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Report on 3rd CHORUS+ Think-Tank

"Think-Tank on the Future of Music Search, Access and Consumption"

MIDEM 2011

Cannes, France, January 24, 2011

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Abstract

Think-Tank on the Future of Music Search, Access and Consumption co-located with MIDEM 2011 in Cannes, France, January 24, 2011

The Think-Tank on the Future of Music Search, Access and Consumption aimed at discussing the current and future challenges of the music industry and to assess the role and impact of current and future music search and recommendation technologies and services. It was held at MIDEM 2011, the world's largest music industry trade fair in Cannes, France and coordinated by CHORUS+, a European Coordination Action on Audio-Visual Search, as the third in a series of Think-Tanks.

The digital changeover has been highly disruptive to the music business so far. This Think-Tank focused on analyzing what is lying ahead, especially from a technological viewpoint with regard to latest technologies emerging from R&D. The goal of this Think-Tank was to establish, with selected highly qualified market and technology experts, a consensual understanding of, and outlook on, the future of future musical services, to identify crucial technologies in relation to search and to outline the map of key enabling technologies in the area.

The Think-Tank analyzed current music consumption patterns, emerging services and technologies and discussed technological gaps in the music industry in terms of search, recommendation and personalization. It identified and the open questions and the challenges of the music industry in the coming 10 years.

Table of Contents

1. Objectives of the Think-Tank

The digital changeover has been highly disruptive to the music business. This Think-Tank was organized in order to discuss the challenges of the music market from a European perspective in an international context and to assess the business and societal impact of current and future music search and recommendation technologies and services. Its aim was to identify what is lying ahead, especially from a technological viewpoint with regard to latest technologies emerging from R&D.

The goal of this Think-Tank was to establish, with highly qualified market and technology experts, a possibly consensual understanding of, and outlook on, the future of future musical services, and to identify a roadmap of crucial technologies for reaching this vision of the future .

Key issues discussed were focused around these questions:

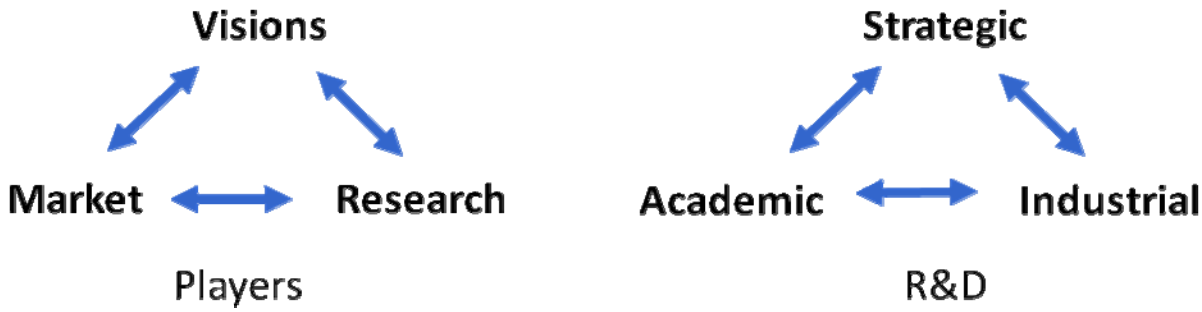
- How / where will music be consumed?
- How will users want to search for music?
- What - technology - is missing to make this possible?

2. Introduction

Andreas Rauber opened the Think-Tank with a brief presentation of the CHORUS+ project, the European Coordination Action that organized this Think-Tank at the MIDEM 2011, and its objectives.

He also presented the agenda of the 3-hour Think-Tank and its goals, providing an overview of the context of players and R&D:

In his opening presentation he mentioned the gap between (1) the vision, (2) the market, and (3) the research in the field of music search and consumption.



Andreas Rauber moderated the Think-Tank discussions following Gerd Leonhards keynote. To structure the discussion he presented a number of results from the online questionnaire realized by the Chorus+ team. This questionnaire, targeted towards the music industry stakeholders, capture their view on the future of music consumption
Selected results from this questionnaire are also presented in this report, with the conclusions made from them in the Think-Tank.

3. Think-Tank Participants

A limited number of representatives from diverse areas in the music industry have been invited to the Tank on the Future of Music Search, Access and Consumption: participants from research, content providers, distributors, service providers, technology companies and communication companies as well as strategic visionaries.

The selection of participants was based on the aim of having representatives from very diverse and broad areas from the music industry, covering a variety of aspects, while keeping the discussion group small enough in order to enable contributions by each person.

The Think-Tank started with a brief introduction of all the participants by themselves and their role in the music business. The final list of participants was the following one:

Participant	Organization	Title/Position
Gunnar DEUTSCHMANN	arvato digital services (Germany)	Sales Manager Media Network
Steffen HOLLY	AUPEO GMBH (GERMANY)	CTO, VP Product Development
Stephen DAVIES	BBC WORLDWIDE (UNITED KINGDOM)	Director Audio and Music
Oscar CELMA	BMAT (Spain)	Chief Innovation Officer
Loretta ANANIA	European Commission	Scientific Officer, Networked Media Systems
Laurence LE NY	FRANCE TELECOM/ORANGE (France)	Music VP
Holger GROSSMANN	FRAUNHOFER IDMT (GERMANY)	Head of Department Metadata
Maggie GORSE	Gorse Analysts (France)	Director
Jean-Charles POINT *	JCP Consult (France)	Managing Director
Stefan BAUMSCHLAGER	Last.fm (UNITED KINGDOM)	Head Label Liaison
Oliver PETRO	REAL NETWORKS GMBH (AUSTRIA)	Director Content Licensing & Editorial
Thomas LIDY *	Spectralmind / Vienna University of Technology (Austria)	Managing Director / Research Assistant
Pieter VAN DER LINDEN *	Technicolor (France)	Director Paris Research Lab
Gerd LEONHARD	THE FUTURES AGENCY (SWITZERLAND)	CEO
Rhett RYDER	THEFILTER.COM (UNITED KINGDOM)	COO
Andreas RAUBER *	Vienna University of Technology (Austria)	Associate Professor

* organizers, on behalf of the European Coordination Action project CHORUS+, www.ist-chorus.org

4. Keynote: The next 3-5 years in music

Gerd Leonhard opened the Think-Tank by giving a 30 minute keynote presentation specifically for the audience of the Think-Tank, addressing the topics of interest to start off the Think-Tank discussions.

In his presentation he stressed the key changes in the music industry in the coming 3 to 5 years, all centered around one key word: **Disruption** – or "a total reset on how things work in music".

The problem is no longer can we get it, but how do we get it.

Based on observed figures he explained that there is a ratio of 10:1 between prices on physical goods and their equivalent in the digital world (previously $10 for physical products is worth $1 in digital). He explained that the demise of physical media is certain; broadband will allow content exchange in any forms. In the very near future, content will be available "in the **cloud**", a download is just a click.
Delivery is no longer a problem. The problem is no longer "can we get it" but "what do we get?" We have access to all the content but we have to select what we need. Obviously to accommodate those technological disruptions, new networked business models are expected to emerge. Pointing towards the huge difference in valorization between Google and the traditional media companies, Gerd Leonhard concluded that to some extent these business models have already emerged.

Data is new oil!

Gerd Leonhard foresees **four major trends in music business** in the next 3-5 years:

- Cloud Media
- Networked Business Models
- Experience Economy
- Data Economy

There is a new world of Data Economy: **"Data is the new oil"!**
Google causes roughly 10% of total Internet traffic. This leads to the internet companies such as Google and more recently Facebook to be worth many times more than the major media companies. Billions will be made while turning the media industry (TV, news, images…) upside down.

Gerd Leonhard foresees that the "old" copy economy will be replaced by the access economy. Services such as Netflix illustrate this tendency. These access services will become increasingly important with the decrease of the cost of access devices. Amazon's kindle price decrease confirms this tendency. Gerd Leonhard predicts that $5 iPad likes will exist soon.

A **new "Tele-Media" industry** will grow:

Telecoms – Media & Content & Entertainment – Advertising – Devices

There will be a lot more (cheap) devices, 5$ tablets are coming for everyone (see above) and traffic is going to explode.

Gerd Leonard explained that in relation to application service providers, the traffic of ISPs is heavily increasing without a tangible economical counterpart for them. He advocated for Collaborative business models combining several clusters of stakeholders. As an example, user studies, mentioned by Gerd, demonstrated that teaming up with music providers might contribute to reducing churn by 15%.

Sharing is non-negotiable – and exploding

People consider that sharing is a base right. Users want to share everything (social networks growth = 30-40 %; 60 % of downloaded videos are shared). He predicts that Internet will follow the same path as radio in the ancient days. After having been forbidden in the early days, radio is now compulsory after having been simply "legal".

As a result of this quest of "sharism" the potential of services such as Facebook and its emerging "Social commerce model" is simply enormous. Gerd presented a very quick calculation showing that a contribution of $1 per Facebook account holder would account for 60% of the current combined revenues from music.

However, the music industry is quite reluctant because it is not controllable and because they believe the value of their content is higher. Moreover, investors do not like investing in music startups because of inherent risks. **Legal restrictions need to be resolved first[1].** Gerd Leonhard alluded to a new usage right needed instead or on top of the current copy right.

Meanwhile, with the exception of last.fm, most successful music companies have been illegal at first: MySpace, Youtube, etc. were based on sharing content (illegally). Initiatives to stop illegal sharing on the user side (DRM, DVD region codes, three strikes, Hadopi) did not succeed. Restrictions just kill the user base.
First changes from the business side are happening. E.g. in India, music can be downloaded immediately and legally via Google (revenue sharing from ad revenues is in place).

Curation, collation, contextualization and connection

Advertisement appears as the straightforward means for monetizing content; currently 75% of content is paid already by **advertising**! The problem then is to catch the scarce attention of the consumers. Therefore the **Value is the context not the content!** The new **forms of payment are**: virtual currencies, personal data, time and attention (influence, reputation …) Advertising becomes relevant when context is known (personalization).

Gerd Leonhard describes briefly some of the potential business models:

- **Freemium models** are good business models, they are (or seem) free at the beginning but users have to pay for additional (premium) services, such as extra features, high-quality formats, live events, special editions, fan articles etc. Games are good examples (c.f. Farmville making 347 M$).

[1] It typically requires a 5M$ investment + 2 years for a new music service. Currently there is only one which really succeeds: Apple (but Apple is also a device manufacturer!).

- **Download vs. Access:** Why own/copy of you can use/access? In the near future not music acquisition (or delivery) but consumption will be important. Main problem is choice, i.e. recommendation is important.
  Regarding the concerns of music industry: Music access can be easily tracked – business models and/or collection royalties can be built on anonymized, proportional usage.

- Gerd also advocates **Flat rate** telecom bundles, with up-selling to other options. However, music should not be bundled with the device, but with network services.

- How will artists & creators get paid?
  - Public Performance (including 2.0 performance via social networks)
  - Up-selling (many options)
  - Flat Rate Revenue Shares
  - Branded Content Deals
  - Sponsorships
  - Fan Clubs / Direct Funding

A question-answering session among the Think-Tank participants started at this point:

The situation of new business models was debated:

It is **hard to establish new business models**, because currently major stakeholders are more concerned by their own situation rather than trying to build a new eco-system with bundling. This makes it difficult for small companies to establish new innovative models, as discussions with majors are cumbersome. Laurence Le Ny summarizes the current situation of the majors: In a very short term vision for the music industry, producers would like to decide how operators will sell music whereas what the customers expect is to have an enhanced and user-friendly music experience that integrates all the existing products/services for a reasonable price.

The Merlin example, who intends to become the fifth major, was mentioned to illustrate the hurdles to enter the industry.
The Think-Tank attendance agrees that while Majors have a strong position, they need to change, in order to allow innovation.

The role of **collection societies** was discussed. Centralizing collection societies would ease establishment of new businesses. However, the EC wants several companies for competition purpose. Gerd says collection societies will have to focus on added value and not keep the ancient way. Tracking can be done by software.

The Think-Tank attendance also debated on the need for a **shift from Copyrights towards** a public, open, standardized, non-discriminatory, collective, multi-lateral system of **Usage Rights**.

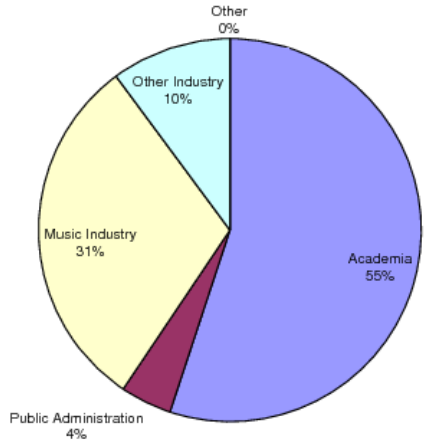
Gerd Leonhard's presentations are available from
http://www.slideshare.net/gleonhard/presentations

5. Roundtable discussion

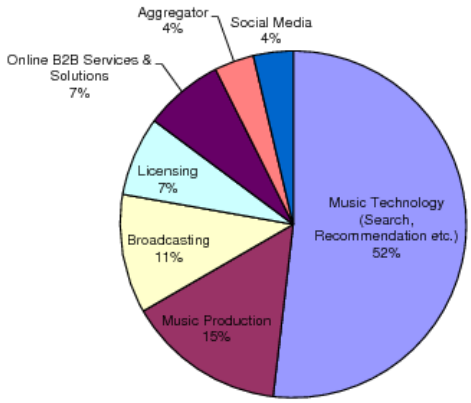
Andreas Rauber introduced the roundtable discussion by presenting the results of the **survey** prepared by the Chorus+ team. The survey, put online about two months prior to the Think-Tank event, captured the opinions of decision makers and stakeholders across the music industry about the future of the music business, music consumption and the role of new technologies.

76 participants participated in this questionnaire, distributed as follows:

Affiliation



Industry Area



The questionnaire was structured into 3 parts (see Appendix for questionnaire):

- Participant personal profile and preferences
- Music business
- Technologies

5.1 Music Listening and Search Scenarios

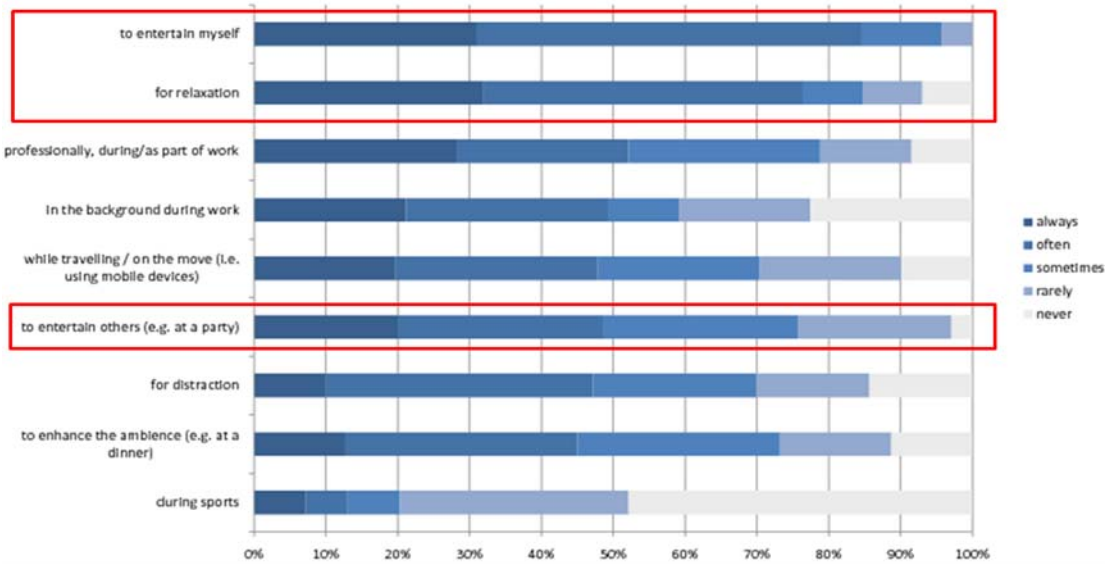
5.1.1 Music for personal entertainment

Most prevailing music listening scenarios are:

- to entertain myself (95 % always, often or sometimes)
- for relaxation
- professionally during/as part of work
- to entertain others (e.g. at a party)
- while traveling / on the move (using a mobile device)

Least chosen listening scenario was “during sports” (20 % always, often or sometimes).

Figure 1: Music listening scenarios

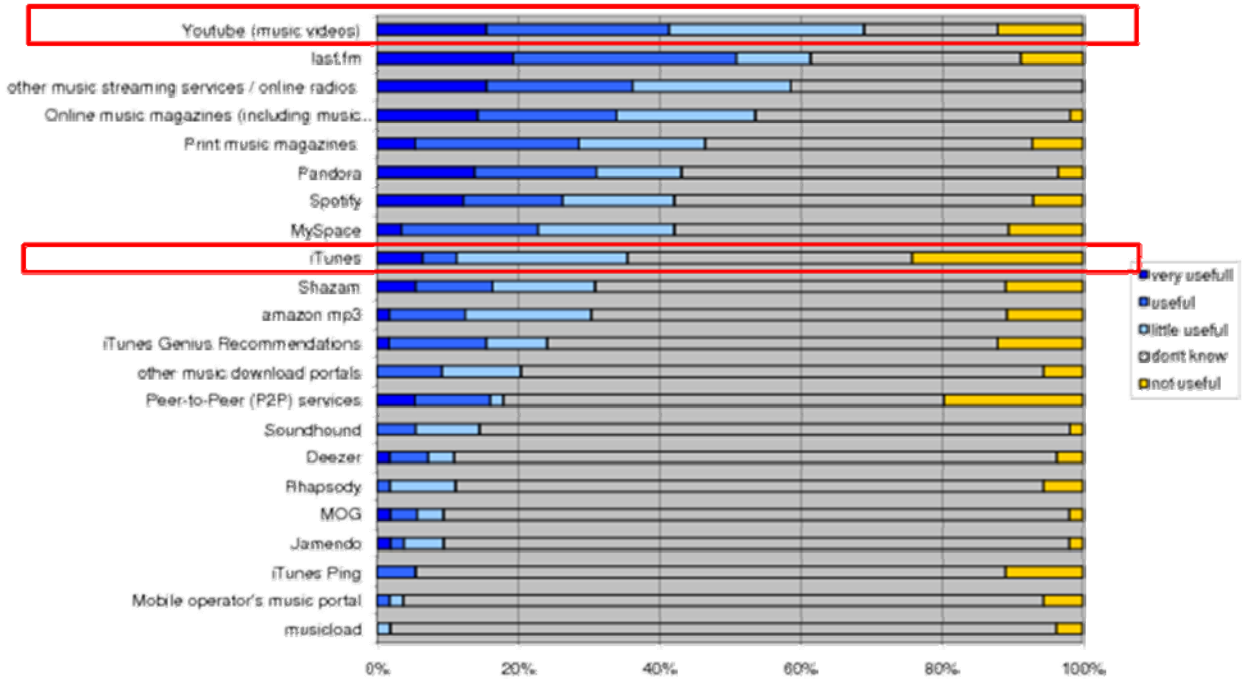


5.1.2 Youtube preferred music service

The question "Which of these music services do you use?" captured current usage of music services. The survey participants could choose from a list or name additional ones.

Youtube was named the **number one music service**, which is consistent with other recent studies[2]. Interestingly, iTunes is named after personalized streaming services such as last.fm, Pandora or Spotify and "other music streaming services / online radios".

Figure 2: Usefulness of music services



[2] "Digital music consumption and digital music access", Nielsen, published via MIDEM Website, Jan.2011 http://blog.midem.com/2011/01/music-three-times-more-consumed-via-youtube-than-via-legal-downloads-exclusive-nielsen-white-paper/

Other music services named were:

8tracks.com – AllRadio – association for cultural equity – Aupeo – Bandcamp – DJTunes – downloadable radio shows – eMusic – EVIADA.org – Facebook – Free quasilegal services – Grooveshark – www.jointhecircle.net/radio – hypem.com – IHeartRadio – iMusic – In car classic radio selections based on GPS screen – Internet Forums – online radio stations – meemix.com – Meerkat – Mixcloud – MTV Music Meter – mufin.com – Myspace – podcasts – rama.inescporto.pt – Shoutcast – Simfy – smithsonianglobalsound.org – Soundcloud – Thumbplay – MOG – VidZone – Vimeo – We7 – Webradio – www.palcoprincipal.com

The three **main criteria for the choice of a music service** were:

- Availability of music
- Simplicity / "Ease of use"
- Recommendation

The popularity of Youtube can be explained by

- Free access
- Everything is there
- People do not change habits (i.e. platforms or services) frequently
- Music videos are an added value

The question of the relative poor score of iTunes was debated. Why is iTunes not so popular (anymore)?

The participants agreed that the main reason was the emergence of streaming services.

Some participants also pointed to a possible bias related to the fact that the respondents were mainly experts and therefore potential early adopters of newly emerging services. Possibly the survey results would differ when applying these questions to general public.

Illegal P2P downloads was not seem as a major reason.

5.1.3 Search criteria rather straightforward and basic

According to the survey, most people search for specific criteria, such as artist, composer, song title, album or genre.

Other search possibilities (enabled by newer technologies, apart from search by meta-data) such as by taste, mood or similarity appear less prevalent.

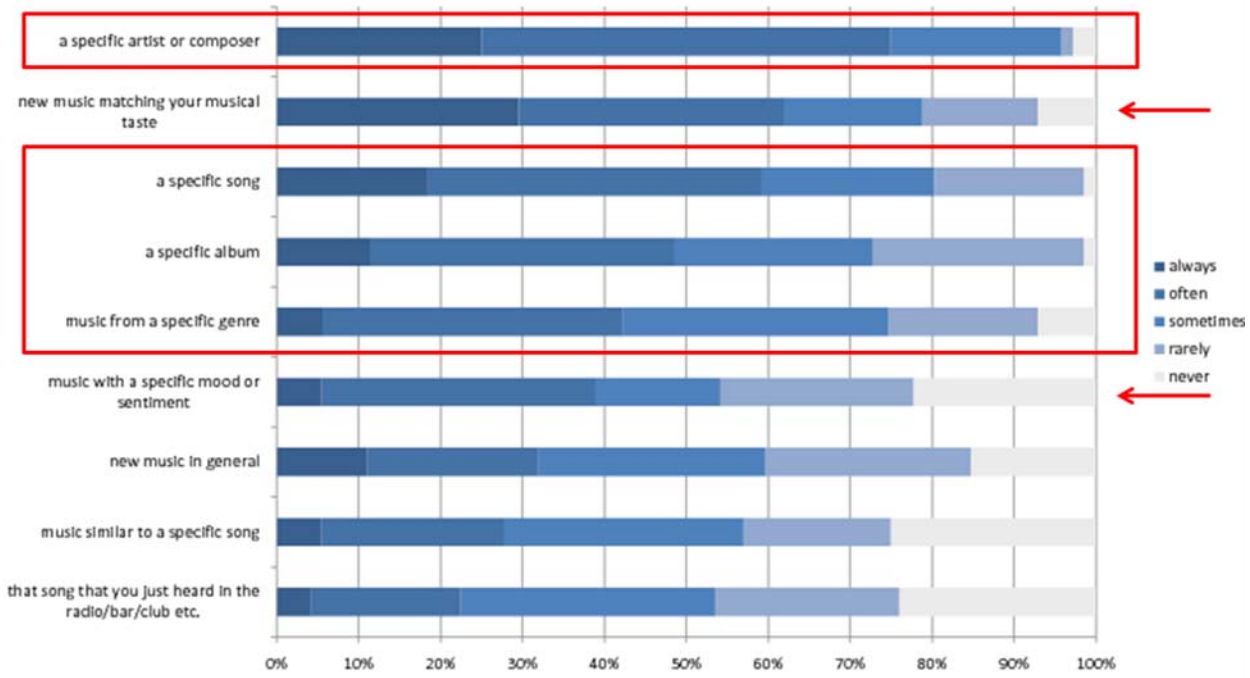
Discussions started about why this is the case:

- because there is no need?
- because of no awareness that it is possible?

Oscar Celma suggested that the technologies are just not (yet) really there.

Gunnar Deutschmann commented that the final goal about search is to bring the music to people.

Figure 3: How music is searched



Steffen Holly explained that to his opinion intuitive search is very important. He expects advanced recommendation techniques combining editorial data and mood detection to emerge.

Rhett Ryder foresees future search and recommendation services to use AI techniques such as machine learning.

According to the debates, it appeared that most Think-Tank participants foresee the emergence of search and recommendation going beyond the use of the editorial information – title, album, artist.

5.2 The Future of the Long-Tail

This topic was discussed in relation to the Search Criteria debate.
A lot of content is available in the "long-tail", but not consumed.

The problem of the long-tail is that most people will buy only what they know (Gerd Leonhard). Oscar Celma said, that 90% of people are not very selective on music. Only a small percentage of enthusiasts want content from the long-tail. Popular music is governing the choice of music.

In Gerd Leonhard's opinion the **long-tail will not work unless the access is unlocked**. However, the tools are not there yet. Holger Großmann amended that most of the music portals do not offer mood-based or similar search features yet. These technologies would give a different picture. Oscar Celma argued that for many services the clients are not the main goal, but making profits from the top artists.

Gunnar Deutschmann pointed out that (exploiting) the **long-tail is an opportunity for small and independent artists**. The problem is how to get the music to the people. Music is frequently recommended personally by people. How to get the music channelized to the audience?

Rhett Ryder reported that they inserted less known content from the long-tail into the playlists at their service TheFilter.com, and the **acceptance** was **very high**. Access to music needs to be easy for the consumers (select 1 seed song and get the ideal playlist), and they want to have opportunities to control and mix the music. This was confirmed by Stefan Baumschlager from last.fm: **Users desire new content** – but if it is too much, they don't like the service anymore.

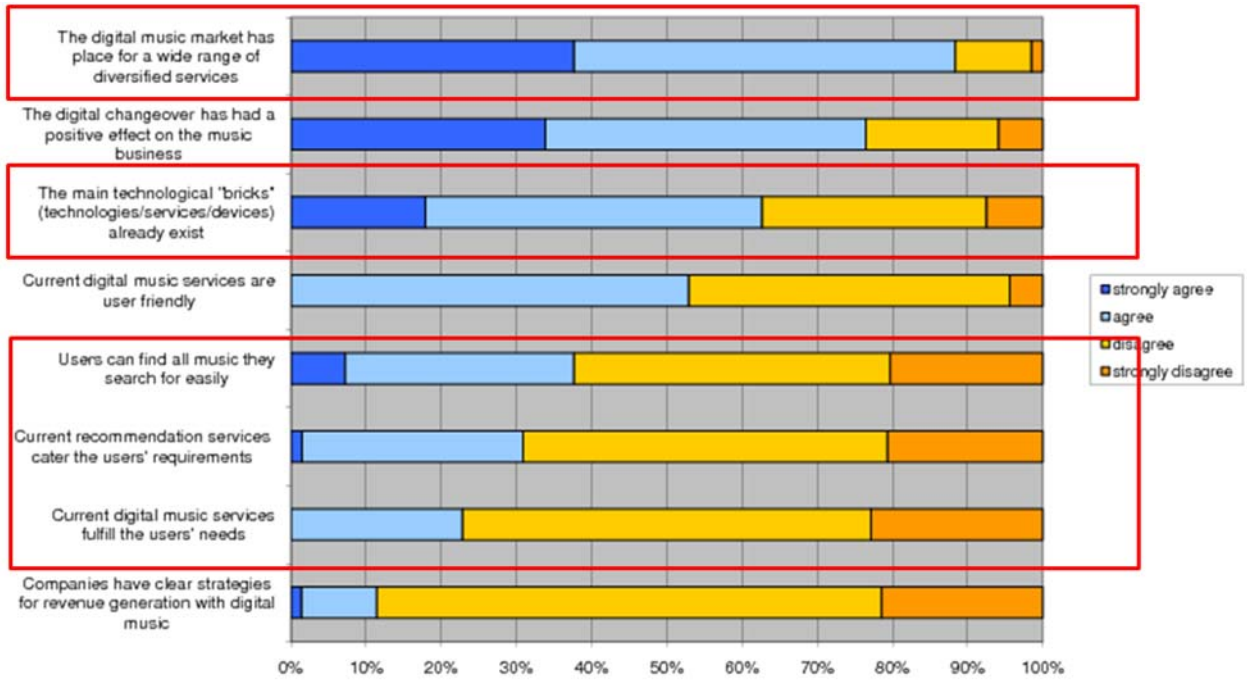
Stephen Davies says consumers are quite simple in requirements. Currently we put services that *we* think work. We need to better know what the users want.

5.3 Technologies for new services exist but business models unclear

Questionnaire participants agreed that the digital changeover had positive effects and that the digital music market has place for a wide range of diversified services.

There was less agreement on the statement that current digital music and recommendation services would fulfil the user's needs.

Figure 4: Statements on the music market: agreement and disagreement (part 1)



Laurence Le Ny states that the main technological "bricks" do already exist: Streaming, download, net radios, etc. What is **missing is integration**: the technological "bricks" need to be integrated in a good way into a (global) music/entertainment universe and built on the right business model with **easier access to rights** and exhaustive offerings. The "right" **business model is not necessarily based on music alone** but in a multi-screen personalised

experience. Laurence Le Ny thinks towards a new simple and integrated music experience with different entry points and cross-media recommendation to cover consumers' needs.

The highest disagreement in the questionnaire was on the statement “Companies have clear strategies for revenue generation with digital music”. Pieter van der Linden raises the question: **Where is the business model issue?**

Laurence Le Ny proposes bundling of services and offering subscription based models. She mentions the recent success of Orange’s music offer (streaming, downloading) combined with access (mobile, broadband). However, she also points to difficulties in discussing these models with the majors. These business models take long to set up and require important negotiations with rights holders.

Stephen Davies points out that many of these things exist in iTunes.

Bundling of services and cross-media recommendation appears as the **most promising path** to invent business models for new services.

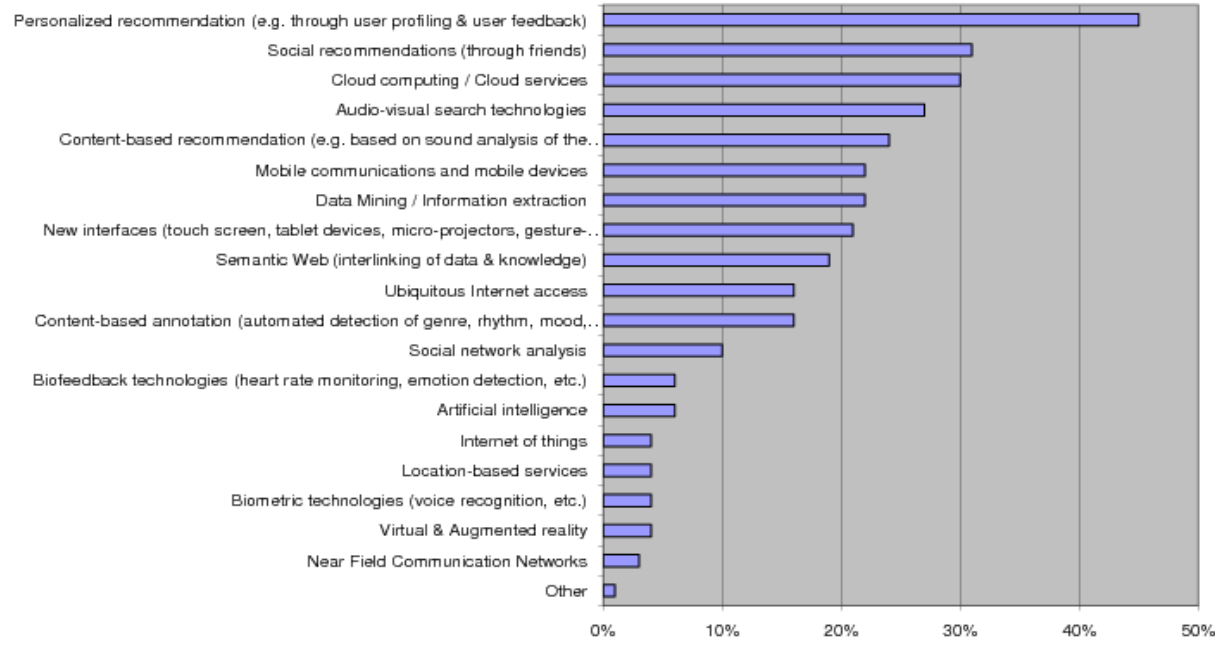
These debates can be summarized as follows: The main technologies are there, new services are expected, but business models remain rather unclear.

5.4 Music Consumption & Key Technologies in 10 Years

According to the survey the top 5 key enabling technologies between 2011 and 2020 will be**:**

1. Personalized recommendation
2. Social recommendation
3. Cloud services
4. Audio-visual search
5. Content-based recommendation

Figure 5: Key enabling technologies between 2011 and 2020



Location-based services, virtual/augmented reality and biometric technologies were given far less importance.

In a free-form question, opinion leaders responded in the questionnaire with the following **major trends for the future of music consumption:**

- Instant availability and accessibility of music
- Automatic adaption of music to the (personal) environment, context
- Many ways of consuming music interactively
- Intuitive search, implicit search
- Personalization, unobtrusive recommendation
- Diversity, long-tail
- Interoperability across services, global music profiles

There was an agreement on the importance of these topics also among the Think-Tank participants. Personalization and recommendation were identified as the most prevailing topics and discussed in further detail (see below).

Further, the survey participants were asked***: If a fairy granted you a wish for a technology (service, device ...) that would form the basis for a perfect product, what would you pick?***

The opinion leaders' **wishes to the fairy** were:

- A (seamless and personalized) service that understands my **current tastes, environment, mood and feelings**, and can create me a perfect stream of new music on the fly, wherever I am.
- Play music for my *current* mood. Play music to get me into a *certain* mood.
- A music analysis system that analyzes the music not in objective terms but in terms of what a particular user will perceive.
- An unlimited music streaming service with (cloud) locker capabilities, solid recommendations including long-tail coverage, social features to share music with friends and see what's trending with your friends. It should include additional artist info to explore bio, pictures, recent news, tour info. It should have apps for all important smart phones.

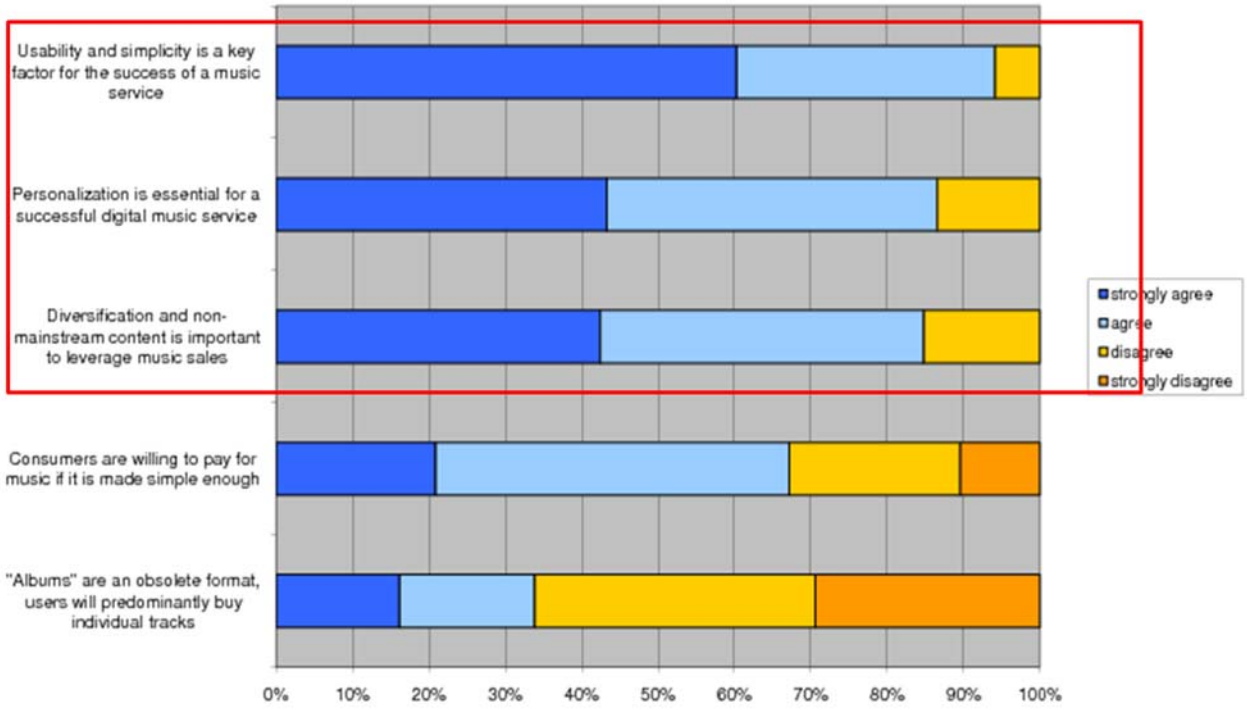
The answers to the free forms do also – mainly – point to similar concerns as the questionnaire: personalization, contextualization, discovery, intuitive search.

5.4.1 Personalization Key Enabler

Opinion leaders participating in the questionnaire agreed on the following:

- **Usability and simplicity** are key factors for the success of a music service
- **Personalization** is essential for a successful music service
- **Diversification** and non-mainstream content are important to leverage music sales

Figure 6: Statements on the music market: agreement and disagreement (part 2)



5.4.2 Recommendation Key Technology

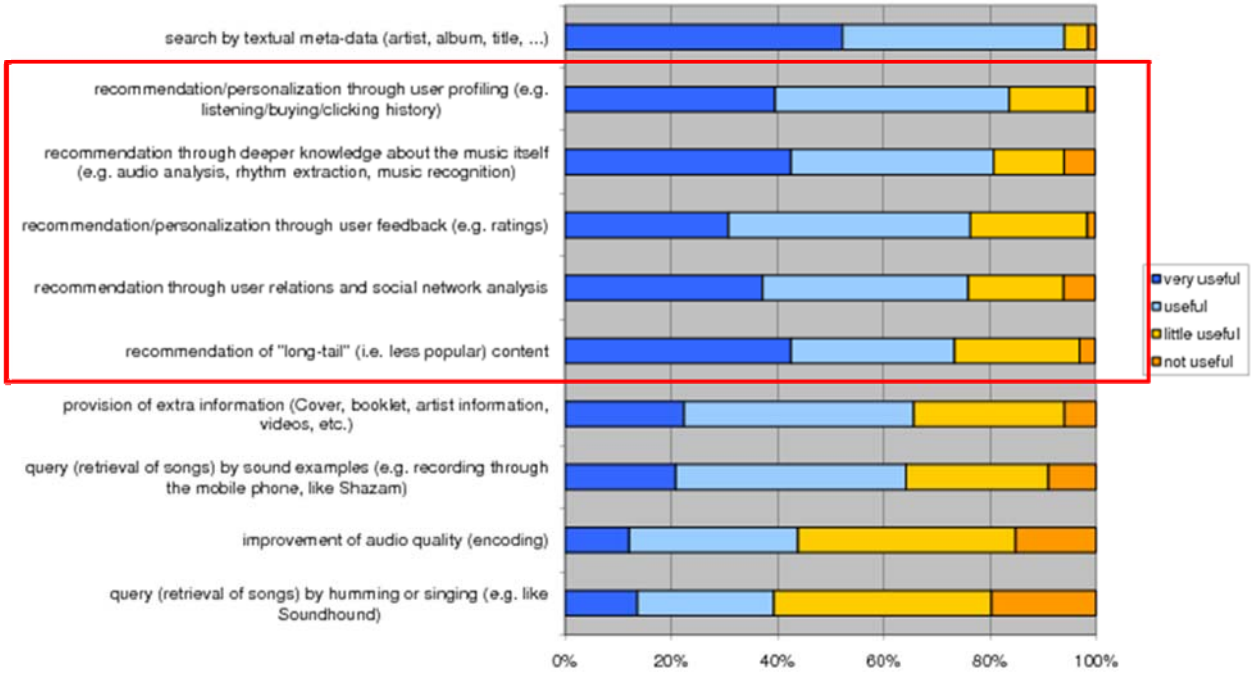
Recommendation to complement Standard Search

On the question "How useful/crucial do you think are these technologies for music sales?" all variants of recommendation & personalization methods were named following immediately after standard textual meta-data search:

Recommendation & personalization through:

- **User profiling** (listening/buying/clicking history)
- **User feedback** (ratings)
- **Deeper knowledge** about the music itself (audio analysis, music recognition)
- Recommendation of (less popular) **long-tail content**

Figure 7: Crucial technologies for music sales



Survey participants were asked: Why do you think these music services (mentioned above, c.f. Section 5.1.2) are best suited for search and recommendation?

Prevalent answers were:

- Easy to use
- **Finding items from the "long tail" / unknown/new artists**
- Experts (person) recommendation

How individual does personalization need to be?
Do services need to be oriented directly towards the individual user?

Stephan Baumschlager pointed out that this is done already successfully (e.g. at last.fm, where individual users consume their individually generated radio streams based on analysis of their music listening habits). Rhett Ryder noted that this is not a technology issue (anymore), rather a business issue.

Context-based Recommendation

Stephen Holly pointed out that recommendation engines which combine various different criteria are key and **context related recommendation** is the future. Much more research on context information is needed (e.g. capturing the weather, combined with locations, music in the car, matching the wife's name etc.) Rhett Ryder adds that all those factors and many more are important and need to be balanced correctly. Also a device should be capable to capture & combine the sources of context independently of platform or service – this would be a hampering limitation. AI and machine learning can automate context recommendation.

Trust

Stephen Davies added that **real personalization** cannot be omitted, recommendation needs to be also based on **trustable information** (well-known DJ, etc.). This was also confirmed by Oscar Celma: recommendations from black-box machines give the user no trust – friend's recommendations obtain much more trust. Pieter van der Linden confirmed: Exchange with other people is a very important source of information. Oscar Celma: Recommendation engines need to give **reasons** for what they recommend.

5.5 Challenges

A number of "Open Questions" were discussed in the Think-Tank:

5.5.1 (What) Can we learn from "pirates"?

Oscar Celma: "Pirates" are frequently music lovers, they value music more than others. Sometimes they download music illegally to "test" it and buy it later.
Pieter van der Linden adds that he believes that free service is not the only driver for pirates. Some people are prepared to pay money just to allow them to download content via P2P networks (he mentions 5€/month subscription fee for an anonymous IP address to use PirateBay).
Loretta Anania: This fits exactly with the (shift towards the) access model.
Stephen Davies: Shift of value away from content is a definite issue if the trend continues.

5.5.2 Do current business models leave no margin for desirable technologies?

Steffen Holly: This is a big issue for recommendation technology providers. Content companies have to pay already a lot to collecting companies, licensing royalties etc. It is very **difficult to monetize a recommendation engine**.

Oscar Celma confirmed this: It proved very difficult to sell a recommendation technology, even if it is the best in the world. Moreover it is very difficult to communicate the added value around recommendations from the long-tail. Instead, music monitoring systems and fingerprint technology are the most successful solutions in the market.

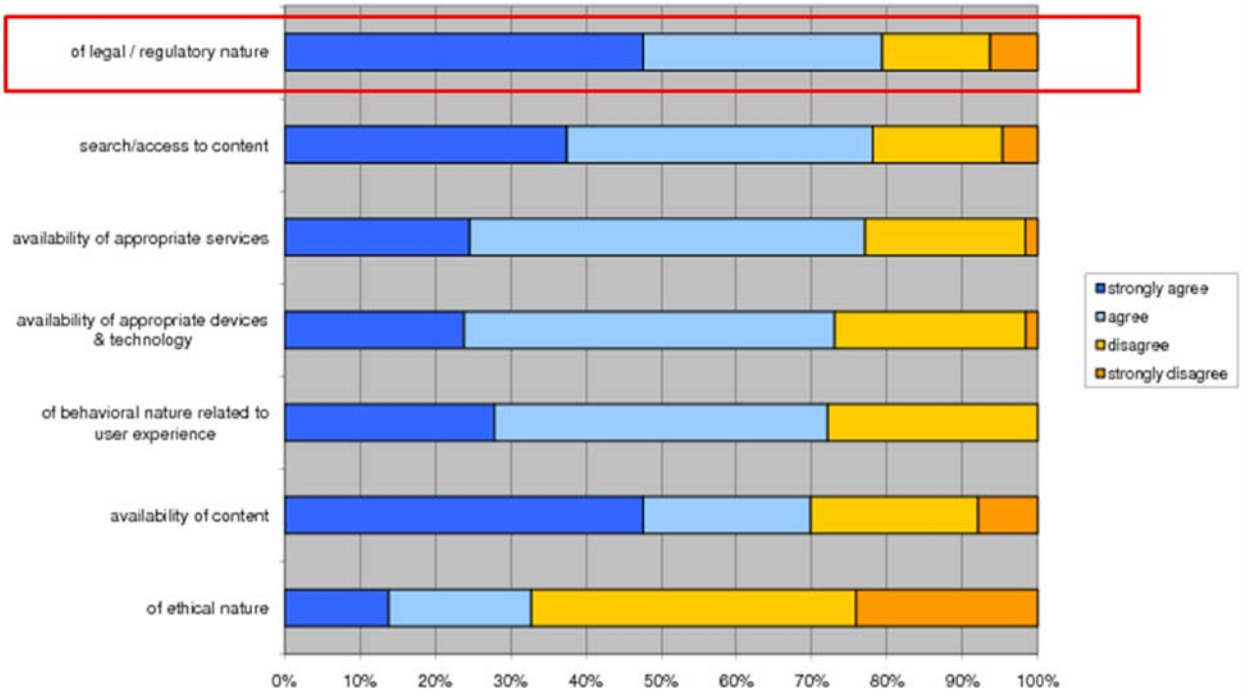
Holger Großmann agreed, there is no margin for these technologies in online stores. In the current business models new technologies cannot be paid, even if they are there and working already.

A shift in monetization and royalty distribution is needed, but it is very difficult to achieve.

The question is how to put all the stakeholders together in a common new business model. It is likely that changes in law and royalty distribution are needed. This is in line with the answers received from the questionnaire on the **major challenges to the (digital) music business:**

Challenge number one is of legal / regulatory nature

Figure 8: Challenges for the digital music business



5.5.3 Are there open technological questions?

A range of technological solutions for recommendation, personalization and discovery exist. The Think-Tank discussion group agreed that the main technological bricks are there, but they are poorly integrated (as pointed out earlier). **The current problem is the business models that leave no room for further technological development**.

Holger Großmann yet is less convinced about the availability of technologies. In particular he points to the need to distinguish between recommendation (main goal: selling) and discovery services. He believes that there is quite some space for R&D in the latter area. He mentions specific discovery scenarios: special content, searching sections within music, special use cases in B2B, etc.
He also explains that as **technology development is expensive, the rights holders must be prepared to share and to remunerate the technologist by some means or another.**

Steffen Holly also points out that the mixture and interaction of various technologies is not yet fully explored.

5.5.4 Are there special markets for new technologies?

Oscar Celma said there is quite a market for search and discovery for professional users. There are also a number of specialized B2B markets, with specific use cases, such as production, sync, or the classical music market.

5.5.5 The future of music creation?

Gunnar Deutschmann asked the question: Who will create the music of the future? There will be new forms of creation, with many more individual people creating music, with potentially new technologies. How will it be distributed? Remember that labels are the service providers for the creatives – and that classical composers were paid by the kings.

Holger Großmann pointed out that life music should stay an exciting scenario, and new business models might arise also around it. Oscar Celma added the idea of free access to concert tickets, private concerts, etc.

Oscar concluded: Music is emotional, we need to give a life experience to our consumers.

6. Appendix

6.1 Questionnaire

QUESTIONNAIRE - The Future of Music Search, Access and Consumption
http://www.ist-chorus.org/tools/questionnaire

The following questionnaire investigates the future of the music business in the light of emerging technologies, particularly around access, search and recommendation. It is conducted by the European Audio-Visual Search Coordination Action CHORUS+ [http://www.ist-chorus.org/] and will form the foundation of an upcoming Music ThinkTank, with the results expected to have an impact on the forthcoming R&D efforts.

The estimated duration of completing the questionnaire is about 20 minutes. It consists of 6 pages: The first three pages ask about current music consumption patterns and services used, while the last three pages will cover technological developments that enable emerging usage patterns in the future of the music industry.

We appreciate your contribution as a stakeholder and/or expert in this field. Thank you for your support!

1. ABOUT YOU AND THE DIGITAL MUSIC BUSINESS

You work in
- Academia
- Music industry
- Other industry
- Public administration
- other (specify, please) [textbox]

If you work in the music industry, in which area?
- Music Production
- Label, A&R
- Licensing
- Aggregator
- Traditional Distributor
- Digital Distributor
- Music Store/Portal
- Broadcasting
- Online B2C Services & e-Commerce
- Online B2B Services & Solutions
- Social Media
- Music Technology (Search, Recommendation etc.)
- Mobile (App) Development
- Media Asset Management
- End Devices
- Network Operator
- other (specify, please) [textbox]

How long have you been involved in the digital music business professionally?
- less than 1 year
- 1 to 4 years
- more than 4 years
- never

Since when have you been using digital music services privately?
- less than 1 year
- 1 to 4 years

- more than 4 years
- never

2. MUSIC CONSUMPTION HABITS

How often do you use digital music services?
- more than 3 times a day
- 1 to 3 times a day
- 1 to 3 times a week
- 1 to 3 times a month
- less frequently
- never

In which scenarios do you listen to music? [Response 1-5 (1 = never; 5 = always)]
- for relaxation
- for distraction
- to entertain myself
- to entertain others (e.g. at a party)
- to enhance the ambience (e.g. at a dinner)
- during sports
- while travelling / on the move (i.e. using mobile devices)
- professionally, during/as part of work
- in the background during work

When you search for music, you search for:
(1 = never; 5 = always)
- a specific song
- a specific artist/composer
- a specific album
- music from a specific genre
- music with a specific mood
- that song that you just heard in the radio/bar/club/etc.
- music *similar to* a specific song
- new music matching your musical taste
- new music in general

Where do you _search_ for music? When you are ...
Response (1 = never; 5 = always)
- at home
- at work
- on the move (i.e. using mobile devices)
- abroad

3. USAGE OF DIGITAL MUSIC SERVICES

Which of these music services do you use? [Response 1-5 (1 = never; 5 = always)]
- iTunes
- iTunes Genius Recommendations
- iTunes Ping
- amazon mp3
- musicload
- MOG
- Mobile operator's music portal
- Shazam
- Soundhound
- MySpace
- Youtube (music videos)
- Rhapsody
- Pandora
- Spotify

- last.fm
- Deezer
- Jamendo
- Peer-to-Peer (P2P) services
- Online music magazines (including music blogs)
- Print music magazines
- Google search for music
- other music download portals
- other music streaming services / online radios

Please name other music services you use:
[textbox]

Which of these music services do you think deliver the best experience? (select up to 3)
[same list as above]

Why do you think these deliver the best experience?
[textbox]

How useful are these services to find new music (via search or recommendation)?
(0 = don't know; 1 = not useful; 2 = little useful; 3 = useful; 4 = very useful)
[same list as above]

Why do you think they are best suited for search and recommendation?
[textbox]

4. STATEMENTS

For each one of the following statements please indicate the level of your agreement.
(1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree)

- The digital changeover has had a positive effect on the music business
- The digital music business is expected to evolve dramatically with new actors and new services
- Companies have clear strategies for revenue generation with digital music
- The digital music market has place for a wide range of diversified services
- Current digital music services fulfill the users' needs
- Users can find all music they search for easily
- Consumers are willing to pay for music if it is made simple enough
- Current digital music services are user friendly
- Current recommendation services cater the users' requirements
- Usability and simplicity is a key factor for the success of a music service
- Improvement in search and recommendation technology will result in increased music sales
- Diversification and non-mainstream content is important to leverage music sales
- "Albums" are an obsolete format, users will predominantly buy individual tracks
- The importance of "album" sales can be strengthened by technological means
- Direct music sales will lose importance, revenue will be generated only by complementary offerings (concerts, merchandise etc.)
- Digital music services can create added value compared to the traditional music business
- Personalization is essential for a successful digital music service
- The main technological "bricks" (technologies/services/devices) already exist
- Potentially disruptive technologies (e.g. cloud computing, internet of things) will determine the way the music business will evolve
- Copyright and licensing issues hamper technological evolution
- Digital rights management is a suitable way to control the music rights
- There needs to be a change in licensing and rights distribution
- Illegal music distribution will decrease with the emergence of new technologies
- It is likely that legal regulations will be made that impose a drastic change of the music market

5. MUSIC & TECHNOLOGY TODAY AND TOMORROW

How useful/crucial do you think are these technologies for music sales?

(1 = not useful; 2 = little useful; 3 = useful; 4 = very useful)
- search by textual meta-data (artist, album, title, ...)
- recommendation/personalization through user profiling (e.g. listening/buying/clicking history)
- recommendation/personalization through user feedback (e.g. ratings)
- recommendation through user relations and social network analysis
- recommendation through deeper knowledge about the music itself (e.g. audio analysis, rhythm extraction, music recognition)
- recommendation of "long-tail" (i.e. less popular) content
- query (retrieval of songs) by sound examples (e.g. recording through the mobile phone, like Shazam)
- query (retrieval of songs) by humming or singing (e.g. like Soundhound)
- improvement of audio quality (encoding)
- provision of extra information (Cover, booklet, artist information, videos, etc.)

Which other technologies do you consider as important/crucial for music sales?
[textbox]

Choose the three most important technologies that will shape music applications and services in 2011-2020 (select up to 3)
- Audio-visual search technologies
- Personalized recommendation (e.g. through user profiling & user feedback)
- Content-based recommendation (e.g. based on sound analysis of the music, recommendation of similar sounding titles)
- Content-based annotation (automated detection of genre, rhythm, mood, beats per minute etc.)
- Social recommendations (through friends)
- Social network analysis
- Semantic Web (interlinking of data & knowledge)
- Cloud computing / Cloud services
- Data Mining / Information extraction
- Virtual & Augmented reality
- Artificial intelligence
- Biometric technologies (voice recognition, etc.)
- Biofeedback technologies (heart rate monitoring, emotion detection, etc.)
- Mobile communications and mobile devices
- Location-based services
- Near Field Communication Networks
- Ubiquitous Internet access
- Internet of things
- New interfaces (touch screen, tablet devices, micro-projectors, gesture-controls, etc.)
- Other [text field]

What kind of interfaces do you expect becoming most useful for music access & search by
(already available, by 2012, by 2015, by 2020, never)
- text based
- voice based: e.g. spoken search request
- audio-input based: e.g. query by recorded music example
- audio-input based: query by singing or humming
- image based
- touch screen
- gesture based
- location based
- social network based
- biofeedback based

What would you consider to be the one or two most exciting scenarios for music consumption 10 years from now?
[text box]

Which technologies would you see as core enablers for future music distribution, search and consumption?
[text box]

If a fairy granted you a wish for a technology (service, device,...) that would form the basis for a perfect product, what would you pick?
[text box]

6. BUSINESS MODELS

How does the European music market differ from other regions?
[text box]

The major challenges for the digital music business are ...
(0 = no opinion; 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree)
- availability of appropriate devices & technology
- availability of content
- search/access to content
- of economic nature
- availability of appropriate services
- of behavioral nature related to user experience
- of ethical nature
- of legal / regulatory nature

The most likely future business models for music are:
(tick up to three options)
- advertising in general (i.e. like in today Internet search)
- advertising based on product placement (i.e. linked with another product)
- user profiling (i.e., selling the user profiles for commercial purposes)
- "Freemium" services (i.e., the basic functionality is free, but the advanced options not)
- value-added services (i.e., a contract for a pack of services on top of usual ones)
- pay-as-you-go (pre-paid, impulse purchase)
- subscription (monthly/annual "flat" fee, etc)
- business model to be defined at a very late stage when a critical mass of users is achieved (like Twitter today, for example)
- user community maintained by user contributions (like Wikipedia, for example)
- not a commercial service (i.e., a public service, "music tax")
- other [text field]

6.2 CVs of Think-Tank Participants

Gerd Leonhard
Media Futurist & Author, CEO of The Futures Agency

The Wall Street Journal calls Gerd ‘one of the leading Media Futurists in the World’. He is the Co-Author of the influential book ‘The Future of Music’ (2005, Berklee Press), as well as the Author of 'The End of Control’ (2007), ‘Music 2.0’ (2008), ‘ and 'Friction is Fiction' (2009, Lulu Publishing). Gerd is currently working on a new book entitled 'Broadband Culture' which will be published primarily as a mobile device application.

Gerd's background is in music; in 1985 he won the Quincy Jones Award and subsequently graduated from Boston's Berklee College of Music (1987). Since 2001, following a decade as digital media entrepreneur and start-up CEO, Gerd travels around the globe and speaks at conferences and events, company retreats and think-tanks on the Future of Business, Media & Content, Technology, Marketing, Advertising & Branding, Telecommunications, and Culture.

Gerd is considered a leading expert on topics such as digital commerce models, tele-media, social media, TV & Radio 2.0, mobile content, innovation, leadership and entrepreneurship, consumer trends, UGC and peer production, copyright, licensing and IPR issues, next-generation advertising, marketing and branding, digital content strategies, and the development of next-generation business models in the content, communications & technology industries.

Gerd's keynotes, speeches, presentations and think-tanks are renowned for his hard-hitting and provocative yet inspiring and motivational style. With over 750 engagements in 37 countries during the past 7 years, Gerd has addressed over 250.000 executives and professionals, and is considered a key influencer.

His diverse client list includes Nokia, The Guardian, Google, Sony-BMG, Telkom Indonesia, Siemens, RTL, ITV, the BBC, France Telecom / Orange, Deutsche Telekom, The Financial Times, DDB, Ogilvy, Omnicom, the European Commission, Nokia Siemens Networks and many others. Gerd is a fellow of the Royal Society for the Arts (London), a member of the World Future Society, a visiting professor at the Fundacao Dom Cabral in Brazil, and resides in Basel, Switzerland.

www.mediafuturist.com - www.thefuturesagency.com - www.twitter.com/gleonhard - www.gerdtube.net

Steffen HOLLY
CTO, VP Product Development, AUPEO GMBH (GERMANY)

Steffen Holly became an electronics before he studied music in Dresden. After his professional music career in Berlin he moved to the Rhein-Main-Area. There he worked as an export manager in a record company and later as supervisor for music rights and advertisement with an own publishing and production company. Parallel to this he studied business administrations.

In 2000 Steffen Holly moved back to Berlin and became Director of Audio Products and Technology Licensing at MAGIX AG, being responsible for all audio software product developments and technologies. This included a partnership with Fraunhofer IIS, IDMT and IAIS and he guided the buyout-process of Fraunhofer AudioID. Together with this new MAGIX subsidiary M2Any he lead the development of several new recommendation ideas together with Fraunhofer IDMT and created the initial concept and name of www.mufin.com. Since 2009 Steffen Holly works as CTO for the Berlin Startup AUPEO! being responsible for technology, product and content which includes further cooperations with Fraunhofer and DFKI. Part of the product development are also new music promotion and licensing models for artists and record labels.

Oscar Celma
Chief Innovation Officer at Barcelona Music and Audio Technologies

Dr. Oscar Celma is the Chief Innovation Officer at Barcelona Music and Audio Technologies (BMAT), a spin-off of the Music Technology Group (MTG). In 2008, Oscar obtained his Ph.D. in Computer Science and Digital Communication, in the Pompeu Fabra University (Barcelona, Spain). Oscar has a book published by Springer, titled "Music Recommendation and Discovery: The Long Tail, Long Fail and Long Play in the Music Digital Age" (2010).

Oscar holds 2 patents (US2003009344 and JP2003323188, 2002) from his work on the Vocaloid system, a singing voice-synthesizer bought by Yamaha in 2004. Since 2006 he is an Invited Expert of the W3C Multimedia Semantics Group. Follow on Twitter: @ocelma

Holger Grossmann
Head of Metadata Department, Fraunhofer Institute for Digital Media Technologies (IDMT)

Holger Grossmann graduated in Information Technologies at the University of Ilmenau, Germany in 1993. Afterwards he worked at several programming projects, particularly in the field of electronic musical instruments. In 2001 he joined Fraunhofer where he worked as an engineer and researcher in the Metadata department. During the following 3 years his research was oriented on the development of the first standardized music identification system "AudioID" which became part of MPEG-7. Since 2006 Mr. Grossmann is head of the Metadata department at the Fraunhofer Institute for Digital Media Technologies IDMT. Today his department realizes innovative R&D projects together with worldwide partners in different fields of metadata and media technologies, such as semantic music analysis, automated music transcription, audiovisual search, music recommendation, authoring tools and incentive-driven distribution systems.

Jean-Charles Point
CEO, JCP-Consult (France)

Jean-Charles Point is CEO of JCP-Consult (France) and Euprocom (Estonia) since 2003, SMEs which activities are R&D in mobile computing and audiovisual content distribution, and consulting activities on set-up and management of European R&D projects. Prior to this he was R&D manager in SEE (Be) (1986-1992, Optical Communication systems), Optical Development Manager in Thomson CSF (Fr) (1992-1995, Optical communication systems), Technical Marketing Manager in Thomson broadcast Systems (Fr) (1995-1998, audiovisual and networking), and Scientific Director in COM21 (USA and Ireland) (1998-2003,CATV,wireless and fiber Access network system, VOIP, VOD). He holds a Msc degree (Ingénieur Civil) in telecommunication engineering from Faculté Polytechique de Mons, Belgium (1982).

Stefan Baumschlager
Head Label Liaison, Last.fm

Stefan Baumschlager has been with Last.fm for over 4 years as Head Label Liaison. He manages relationships with all key label partners globally and leads Last.fm's Music Team since October 09. Prior to Last.fm, Stefan held several roles in radio and worked closely with Gilles Peterson, Karen Pearson, Somethin-Else Productions and Austria's ORF. He holds an MA in Communications and a BA (hons) in Media Studies from the University of Westminster in London.

Laurence Le Ny
Music VP, France Telecom - Orange

Laurence Le Ny has been Director of Music and Live Performances at Orange's Content Division since 2005. She joined the group as Music Consultant in 2004. Previously, Laurence Le Ny was Managing Director of Warner Music France and chaired the association of the *Victoires de la Musique* in 1999. Before, she held the position of Managing Director at Sony Music's Epic label during seven years, after having been Head of Promotion at BMG. Laurence Le Ny began her career at Polygram and CBS Disques where she was respectively Television Promotion Manager and Press Officer.

Oliver Petro
Director Content Licensing & Editorial at Real Networks

Oliver Petro, Director Content at Real Networks since 2007, is responsible for content licensing and management of Real's music services in EMEA. Those services include Real's successful RingBackTone platforms as well as the music download and subscription platforms from Vodafone, SFR and Mobilkom Austria Group, which Real runs as a B2B service in 12 European countries.

He started his professional career as a producer for movies and music scores before he joined Sony back in 2000, where he took over responsibility for the Program Management for some of Sony Europe's CRM and E-Business platforms. Later on, when Sony launched it's Consumer and B2B Music Services, Oliver managed licensing of catalogue and the content departments that built the content supply chains, designed the recommendation systems and managed the store fronts of Connect and Vodafone's Music Platform including the streaming service "Radio DJ".

Thomas Lidy
Managing Director, Spectralmind
Research Assistant, Vienna University of Technology, Austria

Thomas Lidy is the founder and Managing Director of Spectralmind, an innovative software technology company based in Austria, providing next generation music search and recommendation products. Thomas has a long-standing expertise in the music analysis domain, which he has gathered in over 7 years of research at Vienna University of Technology in an international context. He received several awards in this field, both with his research activities and with his startup company Spectralmind.

At Spectralmind Thomas is responsible for reaching the strategic goals, while maintaining an international contact network to leading institutions working in the field of semantic music analysis. Based on a unique audio content analysis technology, Spectralmind is providing business solutions for search & recommendation to media archives and music portals and creating novel visual music discovery apps for smartphones and iPad.

Rhett Ryder
COO of The Filter

Rhett Ryder as COO of The Filter is responsible for Global Sales, Delivery, Services and Alliances, supporting David Maher-Roberts CEO and Martin Hopkins CTO, to meet the strong demand for The Filter products and services around the World. At The Filter, his role is to ensure that we deliver the best content relevance solutions to our customers and that all deployments of The Filter are delivered on time, and meet or exceed our customers' expectations.

Prior to founding Exabre Limited (trading as The Filter) in February 2005, with Co-Founder Martin Hopkins, Rhett spent over 20 years in a variety of sales and leadership roles in Telecoms, Mobile and Content Solution providers. He has worked for leading and high tech companies including: Prime

Computer, Hewlett Packard, Octel Voice Processing (now part of Alcatel-Lucent) and Tertio Telecoms (now part of Evolving Systems Inc).

At Tertio, (founded by Martin Hopkins) Rhett as Managing Director, led the Telecoms Division through seven years of high growth delivering world leading service activation and value added solutions to fixed and mobile network operators around the world. In 1997 Tertio was identified as a Times Fasttrack 100 Company. In 1999, Tertio was acquired by Advent International and APAX partners.

Rhett re-joins The Filter from PowerOasis, where he was Global VP Sales and Alliances. PowerOasis is an innovative company providing Green solutions to power the Telecoms Infrastructure in developing countries where there is no or unreliable Grid available. Rhett strongly believes that providing communication to developing areas can help rapid social and economic growth, especially in areas of conflict where commercial power or delivery of diesel is an issue.

Rhett brings extensive experience of delivering innovative and market leading solutions to entertainment media, content, technology and telecoms providers through working closely with our customers and partners to ensure our customers receive the optimum solution and service possible.

Rhett has an Honours Degree in Engineering, and outside The Filter and family, has interests in architecture, classic cars and rugby. Rhett lives in Bath UK.

Andreas Rauber
Associate Professor at the Vienna University of Technology, Austria

Andreas Rauber is Associate Professor at the Department of Software Technology and Interactive Systems (ifs) at the Vienna University of Technology (TU-Wien). He furthermore is president of AARIT, the Austrian Association for Research in IT and a Honorary Research Fellow in the Department of Humanities Advanced Technology and Information Institute (HATII), University of Glasgow. He received his MSc and PhD in Computer Science from the Vienna University of Technology in 1997 and 2000, respectively. In 2001 he joined the National Research Council of Italy (CNR) in Pisa as an ERCIM Research Fellow, followed by an ERCIM Research position at the French National Institute for Research in Computer Science and Control (INRIA), at Rocquencourt, France, in 2002. From 2004-2008 he was also head of the iSpaces research group at the eCommerce Competence Center (ec3).

His research interests cover the broad scope of digital libraries and information spaces, including specifically text and music information retrieval and organization, information visualization, as well as data analysis, neural computation and digital preservation.

6.3 About this document

The Chorus+Project Consortium groups the following Organizations:

Partner Name	Short name	Country
JCP-Consult	JCP	FR
The French National Institute for Research in Computer Science and Control	INRIA	FR
Centre for Research and Technology Hellas - Informatics and Telematics Institute	CERTH-ITI	GR
University of Trento	UNITN	IT
Vienna University of Technology	TUWIEN	AT
University of Applied Sciences Western Switzerland	HES-SO	CH
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JRC Institute for Prospective Technological Studies	JRC	EU

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