



Artist to
Business to Business
to Consumer
Audio Branding System

www.abcdj.eu

D2.2 Survey Report: Audio Branding Support Systems

Existing tools for use in audio branding are surveyed and typical core work steps are defined. Particular attention is paid to professional metaphors in use and intuitive usability which support audio branding communication, workflows, automation, monitoring and maintenance. Furthermore design of UIs which give representation support are examined in detail. Results are arranged into concrete requirements and recommendations for the project's tool developments.

Project Reference	688122 — ABC_DJ — H2020-ICT-2015
Deliverable/WP/Task	D2.2/W2/T2.5
Delivery Date	29/04/2016
Main Author(s)	Daniel Artur Schindler, HDIS, daniel.schindler@heardis.com
Co-Author(s)	Stefano Miccoli, FINC, stefano.miccoli@finconsgroup.com Borja Torres, LMONK, borja@lovemonk.net
Quality Assurance	Silke Borgstedt, INTEG, silke.borgstedt@sinus-institut.de Richard Wages, TUB, richard.wages@tu-berlin.de
Filename	D2.2_ABC_DJ_audio-branding-support-systems.pdf
Publication Level	PU

ABC_DJ - Artist-to-Business-to-Business-to-Consumer Audio Branding System

contact: www.abcdj.eu
email: info@abcdj.eu

Copyright Notice

© ABC_DJ Consortium. 2016.

This document contains material, which is the copyright of certain ABC_DJ consortium parties. This work is licensed under the Creative Commons Licence CC BY-NC 4.0, <http://creativecommons.org/licenses/by-nc/4.0/>.

Disclaimer

Neither the ABC_DJ consortium as a whole, nor a certain party of the ABC_DJ consortium warrant that the information contained in this document is capable of use, nor that use of the information is free from risk, and accepts no liability for loss or damage suffered by any person using this information.

Neither the European Commission, nor any person acting on behalf of the Commission, is responsible for any use which might be made of the information in this document.

The views expressed in this document are those of the authors and do not necessarily reflect the policies of the European Commission.

Project Information

Full project title	ABC_DJ — Artist-to-Business-to-Business-to-Consumer Audio Branding System
Project Coordinator	Stefan Weinzierl / TU Berlin
Project ID	688122 — ABC DJ — H2020-ICT-2015

Acknowledgements

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688122.

Table of Contents

- History 5**
- Executive Summary 6**
- 1. Introduction 7**
- 2. Basics of Audio Branding 8**
 - 2.1 Three Exemplary Audio Branding Tasks..... 8**
 - 2.1.1 Unique acoustic piece.....8
 - 2.1.2 Music selection as inspiration8
 - 2.1.3 (Potentially) Unlimited acoustic compilation9
 - 2.2 Major Work Steps of Audio Branding Tasks 9**
- 3. Audio Branding Work Steps and their Supporting Tools 11**
 - 3.1 Music Search 11**
 - 3.1.1 Music Search in Production Music Catalogues11
 - 3.1.2 Catalogues with Music Produced by Hobby Musicians and Small Labels13
 - 3.1.3 Music Catalogues of Publishers.....14
 - 3.2 Music Discovery..... 15**
 - 3.2.1 Discovery Based on the Spotify & Echonest Algorithm16
 - 3.2.2 Discovery Based on Independent Algorithms.....18
 - 3.2.3 Curation Based Discovery19
 - 3.3 Music Archiving 20**
 - 3.4 Translation Process 22**
 - 3.5 Music Presentation 22**
 - 3.6 Playlist Management 24**
 - 3.6.1 Composition According to Simple Rules.....25
 - 3.6.2 Algorithm Based Composition.....26
 - 3.7 Music Mixing & Replay..... 27**
 - 3.8 Maintenance 28**
- 4. Core Requirements for Novel Audio Branding Supporting Tools & Feature Modules..... 29**
 - 4.1 Music Search & Discovery 29**
 - 4.2 Music Archiving 29**
 - 4.2.1. DJ Cue Point Module29
 - 4.2.2. Pre-listening Module29
 - 4.2.3. Extraction and Indexing Module.....30
 - 4.3 Translation Process: Brand Filter and Prediction Module 30**
 - 4.4 Music Presentation: Audio Branding Tool..... 31**
 - 4.5 Playlist Management: Playlist Generator Tool 31**
 - 4.6 Music Mixing & Replay: Instore Player Module 32**
 - 4.7 Maintenance: Cockpit Unit..... 32**

- 5. Visualisation..... 33**
 - 5.1 Visualisation of tracks or songs..... 33**
 - 5.2 Visualisation of Moods..... 34**
 - 5.3 Visualisation of brand fit 35**
- 6. Conclusions 36**
- References 37**

History

Version	Name	Date	Remark
VO.1	Daniel Artur Schindler	2016-19-04	Content inserted from cooperative Google Docs documents
VO.2	Daniel Artur Schindler	2016-22-04	Corrections and suggestions from INTEGRAL incorporated
V1.0	Daniel Artur Schindler	2016-27-04	Corrections and suggestions from TUB incorporated
V1.1	Richard Wages	2017-02-26	Correction of typos ahead of publication

Executive Summary

To structure the survey of support systems this report defines 8 work steps in audio branding. The central work step is the translation process where marketing terms are translated into music related terms. It is preceded by 3 work steps and followed by 4, of which the last three mainly play a role when music is to be presented in a store setting (instore music). The 8 work steps are the following:

- Music Search
- Music Discovery
- Music Archiving
- Translation Process**
- Music Presentation
- Playlist Management
- Music Mixing & Replay
- Maintenance

For each of the work steps a representative set of software tools is analysed according to four aspects:

- general functionalities
- general limitations
- technical advantages
- technical limitations

Using the listed characteristics a total of 34 software tools and supporting systems is analysed and leads us to a two-fold conclusion:

- To date there is no unified (visual) language to describe and present music
- Currently there is no tool available that can aid the translation process central to audio branding

This gap is addressed in chapters 4 and 5 where a first concept of the tools and modules the consortium will develop is outlined. Both, the analysis and the outline serve as the groundwork for deliverable D2.6.

1. Introduction

The following report serves both as an overview of existing tools which might be used for support in audio branding as well as an outlook into possible future developments. Eight work steps, which were deducted from the work experience of the two creative agencies in the consortium (HDIS and LMONK), serve as a basis for the survey and the conceptual drafts. The report however does not investigate *every* conceivable aspect of audio branding. It does for example not deal with the production of sounds (jingles) or making “better” music. For the form of content we want to generate, namely sophisticated playlists, we regard existing music as the raw material. To do so we have to deliver support tools which aid the filtering and searching/finding of music.

The most important aspect of audio branding is linking music (audio) and marketing (branding). Hence the whole survey and the concept of future developments both centre around the question how these tools aid this one central process. The tools within our survey were selected based on our own experiences - either because we used them in our work in the past or because we chose *not* to use them for a specific reason. Before we can take on this survey however, we have to take a closer look at the basics of the audio branding process in general.

2. Basics of Audio Branding

Within the ABC_DJ project audio branding is defined as ‘the process of brand building and brand management through the use of acoustic elements within a communication strategy’. Ideally this means that audio branding professionals define a set of audio tracks or music features fitting the item/brand/company to be branded acoustically.

The term *brand fit* was coined by McInnis and Park¹ in 1991 and denotes ‘perception of a congruence between musical features and features of a brand or its product portfolio by the target audience’. Our long-standing expertise and experience in the audio branding industry has shown that each audio branding agency usually established its *individual process*. Nonetheless, a closer look at all the variations we encounter shows, that this process is based on the same or at least *similar work steps*.

To produce a comprehensive overview of audio branding services we look at three exemplary tasks which we as an audio branding agency have to tackle in our day-to-day work. Thus we are able to define the steps needed when facilitating audio branding for a client.

The deliverable then focuses on giving an overview of the tools which are currently (at least partially) used in each of these steps. This analysis is aimed at finding omissions, imperfections or mere gaps in the portfolio of currently available tools. Based on this analysis we then define some basic features our three novel audio branding tools must entail in order to fill the gaps when being developed by the ABC_DJ consortium.

2.1 Three Exemplary Audio Branding Tasks

2.1.1 Unique acoustic piece

In the first task that we want to take a look at an audio branding agency is approached by a client with the request to find a song for a TV commercial. The client usually finished shooting at this moment and now moves the video to post production - with music being one of the components now to be added.

For this example we assume that the client approaches the audio branding agency with a rough cut of the commercial and a general idea of the music. They brief the agency using terms like “Electro Pop”, “funky” and “smooth” to describe the music they want to use for their commercial. It is now possible for the agency to use these same words to search music databases for music that fits both, the criteria given by the client and the rough cut of the video. The selected music is then presented and explained to the client by translating music related terms into a marketing terminology. After the client finally decided on a track, the central audio branding process has ended and the rights clearing process can start (which is not discussed here).

2.1.2 Music selection as inspiration

In the second case a client approaches the audio branding agency with the request to assemble a collection of mood songs as inspiration for a composer. Just as with the first task the client might give the audio branding agency some terms describing the music and the sound he expects. Once again the audio branding agency can now search music databases to find music that fits the client’s briefing. But since this request is usually more vague than the first (2.1.1), the agency also might utilise music discovery services to find new music which is not available through the music databases.

These services also allow for the discovery of music the agency itself did not know to exist

¹cf. Hirsch and Langeslag (2004), p. 235.

or music which fits the music already found but is not connected with the (agency's) terms used for music search. After they were found or discovered the audio tracks need to be presented to the client in some kind of playlist and the selection explained to the client by translating music related terms into a marketing terminology. Finally, as in the first example, the client is either satisfied with the selection or demands more audio tracks to be presented.

2.1.3 (Potentially) Unlimited acoustic compilation

In our third example the audio branding agency is approached by a client who desires background music for their boutique store. The client gives detailed information about the store but might have no detailed ideas regarding the expected music. What the agency now has to do is translating the terms used by the client to describe store and customers into terms the agency can use to find and discover music. In this case an agency usually has to find several hundred music tracks which then need to be archived and tagged (according to a classification established within the agency) in order to be retrieved and arranged into a playlist.

Using an online streaming player or hardware playback system the selected audio tracks can then be sequenced on site according to an order defined by a playlist. To complete its service the audio branding agency then has to monitor the payout at the store to ensure that the right songs are played at the correct, previously planned time. The two last points might also be carried out by a technical partner who supports the audio branding agency with the maintenance of technology.

Obviously the three exemplary tasks have several work steps in common, which now can be looked at more closely.

2.2 Major Work Steps of Audio Branding Tasks

While audio branding can be defined by the single step where marketing and branding terms are translated into music related terms, the exemplary task overview showed us that audio branding services entail several further work steps - both upstream and downstream.

Preceding the translation process are the following three work steps:

□ **Music Search**

With a clear idea of the music in need the audio branding agency searches databases to find suitable audio tracks.

□ **Music Discovery**

The audio branding agency has no clear idea of the music in need and hence relies on algorithms and curators for inspiration.

□ **Music Archiving**

The music found in one of the previous steps has to be catalogued, so it can be utilised in the following steps or future tasks.

The work steps up to this point can be regarded as a typical constant task for an audio branding agency to be equipped with an annotated and up-to-date working archive at any given time.

□ **Translation Process**

The translation of marketing and branding terms into music related terms (and vice versa) can be regarded as a highly creative and central work step in all audio branding processes. After the briefing by a client and understanding their needs, this translation is

the starting point for various subsequent work steps. For example it usually triggers music search in the agency's annotated archive. In case the latter proves to be insufficient it will trigger the aforementioned three work steps anew.

It is exactly this pivotal function that aligns the worlds of music (audio) and marketing (branding) and enables targeted search by the agency and unified communication with the client.

Following the translation process we define four further work steps:

□ **Music Presentation**

The music that was chosen from the music archive or during music search and music discovery has to be made available for and presented to the client.

□ **Playlist Management**

To present the selected music in a store it has to be arranged in a playlist which then can be exported onto a playback system.

□ **Music Mixing & Replay**

To achieve a *perfect* musical flow the instore playback system has to render the playlists seamlessly.

□ **Maintenance**

When music is not presented in front of a client but as instore music, the functionality of the playout system and the consistency of the playlists have to be maintained remotely in a final (ongoing) work step.

Based on these eight work steps the tools used by audio branding agencies for their work can be analysed in a clearly structured way.

3. Audio Branding Work Steps and their Supporting Tools

As depicted in the previous chapter, depending on the task or project an audio branding agency is assigned to by its client, up to 8 work steps have to be carried out. Nearly all of these work steps can be supported by software tools. Most of these tools however were not designed to be used by professional users in a business context - let alone by such specialised businesses as audio branding agencies. As a result audio branding agencies often are confronted with a rather discomfoting situation: in their day to day work they either use support systems which were designed for private end customers or for other professionals than audio branding agencies, like radio stations or film producers. Nonetheless we here take a closer look at these tools in order to record their strengths and weaknesses and to define a toolset which is aimed directly at the previously described audio branding work steps.

The tools within our survey were selected based on our own experiences - either because we used them in our work in the past or because we chose *not* to use them for a specific reason. They were mainly analysed according to the needs of an audio branding agency, but this analysis was enhanced with an assessment from a technological perspective. The list of analysed tools does not claim to be exhaustive – as there are countless music discovery tools based on the Spotify API for example. It provides however for a very good and exemplary overview.

3.1 Music Search

When searching for music an audio branding agency has to be able to use as many of its own music related terms as possible. It then would be very helpful for the agency to know *how close* the found tracks match the search terms, *how many* of the available tracks meet predefined criteria and what other criteria are *related*. Further it seems natural to have some sort of visualisation for each audio track (waveform, artist picture, cover artwork, etc.) and to be offered artist info.

Our study showed that none of the available tools fully meets these requirements. We can roughly group the music search tools into tools which allow for search in (1) production music catalogues, (2) catalogues of music produced by hobby musicians and small labels, and (3) music catalogues of music publishers.

Yet, all reviewed tools have certain features and limitations in common. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations.

3.1.1 Music Search in Production Music Catalogues

Universal Publishing Production Music (UniPPM) / www.unippm.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching royalty-free production music from the Universal Publishing catalogue - Available categories: Length, Use, Music Styles, Mood, Country, Instrument, Tempo, Era, Record Label 	<ul style="list-style-type: none"> - Mediocre level of musical quality - Due to the pre-cleared status only a portion of the Universal Publishing catalogue is available - Extensive but confusing choice of 	_____	<ul style="list-style-type: none"> - Adobe flash required - No mobile version

<ul style="list-style-type: none"> - Short description of each track - Playback function of full track and waveform visualisation - Direct download of tracks for a flat fee 	<p>categories</p> <ul style="list-style-type: none"> - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists 		
---	---	--	--

<p>Extreme Music (similar to EMI Play, Sonoton/Sonofind, Audio Network) / www.extrememusic.com</p>			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching royalty-free production-music from the Sony ATV catalogue - Various lengths and instrumental versions available - Playback function of full track and waveform visualisation - Direct download of tracks for a flat fee 	<ul style="list-style-type: none"> - Mediocre level of musical quality - Due to the pre-cleared status only a portion of the Sony ATV catalogue is available - Only genre category available - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists 	<p>_____</p>	<ul style="list-style-type: none"> - Adobe flash required - No mobile version

<p>Bibliotheque Music / bibliothequemusic.com</p>			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Very good quality and edgy productions - Available categories: Genre, Feel, Keywords, Tempo - Various lengths and instrumentals available - Playback function of full track and waveform visualisation - Download available - Intuitive UI 	<ul style="list-style-type: none"> - Small amount of songs and genres - Few search options 	<ul style="list-style-type: none"> - Provides lossy (mp3) and lossless (wav) versions - Mobile version 	<p>_____</p>

3.1.2 Catalogues with Music Produced by Hobby Musicians and Small Labels

<p>Syncbubble / syncbubble.com</p>			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching production-music and music by hobby musicians - Available categories: Length, Music Styles, 	<ul style="list-style-type: none"> - Low level of music quality - Big amount of music produced by hobby musicians 	<p>_____</p>	<ul style="list-style-type: none"> - No mobile version

<p>Mood, Instrument, Tempo, Era</p> <ul style="list-style-type: none"> - Upload of video you want to sync your music to - Playback function of full track and waveform visualisation - Direct download of tracks for a flat fee 	<ul style="list-style-type: none"> - No extensive search functionalities, music description (tags) are very limited - No visualisation of data, no overview - UI not user friendly or intuitive, mostly lists. 		
--	---	--	--

Jamendo / jamendo.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching production-music and music by hobby musicians - Available categories: Length, Genre, Theme, Instrument, Tempo, Language, Country. - Cheap instore music program. - Direct download of tracks for a flat fee 	<ul style="list-style-type: none"> -Low level of music quality and diversity - Big amount of music produced by hobby musicians - No extensive search functionalities, music description (tags) are very limited -Low visualisation of data, no overview. UI not user friendly or intuitive, mostly lists 	<ul style="list-style-type: none"> - Flac and wav lossless format - Mp3 lossy format for preview downloads 	<ul style="list-style-type: none"> - No multiple track add to cart functionality

Soundtaxi / www.soundtaxi.net			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching music by hobby musicians - Available categories: Mood, Tempo, Instrument, Artist, Keyword - Direct download of tracks for a flat fee 	<ul style="list-style-type: none"> - Low level of music quality and diversity - Big amount of music produced by hobby musicians - No extensive search functionalities, music description (tags) are very limited - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists 	<ul style="list-style-type: none"> - Wav lossless format - A sync "add to cart" action, smoother checkout workflow 	<ul style="list-style-type: none"> - Adobe flash required - No mobile version

Premium Beat / www.premiumbeat.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching production-music and music by 	<ul style="list-style-type: none"> - Low level of music 	<p>Provides lossy (mp3) and lossless (wav)</p>	<p>_____</p>

<p>hobby musicians</p> <ul style="list-style-type: none"> - Available categories: Genre, Mood, Artist, Popularity - Direct download of tracks for a flat fee 	<p>quality and diversity</p> <ul style="list-style-type: none"> - Big amount of music produced by hobby musicians - No extensive search functionalities, music description (tags) are very limited - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists 	<p>versions.</p> <p>Mobile version.</p>	
--	---	---	--

3.1.3 Music Catalogues of Publishers

Shapiro Bernstein / www.shapirobernstein.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching music within the published songs - Available categories: Tempo, Genre, Vocal Gender. - No track download but each song can be requested for licensing directly 	<ul style="list-style-type: none"> - No extensive search functionalities - Publisher-centric, master rights not available for clearing - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists. 	<p>_____</p>	<ul style="list-style-type: none"> - No direct download available - No mobile version

Budde Music / music.buddemusic.de			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Searching music within the published songs - Available categories: Territories, Catalogs of sub-publishers, Artist, Genre, Mood, Key, Tempo, Vocals, Year, Length - Each song can be requested for licensing directly - Download for logged in users available 	<ul style="list-style-type: none"> - Search functionalities compromised by tagging errors (e.g. the categories "Pop" and "[Pop]" are available) - Publisher-centric, master rights not available for clearing - Low visualisation of data, no overview - UI not user friendly or intuitive, mostly lists 	<ul style="list-style-type: none"> - Based on SynchTank software (www.synchtank.com) like many other publisher websites 	<ul style="list-style-type: none"> - Adobe flash required - No mobile version

As a conclusion we can say that these tools allow for:

- Searching for music by entering search terms into a mask
- Filtering the catalogue according to predefined terms

- Replay of the found tracks
- Download or purchase of the found tracks

These tools however have various limitations:

- Little or no visualisation at all going beyond the list metaphor
- No visualisation or information about how the found tracks relate to the rest of the catalogue
- Outdated and even counter-intuitive UIs
- Predominantly production music with low creative quality (i.e. created solely with the idea to be used for marketing purposes and not as a solitary, hence multi-compatible, creative expression)

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- The simple and intuitive UI of Biblioteque Music
- The video upload functionality of Synbubble

3.2 Music Discovery

While discovering music an audio branding agency heavily relies on recommender algorithms or curators suggesting new music. The most common technologies behind these recommendation services are collaborative filtering, automatic content based recommendation, and manual approaches. Beginning with one exemplary song or a limited set of terms the agency does not need to find music fitting the criteria exactly but rather might get inspired by music that is somehow related to the starting point.

It is however very important for the agency to understand the relation to the starting point when algorithms suggest new music. Insofar the underlying recommender technology (or at least the knowledge thereof) plays a key role. I.e., was the new track recommended because many people who listened to/bought the starting track also bought this one? Or was it recommended because it shares important structural/melodical features with the original track? Or was it in the same set of recommendations (by an expert) for a certain 'group' of music consumers?

Furthermore, being able to simultaneously pick a variety of starting points could prove to be helpful, be they linguistic, auditive or even visual. Finally here too it seems only natural to have some sort of visualisation for each audio track (waveform, artist picture, cover artwork, etc.) and to be offered an artist info.

Our study showed that none of the available tools fully meets all of these requirements. Most of the tools investigated are (1) powered by a set of algorithms developed by Echonest, a company which analyses musical qualities and in 2014 was acquired by Spotify.² Discovery tools which are (2) based on other algorithms exist, though only comparatively few. A third group contains (3) interactive tools which are based on curation by experts. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations.

3.2.1 Discovery Based on the Spotify & Echonest Algorithm

²cf. <http://techcrunch.com/2014/03/06/spotify-acquires-the-echo-nest/>

Spotify Weekly Discoveries / www.spotify.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free for Spotify users - Spotify's own algorithm makes a list of music that hasn't been played under your Spotify profile but rather based on the songs you listen to and the songs other people play - Surprising and convincing results 	<ul style="list-style-type: none"> - Limited amount of songs each week - Just one playlist per week 	<ul style="list-style-type: none"> - Accessible via playlist API 	<p>_____</p>

Echonest / the.echonest.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based - Audio fingerprinting and dynamic music data - Provides API and database for developers of music apps and websites - Owned by Spotify 	<ul style="list-style-type: none"> - Only provides API for web applications (developer.spotify.com) 	<ul style="list-style-type: none"> - REST API - Official libraries for Objective-C, Python, Java - Unofficial libraries for PHP, C++, Node.js 	<ul style="list-style-type: none"> - Rate limit of 120 API calls/minute for non-commercial, to be defined for commercial use.

Magic Playlist / magicplaylist.co			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Creates a playlist of similar tracks, starting with one track the user specifies - Add playlist to Spotify 	<ul style="list-style-type: none"> - Playlists contain tracks by the same artist - Very limited musical spectrum for each playlist 	<ul style="list-style-type: none"> - Open source (github.com) 	<p>_____</p>

Moodsnap / moodsnap.fm			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free App, but requires fee-based Spotify Premium account - The user chooses a picture that fits his mood from the app and a linked radio starts to 	<ul style="list-style-type: none"> - No active search (e.g. for similar tracks) possible. - Pictures are selected by the app designers who also link the radios - No brand relevance 	<p>_____</p>	<ul style="list-style-type: none"> - Limited to iOS devices - Commercial license only on request

<p>play</p> <ul style="list-style-type: none"> - Depending on like or dislike of a song the radio algorithm gets optimized 	<ul style="list-style-type: none"> - Only available for iPhone 		
---	---	--	--

Boil The Frog / echonest.com/BoilTheFrog			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Creates a playlist of 10 to 15 tracks linking one artist to an other - Add playlist to Spotify 	<ul style="list-style-type: none"> - Jarring differences between batched tracks - The same tracks are used for different transitions/playlists - Few new suggestions - No brand relevance 	<ul style="list-style-type: none"> - Uses Spotify catalogue and echonest algorithms 	<ul style="list-style-type: none"> - Export lists only as Spotify playlist

3.2.2 Discovery Based on Independent Algorithms

Habu / habumusic.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Discover music in the web-shop "7digital", categorised by mood - Create a playlist of music stored on your device with one click - Superior UI displays Songs as dots within a circumplex mood-chart (positive vs dark and calm vs energetic) 	<ul style="list-style-type: none"> - You can only discover what is available in the 7digital web-shop - No other search mechanisms or information available - Smartphone App only - For private end consumers only, no brand relevance - Playlists are not fulfilling needs of instore music or other commercial use 	<p>_____</p>	<ul style="list-style-type: none"> - Last Android app update 2013

Moodagent / moodagent.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based - Audio fingerprinting and dynamic music data - Provides API and database to developers of music apps and websites 	<ul style="list-style-type: none"> - Provides API for web applications only - Stopped releasing own apps at the end of 2014 	<p>_____</p>	<ul style="list-style-type: none"> - Release date of new playlist service not available to date

Pingtrax / www.musimap.net/searchengine			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based - Multiple, intuitive search modes - Searches a database of 50 Million tracks - Especially designed for professional use - Superior UI with circumplex mood-charts, lists and faders - Result are shown with percentage of fit to search criteria - Search for similarly sounding tracks 	<ul style="list-style-type: none"> - No detailed information on each track - Only available in beta at the moment 	<ul style="list-style-type: none"> - REST API with JSON response - OAuth authentication to API - Export playlists to xls files (office excel) - Real time user support in slack 	<ul style="list-style-type: none"> - License needed (long time for enquiry response) - License costs not clear

Pandora / www.pandora.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Pandora generates a radio station based in just one song and the users likes and dislikes of the following tracks - It's based on it's own algorithm 	<ul style="list-style-type: none"> - No search possible, only skipping and for a limited number of songs - It works only in USA, Australia, New Zealand 	<p>_____</p>	<ul style="list-style-type: none"> - Not available in EU market

3.2.3 Curation Based Discovery

Radiooooo / radiooooo.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Listen to music from around the world, based on an interactive map and selected from 12 decades - Social sharing and purchasing option via iTunes 	<ul style="list-style-type: none"> - Country and decade are the only parameters for song search - Outdated interface 	<p>_____</p>	<ul style="list-style-type: none"> - No documentation nor API provided

22Tracks / 22tracks.com
--

General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Each curated playlist contains 22 tracks - Playlists curated by 120 DJs and musicians from 4 European cities 	<ul style="list-style-type: none"> - No search possible - One can only discover what a curator discovered before - Only available as website or iOS app 	<ul style="list-style-type: none"> - Tracks can be downloaded via Soundcloud - Tracks can be purchased via iTunes - Integration with Spotify and Deezer 	<ul style="list-style-type: none"> - Audio quality and formats depend on third party e-commerce services - No documentation nor API provided

BBC Music / www.bbc.co.uk/music			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free smartphone app - Radio stream of music played by the BBC, based on users music preferences - Tracks can be saved to listen to later via Spotify or Deezer 	<ul style="list-style-type: none"> - Search is only possible for the tracks the user already heard through the app - Search is only possible utilising the date the song was last heard. - Content is based on the style of certain radio shows and the taste of their hosts 	<ul style="list-style-type: none"> - Also supports iTunes and Youtube - Export favourite tracks report as PDF 	<ul style="list-style-type: none"> - JSON and XML representations discontinued in October 2014 - Unknown release date for new API service

In conclusion we can say that these tools allow for:

- Searching for music by entering search terms into a mask
- Receiving suggestions based on specific and unique input
- Replay/pre-listening of the found tracks

These tools however have various limitations:

- Limited visualisation of tracks and their interrelations
- No information about how the found tracks relate to the starting point requests
- Entertainment tools mainly aimed at end consumers and not at professionals

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- The simple and intuitive UI and useful functionalities of Pingtrax
- The idea of image based discovery from Moodsnap

3.3 Music Archiving

To catalogue music which was found or discovered the audio branding agency has to be able to annotate large amounts of files with a (usually) self-defined set of music related or marketing terms. A tool that supports this process also should be able to automatically detect and record as many musical parameters (tempo, key, etc.) as possible. Furthermore it should enable the agency to add information enhancing the playout in a store, like setting cue points (define start and end of the replay a track) or estimating replay gain.

This huge amount of criteria currently is met by none of the available tools. With its countless possibilities for customization foobar2000 however can be enhanced to fit the needs of audio branding. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations of the reviewed tools.

iTunes / www.apple.com/itunes/			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Basic tagging of single tracks and albums - Crossfading of songs (from 1 to 12 sec) - Replay gain & sound enhancer (tone control to give the songs more loudness) - iTunes Genius: Apple generates playlists from file library (unknown mechanism) - Smart Playlists: creation of dynamic playlists 	<ul style="list-style-type: none"> - Only few tagging fields available and not possible to add tagging fields - No third party extensions - No FLAC playback. - Insufficient performance in big music libraries - No tools for automation - No professional playlist production possible 	<ul style="list-style-type: none"> - Many DJ mixing tools integrate with iTunes due to wider adoption - More than 6 releases per year - Windows and OSX native support, emulation needed for Linux support. - Access to library via exposed XML and iTunes Library Framework - DAAP protocol support 	<ul style="list-style-type: none"> - Windows COM interface documentation discontinued, can be found at www.joshkunz.com/iTunesControl - Little customization with hard to find plugins (no official repository) - Fewer file formats (aac, aiff, alac, wav, mp3) than foobar2000

Foobar2000 / www.foobar2000.org			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Many useful extensions - Many automation tools (replay gain, BPM counter, etc.) - Mass tagging - Sophisticated interface customisation - Software development kit (SDK) available 	<ul style="list-style-type: none"> - No cue point editing available - BPM counter inaccurate - No user administration (change log) - No automatic playlist creation 	<ul style="list-style-type: none"> - Wide development community and plugins repository - C++ SDK available - Remote control plugins and command line interface - Lot of formats (MP3, MP4, AAC, CD Audio, WMA, FLAC, WavPack, WAV, AIFF...) 	<ul style="list-style-type: none"> - Native support limited to Windows, wine needed for linux support - Poor default interface

Jaikoz / www.jthink.net/jaikoz/			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Tagging of single tracks and albums - Mass tagging - Automated tagging via MusicBrainz and Discogs database - Vast amount of 	<ul style="list-style-type: none"> - No cue point editing available - No third party extensions - BPM counter inaccurate - No user 	<ul style="list-style-type: none"> - Multiple platform support (Windows + Mac + Linux) - Regular updates (near monthly) - Large technical community 	<ul style="list-style-type: none"> - Requires license (20-30\$) after trial

available/tagable parameters	administration (change log). - No automatic playlist creation		
------------------------------	--	--	--

In conclusion we can say that these tools allow for:

- Annotating and tagging of single or multiple audio tracks
- Various types of automation

These tools however have various limitations:

- Cue points cannot be defined
- No user administration

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- foobar2000 due to its high customisability and openness to third party developments

3.4 Translation Process

As already mentioned several times the translation process where marketing and branding terms are translated into music related terms is the central work step in audio branding. Our survey has shown however that currently no software tools are available to support this work step. This step still heavily relies on the knowledge and experience of a musicologist who is able to deduct musical parameters from marketing and branding terms or to associate musical terms with the perceived qualities of a brand. This is usually done in a written step-by-step process which is recorded in a spreadsheet.

Depending on the respective agency this record might have very different names, like “Music Matrix” at the HearDis! or “Acoustic Transfer Interface” at the Audio Consulting Group³. What these records always have in common though is that no supporting tool is available for music analysis and prediction of how the music will be interpreted by the target group. Due to this fact no detailed overview of the functionalities and (technical) limitations can be given here.

3.5 Music Presentation

To present selected music to a client the audio branding agency has to be able to upload the audio tracks into a storage in the inter- or the intranet and grant the client access to this selection. It is very important for the agency to be able to describe the music while enabling the client to comment on the selection. Furthermore the possibility to add visual elements like the client’s logo or the songs relation to other music or to the perceived qualities of the brand would be very helpful when communicating with clients from the marketing industry.

While there are several websites where you can upload (audio) files to, we took a closer look only at the two top players mainly used in our day to day business. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations of the reviewed tools.

³cf. Hirsch and Langeslag (2004), p. 241.

Soundcloud / soundcloud.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Upload of music files (wav or mp3) - Visualisation with cover image and waveform - Setting restrictions (public/private) - Adding of timed comments and descriptions 	<ul style="list-style-type: none"> - Heavy copyright restrictions lead to many songs being removed within seconds - Users can not comment if they have no Soundcloud account - Free account has 3 hours limit for uploads. Pro account plans available up to 99\$ per year 	<ul style="list-style-type: none"> - Well documented APIs - Standard Authentication (OAuth 2.0) - Multiple audio formats supported for upload (AIFF, WAV, FLAC, OGG, MP2, MP3, AAC, AMR and WMA) - API for playlist management - Official support by development team via stackoverflow.com - Original file format available for download 	<ul style="list-style-type: none"> - 15,000 request per 24 hours limit on all playable stream requests - Stable and official API wrapper available only for Python, Ruby and Javascript - Discontinued Java API wrapper - 500MB limit per uploaded track (as opposed to 5gb claimed on support page) - 128kbps MP3 as only supported streaming format

Dropbox / www.dropbox.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Upload of various file formats - Setting restrictions (public/private) - Organisation via folder structure 	<ul style="list-style-type: none"> - No visualisation available - No commenting possible 	<ul style="list-style-type: none"> - Official Software development kit (SDK) in several languages (.NET, Java, Javascript, PHP, Ruby...) - Multiple formats supported for streaming (aac, flac, m4a, mp3, oga, wav, wma) preview availability depends on browser support - API endpoint to track changes on files and folders - Multiple users permissions management over folders and files with business account - Original file format available for download - Virtually every file format supported for upload - Standard Authentication (OAuth 	<ul style="list-style-type: none"> - Bandwidth limited on daily basis at 20GB (free account), 200GB (premium account) - 100,000 downloads per day (free account) - Space limited to 2gb (free account), 1TB (premium account) - Limit to 50 users subscribed to app before Production approval process (should not be a problem, but initial configuration)

2.0)

In short we can say that these tools allow for:

- Uploading and sharing of single audio files to defined audiences
- Organising of uploaded content

These tools however have various limitations:

- Little customisation and no visualisation of musical qualities whatsoever
- Copyright restrictions since mainly aimed at end consumers and not at professionals

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- The consistent and slick UI of Soundcloud

3.6 Playlist Management

As described above, this and the two following steps are mainly important if the audio branding agency is commissioned to create a music programme to be used in a store setting (instore music). Here the agency does not only need to present a few selected songs to a client but rather has to prepare varied and consistent playlists of several hundred audio tracks to be played at the store. Ideally these playlists are generated by an algorithm, with the agency being able to define as many rules as possible for the playlist to be generated.

Our study firstly showed that while some (1) software tools use intelligent algorithms to create playlists none of these tools offers rules for playlist generation. Furthermore, the (2) tools which do offer rules do so only in a very limited way where one can only define how often a certain track is repeated - obviously these tools are not based on sophisticated algorithms. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations of the reviewed tools.

3.6.1 Composition According to Simple Rules

RCSgSelector / www.rcsworks.com/en/products/gselector			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based - Industry standard in radio programming - Daily/weekly schedule 	<ul style="list-style-type: none"> - Designed for radio programs, not instore music - Playlist creation is based on track rotation rules only - Only available for PC - Outdated UI and technology 	<ul style="list-style-type: none"> - Based on MS SQL server database - Up to 99 scheduled database backups - Mobile-friendly web client - Manage multiple stations from single library - Client-server architecture 	<ul style="list-style-type: none"> - Windows only (except for web client)

Megaseg / www.megaseg.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based - Aimed at web radio producers - Pro version also contains a simple "automated playlist scheduler". 	<ul style="list-style-type: none"> - Playlist creation is based on track rotation rules only - Only available for iOS - Outdated UI and technology 	<ul style="list-style-type: none"> - Quicktime file formats (MP3, MP4, AAC, AIFF, MPEG-1/2/4, WAV) - More formats available via Quicktime plugin - Integrates with iTunes library - Customisable log file, with automatic upload 	<p>_____</p>

Soundtrack Your Brand / www.soundtrackyourbrand.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Fee-based service owned by Spotify - Daily/weekly schedule - Schedule is composed of predefined Spotify playlists 	<ul style="list-style-type: none"> - Works only with Spotify (content) - Available only in Sweden, Norway & Finland - The user can only schedule the succession of prefabricated playlists - No mixing between the tracks - No playlist export - Client's max. annual turnover < 1.1 Million EUR. 	<ul style="list-style-type: none"> - In-store player provided with enterprise license - Free client - Can schedule user-defined (via spotify API) playlists 	<ul style="list-style-type: none"> - Business tier allow only one client per time, only in Sweden, Norway and Finland - Current Spotify API does not allow to add local files to playlist and sync them between clients, just reorder and remove them

3.6.2 Algorithm Based Composition

Serato Pyro / seratopyro.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free App, but requires fee-based Spotify Premium account - Generates smooth transitions between tracks - Adjusts content of playlist according to dislike 	<ul style="list-style-type: none"> - For private end consumers only, no brand relevance - BPM analysis only, no key analysis - Automix only works well with modern (dance) music 	<p>_____</p>	<ul style="list-style-type: none"> - Limited to iOS devices - Supports only Spotify as streaming service. - Local music formats depends on iOS audio formats support - No export feature

Music eScope / www.youngandwellcrc.org.au/musicescape/			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Free - Superior UI displays Songs as dots within a circumplex mood-chart - Creates a playlist of the users music library based on current mood and mood the user wants to achieve - Based on a study with 170 young people and the Echonest algorithm 	<ul style="list-style-type: none"> - Only available as iPhone app - No playlist export 	<p>_____</p>	<ul style="list-style-type: none"> - iOS only - No API available

As a conclusion we can say that these tools allow for:

- Creating long or short playlists according to simple rules

These tools however have various limitations:

- Very few to no rules for playlist generation available
- Export to other tools rarely possible
- The few professional tools have very outdated UI

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- The consistent and slick UI of Soundtrack Your Brand
- The intelligent algorithms and smooth transitions of Serato Pyro

3.7 Music Mixing & Replay

For an optimised listening experience the transitions between each two music tracks in a playlist should be as smooth as possible. While several software players exist which are able to interpret playlists and while even the previously described playlist management tools can replay playlists, we chose to only describe players here that can also *mix* music

In our survey we realised that only players aimed at DJs offer truly satisfying mixing functionalities. However these are mainly designed for live performance and not as stand alone systems for automated playlist replay. The following spreadsheets give a detailed overview of the functionalities and (technical) limitations of the reviewed tools.

Traktor DJ Pro / www.native-instruments.com/en/products/traktor			
General functionalities	General limitations	Technical Advantages	Technical limitations
<ul style="list-style-type: none"> - Mixing music tracks manually and semi-automatically (beat sync) - Set cue points (define 	<ul style="list-style-type: none"> - For live DJs only, no brand relevance - Not usable as a "command line" tool, hence only for live use 	<ul style="list-style-type: none"> - Standard playlist format (m3u) export - Windows and OSX native support - MP3, WAV, AIFF, 	<p>_____</p>

start and end of a track) - Special Vinyl records as trigger tool	- Very expensive	Audio-CD, FLAC, Ogg Vorbis, non-DRM WMA** - Non-DRM AAC, two way synchronization with iTunes - Third party dj units support	
--	------------------	---	--

Pioneer Rekordbox / rekordbox.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
- Mixing music tracks manually and semi-automatically (beat sync) - Set cue points (define start and end of a track) - Organise tracks and make playlists manually	- For live DJs only, no brand relevance - Not usable as a "command line" tool, hence only for live use - Automix only works well with modern (dance) music	- Well documented - XML export for playlists - Windows + OSX support - Supports lossy formats (mp3, aac) and lossless formats (WAV, aiff). - iTunes integration	- Supports only proprietary DJ units

Djay / www.algoriddim.com			
General functionalities	General limitations	Technical Advantages	Technical limitations
- Works with Spotify library - Mixing music tracks manually and semi-automatically (beat sync) - Set cue points (define start and end of a track) - Organise tracks and make playlists manually	- For private end consumers only, no brand relevance - Not usable as a "command line" tool, hence only for live use - Automix only works well with modern (dance) music	- OSX + iOS (djay pro), Android (djay 2) - Wide third-party dj units support (djay pro), - iCloud integration via iTunes - Echonest algorithm - Crossplatform	- Export functionality relies on iTunes file sharing for iOS devices

In conclusion we can say that these tools allow for:

- Mixing music tracks manually and semi-automatically (beat sync)
- Setting cue points (define start and end of the replay a track)

These tools however have various limitations:

- Not available as as stand alone systems for automated playlist replay
- Not at all designed for instore music use

We regard the following tools as the most useful ones and as good source of inspiration for the tools to be developed by the consortium:

- The multiple and creative use of cue points in Pioneer Rekordbox

3.8 Maintenance

To complete the work steps of playlist management and music replay an audio branding agency offering music for stores has to maintain the applied system. At the moment this is done by specialised instore music companies like Mood Media or Play Network who use proprietary systems for this work step. Beyond such proprietary systems there are no tools available on the market to support (remote) maintenance of the music replay at a store.

Consequently no detailed overview of the functionalities and (technical) limitations can be given here. However, based on the needs of an audio branding agency, core requirements for this and other audio branding supporting tools can be systematically deducted.

4. Core Requirements for Novel Audio Branding Supporting Tools & Feature Modules

Based on the detailed analysis of the features and limitations of existing support tools for audio branding an overview of the core requirements for future developments can be given. This overview serves as a starting point for a detailed definition of functionalities and user interfaces to be developed in D2.6. While it is structured according to the work steps defined in the course of the analysis, the tools and modules are not distributed among the work steps evenly. Some of the work steps will be aided by up to three tools or modules while others only by one or none.

4.1 Music Search & Discovery

In the course of the ABC_DJ project there will be no new tool designed for music search or music discovery. This step will firmly stay in the hands of the audio branding agencies. The consortium however will develop a consistent terminology which might be adopted by music archives and music discovery sites in existence. Furthermore all problems of findability, visualisation and musical quality previously discussed for existing tools will be taken into account when developing a new tool for music presentation.

4.2 Music Archiving

For the work step of music archiving we decided to continue using foobar2000 because of its high customisability and openness to third party developments. To optimize the work step of music archiving but also to aid the following work steps the modules will be developed as plug ins for foobar2000.

4.2.1. DJ Cue Point Module

Since no tool available for music archiving enables the audio branding agency to set cue points in audio tracks to define start and end of the track's replay, a module for this task will be developed.

Inspired by the cue point functionality of the examined music mixing players, the user of the tool will be enabled to set start and end-point for each audio track which then can be interpreted by the playlist management tool as well as the instore player module.

This module's core functionalities need to be:

- Defining start and end points in tracks which can be interpreted by the instore player but also other music players
- Defining fader characteristics for the start and end points
- Pre-listening of the defined start and end points
- User administration to record the creator of the cue points

4.2.2. Pre-listening Module

The pre-listening module is based on developments already carried out by IRCAM. It generates a short version of a track, a collection of its prominent elements, so the user is able to get the whole idea of it within seconds instead of minutes. This module enables the audio branding agency to judge the found or discovered audio tracks more quickly and annotate it for archiving purposes.

Furthermore the short versions of audio tracks created by this module can be used for

music presentation. Instead of listening to entire audio tracks clients of audio branding agencies can listen to these condensed versions to quicker get an idea of how their acoustic branding will sound.

This module's core functionalities need to be:

- Creating one shortened version of a given track
- Exporting of the shortened version for uses outside of the pre-listening module

4.2.3. Extraction and Indexing Module

An extraction and indexing module will be developed which can automatically annotate audio files with terms describing their measurable musical features. This serves as further aid in the work step of music archiving as it reduces the time needed to annotate measurable features and frees time to annotate non-measurable ones.

A set of as many measurable musical features as necessary will be defined, based on a representative audio track sample. Furthermore a set of algorithms will be developed which is able to detect these features in any given audio track. These features and their terms will not be chosen arbitrary however, but with the clear aim of mapping them onto terms used in marketing so they can be used for the translation process.

This module's core functionalities need to be:

- Automatic adding of annotations describing measurable musical features of a given track
- Possibility to manually edit annotations the module added automatically
- User administration to record who annotated the tracks

4.3 Translation Process: Brand Filter and Prediction Module

The central module that needs to be developed by the ABC_DJ consortium is the brand filter and prediction module. Based on a massive survey with several thousand music consumers this module will enable the audio branding agency to predict a target audience's interpretation of a given song cluster.

Hence it can be used as a filter both within the music archiving software used for annotation as well as within the audio branding tool to display a certain portion of a music archive. It is precisely this module which maps the marketing terms onto the music terms based, on the one hand, on the analysis of terms that are used by brands to describe music (Terminology B) and, on the other hand, on the analysis of terms that are used by end consumers to describe music (Terminology To).

This module's core functionalities need to be:

- Defining a set of terms according to which music tracks are filtered
- Filtering a given sample of audio tracks
- Exporting a (play)list of the filtered audio tracks

4.4 Music Presentation: Audio Branding Tool

Since it is crucial for the success of an audio branding agency to present to its client how well the assigned request was fulfilled and how well a set of tracks fits the brand (message), a new tool to present selected music has to be developed. Neither the available music search and discovery tools nor the tools for music presentation come close to fulfilling this

need.

A new tool needs to display to the client how the suggested music selection is related to the clients input, how the individual tracks are related among each other and how close the presented tracks are to fulfilling the client's request. This last aspect of the visualisation also implies that the client will be enabled to see which music is too far from fulfilling his request and hence can *not* be used to establish a consistent audio brand.

This tool's core functionalities need to be:

- Pre-listening of selected audio tracks
- Visualisation of selected audio tracks
- Visualisation of the relation of the audio tracks to the perceived identity of a brand
- Visualisation of the relation of the selected audio tracks among each other

4.5 Playlist Management: Playlist Generator Tool

When the selected music serves as a basis to create a music programme to be used in a store or other outlet, the audio branding agency will need to use a specialised tool to generate playlists that can be used to this end. As suggested in our previous analysis, a mix of the functionalities of professional tools (setting rules for the playlist) and tools for private consumers (logarithm based generation of playlists) is in need.

It is however crucial to decisively increase the amount of available rules, so that playlists are no longer based solely on a given amount of repetitions of an audio track.

This tool's core functionalities need to be:

- Creating long and short playlists according to a set of given rules
- Defining a set of rules the playlist is created according to
- Setting parameters for the used rules
- Algorithmically create a musical flow and smooth transition between the audio tracks in the playlist
- Exporting a playlist which can be interpreted by the instore player but also other music players

4.6 Music Mixing & Replay: Instore Player Module

In an instore setting this tool will render playlists created by the Playlist Generator Tool and mix the audio tracks according to the cue points defined by the DJ Cue Point Module. This module will be a software application stored on a dedicated computer or even on one already present at the store. A central requirement here is that this application is, on the one hand, open to remote service (like updating of playlists and audio tracks) and, on the other hand, can be operated to a limited degree by the store personnel (where for example the store manager can rate the quality of a song).

This module's core functionalities need to be:

- Rendering any given playlist
- Taking into account pre-defined cue points
- Enabling data exchange with the Cockpit Unit

4.7 Maintenance: Cockpit Unit

Remote service and maintenance of the Instore Player Module will be carried out with a newly designed Cockpit Unit granting insight into the status of each and every playout module at any time. This browser based tool grants access to various user groups with varying privileges as to how they can interact with the playback at the store.

The status of each player and playlist must be viewed in lists or on a map. Detailed diagnoses must be available for connection to the internet, integrity of the audio track selection, currently played track or the interaction with the track at the store, among others. All this information will be used to optimise the song selection and complete the recursive process of audio branding and instore music provision.

This tool's core functionalities need to be:

- Log-in of various user categories and user management
- Overview of the status of each and every player
- Enabling the agency (or whoever is responsible for maintenance) to interact with the players
- Giving contact information of each store and enabling direct contact
- Enabling the personnel at the store to interact with the playlist and songs in a limited way, e.g. by rating songs or writing feedback

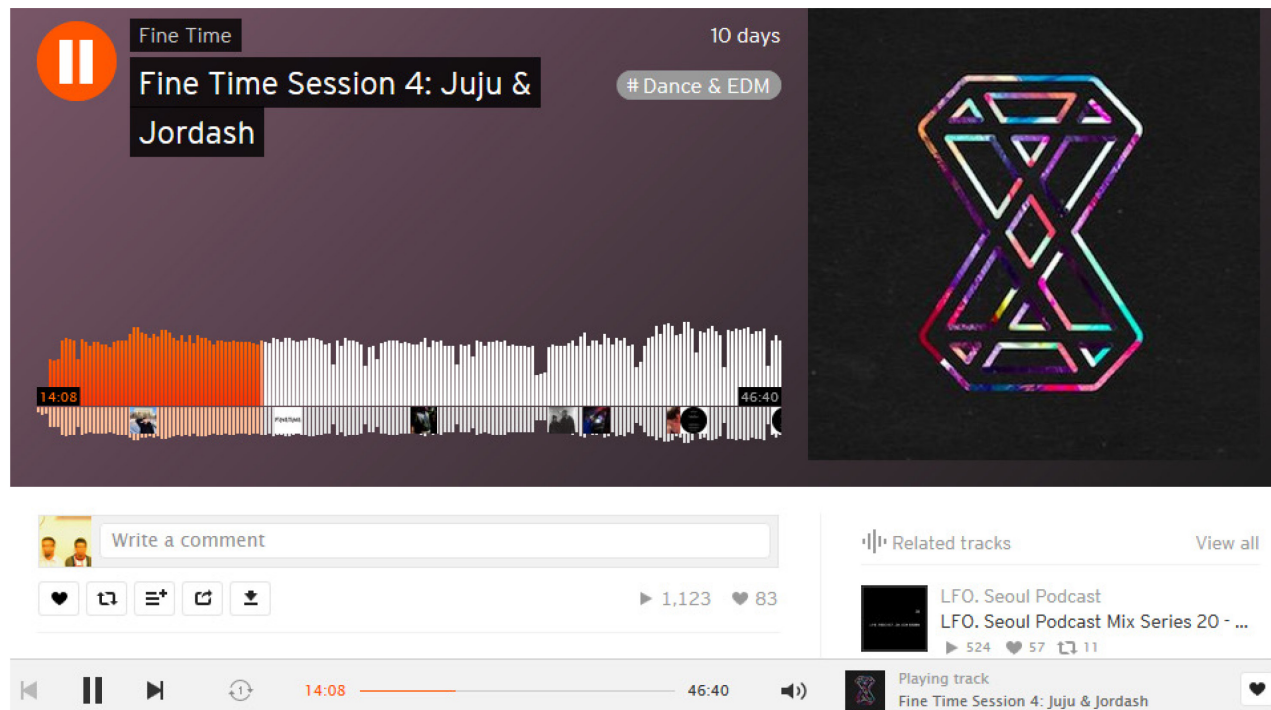
5. Visualisation

During this survey we found that there is no consistent concept of music visualisation across platforms. While detailed visualisation concepts for each tool and module will be given in D2.6 we here want to take a closer look at central elements of visualisation. Some aspects of music presentation (like artist information or musical mood) have common concepts of visualisation, but there are other aspects that are not visualised or even taken into account at all.

One of those aspects is a certain song's relation to a brand's identity or the interrelation between a given number of songs.

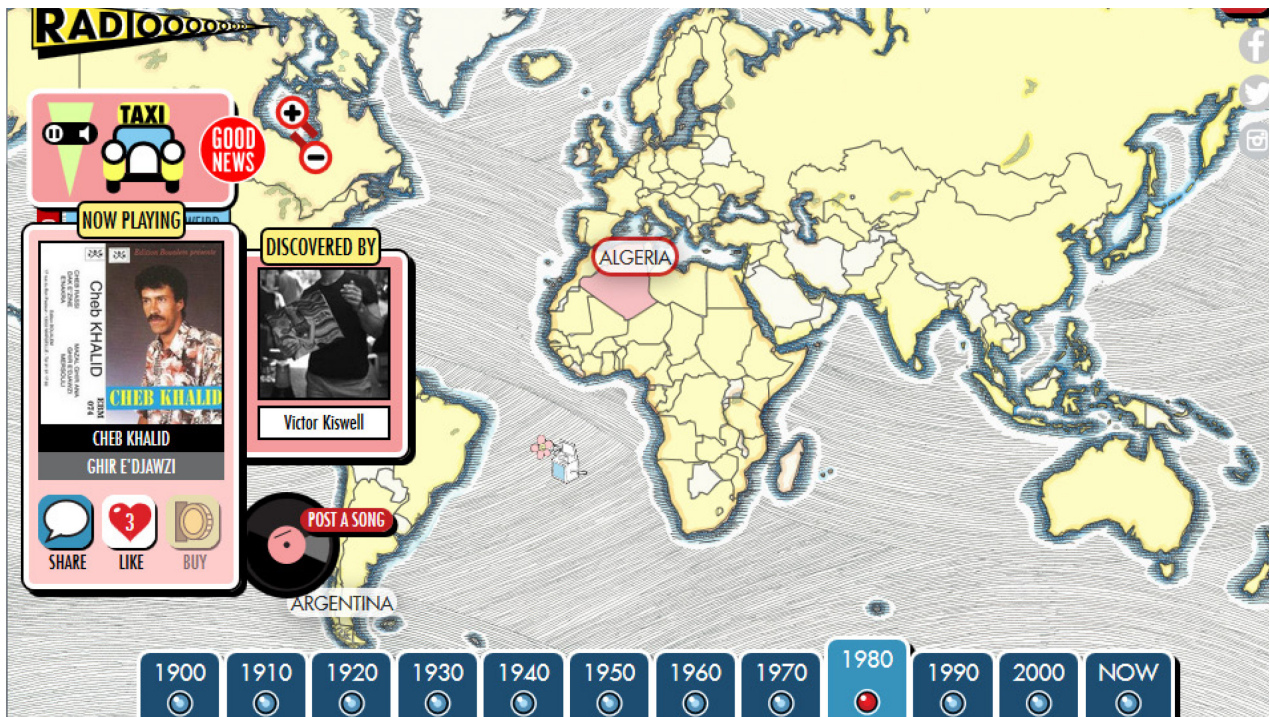
5.1 Visualisation of tracks or songs

Most tools arrange audio tracks in one-dimensional lists where each song is indicated by track title, artist name and maybe name of release (album, single, etc.). Furthermore a picture of the artist or the cover of the release is added. If one song is played a progress bar visualises the past replay time in relation to the track's total duration.



Latest user interfaces like the one of Soundcloud (depicted above) enhance the progress bar by depicting the waveform of the audio track.

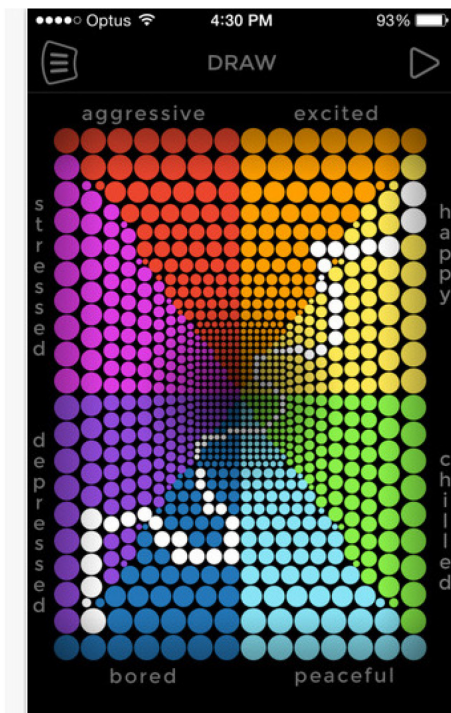
Furthermore the visualisation of a song or collection of songs can contain information about the artist or the release. This is often done using a picture of the artist or release and a short description text. The website Radiooooo (depicted below) however does this by locating the song on a time line, giving information about the song's age and location.



5.2 Visualisation of Moods

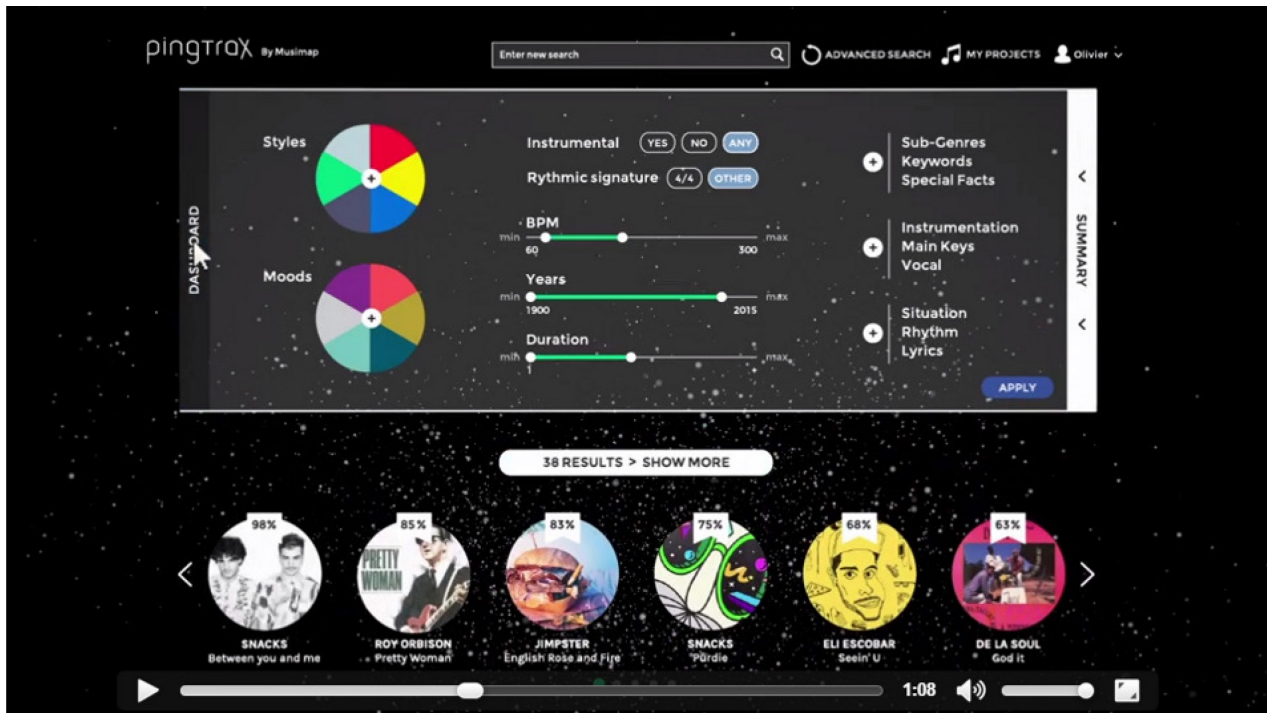
Only very few of the tools on the market visualise the mood a certain audio track conveys. The three tools that do so, Habu, Pingtrax and Music eEscape (two screenshots of the Music eEscape smartphone-app are depicted below), all use a visualisation concept based on the circumplex model of emotion classification.

In the course of the project it will be determined whether this is the best way to visualise the mood of an audio track and how the visualisation of musical moods should look like.



5.3 Visualisation of brand fit

As previously mentioned the relation a certain song with its specific mood and other qualities has to a brand’s perceived identity is visualised by none of the surveyed tools. The closest a software comes to visualising such a relation is Pingtrax (depicted below).



Here the match between the search terms used for the request and the terms a given audio track is annotated with is estimated in percent. There is however no indication as to which terms do match and which do not. Since finding fitting music is the core task of audio branding, new and more meaningful ways to visualise a song's fit to a brand, to other songs or to search terms, will have to be developed.

6. Conclusions

In our survey we found that while no tools dedicated for audio branding are available and agencies have to help themselves using tools developed with other audiences or users in mind, the available tools nonetheless can be used as inspiration and proof of concept for future developments. The eight work steps we defined for the day-to-day business of an audio branding agency allowed for a structured analysis of the available software tools.

This analysis shows that there are two core omissions in the available tools:

- There is no unified (visual) language to describe and present music
- There is no tool available at the moment that can aid the central translation process

Based on these findings we were able to define the necessary features of the tools and modules to be developed by the ABC_DJ consortium comprehensively. This investigation of core requirements and central elements of visualisation will serve as a starting point for the first specifications of functionalities, filters and user interfaces of D2.6.

References

Etherington, Darrell (2014): Spotify Acquires The Echo Nest, Gaining Control Of The Music DNA Company That Powers Its Rivals. Available online at: <http://techcrunch.com/2014/03/06/spotify-acquires-the-echo-nest/> [22.04.2016]

Hirsch, Wilbert; Langeslag, Patrick (2004): Acoustic Branding. Neue Wege für Musik in der Markenkommunikation. In: Brandmeyer, Klaus; Deichsel, Alexander; Prill, Christian (Eds.): Jahrbuch Markentechnik 2004/2005. Frankfurt am Main, Deutscher Fachverlag.