D5.2: Intermediate report on the pilot evaluation

Pilot 1

Editors: Iris Jennes, Zoë De Ruyck (imec)

This deliverable discusses the outcomes of the first pilot phase. It includes the evaluation of the 6 products that were selected for testing in the first pilot and an overview of the next steps in pilots 2 and 3.
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EXECUTIVE SUMMARY

This deliverable gives an overview of the first pilot evaluation. In the introduction, we describe the purpose, the scope and the status of this document.

The next section, the pilot description, gives a short overview of the 6 different products that were tested, both technically and via end-user feedback in pilot 1.

In the third section, the outcomes of the pilot are described per product. This section provides details on the outcomes of the tests enabling the consortium to improve the products as features of the overall HRADIO platform in pilot 2 and 3. For each product, we describe the testing procedures including the procedure, participants and method of analysis. Following this, the results are discussed in a detailed and transparent manner.

The deliverable finishes with a short overview of additional feedback received at events and concludes with a feedback summary and a set-up for the next steps towards pilot 2 and 3.

This first pilot yielded many relevant results for the different products tested. For product 1, Daylist participants liked to give weight to their interests – however, the way they had to give weight to a field of interest was not clear. Subcategories should be included to make the Daylist more personalised. Also, more extra information should be added, like visuals and extra information attached to the listed programs.

For product 3 Menu, participants found the additional information very informative and helpful. In pilot 2, we will foresee that the currently-tuned service name will not disappear, as is currently the case.

For product 4 Recommendations, participants preferred to have a simple list representation. The suggested improvements mentioned by our participants will be taken into account for pilot 2. An important takeaway for pilot 2 is to know that participants like receiving recommendations for new casts and single service messages.

For product 5 Voice Control, interesting insights from radio professionals looking for an industry insight into how the user interface can be applied in radio. 4 points were important here: 1) keep it sane and simple, 2) keep it short, 3) be informative, and 4) offer an exit.

Product 6 Guaranteed Signal Quality, technical tests were executed. However, some tasks failed and therefore an addendum of this document will be released to give more insights on product 6.
For product 7 Channel Screen, research gave in-depth insights into how users want to control the hybrid radio-experience. It has indicated that the concept is well received among participants and the combination of on-demand and live listening is attractive. Concrete feedback will be assessed by the consortium and will guide the further development of the concept by including design options to give users control over selecting, disposing and skipping (time-shifting) of content.

In the upcoming weeks, the next steps include the feedback of pilot 1 into each product. The features will be improved and the consortium will also focus on the development of one or two prototypes wherein these features will come together and thus can be seen and tested as a more mature Hybrid Radio Experience. As explained in D5.1 the next phase includes an integration of products into a viable, exploitable HRADIO platform. D5.1 will also be updated regarding the integration of the different products, as well as the planning of pilot 2 and 3.

To integrate the different products, a timeline for exploitation as first guideline will be made, as it contains the technology readiness level and goals for the different features and components of the HRADIO platform. Then a discussion on features has to be addressed in each pilot and how we will get there, specifically also underlining the preparatory actions. The consortium will decide on the development of a prototype for pilot 2 and 3 containing the features specified in D4.2.
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<td>CRC</td>
<td>Cyclic Redundancy Check</td>
</tr>
<tr>
<td>DAB</td>
<td>Digital Audio Broadcasting</td>
</tr>
<tr>
<td>DL</td>
<td>Dynamic Label</td>
</tr>
<tr>
<td>EPG</td>
<td>Electronic Programme Guide</td>
</tr>
<tr>
<td>FIC</td>
<td>Fast Information Channel</td>
</tr>
<tr>
<td>IMEC</td>
<td>Interuniversitäir Micro-Electronica Centrum</td>
</tr>
<tr>
<td>IRT</td>
<td>Institut für Rundfunktechnik GMBH</td>
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<tr>
<td>LMU</td>
<td>Ludwig-Maximilians-Universität München</td>
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<td>OMRI</td>
<td>Open Mobile Radio Interface</td>
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<td>Programme Information</td>
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<td>Rundfunk Berlin-Brandenburg</td>
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<td>RF</td>
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<td>UK Radioplayer Ltd</td>
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<td>SI</td>
<td>Service Information</td>
</tr>
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<td>SPI</td>
<td>Service and Programme Information</td>
</tr>
<tr>
<td>UI</td>
<td>User Interface</td>
</tr>
<tr>
<td>VRT</td>
<td>Vlaamse Radio en Televisieomroeporganisatie</td>
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<td>WP</td>
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1. INTRODUCTION

1.1. PURPOSE OF THIS DOCUMENT

As described in D5.1, the pilot activities of WP5 are a vital part of the HRADIO project. This deliverable gives an overview of the evaluation of the first pilot phase. It contains the outcomes of the first pilot actions and is a follow-up to deliverable D5.1, which set out a detailed pilot execution and evaluation plan.

In the first pilot phase, 6 products were tested in a closed lab setting, in line with the project’s living lab approach:

![Living lab research cycle (Lievens & Kilpi, 2013)](image)

The next sections describe the first pilot activities in general (see section 2: pilot description) and the outcomes of this first pilot (see section 3: pilot 1: outcomes).
1.2. SCOPE OF THIS DOCUMENT

The scope of this document is to provide insights into the first pilot results, where we evaluated 6 of the 7 products that were specified in D4.2 and D5.1. These products represent various HRADIO functionalities that needed to be tested separately before moving to a unified HRADIO platform. Therefore, this deliverable will first briefly describe the first pilot by reiterating the planned pilot actions of the 6 different products which were tested during pilot 1. In the second section, the outcomes of pilot 1 are given per product. The third section contains an overview of the results and some additional evaluation activities are explained. Finally, the overall conclusion indicates which steps are needed to move from separate products towards an integrated HRADIO platform in pilot phase 2.

1.3. STATUS OF THIS DOCUMENT

This deliverable is preceded by D4.2 and D5.1, in which the pre-pilot activities are described and discussed (D4.2) and a detailed execution and evaluation plan was set out (D5.1). This deliverable thus gives an overview of the first evaluation of pilot 1. A second evaluation report will be made in M22 (for pilot 2) and M30 (for pilot 3).
2. PILOT DESCRIPTION

This section summarizes the pilot actions in pilot phase 1. As described in D5.1, the first phase of the living lab approach (which will be used during the three pilot phases) involves user tests conducted in a lab-setting, as the developed prototype is not yet mature enough to test in a more open setting.

An updated overview of the products tested in the first pilot phase is below:

<table>
<thead>
<tr>
<th>Product</th>
<th>Pilot level</th>
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<th>Input for pilots</th>
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<td>Product 1: content selection and presentation</td>
<td>User testing</td>
<td>Belgium</td>
<td>Initial designs &amp; prototype screens of the UI for content selection and presentation</td>
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<tr>
<td>Product 3: menu</td>
<td>Technical + user testing</td>
<td>Belgium &amp; Germany</td>
<td>GUI mock-up</td>
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<tr>
<td>Product 4: recommendations</td>
<td>User testing</td>
<td>Germany</td>
<td>First prototype (as mock-up) of a recommender system for radio systems</td>
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<tr>
<td>Product 5: voice control</td>
<td>Technical + user testing</td>
<td>Belgium &amp; United Kingdom</td>
<td>Basic lab-level prototypes</td>
</tr>
<tr>
<td>Product 6: guaranteed signal quality</td>
<td>Technical testing</td>
<td>Germany &amp; United Kingdom</td>
<td>Basic hybrid prototype</td>
</tr>
<tr>
<td>Product 7: channel screen</td>
<td>User testing</td>
<td>Germany &amp; United Kingdom</td>
<td>Initial designs &amp; prototype screens of the UI for channel screen</td>
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</table>
3. PILOT 1 OUTCOMES

This section describes the outcomes of the pilot activities for the product tested within the first pilot phase. For each of the products, we first give a description of the product and the pilot input (see table 1 above). Then we give an overview of the technical and/or user research outcomes. This includes a summary of the methods which were used during the evaluation, an overview of the participant profiles, and finally the outcomes of the research. The outcomes are formulated both as generalised outcomes as well as specific answers to the research questions specified in D5.1.

3.1. PRODUCT 1: CONTENT SELECTION AND PRESENTATION

The prototype of product 1 consisted of a clickable wireframe that conceptualised the idea of the personalisation of context (which has been described in D2.1) of news. More specifically, ‘Daylist’ (‘Daglijst’ in Dutch) allowed listeners to submit topics of their interest (i.e. human interest, sport, politics, society, etc.), resulting in a personalised list of informational items. Daylist addresses concepts described in the following scenarios (as presented in D2.1):

Scenario 11 New News

Christophe is often in the car. He has just heard the 8 o’clock news. Before, he would have already heard the same new at 7 o’clock, when he just got in the car. But now, HRADIO provides Christophe with additional information to the previous news bulletin, such as in-depth journalistic pieces or local football updates.

Scenario 12 News Synopsis

Mark spends most of his time behind his desk, without listening to the radio. When he goes home, he likes to get a synopsis of the news he finds relevant. To do this, he has created a profile in his HRADIO-app that indicates what his interests are. Whenever he wants, he can request and listen to this news synopsis. The app also knows which information Mark has heard before, so it only gives him the newest information. After this short update, Mark can just return to listening to live radio.
We designed Daylist as a hypothetical feature of the Radio 1 smartphone application\(^1\). Radio 1 is VRT’s radio station that mainly focuses on news, information and sports. Details on the wireframe prototype can be found in deliverable D4.1, or tried out online\(^2\) via [https://pilootzone.innovatie.vrt.be/](https://pilootzone.innovatie.vrt.be/).

![Figure 2: Screenshots of Daylist](image)

### 3.1.1. User research set-up

The goal of the user research study for this product was to gather responses on the concept and the initial usability flow.

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\(^1\) [https://radio1.be/radio-1-lanceert-app](https://radio1.be/radio-1-lanceert-app)

\(^2\) Only available in Dutch. The landingpage describes the purpose of the prototype. After the user clicks ‘I understand’ they are required to indicate which topics they are most interested in. The app then generates a personalised ‘daylist’. See description in 3.1.1. User research set-up.
VRT and imec launched a call for participation through two social media channels. The call (see Figure 3) aimed to recruit listeners who like informative items on the radio and who are familiar with Radio 1. In the text, we noted that we expected participants to be present during an online focus group, which would take place on November 20 in the evening. For their participation, listeners would receive an incentive of 5 euro (as a meal voucher). Potential participants could express their interest to participate via a Google form in which they were requested to fill out a questionnaire, which included socio-demographic questions and a set of questions regarding their radio listening habits (see appendix G). Afterwards, participants received an email with the details of the online focus group and the link to the prototype; they were requested to complete their fields of interest and take a look at the resulting list.

Figure 3: Call for participation for the ‘Daylist’ product.

In total, 14 participants reacted to the call. Two people participated in the online focus group however (participant B and participant C); besides this we conducted an additional phone interview with three other participants (participants A, D, E).
Flow of the test

After the introduction and a short discussion on radio habits the participants were asked several questions about the mock-up, see appendix A for a complete overview of the questions:

- The first question was about the general impressions of the concept of Daylist. Participants were asked to give feedback, both positive and negative.
- Participants were then asked about the mock-up itself. These questions were divided into two sections: 1) preferences and 2) resulting list.
- After the specific questions, there was a closing session for comments and suggestions for improvements.

Method of analysis of data

Feedback was written down and we showed live tabulation of the results. All conversations were audio recorded so that various sections of the interviews and group discussion could be consulted when necessary.

Participant profiles

4 women and 1 man took part in the research, of which 2 were students, 2 were employees and 1 person was unemployed. All respondents indicated that they listen to the radio daily during the week. The car and the home were selected by almost all respondents as the primary locations for listening to radio, with only one respondent selecting ‘car’ instead of both. Although not all participants responded to the question, FM radio turned out to be the most popular channel for radio listening among the participants, with all participants indicating they listen daily to FM. In comparison, the other options were less popular:
Table 2: Daylist participants listening habits (per device)

<table>
<thead>
<tr>
<th>Participant</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM radio</td>
<td>daily</td>
<td>Daily</td>
<td>Daily</td>
<td>Daily</td>
<td>Daily</td>
</tr>
<tr>
<td>DAB+</td>
<td>Rarely</td>
<td>Daily</td>
<td>Weekly</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>Digital television</td>
<td>Rarely</td>
<td>Monthly</td>
<td></td>
<td>Rarely</td>
<td></td>
</tr>
<tr>
<td>Mobile app (f.e. Spotify)</td>
<td>Rarely</td>
<td>Weekly</td>
<td></td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>Web browser</td>
<td>Rarely</td>
<td>Weekly</td>
<td>Rarely</td>
<td>Rarely</td>
<td></td>
</tr>
</tbody>
</table>

We also asked the participants to indicate what was their motivation for listening to the radio. All participants agreed with the statement that they listen to radio to be informed and to be entertained. To fill time and to relax were less popular motivations, with only one respondent agreeing and respectively one and two respondents disagreeing.

3.1.2. Outcomes

General impressions

In response to the concept of receiving personalised podcast based on Radio 1 programmes, participants found it interesting to be able to listen to a program at a later time. They liked the certainty that they wouldn’t miss any items. When unable to listen to the whole program, they liked to be able to pause the broadcast.

“I think the app is interesting because it’s not always clear where to find the best topics. It’s easy that the search is been done for you. Thanks to the application you can discover new things.” (Participant E)

“Interesting, nice to give your own input, so you can hear what you really want. Yes, this idea appeals to me.” (Participant D)

We also asked participants if they felt something was missing in the mock-up. Participant A and B indicated that they missed the social aspect, namely the possibility of sharing something what you think is interesting.

“I’m not really into social media but I would like to have the possibility to share something interesting with my friend. So, she will have the opportunity to listen to it. Maybe a search tool would be interesting, this would also be easy to share, then, you can name a good show and she will be able to look it up.” (Participant A)
In addition, participant B mentioned that a fast forward feature was missing, namely the possibility to skip to interesting parts. He wants to skip to the top 20 for example. Although participant C reacted that she wants to listen to the whole top 100.

**Results selecting preferences section**

With regard to indicating their preferences, participants were asked to evaluate the selection tool for their fields of interests. All participants positively evaluated the idea of ranking their interests. However, giving weight to the spheres wasn’t clear. They had to click more than once to see that it was possible. Most of the participants didn’t know when they tested the prototype. They suggested to maybe make it more clear by showing a short movie or show the percentages.

With regards to the amount of categories available, most of the participants thought the categories were sufficient. Some of the participants suggested making subcategories, e.g. genre of music or national/international politics, to make it more personalised.

One participant mentioned that not all of the categories were clear, e.g. she didn’t know what “human interest” meant.

**Results personalised list**

When evaluating the list resulting from the indicated interests, participants stated that at first sight the list was correct, but most of the participants didn’t know just by reading the title what every program was about. They suggested to make a short content description or use a picture to be able to evaluate the accuracy of the suggestion before actually listening to the programme.

For testing purposes, the suggested programme list was limited to 30 minutes. Most of the participants liked the fact that there was a limit. But they would like the option to see the ‘full’ list, because they don’t want to miss out on anything. Another suggestion was to be able to choose their own time limit depending on how much time they have available. That way the limited list could have only highlights, for example. Participant B wanted everything shown in his list, so he can ‘scroll’ or ‘swipe away’ what he doesn’t like. These actions are already an established habit among device users.

**Additional comments and suggestions**

The participants want the app to be as simple as possible. They suggest using images to make it more attractive and clearer, e.g. making fields of interests visible in the results by using a colour code.
The highlight function was of interest to participants, and they suggested notification of new episodes of user-selected favourite topics.

The possibility of adjusting the order of the list is something that participants would like to be able to do.

Another suggestion was to add a search function so listeners can also actively search for programmes.

### 3.2. PRODUCT 3: MENU

The initial goal of the prototype was the implementation of general service list functionalities and features. Common service list implementations today do not provide the user with additional information apart from the service name while browsing through the list of available services. While in DAB+ it’s technically possible to send programme-related information along with audio content, these possibilities are rarely used in DAB+ implementation. However, in mobile (esp. in-car) situations, where it’s more likely that favourite services are not receivable (longer journeys, no local signal), the end user is eventually forced to select a new service if he/she wants to continue listening to the radio.

HRADIO scenario S29 “What is it about” exactly describes this situation:

_Ingrid has a new car with a dashboard screen. When she picks a radio station, she doesn’t just get to see the radio stations’ name but also the subject that is being discussed in the current programme. It helps Ingrid choose which station she wants to listen to without having to switch between stations and trying different stations before she finds an interesting broadcast._

However, in the implementation of hybrid radio, it is possible to provide audio over the broadcast channel, and to simultaneously provide additional metadata, such as programme information (PI files), over IP communication channels. In order to display accurate programme information, an implementation must perform the following steps:

1. After a successful broadcast service scan, the service list entries must be queried regarding the provision of additional PI-files. Not all radio stations provide this information.

2. Available PI-files must be downloaded, parsed and the actual programme information be displayed in service list.
3. The application must continually observe time and PI in order to update the service list with current information.

4. Especially in mobile scenarios, broadcast scans must be performed in the background (if a second tuner device is available) to find new entries for the service list or to disable invalid services.

3.2.1. Research set-up

For the realisation of this pilot phase on test, IRT and Konsole worked together in the following pre-pilot actions:

- Investigation of possible metadata sources (e.g. RadioDNS/SPI, DL&DL+)
- Development of a 1st GUI mock-up
- Implementation of a functional test client for Android mobile devices working together with DAB+ tuner hardware by using the OMRI libraries provided by WP3. Additionally, in WP3, libraries for the fetching and parsing of RadioDNS/SPI information were used for the implementation in this pilot phase.

![Screenshot of Menu prototype application](image)

Figure 4: Screenshot of Menu prototype application
With the tests performed in pilot phase 1, the following research questions should be answered:

- Whether such a technical approach would be reasonable for the end user in terms of speed, resources and benefit.
- Whether large service lists and dual tuner background scans would be technically scalable.

### 3.2.2. Technical research outcomes

With the current OMRI implementation, benchmark tests were performed in order to establish the time needed to perform a background scan with a 2nd broadcast tuner. Tests were performed with the actual OMRI implementation by IRT version “org.omri.omriusb-1.0.4-dev” using a Samsung Note 3 device running Android 6.01.

Different band III scans were performed. Scanning time strongly depends on the local reception quality of the available DAB ensembles. Tests in IRT with a reasonable (not active) DAB antenna show average scanning times of 40s – 50s. All tests were performed with outdoor mounted antennas, as the offices at IRT do not allow indoor reception due to very high RF damping windows.³

³ In a regular home, windows are not RF damping and scanning via a DAB antennas would be able to take place indoors.
Figure 5: Passive DAB antennas used for lab bench tests

Table 3: Results Band II scans

<table>
<thead>
<tr>
<th>Number</th>
<th>Time avg.</th>
<th>Services found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan1 (Developers office,</td>
<td>45s</td>
<td>48</td>
</tr>
<tr>
<td>south side IRT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scan2 (IRT living room,</td>
<td>55s</td>
<td>83</td>
</tr>
<tr>
<td>north side IRT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The reasonably higher amount of services found at the north side of IRT is due to the fact that the antenna performance and the sensitivity of the USB Tuner stick (Siano-based Chipset) allowed to scan DAB+ ensembles from the Ingolstadt area on Channel 11A, although the signal quality was too weak for a satisfying user experience.
Not all of the scanned DAB+ services provided RadioDNS/SPI PI-Files. After the successful service scan or after application startup, the application performed a RadioDNS lookup for the services and the SPI fetcher performed a download of available SI and PI XML Files. PI data for one day is between 10kByte and 50kByte in size and is cached after a successful download. These sizes do not cause unreasonable data consumption. However, if the download size may be an issue, additional compression (ZIP) could be applied, which performs well with xml-based documents.

The technical test showed that it is reasonable for an OMRI based application to perform regular background scans during runtime in order to keep the service list up to date. Also the fetching and caching of available PI information is reasonable and neither the download nor the parsing of XML files resulted in any noticeable delays or glitches in the user experience.

### 3.2.3. User research

**Detailed description of procedure**

Individual friendly user testing (‘think-aloud’ method) was used as methodology for the tests. Test persons were invited to voluntarily participate in the tests. Prior to the personal test, participants were asked to fill out a questionnaire regarding their age,
gender and profession, followed by a set of questions regarding their radio listening habits. The template of the questionnaire can be found in appendix D.

The test was set up in IRT’s dedicated test- and showroom (called the “living room”). As already described in the technical results, all tests were performed with a Samsung Galaxy Note 3, a Micro USB DAB+ tuner stick running the latest version of the prototype app on Android 6.0.1.

As antenna, a non-active outdoor DAB antenna was used.

The test application was a fully functional implementation, so that live radio consumption was possible.

After the introduction, the test persons were asked to perform 3 simple tasks and to give spoken feedback about their efforts, problems and experience:

1. “Use the service list in the sample application and select an attractive service”
2. “Try to find out more about the current service”
3. “Try to add a service to the favourites list”

Spoken feedback was noted by the test operator and if necessary, clarified by the operator’s questioning.
Participant profiles

IRT staff members volunteered to take part in the HRADIO user tests. All 8 test persons have a strong technical background either as technology students or in software development and media technology.

![Age and gender distribution of test users](image)

Figure 8: Age and gender distribution of test users

4 of the 8 test persons listen to radio on a daily basis over the weekdays, 2 persons a few times a year and the remaining 2 persons a few times per month. 4 test persons additionally listen to radio regularly every weekend, 2 persons a few times per month and 2 persons never.

Mostly the test persons listen to radio for information and entertainment. 5 or 7 persons gave “I totally agree” or “I agree” as an answer. “I want to relax” was for four test persons a reason (“I agree”) for switching on the radio.

Outcomes

Results task 1 “Use the service list in the sample application and select an attractive service”:

All the participants realized that there are services in the service list which provided additional programme information.

![Bayern 2 Sued](image)

Figure 9: Service “Bayern 2 Sued” with running program “radioWissen”

The programme information was clearly visible and distinguishable from the accustomed name-only service list. This display of additional information was clearly seen as a benefit by the participants when choosing a service.
Mixed feedback was given by the participants with regard to the progress information, which was visually encoded in the “fill colour” of the info button. Only one test person recognized the fill level as indicating the elapsed time of the current program. Most participants expressed the idea that the fill level in the info button reflected the quality or the amount of metadata for this particular program item. Additionally, this misinterpretation was supported by the fact that the info button was not disabled for services which do not provide the data for this functionality.

However, once the meaning of the colour-encoded time progress was clarified, nearly all the participants expressed the usefulness of this information for their own service selection. 3 Participant suggested a classic left-to-right progress bar. Others expressed the wish to have at least percentage information or a descriptive text e.g. “23 min left”.

One test person additionally suggested, that if current programme information is shown, he expects also the same information to be shown for the next (upcoming) programme item.

**Results task 2 “Try to find out more about the current service”:**

For all 8 participants, the function of the info button was clear, especially after clarification while performing/discussing the previous task. As already mentioned, the participants strongly expected that the info button to be disabled or greyed-out when no additional information is available. The detail level of information displayed varies heavily. Some broadcasters only provide the program name and start- and stop times, while others give very detailed information about the topics, studio guests, genres and much more.

**Results task 3 “Try to add a service to the favourites list”:**

The functionality of the “heart” icon was very clear to the participants. None of the testers had problems in adding or removing radio services to/from the favourites list. However, only after a short trial-and-error phase, for many of them it was unclear if the content of the icon (either a heart or a trash can) should be interpreted as an action to be selected or as the current status of a particular service list entry.

**General feedback and additional comments**

In general, once the additional information has been recognised and understood, all test persons found the app to be very informative and helpful compared to their usual radio apps or devices.

Misinterpretations about the different UI choices in the prototype were described and will be improved in future HRADIO UIs.
An often-heard general remark was that (after an initial reception of DL+ title artist information) the currently-tuned service name was no longer visible.

Another misinterpretation was the triangle in the service list before the service name, which many testers thought to be the play/select button of the service or a drop-down button which would reveal additional information.

3.3. PRODUCT 4: RECOMMENDATIONS

This product should prototype and evaluate a recommendation system for radio stations that bases its recommendations on publicly available radio station/programme metadata. The product is the result of the scenario S14

Bernd often has to go abroad for work. When he’s travelling, he uses his smartphone to listen to music and the radio. He likes discovering new, local radio stations. Bernd had difficulties finding the right radio station when he is visiting a country for the first time. Looking for radio stations manually takes a lot of time and you’re never sure whether you will like the station or not. With his new HRADIO app he gets suggestions for local radio stations immediately upon his arrival. Bernd can now easily find the perfect radio stations, regardless of his location. These suggestions are based on his preferences and listening behaviour.

The scope of recommendations for this first pilot includes finding services based on the user’s current station. In addition, questions regarding metadata quality and maintenance should be answered with help of domain experts. In particular, the following research questions should be answered:

Recommendations

1. Does a recommender system for radio stations based on available metadata with focus on genres of played songs produce good recommendations?

2. In what form should recommendations present themselves? (likes? swipes? “other people liked”, …)

3. What is the scope and context of recommendations?

4. How to get users interested in discovery?

5. How transparent should a recommendation system be?
Metadata

6. What is the quality of publicly-available radio metadata?
7. How to incentivise owners of radio metadata to improve it in order that recommendations become better?
8. What problems and challenges are there in practice?
9. What potential problems can we solve?

In order to answer these research questions, specific questionnaires and a recommender prototype were developed in collaboration between LMU and RBB.

3.3.1. Recommender Prototype

The recommender prototype is intended to answer research questions 1, 2 and 6. It consists of a web-based user interface. The user can select a service (upper-left corner). Then a list of recommendations is shown, together with a planet visualization of the same result:

![Figure 10: List of recommendations and planet visualization](image)

The HRADIO Dissemination and Communication platform serves as the backend of the prototype. It provides service metadata and service recommendations via RESTful service interfaces. The Prototype frontend logic was implemented at RBB.
The recommender system bases its recommendations on publicly available metadata provided by several RadioDNS services:

- BR (http://epg4br.irt.de/radiodns/spi/3.1/SI.xml)
- RBB (http://epg4rbb.irt.de/radiodns/spi/3.1/SI.xml)
- MDR (http://epg4mdr.irt.de/radiodns/spi/3.1/SI.xml)
- NDR (http://epg4ndr.irt.de/radiodns/spi/3.1/SI.xml)
- WDR (http://epg4wdr.irt.de/radiodns/spi/3.1/SI.xml)
- SWR (http://epg4swr.irt.de/radiodns/spi/3.1/SI.xml)
- HR (http://epg4hr.irt.de/radiodns/spi/3.1/SI.xml)

For each service, an IP stream bearer was extracted and used to gather ICY-Tag information, usually containing song title and artist information. In total, 48 out of 95 services provided such information. Based on the extracted song information, an external database (Discogs) was queried to gather song release year and genre information. Results of successful queries were stored in the HRADIO metadata search & storage platform as programme events. Programme events then provide the basis for service comparisons and distance computation. These distances were then used to retrieve a list of “close” services that serves as a valid recommendation for a selected service in a “find more like this” sense.

### 3.3.2. User research

User research was conducted in three different blocks:

- Lab test using the recommender prototype and a questionnaire with professional users (see Appendix B.01)
- Lab test using a questionnaire with end users (see Appendix B.02)
- Interview with radio metadata experts (questions prepared, interviewees not yet determined)

The lab tests were conducted in the offices of RBB and LMU. The questionnaires were hosted by LamaPoll (https://www.lamapoll.de/). The full result data set is available on request.
Lab Test with Professional Users

The lab test with professional users was intended to address research questions 1–6. It took place at the offices of RBB and LMU. 19 persons in total participated. The questionnaire consisted of 3 main parts:

- Part 1: Demographic Information and questions about radio listening habits
- Part 2: General questions about recommendation systems
- Part 3: Assessment of the recommendation prototype

Detailed description of procedure

At LMU, PhD, Master and Bachelor Computer Science students were asked in person to participate. All are associated with the chair of mobile and distributed systems. We arranged a test schedule using the Doodle web service for the 8th of November 2018. At RBB, several colleagues were asked to participate in the user tests. Most of the test persons had a strong technical background in software development or media technology. Some persons had no technical background, but are conversant with technical aspects during their daily work.

The test procedure at RBB and LMU was similar. The test set-up consisted of a laptop that ran a browser with the UI prototype in one tab and the online questionnaire in another tab. The participants also received a sheet of paper with a short description of all stations that are part of the recommender system for better scoring competence. At LMU, the test took place on the 8th of November 2018 and at RBB on the 8/9/12th of November. A typical test took about 30 min per participant.
At RBB and LMU the flow of the test was also similar. All participants first read and signed the informed consent form (see appendix E). Then they were introduced to the questionnaire and asked to answer the first two parts. This was followed by a quick introduction to the prototype and an explanation of how to fill in the third and last part of the questionnaire, which asks for structured feedback regarding recommendation quality. All participants were not aware of the fact that about 50% of the recommendations given by the prototype were completely random.

Data analysis was conducted with built-in tools of the LamaPoll system. In addition, Python scripts (with matplotlib and pandas package) were used to analyse the outcomes of the prototype feedback.
Participant profiles

Figure 12 shows demographic data of the participants.

![Pie charts showing gender, age, and profession distribution.](image)

Figure 12: Recommendation test participant profiles

It’s important to note here that 70% of the participants are under 40 and that more than half of them have a strong technical background.

Outcomes

The lab test consisted of three parts. Outcomes are discussed per part.

Part 1:

Questions related to radio listening habits revealed that 50% almost never listen to radio on weekdays and 40% never listen on weekends. Those who listen to radio on weekdays do so in the morning (90%) and in the evening (60%). This changes on weekends: 58% listen to radio in the morning, 42% in the afternoon or evening and 33% at lunchtime. Most participants listen to radio at home (83%) and in the car (67%).

The most popular source for audios are streaming services like Spotify (selected by 85%) followed by a personal music collection (55%) and radio (50%). Figure 13 shows how often audios are consumed:
90% of the participants consume audios at least multiple times a week. Besides music, the most important audios are news (50% listen to news at least once a week), service shows (45%), entertainment shows (45%) and info/events (35%).

The top reasons why participants listen to audio are:

**Part 2:**

- Entertainment (90%)
- Relaxing (60%)
- Pastime (45%)
- Information (45%)

It is important for 75% of the participants that recommendations are marked as such but only 20% would follow links. Only 35% need to know why certain content was recommended.

60% of the participants have no reservations about personalized content but 40% have the feeling that the same recommendations were repeated over and over. Only 5% do not use recommendations at all.

When it comes to the nature of recommended content, 50% of the participants would like to receive recommendations for newscasts of the same station at least once a week. 40% would like to be informed about single service messages (weather, traffic) provided by the station which they currently listen to at least once a day.

Recommendations for alternative stations are interesting for 40% of the participants but only 10% would like to receive those on a daily basis.
Most important station and programme characteristics that should be considered in recommendation engines are music genres (80% agreed), frequency distribution of specific audio, e.g. 50% reportages, 30% music and 20% sports (60% agreed) and music epoch (55% agreed). For 24% of the participants, listening habits and history should be considered as well.

Figure 14 depicts where and when users would like to use recommendations:

Figure 14: Location and timing when using the recommender

Interesting to note is that participants use recommendations mostly during breaks and at home (in the morning or evening) and on the road. This matches quite well with the locations and times that were stated in the questions regarding radio programme consumption in general.

Part 3:

As described in the detailed procedure section above, each of the 19 participants was asked to select radio stations from a list of 48 stations in the prototype UI and to rate the given recommendations (1: very bad, 10: very good). Each participant should repeat the selection and rating procedure 10 times resulting in a total of 190 ratings. Figure 15 shows the distribution of ratings among stations.
The recommendation system performance was tested against a random baseline: 99 of 190 given recommendations came from the implemented recommendation engine, 91 of 190 were generated randomly.

The mean score of all randomly assembled recommendations is 4.56. The mean score of all recommendations given by the recommendation engine is 6.67 which is significantly better than the random baseline. This relation is even more visible if we only consider the top 5 most selected stations (iLive, Antenne RBB, BR-Klassik, PULSE, YOU FM): Mean random recommendation scores decrease slightly to 4.53, whereas mean scores of engine recommendations increase significantly to 7.28. Figure 16 shows the scores for those top 5 stations:
What is interesting is the almost identical score for station “Antenne RBB”. This can be explained by the fact that “Antenne RBB” offers a pretty broad spectrum of music and news which makes it easy for the random system to deliver plausible recommendations by pure chance.

70% of the participants preferred the list as the visualization of the result, whereas 20% preferred the planet visualization. 10% would like to use a completely different visualization. The participants mainly criticized the following aspects of the planet visualization.

- When hovering over a service item in the list, the corresponding circle in the planet visualization is not highlighted.
- The circle radius should correspond to the degree of similarity and not to the length of the name.
- The visualization is rather imprecise and does not really serve a purpose.

In general, the participants suggested the following improvements for the prototype UI:
Adding the ability to play the IP stream to a corresponding recommended service.

Increasing the size of buttons.

Changing the overall optical impression to a more modern design.

Increasing clarity and intuitiveness by explaining the meaning of the delta label and the green bar.

Participants liked about the UI prototype mainly the following features:

- The displayed service info when hovering over a specific service.
- The displayed service logos and information.
- The sorting of recommended services.

Figure 17 shows that for most participants, the title, logo, current playlist and song are the most important information needed to select a recommended station. Detailed EPG information is not of such great importance.

![Figure 17: Most important information needed to select a recommended station](image)

**Lab Test with End-Users**

The user test with end users was intended to provide an overview of the acceptance of general recommendations.

**Detailed description of procedure**
The user tests took place at RBB between the 7th and the 9th of November. At the beginning all participants read and signed the informed consent form (Appendix E). Following a brief introduction, the testers completed a questionnaire on the general recommendations of audio content.

![End user test at RBB](image)

**Figure 18: End user test at RBB**

**Participant profile**

10 persons participated in the user test. Detailed information about participants’ profiles can be found in chapter 3.1.2.4.

**Outcomes**

The majority of testers stated that they generally use recommendations and have only few reservations about them (40%). No tester said they would never click on recommendations. However, the type of recommendations used by the testers differs significantly. 21% of the testers would like to receive recommendations for content on different topics, 37% would like to receive recommendations for complementary audio content and 42% for additional content on the same topic.

The testers had only slight reservations against recommendations. The testers indicated they were concerned about getting the same recommendations all the time.
When asked which contents should be recommended, the testers replied as follows:

In addition, the testers indicated that they would like to receive recommendations at least several times a day. Games and children’s programmes had no importance for this test group. The opportunity to select an alternative station was rated separately: 30% are interested in a daily recommendation, 50% weekly or less and 20% are never interested.

Regarding the station characteristics to be considered for making a recommendation, the majority of testers were in favour of music genres such as pop, rock (80%) or music epochs such as the 80s and 90s (60%). Language (30%) or frequency of single audio clips (40%) were of less interest.

3.3.3. Analysis of existing metadata

Initially, the pilot plan foresaw informal interviews with RBB broadcast technicians to discuss the following research questions:

- How to incentivise owners of radio metadata to improve it so recommendations become better
- What problems and challenges are there in practice?
- What potential problems can we solve?

In the problem analysis we found out that on the one hand there are issues with static data such as the RadioDNS entries with all necessary logo size variants. We were able to improve this data directly by adding the missing logos via the IRT SPI editor. On the other hand, we found that our EPG data was lost during a transformation step on the way from RBB to IRT. As this is a longer transport chain, we are currently still looking for the cause.

However, this is not a fundamental problem. Similar errors and effects can be found more frequently in the system landscapes of broadcasters, since many
heterogeneous software systems are closely interlinked here. The RBB discusses new approaches for storing and transporting metadata. For example, data warehouse or data-lake architectures could considerably streamline and shorten the transport paths for metadata.

3.3.4. Summarized Outcome

This chapter discusses and summarizes the outcome of the lab tests with regards to the research questions described on pages 29 and 30 of this deliverable.

Question 1 ‘Does a recommender system for radio stations based on available metadata with focus on genres of played songs produce good recommendations?’ is thoroughly answered in Chapter 3.2.1.3. Recommendations based on available metadata are possible, although roughly only half of the stations investigated provide sufficiently detailed metadata. We could achieve a user score of 7.28/10.0 based on the results of the user lab test.

Question 2 ‘In what form should recommendations present themselves?’ was answered by the user feedback given for the visual representation of recommendations provided by the UI prototype (see results in Chapter 3.2.1.3 part 3). We found out that most participants preferred the simple list representation but also suggested some interesting improvements, e.g. an additional button to play a selected station or a more modern UI design. Furthermore, participants preferred station logo and title over detailed EPG information in the result list visualization.

To answer Question 3 ‘What is the scope and context of recommendations?’ we focused on specific recommendations for a particular, selected station which already restricted the scope. In addition, we found out (see results in Chapter 3.2.1.3 part 2) that participants are most interested in recommendations for newscasts and single service messages like e.g. the weather forecast. The results of the end user tests correspond to this. The end users are also interested in news and single services like traffic news (see results in chapter 3.2.2.3). Preferred situations for the use of recommendations are at work during breaks, in the evening, in the morning, at home and while travelling which essentially outlines the context of recommendations sufficiently.

To tackle question 4, ‘How to get users interested in discovery?’ we first wanted to learn more about the motivation for using recommendations. We found out that the main motivation for our participants is to get additional in-depth audio content for current and personal topics of interest which is not very surprising. 40% of the participants and 40% of the end users have the feeling that recommendation engines always recommend the same content. Thus, there is room for improvement.
A discovery of radio content should always combine precise recommendations with a simple and meaningful UI to guide the user on her discovery. We’ve provided a prototype that combines both and have evaluated it thoroughly (see results in Chapter 3.2.1.3 part 3). We came to the conclusion that users are open for discovering new radio content as long as the provided toolset is of sufficient quality. In other words: Improving the toolset leads to an increase of users interested in discoveries.

In researching question 5 ‘How transparent should a recommendation system be?’, we found out that most of the participants (75%) prefer recommendations that are marked as such which increases transparency. But for only 35% it is important to know why a certain recommendation was offered. Compared to these outcomes, it is important for the end user (70%) to understand why content has been recommended. The end users also indicated that a recommendation should be marked as a recommendation (80%). In addition, all end users are willing to click on recommendations such as personalized content.

Question 6 ‘What is the quality of publicly-available radio metadata?’ could be answered since the recommendation system makes use of publicly available metadata. We used RadioDNS data for German radio stations. We could retrieve suitable metadata (valid IP streams and ICY-Tags with song information) from 48 out of 95 stations provided by RadioDNS (see Chapter 3.1 for details). So in general metadata quality is detailed and well-maintained enough to base recommendations on (see Chapter 3.2.1.3 for details on the recommendation engine evaluation). The following enumeration contains found issues:

- Not all RadioDNS service information files contains IP stream bearers.
- Available IP streams do not all contain ICY-Tags and most ICY-Tags contain a lot of clutter (included news headlines, weather or traffic information).
- Service logo images are available for almost all services (except those from the Hessischer Rundfunk (HR)).

Questions 7–9 (see p. 30) could not be answered yet since these questions are part of the interview with radio metadata experts which is planned but not yet done. Results will be part of the second pilot phase.
3.4. PRODUCT 5: VOICE CONTROL

The involved partners for this product are Radioplayer (as leading partner) and VRT as participating partner. The voice control product is a variant of a previous application called ‘Radioplayer Car’ which proved that with in-car invocations and the use of voice activation with hybrid radio as a feasible proposition. The product research is split between:

- The UI Research for in-car voice control
- The rationale between Voice UI Offline versus online Voice UI
- How users invoke in-car voice interactions

3.4.1. Technical research outcomes

Two activities constituted this pilot. The first activity was to prepare some desk research investigating the variety of available voice platforms and the viability of the SDKs which they provide. This was undertaken by VRT.

The second activity was to answer some specific questions about how users interact with voice control platforms in the car environment. Much of this work was undertaken either before the official pilot 1 period or at a late stage of the pilot and is therefore not formally considered part of Pilot 1. However, the insights gained are highly relevant so it was deemed important to report on them. Where it is appropriate, additional research may be conducted in December 2018 and added to a subsequent report.

**Question 1: What is the rationale between Voice UI Offline versus Online?**

Most voice platforms are based on a simple piece of consumer-owned hardware that has the task of capturing spoken audio and sending it to an application in the cloud. The cloud application is a machine learning service which is trained to understand human spoken word and translate it into a tangible action. The response is returned as audio and an action back to the client device.

In order for this to work, it requires a persistent internet connection between the user and the ML service in the cloud. In a car environment however, a persistent internet connection is unlikely to exist. Cars in motion can only remain connected to the internet if the user has either a connected dashboard containing a SIM and mobile data plan, or a smartphone with a data plan. Both require the cellular network to provide coverage at that geographical location.
Where the internet connection is not present, online voice platforms like Google Home and Amazon Alexa will either not work at all, or only in a degraded state. What is needed therefore is an offline voice recognition solution which can run locally on the client device without an internet connection. Apple Siri and the Google Assistant already provide this to a certain extent.

**Question 2: How to invoke in-car voice interactions?**

The car is a noisy environment. The driver may have passengers including children talking and making noise, there may be road noise from outside and the radio may be on. This creates a difficult environment for a voice control system to know when it’s being invoked.

In a quiet environment such as a home, the current method of invoking a voice control system is to speak a ‘wake word’ which is a predetermined noun which the voice control system is continuously listening out for. Using multi-microphone noise cancelling, it is possible for these systems to remove background noise.

However, the car is a challenging acoustic environment due to the prevalence of glass in a small volumetric area. This compounds the problem of human-created noise mentioned earlier.

This means that more often than not, unless the interior of the car is quiet, merely uttering a wake word will not be enough to activate the voice control system, as it is unlikely to be heard above the high level of ambient noise.

Instead, some car manufacturers who were first to market with in-car voice control have added a button on the steering wheel which the driver depresses to activate voice recognition. A demonstration of this has been seen, but there is no empirical research by HRADIO as to how this is perceived by users.

**Question 3: What are the VUX requirements from a broadcast perspective?**

To answer this research question, VRT held a series of brainstorms with radio professionals on the Voice topic, searching for industry insight into how this new User Interface can be applied to radio. The key learnings from these brainstorms are:
Keep it sane and simple (KISS). If you offer a voice product, make sure it is good at delivering one excellent experience, like traffic, bedtime stories, or live radio. Stay away from complexity, since it is still very new to the users.

Keep it short. There is no way to interrupt a voice system once it starts uttering a sentence. When these are lengthy sentences there is a chance of annoying the listener, which is to be avoided.

Be informative. Don’t expect the user to know what he has to do say or do. These are new kinds of interactions for end users, so he needs clear questions and options to choose from. (e.g. “Welcome, you can choose A, B or C”). The KISS mantra is to be applied here as well.

Offer an exit. Make sure that the user is able to “escape” the system whenever things go wrong. (e.g. “Say, A, B or Stop”). Not being able to leave a failed Voice experience is to be avoided.

A recent top-of-mind study held by VRT researchers showed a low knowledge of the concept of Smart Speakers within the general public. About 10% know what a smart speaker is, these are largely younger demographics and higher educated individuals. About 2% of the panel owns a Smart Speaker and currently claims limited usage of their device.

Additional research has provided an overview of the current commercially available systems for development of Voice experiences:

- Siri (by Apple)
- Alexa (by Amazon)
- Google Assistant (by Google)
- Cortana (by Microsoft)
- Bixsby (by Samsung)
Some white label Voice products that can be used to build specific use cases are also available, like Houndify (by Soundhound) and Snips. Each of these, commercial or white label, has a certain merit to it. Apple’s Siri is very familiar to end users, Amazon’s Alexa is present on devices like the “Echo” which is a retail success, and both Microsoft and Samsung have a good commercial scale to make a difference in the Voice field. But only the Google system is capable of delivering a key element to the kind of interfaces which we are considering in the HRADIO project: the capability of remaining functional when no internet connection is present. This is a requirement for a true Hybrid user experiences where the main component is broadcast radio. This can be received perfectly in most cases, where internet connectivity can be quite poor depending on the situation, especially when on the move. This is the system we have selected for the prototypes for pilot testing.

3.5. PRODUCT 6: GUARANDED SIGNAL QUALITY

Product 6 refers to user scenario 23 ‘Guaranteed signal quality’:

*Karl has invested in a decent hifi system so he can enjoy his radio and music. Karl doesn’t even have to manually switch between DAB or FM. His new HRADIO receiver automatically makes sure he switches to the most qualitative audio and purest signal. Karls’ wife Sarah often crosses the border while travelling for work. Her HRADIO receiver automatically picks the best signal. That way, Sarah doesn’t have to worry about her radio reception and can concentrate on the road. Laetitia, daughter of Karl and Sarah, is often a passenger in her parents car. She likes to listen to her own radio station via her smartphone and headphone. Before, she often had difficulties listening to the show as the connection sometimes failed. With her HRADIO receiver the signal is seamless and her audio quality remains excellent.*

This is a technical product and the purpose of the first pilot was to complete some bench tests to fully understand what the requirements and capabilities needed to be.

To this end Radioplayer and IRT created sample apps which would use existing libraries and hardware in order to determine a list of DAB stations. The task was not simple: some of the existing libraries failed to work first time, which required effort to address the defects and not all of the test hardware was compatible with the target prototyping platform (which was an Android tablet running Android 7, manufactured by Samsung Electronics). Radioplayer found a configuration which would work, at least in the short term.

However, the problems encountered early on, together with both partners having to navigate staff absences, meant that not all of the findings were ready at the time of
writing this report. Therefore, in the outcomes which follow, the reader is advised that additional info will be provided in a later addendum to this document.

3.5.1. Technical research outcomes

Question 1: What is the definition of a good DAB signal and how does this equate across devices? How capable are tuners to scan DAB and IP simultaneously?

DAB tuners are the sum of many parts. On the RF end, they must have a good level of sensitivity in order to receive the DAB broadcast signal indoors. They must have a reliable interface to connect to a host device (such as a PC or tablet via USB) and there must be up-to-date firmware on the device to decode all of the parts of the DAB signal.

IRT’s OMRI implementation can use different USB-based DAB Tuner sticks with different capabilities and features. Esp. for testing with OTG capable mobile devices (e.g. Smartphones and Tablets), USB tuners based on Siano SMS2230 Chipset can be used because their micro USB connector can directly be plugged into the mobile devices without the need of an additional adapter. Unfortunately, the hardware initially suffered problems with sensitivity when used in London which is a challenging environment due to its high population and high building density. Additional RP antennas were required to improve this. Furthermore, the software stack initially did not show all multiplexes, although this was later resolved.

Through fine tuning, it became apparent that signal quality was not always well reported by these tuners, so it was hard to immediately scientifically define a good signal versus a bad signal. The factors one must look for are: good signal to noise ratio, low error count/low CRC correction, antenna voltage.

Question 2: Can we derive an algorithm which can test the above factors?

In prior work, Radioplayer has derived such an algorithm in its own projects – however this was not part of HRADIO. Therefore, to answer this question, yes, we can derive such an algorithm, but as the section above has shown, this pilot only began to attempt this with the sample applications, and technical development is ongoing.

Question 3: Will the user be aware of switching between frequencies and how?

Just as a car driver is not always aware of when their hybrid car switches between the petrol engine and the electric engine, the tuner will deliver invisible frequency switching to the user.
Question 4: What data charges might the user incur during the DAB to IP switch?

Most vehicles do not have a data connection currently (this will change and there is clear evidence that car makers are already moving towards connected dashboards). This means that when the user switches away from broadcast radio (DAB/FM) to IP, they will require a device that is connected to the internet – likely to be a phone – which will incur data charges. Of course the height of these charges depends on the individual user and the contract they have with their mobile phone company. In any case, the user should be aware of this when using this hybrid functionality.

Question 5: How will service Information for traffic updates (i.e. group 0) reflect fast information? Can a channel cover all layers of the multiplex?

In broadcast systems such as FM or DAB+, traffic information is covered in band either as TMC (in the case of FM) or TPEG (in the case of DAB+)\(^4\). Spoken traffic announcements are broadcast also in band via the announcement mechanisms in DAB+ or the RDS system in FM. In IP streams usually neither the announcement signalisation nor the in band data is available.

Question 6: What determines the Main Service channel – carrying the audio from the station? Will it decode FIC data and bearer IDs and what services are displayed from the multiplex block?

This research question was raised in a brainstorm workshop during the Munich plenary meeting, but was later determined as irrelevant and has been removed from the scope of the pilots.

Question 7: What is the failsafe option once IP connectivity is stopped?

Sometimes either a moving vehicle may be in a location where mobile phone reception is not available, or the user may decide to prevent the radio from using the internet connection.

In this situation a good solution would be to stay with the broadcast radio signal (DAB/FM) until the user determines that it is no longer listenable. Some radio listeners are more tolerant of listening to RF noise when travelling through ‘black spots’,

\(^4\) i.e. service information, especially traffic information is part of the radio broadcast signal.
whereas others may immediately retune to another station or turn the radio off. Thus there is an element of user subjectivity about what is tolerable and what isn’t.

**Question 8: Should the OMRI tuner run an IP scan first before a broadcast scan, so that the metadata is in place first?**

This research question was raised in a brainstorm workshop during the Munich plenary meeting, but was later determined as irrelevant and has been removed from the scope of the pilots.

### 3.6. **PRODUCT 7: CHANNEL SCREEN**

This product is based on a combination of time shifting and personalisation scenarios.

Scenario 4 ‘In the mix’: ‘Olivia is in class during the day, and misses a lot of fun radio broadcasts because of it. In the morning, she listens to live radio, starting her day with the news and some music. When she hears a good song or is interested in a topic, Olivia can tag this in her radio-app. The interesting topics and songs she likes that are aired while she is in class, are aggregated in a personalised podcast she can listen to at the end of the day.’

Scenario 7 ‘Event radio’: ‘Annie is a keen festival-goer. During the festivals, she would like to know all about the latest updates concerning the festival. But often, the mobile network is overused. That’s why she follows the pop-up DAB radio station that brings all of the festival-specific information: from news and music to the programme, traffic info and even the local weatherforecast.’

Scenario 10 ‘Streaming meets broadcast’: ‘Leon uses his smartphone to chat with friends, to keep up to date with the latest news and to discover new music. He uses streaming apps to personalise his music list but also wants to keep up with the news. With the HRADIO app he can make hybrid radio: he can personalise the music he wants to hear, listen to live radio or stream. That we he decides when he wants to hear the news or not. He can simply skip over topics that don’t interest him. Additionally, he can assemble a personalised programme for different times of the day so he doesn’t have to change his preferences each time. This is convenient as he prefers to just listen to music in the evening, without the news updates. In the morning he likes to be informed about the latest news.’
The Channel screen product allows the user to see and use additional content. Examples are text descriptions of audio clips, images, durations and possibilities for interaction with audio. As interaction is particularly context-dependent, this product differentiates between the in-car interface and the mobile interface. For both interfaces, mock ups were developed.

### 3.6.1. User research

The in-car interfaces were designed but not yet tested with end-users. Instead the consortium opted to test the in-car interface in the second pilot as a prototype which integrates multiple features (rather than just the channel screen feature). To address research questions, the mobile interface was shown and discussed with end users. The approach is explained below.

Testing with both end users and professional users addressed the following issues:

1. Feedback on the concept of ‘Mein Programm’;
2. Do users want control over the interface and content?
3. Which kind of controls do users need?
4. Is there a need to show users that they are currently using Wi-Fi?
5. How do users want to return to the program?

### ‘Mein Programm’ Prototype

As D5.1 describes in greater detail, an initial concept of a personalized hybrid radio service was developed and presented as a first-prototype mock up. This prototype was jointly created by RBB and Konsole Labs.

The idea was to use a personalized radio service to create an individual ‘program scheme’ of music events and content items according to a user’s individual preferences and interests, as an alternative to the default program scheme offered by the radio station.

### User research

User research consisted of three different parts:
Lab test with end users to explore the concept of a personalized hybrid radio service: “Mein Programm” (detailed description in D5.1);

Lab test using a questionnaire with end users (see appendix C). The lab tests were conducted at RBB. The questionnaires were hosted by LamaPoll (https://www.lamapoll.de/).

Interview with radio professionals to acquire feedback on the concept of ‘Mein Programm’.

**Detailed description of procedure**

The user tests took place at RBB between the 5th and the 7th of November. One person conducted the interview and one person took notes. Each test was performed individually and lasted about an hour.

At the beginning all participants read and signed the informed consent form (Appendix E).

The user test consisted of two parts, one practical and one theoretical. In the practical section, the concept of a personalisable hybrid radio service was introduced and the demo ‘Mein Programm’ was presented.

In an open interview with testers, we gathered feedback. The ‘think-aloud’ method was used.

Afterwards, various audio clips were played which simulated the transition from a live radio programme to individually-selected audio clips from ‘Mein Programm’. End users also provided general feedback. Finally, testers completed a questionnaire targeting the concept of "My Programme", personal data and testers radio listening preferences. Upon completion, testers received compensatory payment of €35.

![Figure 19: Friendly end user test at RBB](image-url)
Participant profiles

10 persons participated in the user test. 70% were male, 30% female. Their gender, age and profession are shown in the following figures:

Figure 20: Channel screen participant profiles
Table 4: Channelscreen list of participants

<table>
<thead>
<tr>
<th>Tester</th>
<th>Age</th>
<th>Gender</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>30–39 years old</td>
<td>M</td>
<td>Non-technical</td>
</tr>
<tr>
<td>T2</td>
<td>50–59 years old</td>
<td>M</td>
<td>Civil servant</td>
</tr>
<tr>
<td>T3</td>
<td>20–29 years old</td>
<td>M</td>
<td>Student</td>
</tr>
<tr>
<td>T4</td>
<td>50–59 years old</td>
<td>F</td>
<td>Teacher</td>
</tr>
<tr>
<td>T5</td>
<td>60–69 years old</td>
<td>M</td>
<td>Pensioner</td>
</tr>
<tr>
<td>T6</td>
<td>50–59 years old</td>
<td>M</td>
<td>Technical</td>
</tr>
<tr>
<td>T7</td>
<td>50–59 years old</td>
<td>M</td>
<td>Unemployed</td>
</tr>
<tr>
<td>T8</td>
<td>20–29 years old</td>
<td>M</td>
<td>Student</td>
</tr>
<tr>
<td>T9</td>
<td>30–39 years old</td>
<td>F</td>
<td>Technical</td>
</tr>
<tr>
<td>T10</td>
<td>40–49 years old</td>
<td>F</td>
<td>Non-technical</td>
</tr>
</tbody>
</table>

The user group consisted of various age groups and professions. No technical background was required to participate in testing.

The majority of testers (70%) listen to radio during the week and also at the weekend. 10% indicated that they never listen to radio. Of the radio listeners, 90% indicated that they listen to radio during the morning and early afternoon. Testers were asked about the time period during which they might potentially listen to ‘Mein Programm’. 60% of users indicated that they would use the service either at home in the morning or in the afternoon during the journey to or from work. Similar habits were indicated for weekend listening.

Results regarding use of non-radio audio were comparable to testers’ use of radio. Most testers indicated that they listen to radio on a daily basis during the mornings (70%) and afternoon (80%), within various contexts – in their offices, at home or while driving to work.
The three main reasons for listening to audio content were ‘to be informed’ (100%), ‘to be entertained’ (80%) and ‘to participate’ (90%). These responses support the basic concept of ‘Mein Programm’, which addresses exactly these three aspects.

The above diagram shows user preferences regarding audio content. Categories which did not appear in user audio content preferences included entertainment, children’s programming, documentaries, recommendations and games of chance.

**Figure 22**: Types of audio content (excluding music programmes)

Outcomes end user testing

**Research question 1: Feedback on ‘Mein Programm’**

End results indicate that 90% of testers are very positive about a hybrid radio service. Even those users who classified themselves as infrequent radio users indicated their interest in on-demand radio and live radio broadcasts. The combination of podcasts and live radio was understood as a new hybrid offer.
‘I like this idea, because I am not a typical radio listener, and with this idea I can listen freely to radio content without being restricted by the time of broadcast.’ (Tester 8)

Tester 10 was on the other hand not sufficiently convinced to opt for daily use of ‘Mein Programm’, and limited his potential interest to particular themes and categories of information.

“I basically prefer to be surprised by live radio, and would not restrict myself to pre-selected music.” (Tester 10)

The following diagram shows that most testers would use ‘Mein Programm’ in the morning or afternoon. This is consistent with the general daily radio/audio consumption behaviour described in the Participant Profile chapter of this Deliverable. Tester 1 indicated that audio content in ‘Mein Programm’ should be current and up-to-date.

“I would use (the function) more often if the programme indicated that audio/news was current.” (Tester 1)

Testers were also asked whether they would listen to various audio items collected into themes. Responses here were varied; two testers liked the variety of themes that they find in radio programming, and this kind of thematic variety should be included in ‘Mein Programm’. Testers did not clearly identify exactly in which themes they are interested, but the possibility of collecting items under topic headings was seen positively.

Research question 2: Does the user want to have control over the interface and over what is shown?

Testers were asked under which criteria they would like to sort audio items. Possible categories include broadcast-related data, i.e. creation date, and recommendations. Results could be presented in a user-defined sequence. No clear
preferences were discernible, but 60% of testers indicated that a user-defined presentation of results would be useful.

Testers were asked how selected audio items from a playlist should be disposed of following playing. Most testers wanted to decide for themselves when an audio should be deleted. Users felt that audio items should not be deleted even when their storage lifetime is expired (70% of users were against this suggestion) or after a specified period of time, i.e. the following day (60% against).

<table>
<thead>
<tr>
<th>Which info do users want to see?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Category (e.g. news, sport)</strong></td>
</tr>
<tr>
<td><strong>Author</strong></td>
</tr>
<tr>
<td><strong>Date of creation</strong></td>
</tr>
<tr>
<td><strong>Image</strong></td>
</tr>
<tr>
<td><strong>Duration</strong></td>
</tr>
<tr>
<td><strong>Region</strong></td>
</tr>
</tbody>
</table>

Figure 24: Preferred type of information

Research question 3: Which kind of controls do users need?

All testers indicated that a currently-playing audio should be skippable. Users should be able to add song audio to a playlist; this function would not necessarily be useful for news content, due to the need for news to be up-to-date.

Other proposed functions (described in D5.1) such as bookmarking and delete, were positively received by users. Two testers indicated that they would prefer to delete unwanted audio rather than select audio which they liked.

The issue of the location of the ‘play’ button was unresolved, but a majority of testers (60%) indicated that the button should be centrally located.

Research question 4: Is there a need to show users that they are currently using Wi-Fi?

80% of testers indicated that they want to see whether they were using wifi or mobile data. One tester indicated that they would like to be able to select ‘wifi only’ within the app settings.
Research question 5: How does the user want to return to the program?

The concept of ‘Mein Programm’ allows the user to specify the time frame for listening to his/her own programmes. When the specified end-time is reached, the live radio broadcast resumes. A range of five possibilities were presented to testers, each using a specially-recorded audio example.

- Example 1: following the end of the ‘Mein Programm’ selection, an audio signal indicates the return to live programming.
- Example 2: following the end of the ‘Mein Programm’ selection, live programming is resumed without an audio signal.
- Example 3: during the final 10 seconds of ‘Mein Programm’, an acoustic signal is played at a reduced volume.

In addition, we explored the acceptance of various aspects of the time-shift functionality.

- Example 4: live broadcasting can be interrupted by a selected audio feature (i.e. a weather update). This additional audio could be played back at a faster speed to ensure that a user missed less of the live broadcast.
- Example 5: live broadcast can be interrupted by a selected audio feature as in example 4. This interpolated audio is played back at 1:1 speed, but the remainder of the live broadcast is played back at a faster speed to ‘regain’ the time taken up by the interpolated audio.

The results indicated that 80% of testers preferred the solution offered by example 1. As an alternative to an acoustic signal, one tester suggested the use of a jingle. 50% of testers also considered example 2 to be an acceptable solution.

All testers are delighted with the idea of time-shifting. But no testers considered examples 3–5 to be attractive solutions. One tester noted that if he had selected ‘Mein Programm’, he would not want to return to live broadcasting during his listening session.
Outcomes interview with radio stations

We addressed various representative radio broadcasters to gauge their impressions of ‘Mein Programm’. Reactions were in general very positive, and included proposals for future cooperation on the issue.

Our prototypes produced significant feedback. One topic involved the issue of the kind of content with which an editorial team should be able to engage. Use of the app should be simple and clear. Users should easily see which items were recommended to them, and why. RBB’s news radio station noted that real-time updates are important, particularly for such content as news, weather and traffic.

Depending upon editorial needs and requirements, the editorial aspect of HRADIO will be refined and ideally developed into the next pilot phase.
This section describes the results of additional activities that took place during pilot phase 1. In this case, 3 versions of the prototypes tested in pilot 1 were shown at IBC, Berlin in September 2018. At the booth we had prototypes for ‘my programme’ (product 7), time-shifting (product 3) and a teaser to illustrate visualisation of radio (made by VRT) on display to demonstrate the HRADIO concept. The goal of the activities at IBC was to create awareness about hybrid radio. We therefore seized the opportunity to ask visitors to evaluate the HRADIO concept and prototypes. For this, an open-ended survey via Qualtrics (see Appendix F) was created that was used by the HRADIO exhibitors to log the visitors’ answers. Below, we summarize the main feedback issues that were mentioned by the visitors:

**Hybrid is the future?** Some visitors were wary of the statement that hybrid would be the future of radio at first. In explaining the prototypes and concepts we as a consortium are working on, many of the visitors agreed that hybrid radio would provide an interesting listening experience and business opportunities.

**Time-shifting** was often described as useful and very tangible, as visitors compared the EPG of the prototype to their current television experience.

**Visualisation** was considered interesting and important, from a business perspective. When visitors viewed the prototype from an end-user perspective, in first instance it was considered dangerous for in-car usage.

The mock-up of ‘my programme’ (product 7 channel screen) received positive feedback as a concept as visitors imagined it would draw in younger listeners or respond to a personal need.
Aside from the IBC event, we also showed our prototypes at the ICT event in Vienna and at Media Fast Forward (an event organised by VRT).
5. CONCLUSION

This section gives an overall conclusion of the first pilot phase per product as well as future plans for pilot 2 and 3.

For product 1, Daylist participants liked to give weight to their interests – however, the way they had to give weight to a field of interest was not clear. Subcategories should be included to make the Daylist more personalised. Also, more extra information should be added, like visuals and extra information attached to the listed programs.

For product 3 Menu, participants found the additional information very informative and helpful. In pilot 2, we will foresee that the currently-tuned service name will not disappear, as is currently the case.

For product 4 Recommendations, participants preferred to have a simple list representation. The suggested improvements mentioned by our participants will be taken into account for pilot 2. An important takeaway for pilot 2 is to know that participants like receiving recommendations for new casts and single service messages.

For product 5 Voice Control, interesting insights from radio professionals looking for an industry insight into how the user interface can be applied in radio. 4 points were important here: 1) keep it sane and simple, 2) keep it short, 3) be informative, and 4) offer an exit.

Product 6 Guaranteed Signal Quality, technical tests were executed. However, some tasks failed and therefore an addendum of this document will be released to give more insights on product 6.

For product 7 Channel Screen, research gave in-depth insights into how users want to control the hybrid radio-experience. It has indicated that the concept is well received among participants and the combination of on-demand and live listening is attractive. Concrete feedback will be assessed by the consortium and will guide the further development of the concept by including design options to give users control over selecting, disposing and skipping (time-shifting) of content.

In the upcoming weeks, the next steps include the feedback of pilot 1 into each product. The features will be improved and the consortium will also focus on the development of one or two prototypes wherein these features will come together and thus can be seen and tested as a more mature Hybrid Radio Experience. As explained in D5.1 the next phase includes an integration of products into a viable,
exploitable HRADIO platform. D5.1 will also be updated regarding the integration of the different products, as well as the planning of pilot 2 and 3.

To integrate the different products, a timeline for exploitation as first guideline will be made, as it contains the technology readiness level and goals for the different features and components of the HRADIO platform. Then a discussion on features has to be addressed in each pilot and how we will get there, specifically also underlining the preparatory actions. The consortium will decide on the development of a prototype for pilot 2 and 3 containing the features specified in D4.2.
6. REFERENCES

7. APPENDIX

7.1. APPENDIX A INTERVIEW QUESTIONS DAYLIST

Introduction round -- 10min.
- introduction of the online group talk (5min max)
  - HRADIO as a project (European project on hybrid radio)
  - Purpose of the talk (Evaluation of first ideas of radio meets podcast)
  - Rules this evening
    - be polite
    - let others finish talking
- introduce yourself (5min. max)

General impressions of Daglijst -- 15min
- What do they think of receiving personalised podcast based on radio 1 programmes)
  - What were the positives?
  - What would they change?
  - What is missing?
- Do they think they will use this?
  - Why/Why not?
  - When would they use this?
  - How often would they use this?

Daglijst section on preferences -- 15min.
- What do they think of the categories?
  - Would they add other categories?
  - Would they leave out categories?
  - What do they think of their degree of influence?
- Would they change the way categories are visualised? (Perceived convenience of the interaction design?)

Daglijst section on list -- 10min.
- What did they think of the result, the 'daglijst'?
  - Was the content interesting?
Would they change anything?

How many items do they THINK they want to listen to in a row?

Closing session -- 5min.

Would you like to add anything? (each person gets a chance to ask questions, make final comments etc.)

7.2. APPENDIX B USER TEST RECOMMENDER

Questions for professional users (B.01)

Part 1: Demographic Information and questions about radio listening habits

- What is your gender?
- Please select your age group.
- What is your profession?
- How often do you listen to radio?
- If weekly or daily, when do you usually listen to the radio?
- Where do you listen to the radio?
- What services do you use to listen to audio?
- How often do you listen to audio content (Radio, Spotify, Podcast)?
- I listen to audio on the following devices:
  - Radio UKW
  - Radio DAB+
  - Webradio-Empfänger (IP)
  - TV
  - desktop PC
  - laptop
  - tablet
  - smartphone
  - smartspeaker (z. Bsp. Google Home, Alexa)
  - MP3/CD/Schalldruck Player

- I listen to audio content:
  - alone
  - with at least one other person
  - in the morning
  - at lunchtime
  - in the evening
o at night
o at home
o when traveling
o at work/at uni/at school
o during breaks

- I listen to audio content because:
  o I want to be informed.
  o I want to be entertained.
  o I want to kill time.
  o I want to relax.
  o I want to join in.

- I listen to the following kinds of audios:
  o news
  o services (weather and traffic news)
  o entertainment
  o leisure/hobbies/lifestyle
  o documentaries
  o culture
  o children’s programmes
  o sport
  o tips
  o games of change

Part 2: General questions about recommendation systems

Recommendations make our lives easier. If I read a news story on the internet, very shortly afterwards I begin to receive suggestions about things that may interest me. In the final part of this questionnaire, we would like to explore your feelings about such recommendations.

- Please rate the following statements:
  o I listen to audio content (i.e. news) to the end.
  o I click on the appropriate recommendations.
  o I click on recommendations when they are appropriate (i.e. personalised content).
  o It’s important to me to understand why particular content has been recommended to me.
• **What would make you click on a recommendation?**
  o I want to find out more about the topic.
  o I want to find additional audio material.
  o I want to find out why this recommendation is relevant for me.
  o I would never click on a recommendation.
  o other (please specify)

• **Why would you not want to see personalised content?**
  o Because I might miss something.
  o Because I don’t trust this function.
  o Because I don’t use recommendations.
  o Because usually the wrong content is recommended to me.
  o Because I always get the same content recommended to me.
  o other (please specify)

• **For which content would you like to get recommendations?**
  o Alternative stations
  o Individual audio clips of the same station, such as
    o News
    o services (weather and traffic news)
    o entertainment
    o leisure/hobbies/lifestyle
    o documentaries
    o culture
    o childrens programmes
  o sport
  o tips
  o games of change

• **Which station / station characteristics do you want to consider when recommending a program?**
  o played music genres (frequency)
  o epochs of played music
  o region
  o language
  o frequency of the individual audio clips (e.g. 50% reports, 30% music, 20% sports, etc.)

• **In which situation would you use the recommendations?**
  o alone
○ with at least one other person
○ in the morning
○ at lunchtime
○ in the evening
○ at night
○ at home
○ when traveling
○ at work/at uni/at school
○ during breaks

Part 3: Assessment of the recommendation prototype
- Please use the prototype 10 times, comment and evaluate the results (10 very good - 1 bad)
- Which type of presentation do you like?
  ○ lists
  ○ planets
  ○ free text
- Which kind of information do you need to select the recommended station?
  ○ image
  ○ title
  ○ Current playlist
  ○ Current Song
  ○ EPG extract
- What do you like most about the presentation?
- What do you not like about the presentation?

Questions for end users (B.02)
Part 1: Demographic Information and questions about radio listening habits
- What is your gender?
- Please select your age group.
- What is your profession?
- How often do you listen to radio?
- If weekly or daily, when do you usually listen to the radio?
- Where do you listen to the radio?
- What services do you use to listen to audio?
- How often do you listen to audio content (Radio, Spotify, Podcast)?
● I listen to audio on the following devices:
  ○ Radio UKW
  ○ Radio DAB+
  ○ Webradio-Empfänger (IP)
  ○ TV
  ○ desktop PC
  ○ laptop
  ○ tablet
  ○ smartphone
  ○ smartspeaker (z. Bsp. Google Home, Alexa)
  ○ MP3/CD/Schallplatte Player

● I listen to audio content:
  ○ alone
  ○ with at least one other person
  ○ in the morning
  ○ at lunchtime
  ○ in the evening
  ○ at night
  ○ at home
  ○ when traveling
  ○ at work/at uni/at school
  ○ during breaks

● I listen to audio content because:
  ○ I want to be informed.
  ○ I want to be entertained.
  ○ I want to kill time.
  ○ I want to relax.
  ○ I want to join in.

● I listen to the following kinds of audios:
  ○ news
  ○ services (weather and traffic news)
  ○ entertainment
  ○ leisure/hobbies/lifestyle
  ○ documentaries
  ○ culture
  ○ children’s programmes
Part 2: General questions about recommendation systems

Recommendations make our lives easier. If I read a new story on the internet, very shortly afterwards I begin to receive suggestions about things that may interest me. In the final part of this questionnaire, we would like to explore your feelings about such recommendations.

- Please rate the following statements:
  - I listen to audio content (i.e. news) to the end.
  - I click on the appropriate recommendations.
  - I click on recommendations when they are appropriate (i.e. personalised content).
  - It’s important to me to understand why particular content has been recommended to me.

- What would make you click on a recommendation?
  - I want to find out more about the topic.
  - I want to find additional audio material.
  - I want to find out why this recommendation is relevant for me.
  - I would never click on a recommendation.
  - other (please specify)

- Why would you not want to see personalised content?
  - Because I might miss something.
  - Because I don’t trust this function.
  - Because I don’t use recommendations.
  - Because usually the wrong content is recommended to me.
  - Because I always get the same content recommended to me.
  - other (please specify)

- For which content would you like to get recommendations?
  - Alternative stations
  - Individual audio clips of the same station, such as
  - News
  - services (weather and traffic news)
  - entertainment
○ leisure/hobbies/lifestyle
○ documentaries
○ culture
○ children’s programmes
○ sport
○ tips
○ games of change

- Which station / station characteristics do you want to consider when recommending a program?
  ○ played music genres (frequency)
  ○ epochs of played music
  ○ region
  ○ language
  ○ frequency of the individual audio clips (e.g. 50% reports, 30% music, 20% sports, etc.)

- In which situation would you use the recommendations?
  ○ alone
  ○ with at least one other person
  ○ in the morning
  ○ at lunchtime
  ○ in the evening
  ○ at night
  ○ at home
  ○ when traveling
  ○ at work/at uni/at school
  ○ during breaks

7.3. APPENDIX C USER TEST ‘MEIN PROGRAMM’

Part 1: Feedback on ‘Mein Programm’
- Are you interested in using ‘Mein Programm’?
- When will you use “My Programme”?
- How often do you use “My Programme”?
- Which kind of information do you need?
  ○ title
  ○ description
Part 2: Demographic Information and questions about radio listening habits

- What is your gender?
- Please select your age group.
- What is your profession?
- How often do you listen to radio?
- If weekly or daily, when do you usually listen to the radio?
- Where do you listen to the radio?
- What services do you use to listen to audio?
- How often do you listen to audio content (Radio, Spotify, Podcast)?
- I listen to audio on the following devices:
  - Radio UKW
  - Radio DAB+
  - Webradio-Empfänger (IP)
  - TV
  - desktop PC
  - laptop
  - tablet
  - smartphone
  - smartspeaker (z. Bsp. Google Home, Alexa)
  - MP3/ CD/ Schallplatte Player
- I listen to audio content:
  - alone
  - with at least one other person
  - in the morning
  - at lunchtime
○ in the evening
○ at night
○ at home
○ when traveling
○ at work/at uni/at school
○ during breaks

● I listen to audio content because:
  ○ I want to be informed.
  ○ I want to be entertained.
  ○ I want to kill time.
  ○ I want to relax.
  ○ I want to join in.

● I listen to the following kinds of audios:
  ○ news
  ○ services (weather and traffic news)
  ○ entertainment
  ○ leisure/hobbies/lifestyle
  ○ documentaries
  ○ culture
  ○ children’s programmes
  ○ sport
  ○ tips
  ○ games of change
Survey HRADIO workshop user testing

Welcome! Glad you are interested in participating in our workshop! Please answer the questions below and we will contact you shortly to confirm your registration and give you all the practical details.

- **Personal information**

<table>
<thead>
<tr>
<th>First name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname:</td>
<td></td>
</tr>
<tr>
<td>Gender:</td>
<td></td>
</tr>
<tr>
<td>Birthdate (year only):</td>
<td></td>
</tr>
<tr>
<td>Profession:</td>
<td></td>
</tr>
</tbody>
</table>

- **Radio usage: How often do you listen to radio?**

<table>
<thead>
<tr>
<th>(almost) never</th>
<th>A few times/year</th>
<th>A few times/month</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>On weekdays</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the weekend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **IF ON WEEKDAYS → A FEW TIMES / WEEKLY OR DAILY IS SELECTED:** When do you usually listen to the radio? (*1 option possible*)
  - Morning
  - Noon
  - Afternoon
  - Early evening
  - Late night

- **IF IN THE WEEKEND → A FEW TIMES / WEEKLY OR DAILY IS SELECTED:** When do you usually listen to the radio? (*1 option possible*)
  - Morning
  - Noon
  - Afternoon
  - Early evening
  - Late night
• Where do you listen to the radio? (+1 option possible)
  • At work
  • At home
  • In the car
  • Other, namely, (fill in)

• Via which device do you usually listen to the radio?

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Once a month</th>
<th>Once a week</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue radio (FM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital radio (DAB+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital television</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile app (i.e. Spotify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webbrowser</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, namely, (fill in)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• I listen to audio content because (5-point likert scale I totally agree – I don’t agree)

<table>
<thead>
<tr>
<th></th>
<th>I totally agree</th>
<th></th>
<th>I don’t agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to be informed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I want to be entertained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I want to kill time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I want to relax</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I want to join in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, namely, (fill in)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you for answering this survey.
Einverständniserklärung

Projekt
EU Horizon 2020 Projekt HRadio

Ziel des Nutzertests

Beschreibung des Nutzertests

Datenschutz

Während des Tests können Bilder gemacht werden. Diese werden ebenfalls ausschließlich für projektbezogene Berichte verwendet oder möglicherweise auf der HRadio Projekt-Website veröffentlicht.

Einverständnis
Ich , stimme dem Inhalt dieses Dokuments zu. Ich stimme zu, an diesem Nutzertest teilzunehmen.
Ich stimme zu/ ich stimme nicht zu (bitte entsprechend kennzeichnen), dass die für Projektberichte oder Projekt-Website gemachten Bilder verwendet werden.

Datum: 06.11.2018

Unterschrift:

Rückfragen können gerichtet werden an: Simone Holleeder, Rundfunk Berlin-Brandenburg, Martene-Dietrich-Allee 20, 14482 Potsdam, Simone.Holleeder@rbb-online.de.
Datenschutzbeauftragte des rbb: Anke Naujock, Masurenallee 8-14, 14057 Berlin, E-Mail: Datenschutz@rbb-online.de.
Einverständniserklärung

Projekt
EU Horizon 2020 Projekt HRadio

Ziel des Nutzertests

Beschreibung des Nutzertests

Datenschutz

Während des Tests können Bilder gemacht werden. Diese werden ebenfalls ausschließlich für projektbezogene Berichte verwendet oder möglicherweise auf der HRadio Projektw Website veröffentlicht.

Einverständnis
Ich, _________, stimme dem Inhalt dieses Dokuments zu. Ich stimme zu, an diesem Nutzertest teilzunehmen.

Ich stimme zu/ Ich stimme nicht zu (bitte entsprechend kennzeichnen), dass die für Projektberichte oder Projekt-Website gemachten Bilder verwendet werden.

Datum:

Unterschrift:

Rückfragen können gerichtet werden an: Simone Hollederer, Rundfunk Berlin-Brandenburg, Marien-Dietrich-Allee 20, 14482 Potsdam, simone.hollederer@rbb-online.de.

Datenschutzbeauftragte des rbb: Anke Naujock, Masurenallee 8-14, 14057 Berlin, E-Mail: Datenschutz@rbb-online.de.

Co-funded by the Horizon 2020 Framework Programme of the European Union
7.6. APPENDIX F: QUESTIONNAIRE FOR IBC

Start of Block: Default Question Block

Q1 1. How do you evaluate the concept of creating your own program scheme (demo 1, Mein Programm)?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q2 2. Do you have suggestions for improvement of the experience?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q3 3. How do you evaluate the concept of adding personal content to radio (demo 2, Selfie)?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q4 4. Do you have suggestions for improvement of the experience?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
Q7 5. How do you evaluate the concept of radio time shifting (demo 3, Time shifting)?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Q8 6. Do you have suggestions for improvement of the experience?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Q9 7. How do you evaluate the concept of a visual menu (demo 4, Menu)?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Q10 8. How do you evaluate the overall concept of HRADIO (hybrid radio)?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Q5 What is your job function + sector you are working in?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Q11 Do you see a benefit of this concept for your line of work? 

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q6 Are you interested in receiving updates about HRADIO? Please leave us your e-mail address.

________________________________________________________________

End of Block: Default Question Block

7.7. **APPENDIX G: DROP OFF PRODUCT 1**

HRADIO drop-off pilot phase 1

Start of Block: Socio-demografische informatie

Q1 Wat is je naam?

________________________________________________________________

Q2 Wat is je voornaam?

________________________________________________________________

Q3 Wat is je geslacht?

○ Man (1)  

○ Vrouw (2)  

○ X (3)  

Q4 Wat is je geboortejaar?

________________________________________________________________

Q5 Wat is je telefoonnummer?

(Je contactgegevens worden enkel gebruikt voor je deelname aan dit onderzoek. Ze worden niet opgeslagen of toegevoegd aan een database.)
Q6
Wat is je e-mailadres?
(Je contactgegevens worden enkel gebruikt voor je deelname aan dit onderzoek. Ze worden niet opgeslagen of toegevoegd aan een database.)

Q7 Wat is je beroep?

End of Block: Socio-demografische informatie

Start of Block: Luistergedrag Radio

Q8 Hoe vaak luister je naar de radio?

<table>
<thead>
<tr>
<th></th>
<th>(bijna) nooit (1)</th>
<th>Een paar keer per jaar (2)</th>
<th>Een paar keer per maand (3)</th>
<th>Wekelijks (4)</th>
<th>Dagelijks (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tijdens de week (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In het weekend (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Display This Question:
If Hoe vaak luister je naar de radio? = Tijdens de week [ Een paar keer per maand ]
And Hoe vaak luister je naar de radio? = Tijdens de week [ Wekelijks ]
And Hoe vaak luister je naar de radio? = Tijdens de week [ Dagelijks ]

Q9 Wanneer luister je op weekdagen naar de radio?

▢ In de voormiddag (1)
Display This Question:
If Hoe vaak luister je naar de radio? = In het weekend [ Een paar keer per maand ]
And Hoe vaak luister je naar de radio? = In het weekend [ Wekelijks ]
And Hoe vaak luister je naar de radio? = In het weekend [ Dagelijks ]

Q10 Wanneer luister je tijdens het weekend naar de radio?

- In de voormiddag (1)
- ’s Middags (2)
- In de namiddag (3)
- ’s Avonds (4)

Q11 Waar luister je naar de radio?

- Op het werk (1)
- Thuis (2)
- In de auto (3)
Q12 Welk toestel gebruik je om naar de radio te luisteren?

<table>
<thead>
<tr>
<th></th>
<th>Zelden (1)</th>
<th>Maandelijk (2)</th>
<th>Wekelijk (3)</th>
<th>Dagelijk (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analoge radio (FM) (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digitale radio (DAB+) (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digitale televisie (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobiele app (bv. Spotify) (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webbrowser (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andere, namelijk: (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Andere, namelijk: (4)
<table>
<thead>
<tr>
<th>Q13 Ik luister naar de radio omdat...</th>
<th>Helemaal oneens (1)</th>
<th>Eerder oneens (2)</th>
<th>Niet oneens of eens (3)</th>
<th>Eerder eens (4)</th>
<th>Helemaal eens (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>...ik geïnformeerd wil worden (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...ik geëntertained wil worden (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...ik de tijd wil vullen (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...ik wil ontspannen (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...ik wil meedoen (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andere, namelijk: (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Block: Luistergedrag Radio