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The adoption of personalized music services – Combining qualitative and quantitative research –

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ABSTRACT

In the last decade the music industry has been developing different Internet based music services. Lately personalization via recommendation is gaining popularity. In this paper we investigate the adoption of personalized music services by a combined quantitative and qualitative research approach. We first deploy an adoption study by the use of an adapted TAM survey. Our quantitative findings confirm perceived enjoyment as influential factor for intention to use, higher than perceived usefulness. Instead of broadening the quantitative study to a wider group of users we investigate deeper with qualitative interviews based on diffusion of innovation and different adoption models. Firstly three hypotheses are formulated on basis of the survey. Secondly our qualitative results give a richer explanation and show our group of respondents value the quality of the music recommendation mechanism over extra other functionalities like social networking, blogging and scrobbling. The latter result is important for music service suppliers in their highly competitive market.

Keywords

Adoption of innovations, personalized music, information services, diffusion.

INTRODUCTION

Today's networked society offers ample possibilities to buy or listen to music and people increasingly like to listen to and share their own personalized mix of music (Lam & Tan, 2001; Voida et al, 2006; Pachet, 2003). This implies music retailers are no longer their single source to obtain music and the Internet is playing an important role as a multi channel music supply chain (Premkumar, 2003; Burnes et al. 2004). New forms of Internet based music services are emerging; from "traditional" streaming radio, online sellers, toward community based music recommendation services. There is still an ongoing development in this market and no stable situation is arrived. The following phenomena can be observed:

- The entire digital music market is steadily rising in revenue (von Walter and Hess 2003; IFPI 2009), but the market is divided in a limited amount of large players,
- New start-ups and entrepreneurs enter this market with innovative ideas offering new or extended functionalities in their music services,
- Personalization and streaming mechanisms are gaining popularity and are introduced in various music services (Nielsen, 2008).
- Serious and mature players in the market have been including similar or competitive services or buy the prior mentioned startups to maintain their market share (SellaBand.com; Lala.com 2010).

This overview shows that the mere direct selling of music (e.g via Itunes, Walmart or Amazon) has been developing towards music services that are driven by the mass customization principle; i.e. recommendation services with different personalization functionalities (Celma & Lamere, 2008). This shows that the market makers continuously search for the right match between business model and the appropriate functionality they need to offer to consumers.

This paper zooms in on that phenomenon and investigates the current status on what we call Personalized Music Services (PMS). Our research objective is to first specify the properties of the PMS and secondly investigate the attributes of successful adoption of these hedonic information systems. Our contribution is relevant in two ways. First for the scientific domain; our literature review shows studies on digital rights management or business models prevail. The now mature market shows there is a need for serious adoption studies on music services suppliers to investigate the area of personalized and recommendation based music service. Secondly, the entrepreneurs, but also established music suppliers still are searching for

the right match between business model and service functionality of their PMS. Our adoption analysis gives insights on what functionality end-users expect in what business model context.

RESEARCH METHOD

This paper is embedded in a longitudinal research project of observation and sense making relating to personalized music services over the last four years. In *this* paper we investigate the adoption of these services. Jick (1979), Kaplan (1988) and Miles & Huberman (1994) proved the strength of combining qualitative research with quantitative study for this research goal. Dwivedi, Williams and Lal (2008) stimulate to use the theoretical and methodological variety available. In this paper we apply these two different methods for data collection and analysis; quantitative and qualitative, each discussed in a separate section.

Prior to these two sections we specify and define our research object. Based on our objective to characterize personalized music services from the end user perspective we first conduct a literature study (Webster et al. 2002) for contributions in both the IS as well as the music domain.. In this search we focused around the following individual and combinations of keywords: *download music, digital music, streaming content, internet radio, internet music, sharing music, web radio, net radio, streaming radio, e-radio, online streaming music radio, music download sites, MP3 music downloads, buy MP3 music online, digital music downloads.* This initial investigation results in a small but relevant set of publications, that helps us to define characteristics of the PMS.

Research object

Premkumar (2003) explained the consumption of music can be distinguished in two formats.

> The consumer either owns the specific product (either in tangible form, like CD or vinyl; or in a digital intangible file format like MP3 or AAC file).
>
> The consumer enjoys music trough a service like a "radio station".

This definition still holds, but the functionality has been developing. Lately various authors (Kusek and Leonhard, 2008; Haupt, 2009) predict music itself is to become a utility or a ubiquitous service rather than a product. The core functionality of PMS still will remain: *offering music to consumers*, but the format and transfer model is changing from a pull model (buying songs) towards a personalized push model (streaming recommended songs). Current developments in ubiquitous computing (Lehtiniemi, 2008) and social networking services (Voida et al. 2006) support these developments of enjoying music.

Continuing the line of reasoning of Premkumar (2003), Lam & Tan (2001) Haupt (2009) and Celma (2008) and including the findings of scholars that specialize on recommendation mechanisms (ISMIR) we define a personalized music service (PMS) as:

An Internet enabled service that offers music in principally an audible format to its consumers by the use of an automated recommendation mechanism. The offered content can be in various formats like songs, albums and concert registrations, not necessarily accompanied from snippets or audio fragments. The recommendation functionality can be based on two different mechanisms possibly even combined into one service.

1. Algorithm based recommendation. Based on musical properties (e.g. Pandora), corresponding styles (e.g. last.FM) or listening patterns (e.g. Itunes Genius)
2. Social network based recommendation, Based on friend opinions or suggestions (e.g. Spotify).

In various cases the PMS can go accompanied from extra functionalities like providing extra material like clips, interviews, background information, song texts or even music scores. But for our research objective we take the specific focus that a PMS' core functionality is the predominant automated supply of music in an audible format to its consumers.

Quantitative method

In our quantitative analysis of the adoption of PMS we continue the work of van der Heijden (2004). Hirschman and Holbrook (1982) distinguish between utilitarian and hedonic consumer products and Van der Heijden (2004) extends this line to information systems. Van der Heijden (2004) shows that intrinsic motivators like perceived enjoyment are dominant predictors of usage intention. (figure 1).

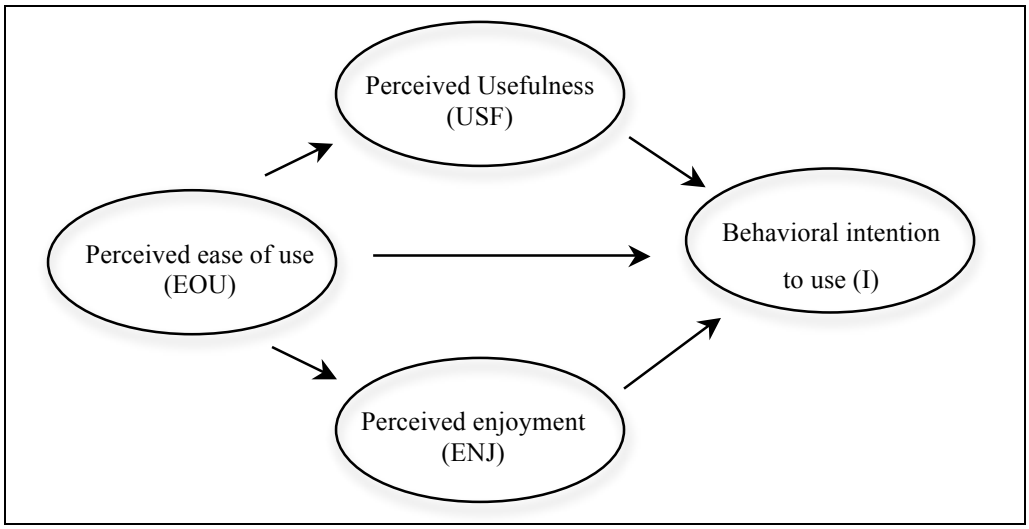

Figure 1. Quantitative research model (adapted from v.d. Heijden (2004))

This work is continued in different variations of hedonic information systems (Nauman et al, 2009; Ayyagari, 2006). Based on the work from van der Heijden (2004), Saade and Bahli (2005) and Turel et al (2010) we derive a set of four dedicated questions especially for Perceived Enjoyment (ENJ) as factor for the hedonic PMS. The results gathered with the help of the online survey instrument were analyzed to determine the reliability of the questions and to test the proposed links between the determinants from the model by a regression analysis. Benbassat and Barki (2007) state that the adaptions of the TAM model lead to confusion. In combination with a qualitative counterpart (Wixom & Todd, 2005) the adapted TAM model still functions as a good indicator and a way to generalize the results.

Qualitative method

Based upon the survey results and our combined research ambition we continue the adoption analysis and derive three hypotheses (Miles & Huberman, 1994; Pope, Zieband & Mays (2000) for our qualitative part. This enhances the prior study and gives an in depth qualitative analysis of how individuals perceive and use PMS; Our main research goal with this second study is to further investigate the adoption characteristics of the PMS by its users.

The hypotheses are analyzed with a qualitative evaluation instrument that is based upon Systems Success Models ((Saarinen and Sääksjärvi 1992; Schmidt, Lyytinen et al. 2001; DeLone and McLean 2003) and Technology Acceptance models (Davis 1989; Venkatesh, Morris et al. 2003, Heijden, 2004) and on the Diffusion of Innovation models (Rogers 2003, Schuring and Spil, 2004).

Fifty four (potential) end users of PMS were interviewed with an open interview framework for more than an hour. The interview model was adapted from Schuring & Spil (2004). All interviews were analyzed by hand with keywords and context as described by Miles and Huberman (1994). The classification scheme used to analyze the expected value of the personalized music services (PMS) shows three determinants of ICT diffusion:

- Relevance; in this research encompasses the degree to which the end user expects the PMS to meet his objectives. This determinant comprises relative advantage, net benefits and perceived usefulness;
- Service and system quality; in this research concerns how the end users needs are satisfied with the product quality of the innovation. This determinant includes ease of use, ease of startup and simplicity of the system but also the availability and responsiveness;
- Information Quality; in this research means functional capabilities, requirements defined from the user perspective and the completeness of these functionalities.

Each of the 54 interviews was transcribed and the hypotheses were assessed as positive, neutral or negative for each hypothesis. For each hypothesis all relevant remarks were highlighted and some of the quotes are described below.

We conclude our paper in the final section, based on the combined analysis, and explain the present status of PMS, their success and adoption, and discuss possible future developments in this specific domain.

QUANTITATIVE ASSESSMENT OF PERSONALIZED MUSIC SERVICES

Our research setup includes a heterogeneous group of Dutch participants using an online survey instrument, created on the basis of the enhanced TAM model (figure 1).

Demographics

Our sample included a total of 50 respondents, 78% male and 22% female. The mean age of the participants was 33, ranging from 17-60. 10% has an undergraduate educational level, 35% has a bachelor level and 45% has a master degree or higher. 67% of our respondents possess an mp3 player and 78% express they have visited a PMS at least once. The latter is questioned by providing the respondents with a small list of examples (Finetune.com, Last.FM, Pandora.com, grooveschark.com, jango.com, musicovery.com)

n=50	Yes	No
Own MP3 player	67%	33%
Experience with PMS	78%	22%

Table 1. contextual results

Quantitative Analysis

The only direct determinant is the behavioral intention (I). Only 22% of the 50 respondents indicate they intend to use the PMS in the next three months. A large portion of 51% considers to start using it and 27% express they will not use it. These figures are summarized in figure 2. All 50 people express unanimous answers to the three respective questions regarding behavioral intention.

Figure 2. Behavioral intention results

Regression analysis

The regression analysis is applied to determine the effect of each determinant on the behavioral intention(I). The results of this analysis can be found in table 2.

		(n=50)			
Dependent factor	**Determinant**	**Cron. alpha**	**β**	**R²**	**p**
Behavioral intention to use (I)	Perceived Usefulness (USF)	.907	-.827	.684	.000 **
	Perceived ease of use (EOU)	.892	-.392	.154	.071
	Perceived enjoyment (ENJ)	.932	-.815	.664	.0010 **

Table 2. Regression analysis

** Correlation is significant at the 0.01 level (2-tailed).

Perceived usefullnes (USF) and perceived enjoyment (ENJ) do have an effect on the behavioral intention. Nauman et al (2009) accept the lower p value (0.5) for their EOU factor, but in our opinion only p levels of 0,01 or 0,1 should be accepted. Therefore our study confirms van der Heijdens (2004) findings on the perceived enjoyment (ENJ) item, but does not confirm the findings on Ease of use (EOU). We repeatedly analyzed our data, but cannot really explain this difference. The beta coefficients acquired in the regression analysis from these determinants do not differ significantly. It can be concluded that 'perceived usefulness' and 'perceived enjoyment' have about the same positive influence on 'behavioral intention'.

This research is a first step in testing the hedonic adaptations of the TAM model in the domain of PMS. The research population for this first investigation was relative small and therefore the statistical analysis and its findings are limited in their predictions. However, the findings from this research confirm the applicability of the adjusted TAM model and we stimulate other researchers to replicate this research for different PMS. An extensive analysis with a larger sample size is recommended for further analysis. We decide to dig deeper into the research problem and perform a qualitative study. Our line of reasoning and research approach is explained in the next section.

FORMULATION OF HYPOTHESES

The quantitative analysis gives us enough solid evidence in which directions we need to look further, and according to Babbie (2003) and Miles & Huberman (1994) a qualitative research set up can give in depth explanations or patterns that the survey instrument cannot reveal. Based on the findings of our survey investigation and the ambition to follow a different research approach we took the data and analyzed for these patterns. Pope, Zieband & Mays (2000) and Miles & Huberman (1994) show hypotheses can be used to structure the sets of qualitative data. Based on our own specific survey questions, its results and the related work in adoption of hedonic information systems (Ayyagari, 2006) we derive the following three hypotheses, each of the hypotheses will be explained individually:

Hypothesis	Foundation in quantitative study
H1 - Higher quality (relevant) music will deliver more listeners	Perceived Usefulness (USF)
H2 - Better availability (speed and simplicity of the service) leads to more listeners	Based on the findings of Perceived ease of use (EOU)
H3 - The addition of extra functionality in PMS will lead to an increase in its usage	Based on the findings of Perceived enjoyment (ENJ)

Table 3. Overview hypotheses

H1 - Higher quality (relevant) music will deliver more listeners

Independent from the age and actual experiences with PMS there is a significant expectation of perceived usefulness (USF). We conclude the users expect to obtain real benefits from the use of the PMS. But this also raises the question what end-users perceive as usefulness in the PMS context.

Usefulness especially in the case of personalized recommendation services means the right music at the right time.

But users especially want to discover new music and sometimes a surprise is also rated as useful or relevant. So in a more generic sense it means a series of "bad" recommendations will users make decide to stop the service.

The continuing match between what the PMS offers and the user values as good music at the desired time. Therefore we formulate our hypothesis that includes our qualitative questions as follows:

H2 - Better availability (speed and simplicity of the service) leads to more listeners

Our survey results on the EOU item were less strong than the original results by van der Heijden, but statistically comparable with Nauman et al (2009). Therefore we investigate the ease of use more in depth and question the typical attributes for the ease of use in the PMS context. Ease of use traditionally in utilitarian IS is connected to user interface, speed, simplicity, and availability. These issues are best addressed by DeLone and McLean (2003) as they call it system quality.

We specified the attributes from the utilitarian domain to the hedonic domain and focus on speed of the service that is responsiveness on user interaction and the speed of supplying music results after a search. Secondly we focus on simplicity of the PMS and investigate the ease of use of the User Interface of the PMS application

H3 - The addition of extra functionality in PMS will lead to an increase in its usage

Enjoyment is statistically significant on Behavioral Intention. Reflecting upon our own literature -and desk research on PDSM we question what enjoyment fits to the PMS domain? Is it rather the mere experience of listening to music? Or is enjoyment for PMS users not only individually based, but also tightly related to sharing music and listening experiences. We see a trend that some PMS suppliers include these social networking functionalities into their PDSM and are curious about their contribution to the enjoyment perception.

QUALITATIVE DATA ANALYSIS

Demographics

Our group of 54 interviewees is heterogeneous. 48% is female, 52 % is male. Age spreads from 19-56. All respondents frequently use the internet. 68% uses the Internet for music related activities (listening, viewing, searching, buying). The interviewees not necessarily include the survey respondents.

Analysis Hypothesis 1 – Higher quality (relevant) music will deliver more listeners

Thirty six interviewees (66%) confirmed the hypothesis that quality of the music would influence their adoption decision. Quality of music was found in two ways, the sound quality and the personalization of the music. On the latter most weaknesses were found. Many interviewees (18) state "wrong numbers" as a reason to stop listening or tune to another website.

Only one of the 54 interviewed persons rejected the hypothesis by stating "to find new music you have to look beyond your personal taste". Seventeen interviewees were neutral to this hypothesis that means they showed neither positive remarks about the quality of songs nor negative remarks.

We observe a degree or ordering in the perception of the interviewees when we take the number of answers in perspective.

1. The actual match between what music (artist/style) the user searches for and the PMS comes up with.
2. Audio quality
3. Actual dynamics or recommendation algorithm. In other words: once a mistaken match is bad, but can be compensated by a correct match the next time.
4. Surprise factor or new music
5. Music without disturbances

Analysis Hypothesis 2 - Better availability (speed and simplicity of the service) leads to more listeners

The majority of the interviewees (65%) confirm this hypothesis. The majority of the interviewees calls this aspect: "ease of use" and value it as very important. The respondents give many different reasons:

"easy to select music"

"User friendliness is important to me"

"The speed of the system, especially the start up is important"

"The simplicity of the system can be even more simple"

Nineteen interviewees (35%) are indifferent on this hypothesis of simplicity and speed but none of the interviewees state that the "ease of use" will lead does not deliver more users.

The use of Internet and PC is mentioned as a barrier of PMS by the majority of the respondents (87 %). Many respondents answer: "PMS is nice when you are behind your computer". This is combined by the expression that in "normal life" they would use another format of music supply. Most of the respondents were capable of using the PMS from the perspective of availability. The respondents state improvements on resources should be found in:

1. Better Internet services.
2. Network availability and stability.
3. Use of mobile equipment.
4. Better software.
5. Better customization of the PMS.

Analysis Hypothesis 3 - The addition of extra functionality in PMS will lead to an increase in its usage

There is much indifference in the answers of the interviewees whether the functionality of the PMS should be increased. Ninety three percent (93%) do not confirm this hypothesis. Only three interviewees utter the necessity of extra functionalities. Just one does explicitly state that he does not like these extra functionalities.

In literature, the social media are found to be very influential but in our empirical data we could only find five interviewees mention it. Most of the respondents "just want to listen to good music". They have no high requirements for the new PMS. As far as they could tell, the functional quality of the music service was good. When questioned deeper, many requirements were mentioned that might trigger people to use the system. These requirements are fairly broad, numbered in order of importance and sometimes only mentioned a few times, but still they can be useful:

1. Information display on what is played
2. Supply of new songs
3. Influence on the playlist
4. Scrobbling (i.e. keeping track and uploading the information of the played songs in your playlist for recommendation purposes)
5. Social network

CONCLUSIONS

In this paper we investigated and specified the phenomenon we call Personalized Music Services.

The supply mechanism for music is arrived at a new level and this logically impacts how society buys, shares, listens and creates music. A personalized music service automatically supplies the user with music in an audible format. The service is driven by music recommendations managed by the user himself through a variety of attributes, e.g. his listening behavior, playlist configuration or mood indication algorithms, or recommendations from his social network.

Our combined adoption study of these services shows the following results:

The quantitative investigation partly confirms findings in research set-ups of TAM research in similar hedonic domains. Perceived usefulness and perceived enjoyment are two significant items on intention to use. Ease of use is more important compared to results in utilitarian systems research, but in our research not significant on the 0.01 p-level.

The qualitative results give a detailed understanding on what really matters for users of PMS.

Perceived usefulness especially is about getting the right music on the right moment. Not all respondents are currently convinced that PMS are able to fulfill this requirement. The right music does not necessarily mean the same thing to the interviewees ranging from no wrong songs to good audio quality to new music.

Ease of use is tightly coupled to speed and ease of use of the application interface. The latter is even more specified in the interviews and the majority reports simplicity of the application as an important aspect. Although the ease of use is not significant in the quantitative part of the study, the hypothesis 2 on speed and simplicity is confirmed by most of the interviewees.

Limitation in functionality is often reported with examples like next song, search function, and recommendation evaluation. The interviewees respond no real preference for the type of recommendation mechanism (algorithm or social network). The service value of PMS can be summarized as “simply listening to good music”. “Good” means the recommendation of “no wrong songs”.

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