.
Online & Offline	0.29	0.37	Browser	0.14	0.34	Yes	0.14	0.36
Online	-0.52	0.38	Software	-0.37	.037	No	-0.37	0.34
Mobile application (9%)	Utility mean	Std. Dev.	**Community features (7%)**	Utility mean	Std. Dev.			
Yes	0.18	0.32	Yes	0.04	0.31	$R^2 = 0.745$		
No	-0.42	0.29	No	-0.27	0.31	**Legend**		
						Price (20%) = Relative importance of the attribute		

Table 2. Part worth utilities of the attribute levels and importance of the attributes

To answer RQ1 the following section addresses attribute importance. For the volunteers, especially the attribute price (20%), followed by the subscription period (16%), music quality (14%), offline access (12%), distribution channel (11%), personalized recommendations of music (10%), mobile application (9%) and access to various community features (7%).

Based on the part worth utilities of the attribute levels, the preferred product configuration can be read and answered thus RQ2. Because almost all attribute levels have a clear utility direction the optimal product is fairly intuitive. Only the decision on the distribution channel could not be answered in advance. The respondents prefer the browser usage. It should be noted, that the platform Steereo offers its service through the browser. The part worth utilities show, in contrast to the relative importance, significant differences in the impact of product utilities. For example, the product price of 2.00 Euro (0.59) increases the value of total utility by a multiple greater than an existing community feature (0.04).

Willingness to pay for changing attributes levels

To answer RQ3 as the reference product for the calculation of WTP, we have opted for a typical configuration of the provider Steereo. It costs 5.00 Euro per month, has contract duration of 6 months, is delivered via the browser and additionally has

community features. There is no personalization, no mobile application and no offline access delivered. For the calculation in each case, one attribute was changed and thus determine the WTP for individual attributes, which are summarized in Table 3.

The prices represent the additional monthly WTP of the customer, if the particular attribute is changed in its level. For example, the user would pay 3.25 Euro more per month for a mobile application. If the product has contract duration of 12 months, the provider would have to lower the price 3.00 Euros, to create the same utility for the customer. The results show that the contract duration (5.25 Euro), the music quality (4.50 Euro) and the possibility of offline access (4.50 euro) increase the price most. Compared to the results of the relative importance in this analysis, the value of the mobile application is drawn clearly (3.25 Euro). The low WTP for personalization (2.75 Euro) and community features (1.50 Euro) point to the use of MaaS as an on-demand service.

Product attribute	Changing attribute level from	WTP for changing the attribute level
Contract duration #1	12 to 1 Month	Δ 5.25 Euro/Month
Contract duration #2	12 to 6 Month	Δ 3.00 Euro/Month
Music quality #1	128 to 320 kbit/s	Δ 4.50 Euro/Month
Music quality #2	128 to 256 kbit/s	Δ 3.00 Euro/Month
Offline Access	Online to Online&Offline	Δ 4.50 Euro/Month
Distribution	Software to Browser	Δ 2.75 Euro/Month
Mobile application	No to Yes	Δ 3.25 Euro/Month
Personalization	No to Yes	Δ 2.75 Euro/Month
Community features	No to Yes	Δ 1.50 Euro/Month

Table 3. Willingness to pay for changing the attributes levels per Month

DISCUSSION AND IMPLICATIONS

In this study we explored the importance and the WTP for attributes of MaaS premium offers. This is a first empirical investigation of a new distribution model. In comparison to the relative importance, the results concerning the WTP offer a concrete assessment of the different attributes possible. Hence, the combination of the two results allows a sophisticated interpretation of customer needs.

Similar to the empirical investigations of PpD offers with DtO our results show, that the price is by far the most important attribute of premium offers (Bamert, Meier-Bickel and Rüdt 2005). This is strengthened by the contract duration which is also very important for customers. Beside the mobile application the quality of music and offline access are important levers for the pricing of a MaaS premium offer. As distribution channel for the service, the customers favored the browser over the software. As personalization and community features are not important for the purchase decision and also show a low WTP our assumptions are confirmed that MaaS is rather used as a demand service and therefore lines up next to DtO offers.

But the results also show that MaaS falls short of its opportunities due to technical limitations. The subjects give offline access a high relative importance while they give the mobile application a low one. This could invert in the future due to a higher mobile broadband coverage. All things considered this means that the speed of stationary internet is sufficient for CaaS but other technical limitations like insufficient mobile broadband coverage could thwart the CaaS distribution concept. The multiplicity of technical devices and the consumers need to fully exploit their capabilities especially in a mobile context give CaaS a good chance to fully deploy its capabilities. Thereto the internet cloud around the consumer and its devices has to improve.

LIMITATIONS AND FUTURE RESEARCH

A significant limitation of the present study lies in its restriction to the German MaaS platform Steereo. While its configuration can be compared with other platforms, future studies should try to investigate the whole MaaS market. The findings of this study may be transferable to other platforms and provide first indications of the configuration and WTP for premium offers.

The recent studies on digital music often took place among established download platforms. In contrast, MaaS is a new distribution concept, and users belong to the group of early adopters. Consequently this study is only a snapshot in time that needs to be replicated in the future. It remains to be explored, how especially the diffusion of mobile Internet sets a different focus in the assessment of premium offers.

Because of the novelty of the topic there are a lot of research gaps and questions for the future. Regarding MaaS, piracy was always a topic which has been heavily discussed in scientific context. All indications are that some users stop illegal downloading while using MaaS platforms (IFPI 2010). Here arise the questions, what influences this decision and how big the impact will be.

For the new form of content distribution, the question arises, from what theoretical perspective, the topic can be examined. First of all, the literature on the Service Science can be applied (Chesbrough and Spohrer 2006; Ostrom et al. 2010). For example the property rights theory could be used, to examine the changes in property rights under MaaS in comparison to the DtO-model. But first it is vitally important to do a precise classification and definition of CaaS in the research area of Service Science.

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