Grant Agreement No.: 761802

D1.2: Use cases, requirements, architecture and initial content

Deliverable 1.2 documents the user research process of MARCONI. Following a design-thinking approach, the media partners of the consortium studied the context of radio making. In particular, they co-designed up to 24 concepts together with end-users, including both listeners and radio makers. These concepts were analysed and categorized, which formed the basis for 4 user scenarios. In turn, these scenarios involve several use cases that inform the technical requirements of MARCONI.

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EXECUTIVE SUMMARY

This document describes the user research process, the translation of the user research findings to user scenarios and technical requirements. The user research process (Chapter 1) followed a design thinking approach. Departing from a user journey mapping with experts (i.e. radio makers) and contextual inquiry (i.e. observations, informal interviews in radio stations), we derived key values of radio makers towards interacting with listeners. These values served as input for a co-design workshop with radio makers at VRT. Also, initially defined concepts were checked in a co-design workshop with listeners. The results of these workshops were analyzed and prepared as concepts. Then, these concepts were discussed in a preference rating workshop with the MARCONI consortium, after which we identified missing research opportunities.

Together with the findings of the contextual inquiry of NPO and SFilter, these opportunities informed 4 co-design workshops with radio makers and listeners at NPO and SFilter. Again, these workshops resulted in concepts, which were thoroughly discussed, filtered and categorized in a group-analysis. The resulting five categories, i.e.:

- facilitating relevant feedback,
- co-creating content,
- allowing personal services,
- providing content on demand for listeners and radio makers,
- feeling part of a community,

formed the basis for four user scenarios (Chapter 2). The first scenario focuses on facilitating relevant feedback for both radio makers and listeners in the context of a weeklong 24/7 radio event. The second scenario concerns the co-creation of content by listeners in the context of an informational radio show. A third scenario allows personal services for listeners through interactions. Fourth scenario focuses on providing content in demand.

In Chapter 3, the user scenarios are translated and discussed as 6 general technical requirements:

- Front end app for radio editors
- Lively environment in the studio and online
- Live functionalities for listeners
- On-demand functionalities for listeners
- Content analysis services and conversation services
- Storage and communication services

In turn, these technical requirements are subdivided in a more detailed list.

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ABBREVIATIONS

SMS	Short Message Service
ML	Machine learning service
RM	RadioManager
APP	Radio phone application
MARCONI	Multimedia and Augmented Radio Creation: Online, iNteractive, Individual
DAB	Digital Audio Broadcasting
DJ	Disc Jockey
GDPR	General Data Protection Regulation

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1 Methodology

1.1 Introduction

The MARCONI project aims to enable fully interactive and personalised radio experiences, through integrating 'live' broadcast radio with digital platforms and social media, thereby offering listeners novel radio experiences. This general concept (as described in D1.1[1]) is further refined, improved and validated through stakeholder consultations, based on the methodological model of design thinking[2]. First, we aimed to get an understanding of the context of the radio makers, i.e. radio producers, radio hosts, digital strategists of the different radio stations in MARCONI (see section 1.2.1). Second, we involved the second user group of MARCONI, i.e. listeners as a broad target audience. To further integrate these stakeholders in an otherwise technology-expert driven design process, MARCONI applies a co-design approach, which is supported by brainstorm methods such as user journey maps[3], mapping and inspiration cards[4] in participatory design formats such as Map-it[5] (see section 1.2.2).

Figure 1 shows an overview of the different methods that are applied, on which moment and where, and how this opened the problem space. The initial exploration of the problem space through a user journey mapping in September 2017 led to the elaboration of 5 user scenarios, which are defined in Deliverable 1.1 (D1.1). We further divergated the problem space through observations and co-design workshops. Based on these findings, we were able to converge to 4 scenarios (presented in Chapter 2), which form the basis for the technical requirements (Chapter 3).

1 https://static1.squarespace.com/static/595cd103893fc0cdd9514ebd/t/5a4f86e9f9619a5160b6c9f5/1515161328506/D+1.1%3A+General+concept.pdf

2 Buchanan, R. (1992). Wicked problems in design thinking. Design issues, 8(2), 5-21.

3 Christopher, M., Payne, A., & Ballantyne, D. (1991). Relationship marketing: bringing quality customer service and marketing together.

4 Halskov, K., & Dalsgård, P. (2006, June). Inspiration card workshops. In Proceedings of the 6th conference on Designing Interactive systems (pp. 2-11). ACM.

5 Huybrechts, L., Dreessen, K., & Schepers, S. (2012, August). Mapping design practices: on risk, hybridity and participation. In Proceedings of the 12th Participatory Design Conference: Exploratory Papers, Workshop Descriptions, Industry Cases-Volume 2 (pp. 29-32). ACM.

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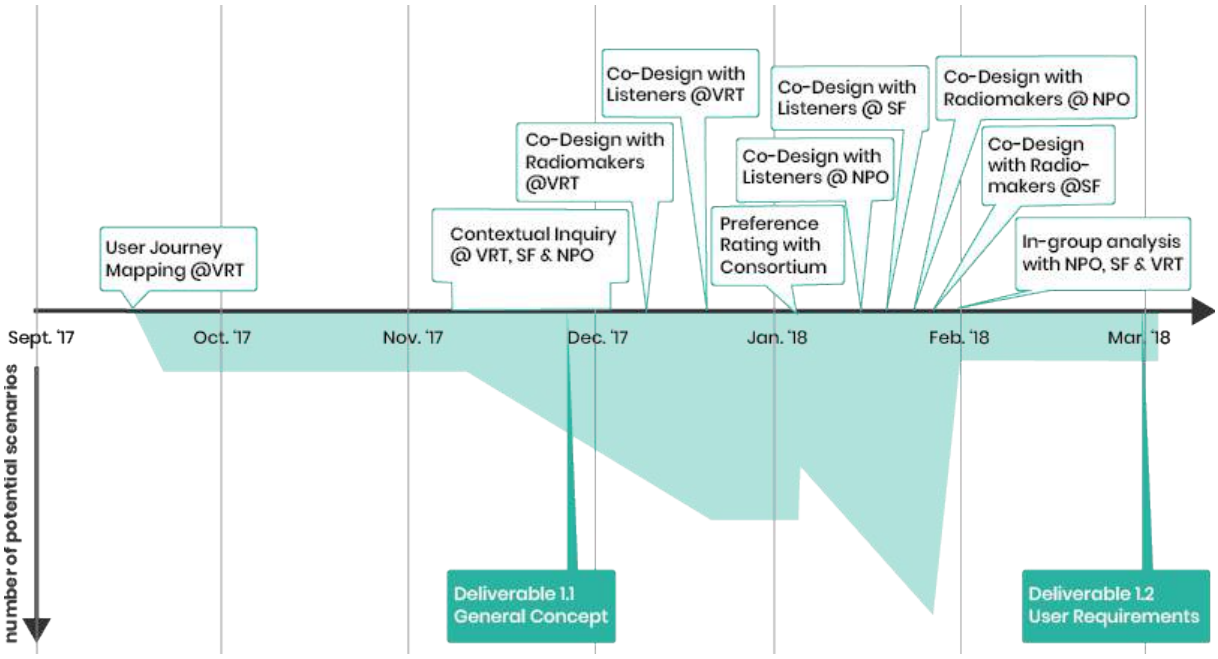

Figure 1. Timeline of user research phases (above line), and the divergence and convergence of potential scenarios (below line) following a design thinking approach.

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2 Design-thinking approach

In the following, we will elaborate on the different methods used in this design-thinking process. Observations and co-design workshops were held at each of the three media partners of the MARCONI consortium, which gave us the opportunity to reflect on similarities and differences. Both VRT and NPO are public broadcasters, and house several radio stations[6]. StadtFilter is a small, independent radio station. Also, the media partners are located in three different countries. These differences provide a rich ground for comparison.

2.1.1 CONTEXTUAL INQUIRY

2.1.1.1 USER JOURNEY MAPPING

As a first exploration of the problem space, we organised a brainstorm workshop at VRT on September 13, 2017. All 12 participants were familiar with embedding interactivity in the radio experience (see table 1).

Nr	Profession	Gender
1	Researcher	F
2	Digital strategist radio station Studio Brussels	M
3	Researcher	M
4	Lead developer	M
5	Project manager	M
6	Innovation manager	F
7	Researcher	M
8	Researcher	F
9	Designer	M
10	Advisor Radio	M
11	Researcher	M
12	Developer	M

Table 1. Overview of profession and gender of participants in the user journey mapping workshop at VRT.

We deployed the method of user journey mapping7: participants use 6 post-it notes to depict particular frustrations experienced by a user (termed 'pain') and possible solutions to those frustrations ('gain'). The participants must use exactly 6 post-its to depict the situation. This constrain encourages participants to reflect and focus their thinking. Participants were encouraged to create 3 storyboards, and present them to each other. Then, participants were asked to hand out three votes on their favourite scenario(s), and motivate why. They were allowed to distribute all 3 votes over one scenario or over three.

[6] Studio Brussels, Radio 1, Radio 2, MNM, Klara at VRT, and Radio 1, Radio 2, 3FM, Radio 4, Radio 5 and Radio 6 at NPO

[7] Christopher, M., Payne, A., & Ballantyne, D. (1991). Relationship marketing: bringing quality customer service and marketing together.

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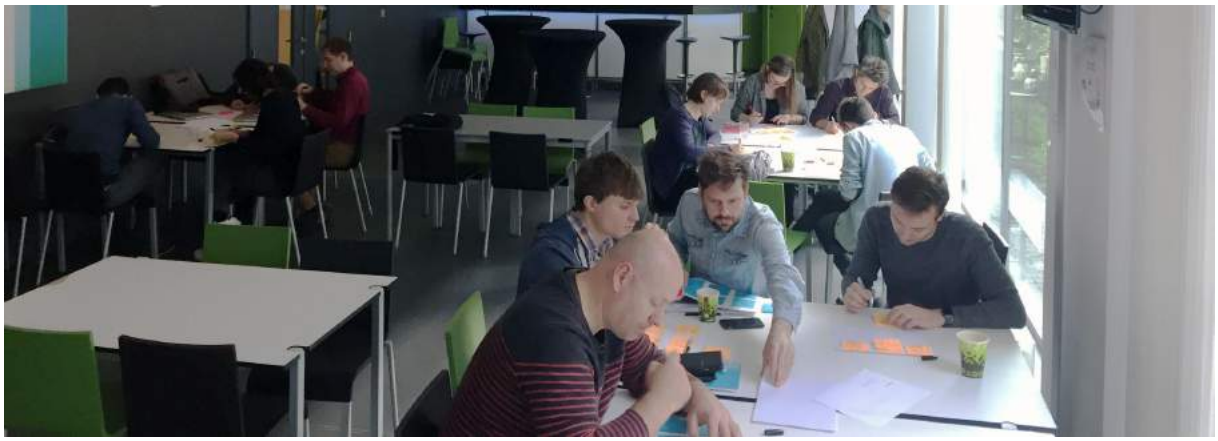

Figure 2. Participants divided in 3 groups in the user journey mapping workshop at VRT.

The most successful user stories described in a storyboard, as determined by participant voting, were finally expanded into scenarios. These scenarios were described in D1.1[8]. They depict real-life situations in which a particular user will experience frustration or 'pain'. Scenarios propose various solutions which represent 'gains' and benefits for the user.

2.1.1.2 OBSERVATIONS

For the preparation of the co-design sessions, the workshop moderators of VRT, NPO and SFilter observed radio hosts and editors during at least one radio show (see Figure 3, and see annex C for the observation template), after which informal contextual interviews were taken. These contextual inquiries[9] took place in November and beginning of December. Through this inquiry we identified key values of interacting with listeners, which informed the co-design workshop approach for radio makers by a list of values.

8 https://static1.squarespace.com/static/595cd103893fc0cdd9514ebd/t/5a4f86e9f9619a5160b6c9f5/1515161328506/D+1.1%3A+General+concept.pdf

9 Holtzblatt, K., & Jones, S. (1993). Contextual inquiry: A participatory technique for system design. Participatory design: Principles and practices, 177-210.

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Figure 3. View during observations outside the radio studio of Studio Brussels, VRT (above) and inside the studio of Stadtfilter (below).

2.1.2 CO-DESIGN

All co-design workshops were organised at the three media partner locations of the MARCONI consortium, i.e. VRT (1.1.3.1), NPO (1.1.3.2) and SFilter (1.1.3.3), and was facilitated by the Map-it[10] method. The main research question we investigated was " How can we make (online) radio more interactive and facilitate personalisation?"

Participants of the workshop were divided in two groups and each group was assigned to one moderator. A large (A0) map covered each table. Each participant also received sticker sheets, based on a pre-defined template (see annex A). All moderators followed the same script (see annex B). The moderators took care not to intervene too much, and made sure the

[10] Huybrechts, L., Dreessen, K., & Schepers, S. (2012, August). Mapping design practices: on risk, hybridity and participation. In Proceedings of the 12th Participatory Design Conference: Exploratory Papers, Workshop Descriptions, Industry Cases-Volume 2 (pp. 29-32). ACM.

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participants felt comfortable to speak freely (by creating a cozy living room atmosphere a.o.). For the workshop with listeners, informed consents were requested to be signed[11] before the start of the workshop. In this consent, the purpose and set up of the workshops was explained, and participants were informed the workshop is filmed and photographed yet results will be anonymized (see annex D). Further, in accordance with the data management plan, no identifiable participant faces are shown. Also, before the workshop started, a short presentation introduced the MARCONI project.

The script departed with asking participants to identify (1) values, (2) needs and (3) frustrations in terms of interacting with listeners. Examples of values were noted on their sticker sheet. These examples were inspired by the observations (as described in section 1.2.1.2). Then, guided by inspiration cards[12], participants were offered the opportunity to write down (4) solutions for the mapped challenges. First, they reflected on these solutions individually, and then they discussed them in group in a playful way. In the fifth round, (5) each group was asked to lock their two most favourite conceptual solutions. By discussing their needs and solutions in group, workshop participants are encouraged to find consensus (see also Figure 4). The moderator made annotations on the map to clarify concepts and discussions.

After a short break, the annotated map switched tables together with one participant who presented the map to the other group. The other group was requested to write what they liked (thumbs up sticker) and dislike (bomb sticker) during this presentation. Then, the group was allowed to hand out two bombs (6). Finally, the group could stick their likes on the concepts at hand (7).

Results of the workshops were analysed (based on grounded theory[13]), coded and clustered in concepts (see section 1.1.3.4). To avoid bias in the interpretation of the data, all sessions were transcribed, and further analysed by multiple researchers. The resulting concepts formed the basis for a preference rating exercise with the MARCONI consortium (see section 1.1.4).

[11] are available upon request.

[12] Dalsgaard, P., & Halskov, K. (2010, April). Designing urban media façades: cases and challenges. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems(pp. 2277-2286). ACM.

[13] Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons and evaluative criteria. Zeitschrift für Soziologie, 19(6), 418-427.

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Figure 4. A radio editor gives her opinion on the mapped concepts while the other participants are listening. The moderator (standing) writes down a summary of this opinion on the map.

2.1.2.1 CO-DESIGN WITH RADIOMAKERS AT VRT

The co-design workshop took place on Tuesday December 12, 2017 at VRT in Brussels, from 10.30 to 13.30. Thirteen participants took part in the workshop (see Table 2), and were divided over 2 groups. Participants were recruited within the organisation. Each workshop aimed to mix professional radio makers with digital profiles in order to spark discussions on the application of future technology.

Nr.	Profession	Radio station	Institution	Gender
P1	Editor	MNM	VRT	F
P2	Innovation manager		VRT	F
P3	Radio host	Radio 2	VRT	M
P4	Researcher		uHasselt	M
P5	Radio host	Radio 1	VRT	M
P6	Researcher		NPO	F
P7	Editor	Radio 2	VRT	M
P8	Product owner	Radio 2	VRT	M
P9	Editor	MNM	VRT	F
P10	Radio host	Radio 1	VRT	M
P11	CTO		Pluxbox	M
P12	Radio host	Radio 1	VRT	M
P13	Researcher		uHasselt	F

Table 2. List of participants of co-design workshop with radio makers at VRT.

After analysis of the 2 annotated maps, 8 concepts remained, which will be discussed in the following:

1.Voice control

Frustration: Radio hosts and editors have many tools to operate, which slows down their efficiency and distracts them from their key task.

Concept: controlling the radio editing platform by voice instead of keyboard.

2. Lively environment

Frustration: radio studios are grey and dull. Radio makers believe that hosting a show at events such as music festivals result in better radio shows, as radio hosts are able to immediately see the effect of interacting with listeners.

Concept: Equipping radio studios with screens that display interactions with listeners.

3. Integrated system: Clustering on content

Frustration: radio stations receive many messages in chronological order, not always responding to the question that was asked in the radioshow.

Concept: incoming messages should be clustered on the content it responds to; whether it is to request a song, to say there is a traffic jam, or to respond to a question/discussion held by the radio host.

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4. Integrated system: Radio Archive

Frustration: the 'richness' of public broadcasters is the archive, yet this content is rarely used

Concept: integrating access to the radio archive in the editing platform

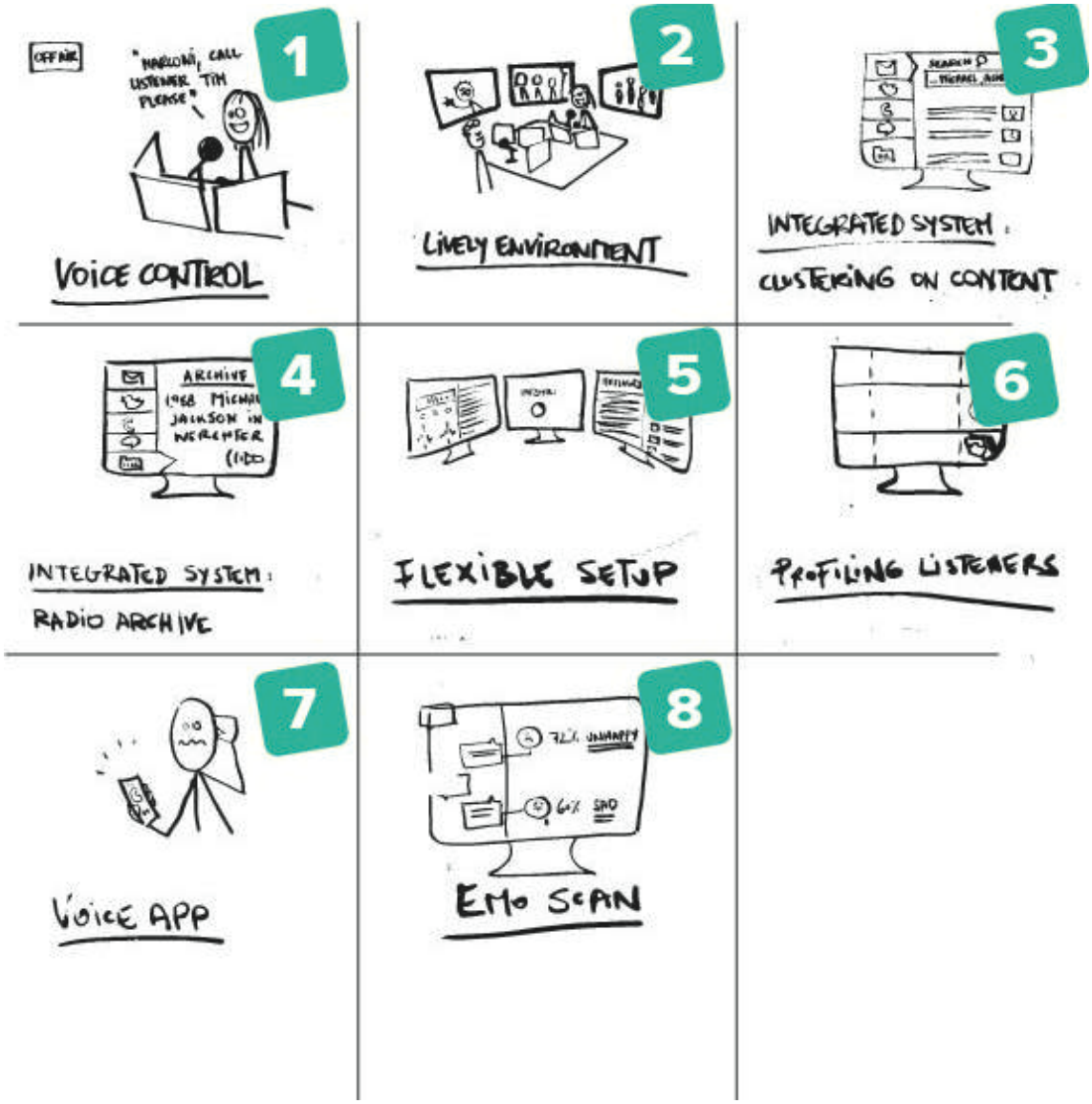

Figure 5. Overview of the resulting concepts of the VRT co-design workshop with radio

5. Flexible setup

Frustration: there are many tools for radio hosts and editors, which holds them back in their key tasks (this was also observed beforehand). Also, radio makers from one radiostation (e.g. aiming at in-depth journalism) deploy different tools than radiostations (e.g. e-mails as they can contain long answers) that aim at youth (e.g. snapchat messages, yet zero e-mails).

Concept: One platform that integrates every digital tool in a user friendly interface and allows for customization on the level of the radio station.

6. Profiling listeners

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Frustration: There is a need to estimate fast whether a listener would be a good interviewee or not. Experienced editors recognizes the telephone number of listeners that can present a good story.

Concept: Profiling listeners in a visual way.

7. Voice-app

Frustration: young people do not like to call or be called.

Concept: An additional function of the existing radio app to include a voice function (or video), similar to WhatsApp. This would allow them to 'rehearse', send in audio content beforehand or talk live in a more familiar way.

8. Emo-scan

Frustration: chatbots are not human yet target functional information. Radio makers identify this as a potential danger in current chatbot applications, withholding them to deploy it.

Concept: a chatbot that recognizes the emotional state of the incoming messages and clusters them on this emotion, which would allow them to respond in a correct way.

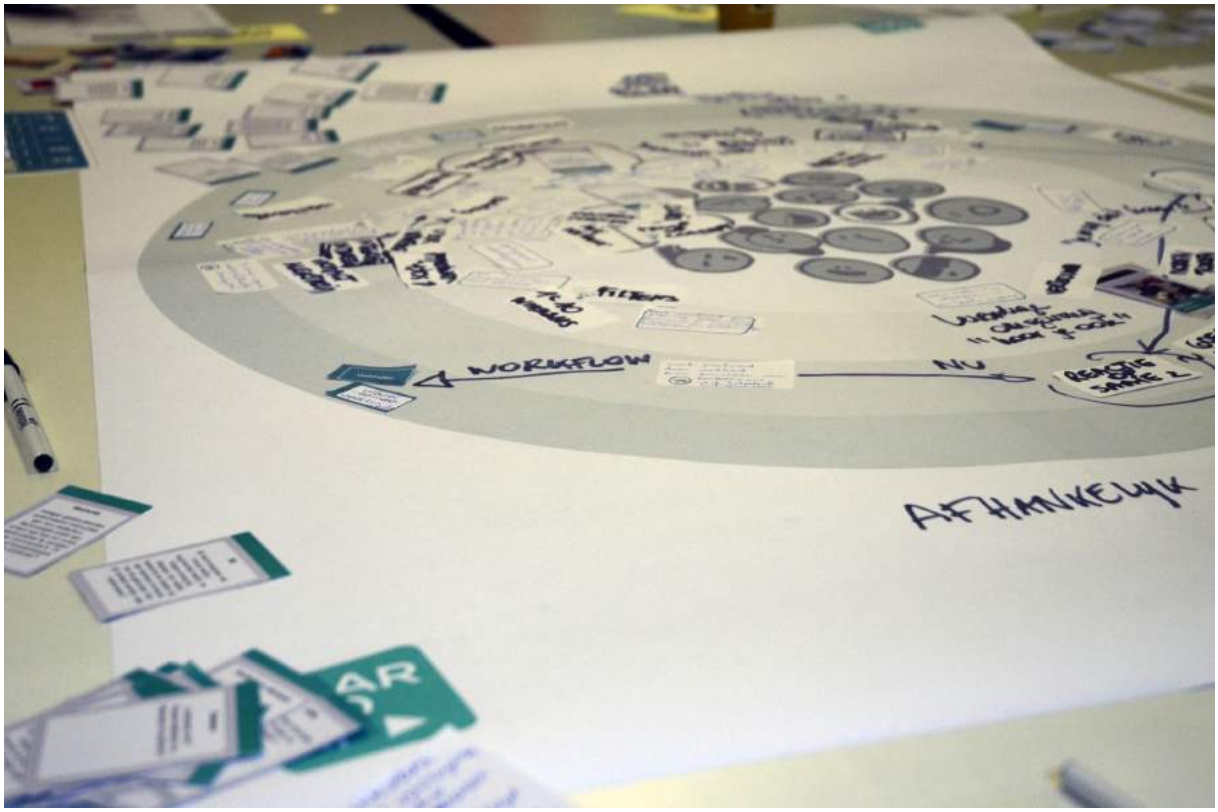

Figure 6. Mapping result of group 1 in the workshop with radio makers at VRT

2.1.2.2 CO-DESIGN WITH LISTENERS AT VRT

The workshop was organised at the VRT 'house for radio' (Radiohuis) in Leuven, on Wednesday December 20, from 14.00 to 17.00. Participants were recruited via a recruiting agency) in order to assure a mix of listeners with a critical stance, they received an incentive. Listeners were mixed in terms of age, gender, interaction experience and the group was expanded with radio team members to create support amongst participants. In total, 10 people

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participated of which 8 listeners (see Table 2). All participants have at least one radio station app installed and listen to the radio via this app.

Nr.	Profession	Radio station	Experience interacting with radio stations	Gender	Age
P1	Administrative assistant	R1, StuBru, MNM	via sms	F	29
P2	Scientific assistant	StuBru, Q-music	/	F	26
P3	Student	R2, R2, StuBru, MNM	via telephone interview	F	24
P4	Unemployed	R2, R1, MNM, Nostalgie	/	F	59
P5	Student	StuBru, Hitfm	/	M	22
P6	Unemployed	Q-music, MNM	via Facebook, twitter or instagram	M	22
P7	Office clerk	StuBru, R1, MNM	via Facebook	M	46
P8	Office clerk	R1, R2, Joe FM	via e-mail and sms	M	53
P9	Radio host	R1	/	M	
P10	Developer	(VRT)	/	M	24

Table 3. Overview of participating listeners at co-design workshop of VRT.

This workshop departed with a discussion on the MARCONI concepts as defined in D1.1, as a warming up exercise that would also allow us to gain insight in the end-users' perspective.

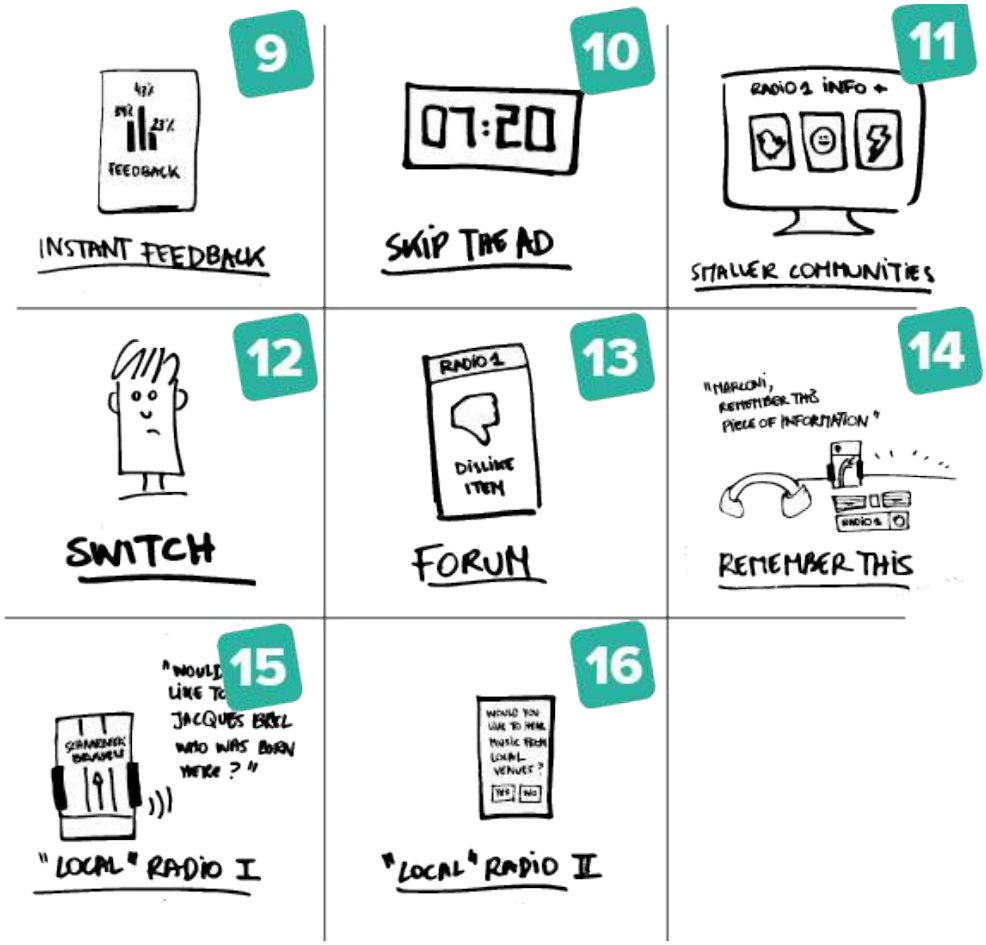

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Figure 7. Overview of the 8 concepts that were defined in the co-design workshop with listeners at VRT.

After analysis, we ended up with 8 concepts:

9. Instant feedback

Frustration: there is often no reason to spontaneously contact the radio station. What if they would allow us to respond more often, and that we could see the responses.

Concept: a poll of which results are immediately visualized.

10. Skip the ad

Frustration: Radio has a background function. Advertisements break the background function, as they are often annoying (like a song you do not like), and not relevant.

Concept: Moving advertising blocks forward in time. For instance, to listen to advertisements during a longer period of time each hour.

11. Smaller communities

Frustration: Personalized radio is in conflict with the typical radio experience: e.g. recognizing car drivers that listen to the same station in the traffic jam.

Concept: Not offering personalized playlists but offering community playlists. Listeners could select a particular genre community out of 3 options. The station still broadcasts the same information, radio items, etc. As such, radio stations could more easily align the information with music, and allow for new music discoveries.

Figure 8. Moderator reports on results of workshop with radio makers at the workshop with listeners.

12. Switch

Frustration: A listener is not always interested in all the information the radio show discusses. If there is a solution for personalized music (i.e. Kenny button scenario), can there be thought of a similar solution for personalized information?

Concept: a function that would allow listeners to switch between the content of radio stations. If radiostation MNM discusses the soccer game, then listener could switch to an item on StuBru on a new television show.

13. Forum

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Frustration: Politicians often talk too much, they interrupt the interviewer, which causes listeners to feel annoyed.

Concept: Rating the discussion. If the discussion gets many dislikes, the discussion will get off air and a default song will play.

14. Remember this

Frustration: When driving a car while listening to the radio, it can be frustrating to arrive at your destination during an interesting discussion on the radio. Some listeners kept seated at the parking lot to continue listening. Others tried searching for the radio item online but were frustrated because of the linear search function.

Concept: Via a function (button or voice control in car), listeners could pause the discussion and continue listening through other devices. An additional feature could be to have a bookmark function that saves the content, e.g. an interesting link or reference, and copies it to a personal device.

15. Local radio I

Frustration: Some listeners like to receive information on events, music festivals via social media. Yet besides this, social media does not offer any added value.

Concept: while driving a car from point A to B, listeners could be offered local music. The listener imagined this feature could be activated before departing.

16. Local radio II

Frustration: similar as described above in 7.

Concept: while driving a car from point A to B, listeners could be offered local information. The participating listener imagined this information would be pushed during the drive.

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Figure 9. Close up of participant holding the inspiration cards.

2.1.2.3 PREFERENCE RATING WITH CONSORTIUM

On January 9, VRT organised a preference rating workshop with the consortium in Graz, Austria. This workshop is similar to the Map-it approach described in section 1.2, yet limits its focus to the part on rating concepts through identifying 1 priority like, 2 or 3 secondary likes and 3 pitfalls by each participant. The consortium was divided in two groups (see Table 4), of which one table was moderated by VRT, the other by uHasselt.

Nr	Partner	Gender
Group 1		
1	VRT	M
2	Pluxbox	M
3	UNIVIE	M
4	NPO	F
5	SFilter	M
6	IN2	M
Group 2		
7	VRT	M
8	NPO	F
9	NPO	F
10	IN2	M
11	Pluxbox	M
12	UNIVIE	M
13	JRS	M

Table 4. Overview of distribution of consortium members over two groups.

This workshop aimed to take the consortium perspective into account, including technical and business point of views. The workshop resulted in annotated maps that were qualitatively analyzed by one researcher. On a more quantitative scale, the ratings of likes and pitfalls were weighed as 2 points for each priority like, 1 point for each secondary like and -1 for each defined pitfall. These ratings are presented in Table 5. We discuss the top 3 of the concepts, striking observations of other concepts, and concepts that were rated least, as well as general observations.

Concept	Name	Priority like	Secondary like	Pitfalls	TOTAL
6	**Remember this**	**4**	**5**	**1**	**12**
3	**Smaller communities**	**2**	**4**	**1**	**7**
14	Profiling listeners	2	2	2	4
1	Instant Feedback	1	2	-	4
11	Clustering on Content	-	4	1	3

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12	Radio archive	-	3	-	3
7	Local Radio I	1	1	1	2
8	Local Radio II	1	1	1	2
10	Lively environment	-	2	-	2
13	Flexible Setup	1	-	-	2
15	Voice app	-	1	-	1
4	Switch	-	-	-	0
16	Emo scan	1	-	2	0
5	Forum	1	-	4	-2
9	Voice Control	-	-	2	-2
2	Skip the ad	-	-	4	-4

Table 5. Ratings given by the consortium on VRT concepts.

Concept 6, Remember this, received most likes. Consortium members discussed this concept allows for re-connection by the listener. It also allows creating bookmarks in radio content, which can personalize future radio experiences.

Concept 3, smaller communities, is liked as it still connects to the community feeling but also has the ability to respond to the raising niches and connects to the need for personalization. In both groups, participants recognized similarities with concept 4. As a result, concept 4 was not further discussed.

Concept 14, profiling listeners responds to an actual need, which is liked by participants. Yet some pitfalls were defined: i) privacy, a possible solution might be privacy by design: anonymisation and pseudonymisation, and ii) this concept requires manual labour, a solution can be generated automatically.

Concept 10, lively environment, will cause a better connection with listeners, as a way to understand who the radio hosts are talking to. It can contribute to visual radio, making the current television broadcasts of radio shows more interesting. It can be an incentive for listeners to send their data. This concept could be augmented with concept 1, to allow listeners to give feedback and receive results

Concept 11, clustering on content, connects to concept 10 and 12, and provides a quick win as it can be developed rather quickly. It is considered a major innovation for Marconi as it makes radio making more efficient.

For all concepts, legal issues were recognized as pitfalls. Also, pitfalls were identified that concerned the exclusive radio-on-demand function, such as the Spotify[14] model. Key to the radio experience is that allows for new discoveries, it is surprising. Is not the role of public broadcast to provide playlists.

Concept 5, forum, was considered to be too negative as it focuses on giving dislikes. The consortium members saw similarities with concept 1, instant feedback.

Concept 9, voice control, was labelled as cumbersome, i.e. it is easier to push a button. Furthermore, radio stations are a difficult, noisy environment for such technology. Concept 4, skip the ad, was rated as not feasible in a commercial context.

[14] https://www.spotify.com

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The consortium argued three services were missing from the concepts defined in the co-design workshops at VRT, i.e. a focus on 1) chatbot technology, 2) analytic services and 3) social media analysis. Therefore, NPO and SFilter focused on these services in their planned workshops with listeners, through the application inspiration cards that specifically mention examples of these services (see section 1.2.5).

2.1.2.4 CO-DESIGN WORKSHOPS WITH RADIO MAKERS AT NPO AND SFILTER

2.1.2.4.1 NPO

The co-design workshop took place on Thursday January 25 2018 at NPO in Hilversum, from 13:00 to 16:00. 8 Participants took part in the workshop (see Table 6), and were divided over 2 groups. Participants were recruited within the organisation. Each workshop aimed to mix professional radio makers with digital profiles in order to spark discussions on the application of future technology.

Nr	Profession	Radio station	Gender
P1 (Te)	Online Editor	NPO Radio1	F
P2 (Wi)	Online web editor	NPO Radio 4&5	F
P3 (Ti)	Education Coordinator Radio	general	M
P4 (Je)	Service manager Audio online	general	M
P5 (M)	Editor in Chief	NPO Radio1	M
P6 (S)	Online editor	NPO Radio2	F
P7 (Ja)	Online editor	NPO Radio1	M
P8 (W)	Online producer	NPO Radio2	F

Table 6. Overview of participants in the co-design workshop with radio makers of NPO.

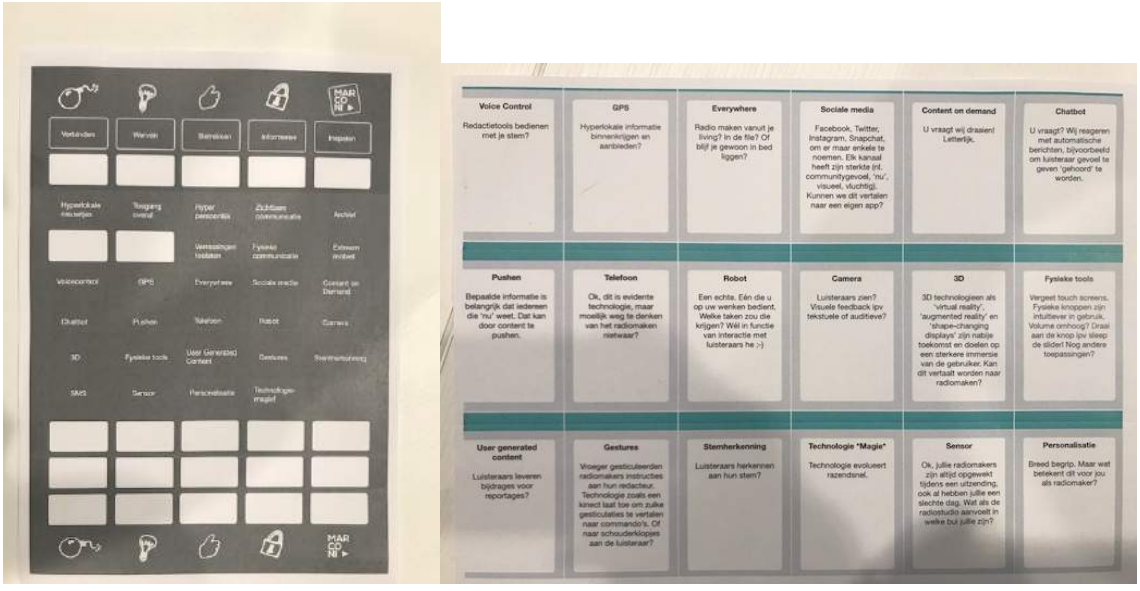

Figure 10. Sticker sheet and inspiration cards as deployed in the co-design workshop of NPO.

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Figure 11. Participants of one group are discussing solutions during the co-design workshop with radio makers at NPO.

The workshop departed by presenting inspiring applications and ideas that are interesting from the perspective of the listener (section 1.2.1.1) and can optimize the engagement between radio and the listener. Then, 'connecting' and 'involving' were selected as key words. There were hardly any frustrations concerning the current and future work practices of makers, except for the chatbot application. On the other hand, some editors saw great advantages in a chatbot in terms of efficiency and improving workflow(see concept 1, below). Personalized radio based on preferences, GPS, time of day and available time at that time were ideas that sparked discussion. Most pitfalls were named in relation to privacy legislation and legal rights regarding the content.

The following concepts were defined after analysis of the annotated maps:

1. Chatbot to answer socials

A lot of questions and remarks from listeners are received during a show but also as a show has just ended. Because another program already started no one is answering these questions anymore. A chatbot would help to serve the listeners better.

2. (Hyper) personal radio

Radio based on preferences (on the basis of data), location, time of the day and available time at that moment, accessible anywhere and anytime.

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***3. Audio** Reddit*

Similar to Reddit [15], this concept deals with a type of audio page where you can leave your interests and comments, you can rate songs and programs and you get suggestions based on your preferences.

4. Radio analyzer 4.

An analytics tool to make good analysis of linear radio but also of socials (likes, engagement, etc.) of different platforms that are connected.

5. ***One app***

One application or platform where you can upload low-threshold songs, leave your opinion, give likes and based on your input creates a 'best of' and presents it to you.

6. Blendle for Audio

A software service that serves audio, video and online editorial articles (similar to Blendle[16]) during the day, based on your preferences. A mix of personalized media services.

7. Interactive podcast

Interactive podcast where you as a user can influence the content, within a community with other users.

8. Personalised push

Personalized push notifications based on your preferences. If you like a certain band or song you get a notification it will be playing within a few minutes.

9. More Button

A 'more' button that gives you more related content around a specific item. Instead of skipping content you can get more content from the same program/singer/band/newsitem etc.

10. *Radio App with messenger/chat functionality*

A radio app combined with a messenger functionality similar to Whatsapp [17] where the standard radio functionalities and a chat sit in one.

11. Save for later

Access anywhere via one mobile app with the 'Save for later' option, or 'Remember me'. If you are listening an interesting program or item but you are not able to listen to the end, you can start listening again on a self-chosen moment.

[15] https://www.reddit.com

[16] https://blendle.com

[17] https://www.whatsapp.com

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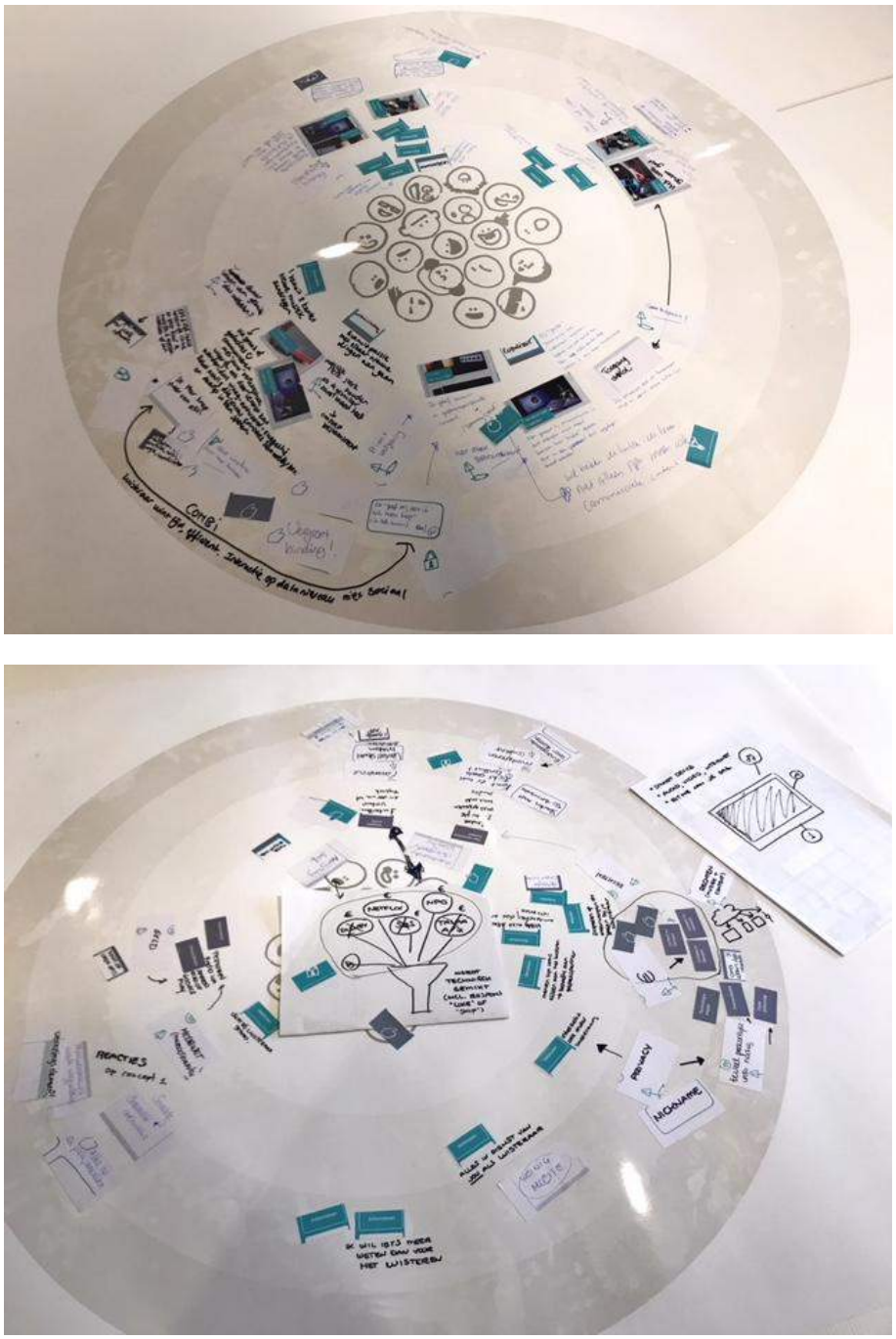

Figure 12. Maps of the workshop with radiomakers at NPO.

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2.1.2.4.2 Stadtfilter

The workshop was organised at the Radio Stadtfilter Studio in Winterthur, on January 20th, from 13.30h-16.30h. Participants were invited to join at the weekly team meetings 2 weeks before.

Nr *[18]	Profession	Radio station	Experience	Gender	Age
P1	Editor (Online)	Stadtfilter	very experienced	F	32
P2	Editor/Instructor	Stadtfilter	very experienced	F	35
P3	Editor(News)	Stadtfilter	beginner	F	29

Table 7. Participant table Radio-makers Sfilter 20.01.18

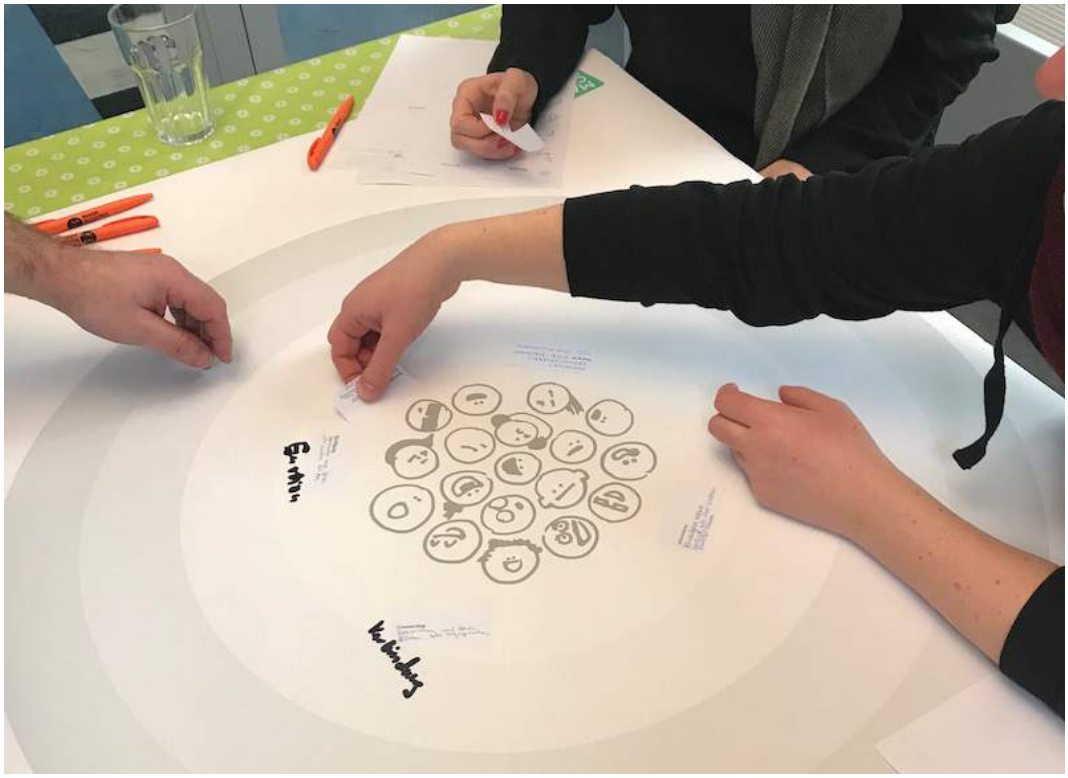

Figure 13. Radio-makers stick their labels at workshop SFilter.

The following concepts resulted from the co-design workshop at SFilter:

1. Virtual environment

Virtual Reality environment to let “listeners see through DJ’s eyes”.

[18] *P4-P6 male did not show up

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***2. Voice** controlled environment*

A potential concept is a Siri/Alexa-styled voice controlled environment for studio and listeners interface, in which listener requests can be seen/heard as a 'proposal', thereby not allowing for a total content take over by the listener.

***3. Spotify**-like services*

In particular, this concept concerned generating playlists, similar to what music streaming service Spotify[19] offers.

***4. Enhanced** podcast service*

In addition, an easy-to-use podcast service that allows for combination possibilities as in Spotify.

***5. Central** button to distribute all social content*

To make the work of radio makers easier, a central social media exchange button that could easily distribute content to all channels was discussed.

***6. User** generated content, "like" playlists and movable stacks*

The possibility for listeners to generate "like" playlists, or movable stacks with "like" functions or drag and drop functions.

***7. Content** proposal possibility*

Listeners should be able to propose content, which could be explored via a database with search functionality.

***8. Mobile** broadcast app*

A mobile studio app for outside broadcasts could have capabilities to control the music mix, playlists and social media (in order to have total control).

[19] https://www.spotify.com

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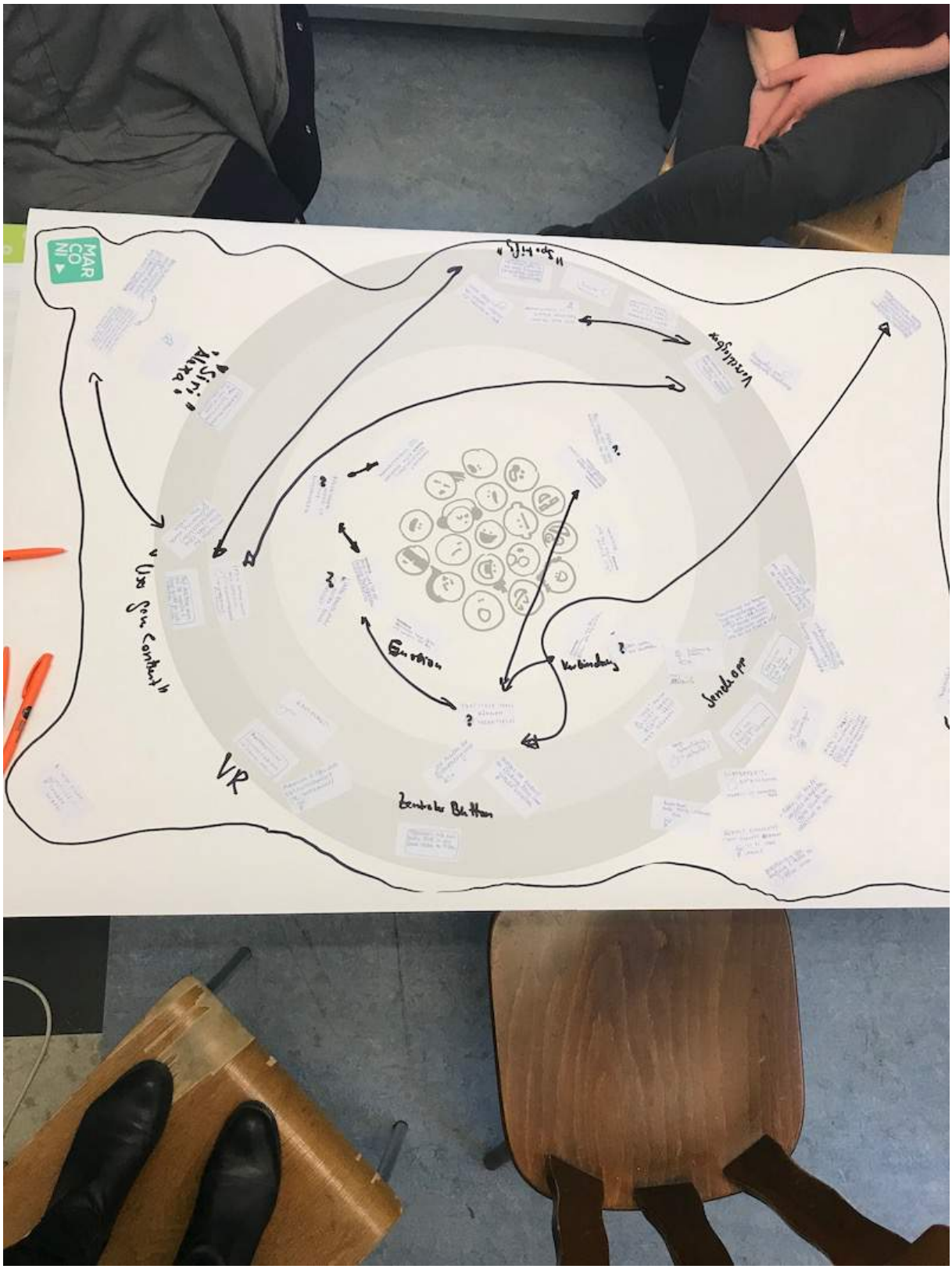

Figure 14. Map of the workshop with radio makers at SFilter.

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2.1.3 CO-DESIGN WORKSHOP WITH LISTENERS AT NPO AND SFILTER

2.1.3.1 NPO

The workshop was organised at the NPO in Hilversum, on Tuesday January 16th, from 19.00h to 22:00h. Participants were recruited via a recruiting agency in order to assure more active listeners and a mix of listeners with a critical stance. They received an incentive for attending the workshop. Listeners were mixed in terms of age, gender, interaction experience. In total 7 people participated.

Nr	Profession	Preferred Radio Station	Interacting with Radio Station	Age	Gender
P1	Director	3 FM	Phone, WhatsApp	51	M
P2	Student	FunX	Phone, WhatsApp	21	M
P3	Test engineer	Radio 1	Phone, sms	36	M
P4	Student	FunX	Phone, sms	21	F
P5	Project leader	Radio 5	Phone, website, sms	50	F
P6	Administrative	FunX	Phone, sms	22	F
P7	Actor	Radio 2	App, Phone	60	M

Table 8. Overview of participants in the workshop with listeners at NPO.

Figure 15. Co-design workshop set-up with listeners at NPO.

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In preparation for this workshop with listeners, consortium partners Pluxbox and NPO have gone through the list of MARCONI technological innovations (see annex E), and made a selection and iterated on elements that we would like feedback on: 1) remember me 2) chatbot, 3) analytic service and 4) social media analysis. Below you find the findings per element.

In general, all participants experienced radio as a "mystery"; they like that when they listen to the radio they do not have to make choices. The DJ does that for them. However, the participants also mostly agreed that they would like to give real time feedback on the DJ's show. For example, if a listener spoke for too long in the show or when the subject could not appeal to the listener. The following general concepts were defined after analysis of the discussions:

1. Remember me

A "remember me feature" that the app would memorize where the listener left the radioshow, was appreciated. However, participants indicated that they appreciated the "surprising" element of radio. If they liked music, they would look for it. One of the participants formulated it very aptly: "You know what it is: "decision making stress". We have to do more on our own, and make more decisions by ourselves. The great thing about radio is that you are not in control. [...] And when your favorite song comes up, it feels like you won the jackpot." With a forced quantitative choice, 3 of the 7 (participants) indicated that they could see something in this "remember me" feature.

2. Chatbot

The participants indicated that they prefer not to talk to a computer, but that it depends on the context. One participant said: "But if you ask a question and you get an answer, does it matter whether it is a computer?" An advantage that was seen was mainly in the context of "flaming": a chatbot can in this case ensure that not everyone gets to see hurtful tirades. Schold tirades can then be filtered out.

3. Analytic services

Most participants considered this a "far from my bed show" and indicated that it was not to be served. This can be seen in the following response from a participant: ""Imagine, you are super sad and such a device "thinks" it understands you and what you would like to hear, who would really appreciate that?" Another participant underlined this with: "Ok, it does not matter. I already hate that facebook. That he knows what I've been looking for on google." In general terms, the participants do not want the computer to decide for them in an intervening way.

4. Social media analysis

Most participants did not think this was a good idea. One participant said it as follows: "But [...] why would the radio do the same? That has to do with Facebook and Spotify, not with radio".

In conclusion, participants found it partly difficult to be open to new technology. They think radio is something beautiful and do not want to change that too much. The participants indicated that of the four elements mentioned the 'remember me' option was 'the least bad'. The workshop has not delivered particular use cases but we have some practical implications we can take into account.

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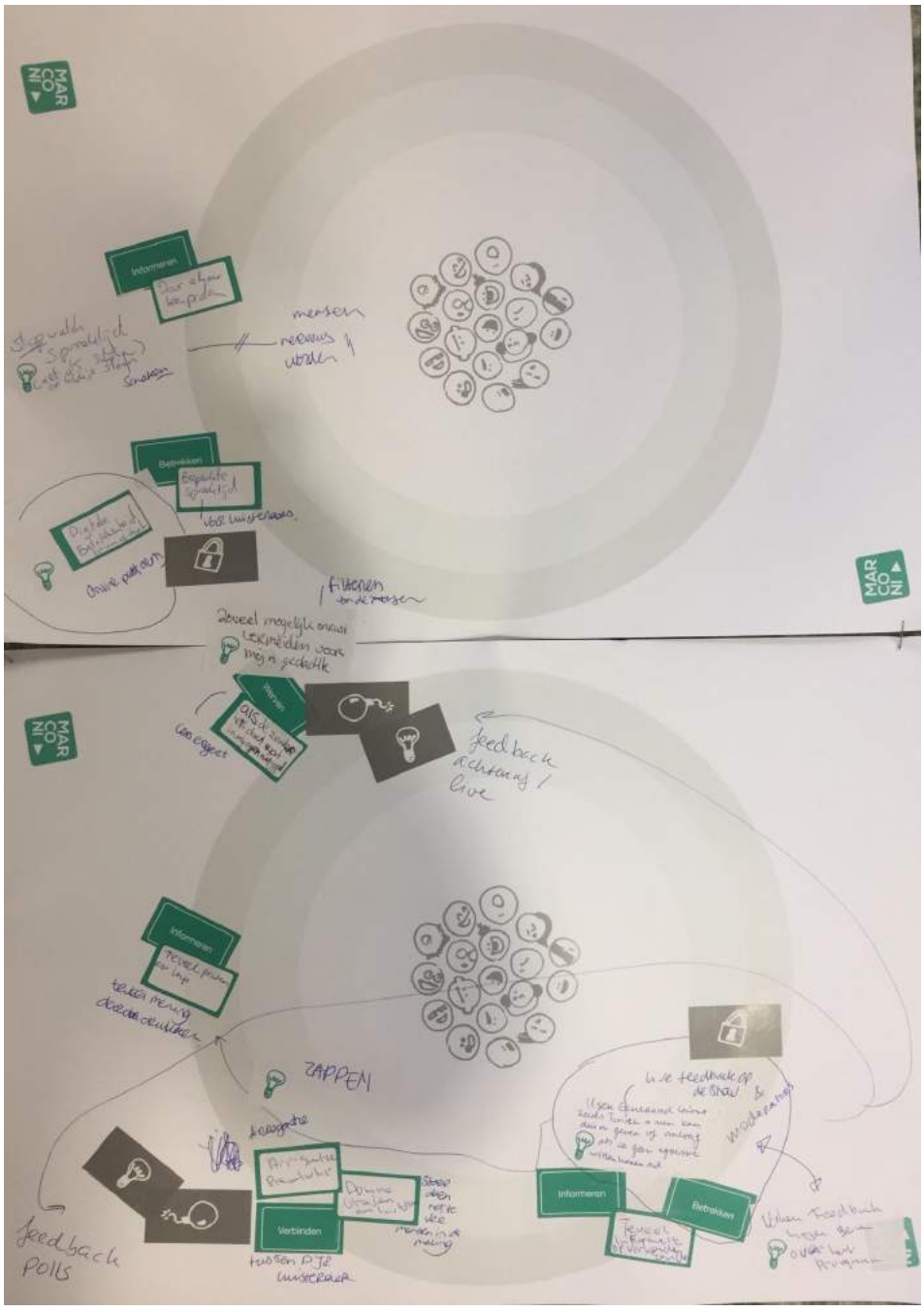

Figure 16. Maps of workshop with listeners at NPO.

2.1.3.2 STADTFILTER

The workshop was organised at the Radio Stadtfilter Studio in Winterthur, on January 28th, from 13.30h-16.30h.

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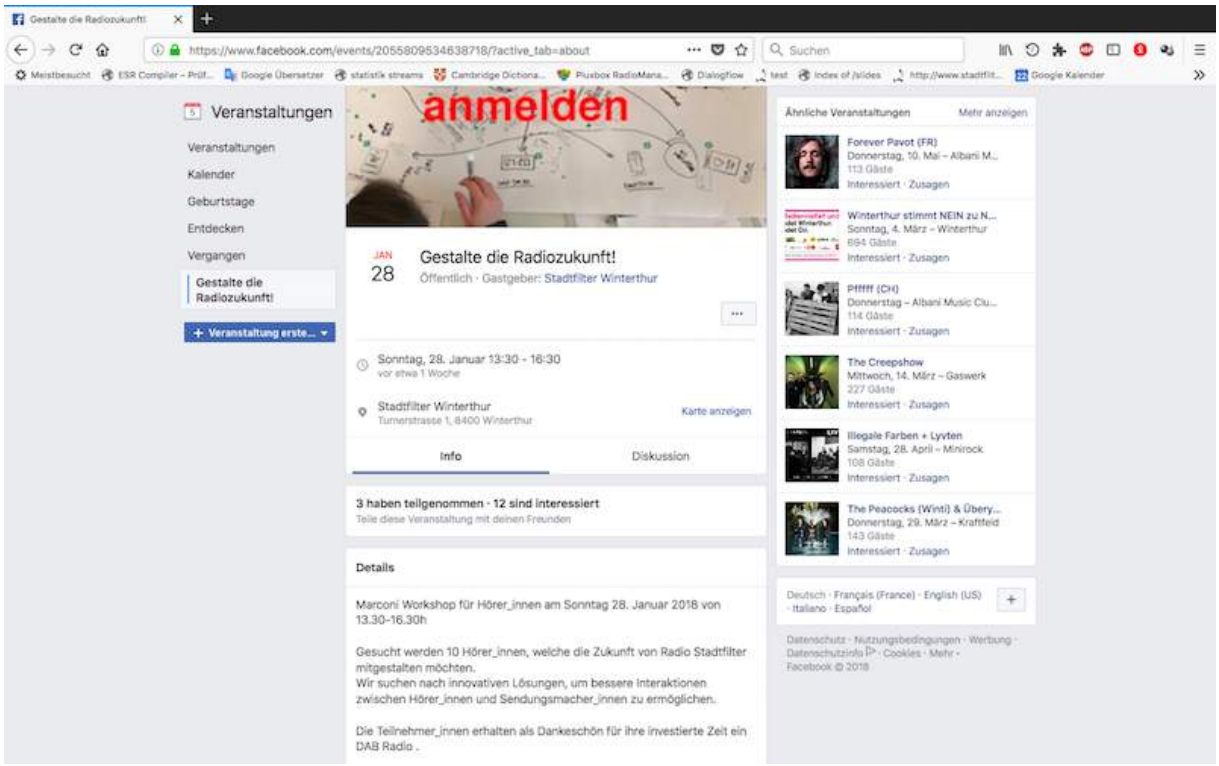

Figure 17. Screenshot of Facebook call to recruit participants for workshop SFilter.

Participants were invited to join by newsletter, website and facebook event. Confirmation followed by email. Every participant received a DAB radio as incentive.

Marconi Workshop für Hörer_innen am Sonntag 28.01.18 13.30-16.30h
Gestalte die Radiozukunft als aktive Hörer_in von Radio Stadtfilter mit:

Gesucht werden 10 Hörer_innen, welche die Zukunft von Radio Stadtfilter mitgestalten möchten.
Wir suchen nach innovativen Lösungen, um bessere Interaktionen zwischen Hörer_innen und Sendungsmacher_innen zu ermöglichen.
Die Teilnehmer_innen erhalten als Dankeschön ein DAB Radio für ihre investierte Zeit.

Anmeldungen für den Workshop an kai.brenner@stadtfilter.ch bis 25.01.2018

Invitation text for Facebook, Website and newsletter in German.

Number	Profession	Age	Gender
P1	software programmer	42	M
P2	facility manager	51	M
P3	student of media and communication science	21	F
P4	allrounder	41	F
P5	designer	25	M

Table 9. Participant table Sfilter.

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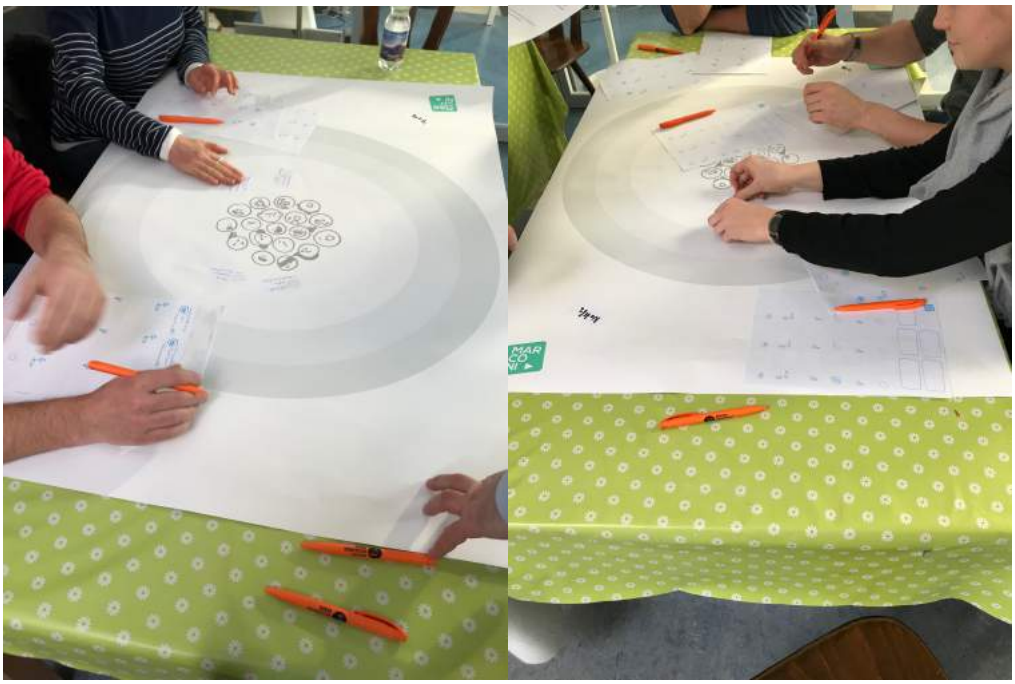

Figure 18. The two groups at their table of workshop at SFilter.

In general, we learned how radio is perceived as a 'cinema in the mind, as a 'land of discovery' for new music, or as a news and information source with background information.

Frustrations were: i) there are no possibilities to skip non-liked music or trailers, ii) presenters that are compulsively funny and iii) bad selections of music or bad DJs.

Then, the following concepts with their (potential) pitfalls were defined:

1. ***3D-Sensors user/listener experience***

Sensors can "feel" the mood of the listener and propose music. 3D Sensors react on movements like dancing to the played music and influence playlist creation. The application uses also swarm mood to create new playlists.

- Pitfall: This concept was intensively discussed and because of the possible severe problems with the general data protection regulations (GDPR) not followed up.

2. *Siri/Alexa style voice controlled environment*

A simple voice controlled environment as an easy to use radio experience.

- Pitfall: Participants see a problem in the data maintenance and security of collecting user profiles.

3. *Spotify Services ("pick rosines")*

   Spotify-like services to build user generated content. More than one station can be chosen for content selection, so a collection of different shows of different stations is possible.

- Pitfall: Participants see that the spontaneity of radio gets lost. Users have to "work" first to get their wanted content and can get lost in surplus.

4. *Social media central all channels go to the studio*

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No matter what social channel a listener will use: all will end up in the studio and will be answered back on that selected channel.

- Pitfall: Participants see the possibility to get spammed with useless irrelevant information.

5. *Social media central with a forum for listeners*

Listeners should have forum possibilities with input also via social media channels.

- Pitfall: Participants mentioned that a forum has to be moderated and so more human resources are bound.

6. *Chatbot enhanced*

A chatbot that gives answers not only about actual content but also gives links to archived content and/or podcasts relating to that request.

- Pitfall: Participants saw no pitfalls on a chatbot; they pointed out the easy-to-use technology

7. *FCW*

A listener will be notified on his mobile when there's new content live on-air based on her/his preferences (e.g. football). By clicking "YES" the listener will listen to the on-air live stream. If listener ends listening to the stream, a second notification informs the listener if he/she wants to get a podcast link of that content. If the podcast is played to the end, the application switches automatically to the on-air live stream.

- Pitfall: Participants regarded this application as interesting but as the fact it is app based is considered not suitable for "real" radio listeners.

Figure 19. Maps with annotated results from the co-design workshop with listeners at SFilter.

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2.1.4 IN-GROUP ANALYSIS

On February 1st, VRT, SFilter and Pluxbox met at NPO in Hilversum, the Netherlands, to discuss and group the findings of the different workshops using affinity diagramming[20]. Such research triangulation[21] contributed to the validation of the concepts. Furthermore, each media partner brings in their own technical and strategic perspective. In this workshop, each media partner first presented the concepts that resulted from the workshop (i.e. NPO, SFilter and VRT), and annotated them in a visual way on a post-it (see Figure 20). Then, we labelled the post-its thematically, and redundant concepts were put aside. We used this labels as categories and distributed the post-its accordingly (see Figure 21). Again, several concepts were found to be redundant and put aside.

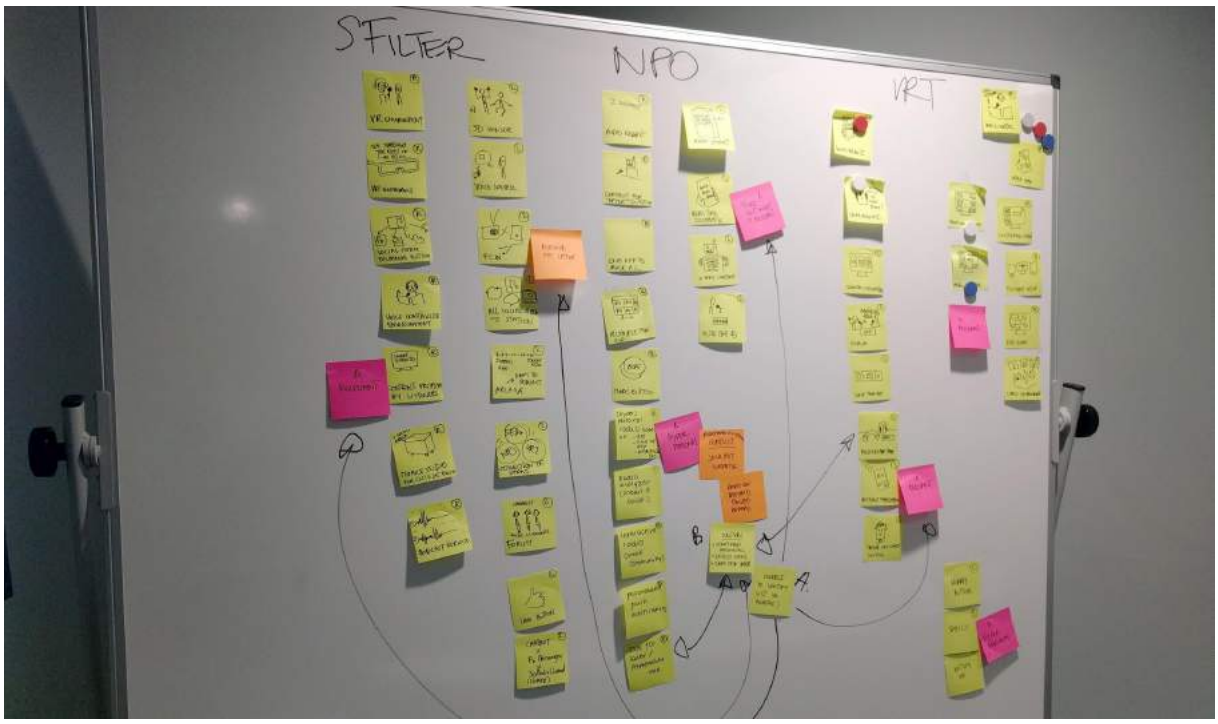

Figure 20. Overview of the concepts on post-its at the beginning of the group-analysis.

Finally, we ended with 8 overall categories that form the basis for our use cases (see Section 2. “MARCONI use cases”), of which the following 5 categories serve a specific user goal:

A **Facilitating relevant feedback**: Several concepts (i.e. instant feedback for users & real-time feedback for radio makers, content proposal from users, mute the DJ, chatbot) concerned the need to understand the listener, and to find out what is relevant at a certain moment.

B **Co-creating content**: Three concepts (i.e. forum, podcast-archive, local radio) further built upon this need to understand the listener by allowing him to co-create radio items or compose their ‘own’ radio show.

C **Allowing personal services for listeners**: Other concepts (i.e. remember me, start from the beginning, personal radio based on GPS, time of day and time available, mood,

[20] Beyer, H., & Holtzblatt, K. (1999). Contextual design. interactions, 6(1), 32-42.

[21] Denzin, N. K. (2012). Triangulation 2.0. Journal of mixed methods research, 6(2), 80-88.

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The Daily, FCW, switch functionality, personalised push, notify me) focus on creating personalised radio experiences.

D **Providing content on demand for listeners and radio makers:** Several concepts (i.e. podcast service, chatbot for linked archive, clustering content, 'more' button, local radio) focused on the ability to filter content.

E **Feeling part of a community**: Some concepts (i.e. interactive radio, interactive podcast, smaller community, forum with listeners, lively environment) were concerned to protect radio as a collective experience, and proposed solutions to strengthen this community aspect.

and the following 3 categories that are more generic. These categories support or guard the general radio experience:

F **Technology**: Several concepts (i.e. voice controlled environment, chatbot, voice control-call listener, voice app) did not focus on a particular user goal but instead elaborated on the possibilities of technology, such as AI, voice control and chatbots.

G **Tooling in general**: Other concepts (i.e. radio analyser, clustering content, profiling users) described functionalities of particular tools that could help users in reaching a particular goal.

H **Essential aspects**: One concept highlighted how the surprise element is key in radio experiences, which is an aspect that should be respected in all use cases.

In the following chapter ("2. MARCONI use cases"), we present 4 scenarios based on category A, B, C and D. Aspects of category E are integrated in scenario 1 and 2. The general aspects of category F, G and H are interwoven in the 4 scenarios.

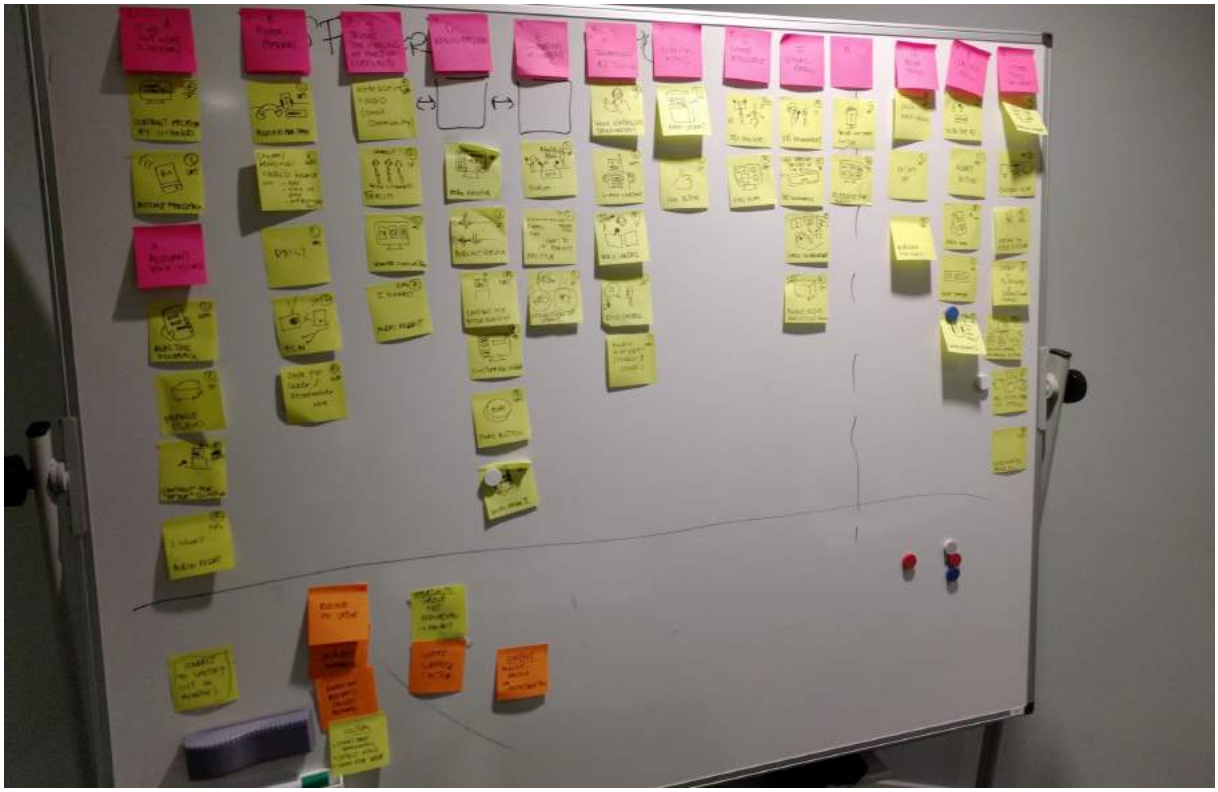

Figure 21. Overview of the categorized concepts at the end of the group-analysis exercise.

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3 Use cases

3.1 Scenario 1: Facilitating Relevant Feedback

3.1.1 AS A SERVICE FOR THE EDITORIAL TEAM

Every year, during the week before Christmas, a week-long 24/7 radio event is organized. This radio event takes place outside, in a custom studio setup. Many people are invited to be interviewed live on radio and a lot of interaction is done with listeners.

Linde is the radio presenter for the following three hours of this radio event. She puts herself behind the presenter's desk and **swipes through the rundown of the next hour (UC-1.1).** For every group of listeners that is invited to talk about an event they organised, **a separate item is displayed in the rundown (UC-1.1)**. When she clicks on a item, she can see **more information on that group, along with media (UC-1.2)** that's been sent in by them using the radio station's app.

Sien, the editor for the next three hours, prepared this rundown based on sent-in content. For every good story that is submitted through the radio station's app, **she creates an item at the appropriate slot of the radio show (UC-1.3)**. Moreover, she is **able to approve or reject sent-in media (UC-1.4)** directly. When a piece of content is approved here, it can be used by any subsequent by-product (e.g. television, social media, public screens). The studio is equipped with several screens, **showcasing user-generated content (UC-1.5)** during the radio show. The content on these screens also **adapts to which users (of the radio station's app) are in front of the microphone (UC-1.6)**. When available, approved content sent in by that particular group is displayed.

During next hour, Linde requests listeners to **submit messages via the radio station's app (UC-1.7)** concerning the current subject. Sien follows up responses using the editor app. Before letting anyone call into the show, the editor asks some more detailed questions. Luckily, the MARCONI app got her covered: **it automatically analyses incoming messages and tries to derive the context (UC-1.8).** Based on this context, **the app suggests a couple of automated responses (UC-1.9),** which Sien can simply click to send. If these responses are not sufficient, also pre-programmed responses by the editorial team (such as 'Thanks!' or '😊😊😊') are offered, as well as the ability to **send a custom message (UC-1.10)**.

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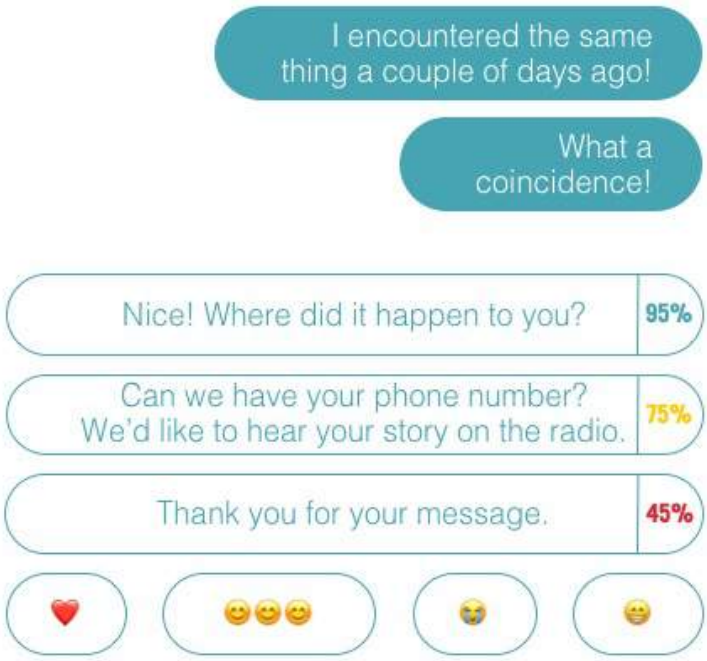

Figure 22. Mock-up of MARCONI chatbot interface.

Later during the show, a listener sends a message to the radio station via the app. MARCONI **recognizes some relevant keywords (UC-1.11)** in this message, including the subject of the current radio show and the places Linde talked about the last hour. Therefore, Sien is **notified of this message with a smart alert (UC-1.12)** in the MARCONI app. She decides it would be interesting to have a quick phone call with that listener to elaborate a bit more on live radio. She taps the **'Request phone number' button (UC-1.13)** in the MARCONI app, which automatically sends a message to that listener with the question to respond with his/her telephone number to talk about his/her story on live radio. A couple of moments later, the listener answers with his phone number. Because **MARCONI has been integrated with the telephone system (UC-1.13)** of Studio Brussel, Sien can tap the phone number and choose 'Call'. This sets up a call with the listener, using a third-party solution (Phonebox, Skype, Telos,...). After a brief conversation, Sien puts the listener through to Linde, which has a nice conversation on air. The conversation went well, in fact, Sien decides this could be a useful contact for future radio shows. Within the MARCONI app, a button popped up next to the phone number which reads **'Request permission for future use' (UC-1.14).** She taps this button. This initiates an automated conversation with the listener, which **automatically asks him for permission to save his phone number for future use (UC-1.15)**. If he accepts, this is reflected in the personal settings of the app as well.

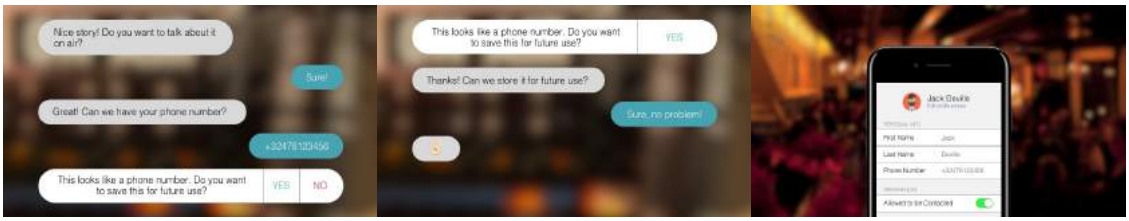

Figure 23. Three mock-ups of MARCONI chatbot interface.

3.1.2 AS A SERVICE FOR THE LISTENERS

Lisa is an enthusiastic follower of the radio show and the main platform she uses to get in touch is Facebook. This makes **Facebook Messenger (UC-1.16) her first choice to keep in**

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touch with her favourite radio station. Lisa considers the radio station's messenger account her buddy who enriches her life.

Lisa is a big fan of De Dijk and she is constantly following them on tour. She participated in a contest by the radio station last week to win tickets to their big show tomorrow but was out of luck, she didn't make it to the final. **The radio stations' bot remembered her interests (UC-1.17)** in the band§, and while still at work, she **receives a message from the radio station (UC-1.18)**. The message reads that the first 100 people who respond to the message with a unique and correct song title of the band are invited to an exclusive live set tonight, as a promotion for their show tomorrow. She responds immediately and is just in time to secure the last duo ticket for tonight.

Her victory enhanced her mood for the afternoon and she is in for a nice tune during the last two office hours of the day. She opens her web browser and navigates to the station's website. She logged in via Facebook the last time she visited it and, based on her preferences, **starts playing the live stream right away (UC-1.19)**. At 2PM, presenter Egdon just started his show and requests listeners to send in their favourite barbecue background music. Lisa navigates to the browser tab of the radio station, **clicks the 'Submit BBQ song' (UC-1.20)** button that just appeared and submits her favourite. She also adds a small comment along with it. A couple of minutes later, she receives a message in Messenger from Gerard Ekdom. He likes her song and her story behind it, and asks her if she'd be interested to tell it on live radio. She agrees and a call is set up to tell her story.

Lisa is on her way to the radio event to go watch the show live. While she's in the car, she remembers a live performance of a song she heard sometime last week during the evening show. She likes it a lot but forgot the artist and title. When she arrives at the event site, she takes out her smartphone, and opens Facebook Messenger. **She starts a conversation with the radio station and types** in: 'What was the acoustic song that was performed live last week during the evening show?' **(UC-1.21)**. **She gets a prompt response** with the question 'Hi Lisa! Let me check that for you. Was it a male or female voice singing, or was there no singing altogether?'. She answers 'Definitely a male voice'. The station's bot responds 'We found two possible matches. "Ed Sheeran" performed "You need me man, I don't need you" last Thursday and "Damien Rice" played "Volcano". Tap this message to **get a preview of both performances (UC-1.22)** to check whether the song you're looking for is among them'. Lisa taps the message, listens to the first preview and finds out this is the song she was looking for.

Later that week, Lisa is listening to an alternative radio show in the evening. She hears a band that she listened to when she was a teenager, i.e. Gggroup X, which is not played on the radio often. She **opens the chatbot on the radio station's website (UC-1.23)**, and types "Is there more information on Gggroup X?" she writes and gets the following response: "Thanks for your question. We did an interview with the lead singer a year ago. Listen to it here." Erna clicks the item and starts listening to the interview. During this interview, the lead singer also talks about another band of her young years, K. After listening to this interview, she wants to know if there is also content about her favorite band K. She uses the chatbot and types "is there also stuff about K?". The chatbot responds: "I' am sorry, but I haven't found anything relating your subject! Would like us to create a new topic about it? Lisa types "Yes" The chatbot responds "Thank you for your feedback. Would you like to get informed when we have a radio item about K? **Please log in to your MARCONI profile (e.g. using Facebook)" (UC-1.24)**. The chatbot displays buttons on which Lisa can enter her choice. She clicks MARCONI profile. Later on, editor Karla puts an item on band K on the agenda of next music editorial meeting, which is planned for next week. Lisa is **notified about this forthcoming item one day beforehand (UC-1.25)**. Lisa is a happy listener as she feels taken seriously by her radio station.

MARCONI uses the insights of the chatbot to better respond to the questions and needs that live with the listener. **Training of the chatbot** improves the interaction with the listener (**UC-1.25).**

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3.2 Scenario 2: Co-creating content

Jan is the presenter of an informational radio show on the national radio station of Belgium. This show attracts thousands of listeners each morning. An important asset of the show is listener interaction: e.g. listeners requesting for feedback on a certain topic, or respond to polls on current topics, and presenter call domain experts for comments. Interaction is supported via several platforms such as e-mail, sms, Facebook, Instagram and the radio station's smartphone application.

Each of these platforms has its own interface. As a result, radio presenters and editors need to switch between several screens and/or browser tabs, which is an inefficient and frustrating way of working. Luckily, MARCONI offers a solution: Jan opens the **unified interaction interface (UC-2.1)** of the MARCONI editorial app. The relevant platforms for his radio show are loaded into view. Jan had **pre-defined these relevant platforms (UC-2.2)** a few months ago. Most listeners contact him via e-mail, so they are **automatically connected to his radio show (UC-2.3) and added to the live feed.** He does not often use photos, but for the item in his show today, he requests listeners to send in pictures of traffic safety examples in Brussels. In the "Sources" panel of the MARCONI editorial app, he enables the app and **filters for pictures of streets, geotagged (UC-2.4)** with Brussels. Incoming pictures are automatically filtered and added to the live feed view. Jan starts a conversation with one listener who sent in some very interesting pictures, and labels the pictures appropriately to use in a discussion on the next day.

After his show, at 10AM, Jan starts to prepare for the next show by **creating a new label for his item (UC-2.5)**. He then uses the MARCONI editorial app to look for listeners who can most probably contribute valuable input for this story. Listeners are classified by properties and given an animal category based on these properties. For his item about the traffic safety in Brussels, Bert looks for people with an informed opinion, writing skills and interest in mobility. After some searching, he finds these properties are found most for people with the Owl category **(UC-2.7)**. First, he opens the 'Announcements' tab, and clicks the 'Create new' button. He **adds an internal description (UC-2.6)** for the editorial team, and an **external message (UC-2.8)**, which the listeners linked to the Owl profile will receive. **He schedules the post for 12PM (UC-2.9)**, because most people have a midday break then and the hoped outcome is possibly largest around that time.

Listener Bernd receives such an external message via the app of the radio station on his smartphone: "Give your opinion on the traffic safety issues". Bernd opens the message and sees a text field that fits 280 characters. In this field, Bernd reads "What's your opinion?", which is the default message. Bernd types that there is a news article that predicted these traffic problems half a year ago, and posts the link to the article.

The next morning, the debate on traffic safety continues as new accidents occured. **Bert creates a new, filtered feed of live incoming messages (UC-2.10)** from people with the Owl profile or messages containing 'traffic', 'accident' and 'Brussels' as well. **He marks relevant messages with the label he created before (UC-2.6)**.

Around 1:30PM, he opens the Announcements tab, where a **new, filtered feed with answers to his Announcement (UC-2.11) was automatically created**. He picks some relevant answers, and **goes into conversation with these listeners**, asking for more comments and quotes. He also **labels the most interesting responses (UC-2.5)**.

During the compilation of this story, he remembers a video sent in a couple of weeks ago relevant for his story. Bert **opens the search field of the MARCONI editorial app (UC-2.12)**, which he uses to search the whole Audience database for messages. He types some keywords he can remember to identify the video: 'video of largest traffic jam at Meiserplein in Brussels in December 2017'. **He finds two relevant videos** and hovers over the first one, which

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enables him to scrub through it quickly. Using this method, it turns out the video he's looking for is the second one. He clicks it, which opens the conversation, in which he can find some more context. He uses this conversation to get a quote to go along with this video.

His story has two derivatives: one radio item in the evening, and one article on the website. Bert opens the MARCONI app and **goes to the label he created (UC-2.5)** at the start of collecting assets for his story. There he can **find all relevant messages, photos and videos, categorized by type, user and content (UC-2.13)**. For the radio item, **he starts dragging the items in the show's rundown (UC-2.14)**, which is automatically synced with Pluxbox RadioManager. For the article, he drags the items in the website editor, in which he can do additional formatting and add additional text in-between. After he's finished, he can **publish this to the radio station's website (UC-2.15)** in one click. Because he has a precise overview of every listener which helped co-creating this article, **he sends a link to the finished work to every one of these users (UC-2.8).**

3.3 Scenario 3: Allowing personal services

Robin likes to listen to news and informational shows. She likes to get a regular news update however she finds it frustrating to get the same news over and over again. She would love to listen to the latest news update and other topics she is interested in at times when she can give full attention, e.g. when in the car. When Robin is in work modus, she wants to listen to music.

To fulfil this need she recently encountered a **new MARCONI app where all the public radio stations are easily accessible (UC-3.1).** She is curious and downloads the app. When the app opens she can **choose between several radio stations (UC-3.1)**. As she is fond of Radio1, she clicks the logo and enters the linear broadcast. In screen, she **gets information about (UC-3.2)** the show (playing now), items (or songs) that are coming up, and relevant news articles from the Radio1 website. **She can start to listen immediately (UC-3.3)** or **log in (UC-3.4) and add some preferences (UC-3.5).**

She starts to listen to the linear program. When a news update starts she has to leave for work. She clicks a **button "save for later" (UC-3.6)**. She is given the option **to create her own personalized stream (UC-3.7)**, where **daily relevant show sections are combined in a personal radio program for Robin (UC-3.8).** For now, she just wants to listen to the latest news update.

When she gets in the car, **the app knows she has changed location because of the connection her mobile phone makes with the car (UC-3.9)**. The **app asks (UC-3.10)** if she wants to listen to the latest news update now. She can **click and start listening immediately (UC-3.3)**, **abort (UC-3.11)** or **let the app start within 20 seconds automatically (UC-3.12)**.

She listens to the news update. Since she added only one item in the personal radio program, **the app switches to the linear broadcast (UC-3.13)** from Radio 1 after the update is finished.

Unfortunately, she enters in a commercial break. But when looking at the screen she sees another topic of interest about Sports. As Robin is a big skate fan and the Olympics are coming up, she is interested in what Sven Kramer (famous Dutch skater) has to say. **She taps on 'the Sports Program' (UC-3.14)** and **the fragment with Sven Kramer starts to play**. As she is a first-time user of the app, a **playlist is generated with similar topics (UC-3.15)** so Robin can stay tuned. Here she also has the option **to add and like show fragments in order to make the update more relevant (UC-3.16).** This **playlist can be saved (UC-3.17)** as well of course so she can check back on the items she likes anytime she wants.

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Robin keeps listening to Radio1. When she is at work, a news update is dedicated to a Blue Blood Moon that will appear that night (as she already indicated she is interested in science in her preferences). Robin gets **a notification 5 minutes before with the message that Radio1 will elaborate about this phenomenon (UC-3.18)**. She grabs her earbuds, goes to the MARCONI app on her laptop and listens to the news update as a break from work.

After lunch, **at 1PM** Robin opens the app on her mobile. **The app asks her if she wants to listen to the latest news update now or later (UC-3.3)**. She taps 'later', because she wants to relax a little. So she listens to the Radio1 live broadcast and **when the news update starts, she gets music instead**.

When she drives home at 6PM she opens the app again and the latest news update starts immediate. She had a nice day because she could use Radio 1 as a companion to inform and relax her at the time she needed it.

3.4 Scenario 4: Providing content on demand

Jill wakes up in the morning and likes to listen to the radio for the latest new update. After activating the app she asks Alexa **please turn on the radio (UC-4.1)**. Alexa says "Hello! Welcome to the MARCONI App. Ask me who or what is currently playing on MARCONI radio, or ask me to play a radio channel. **A radio show starts to play (UC-4.2)**

On the way back in the afternoon Jill likes to listen a radio station with more alternative music in her car. She opens the app in Alexa and asks the Alexa app to **turn on a particular radio station,** i.e. NPO 3FM **(UC-4.3).** She hears quite a good song and asks '**What's the name of this song**' **(UC-4.4).** Her car **answers** 'This is 'Scheef' from 'Eefje de Visser' **(UC-4.5.**). **Do you like to add this number to your music list?** Jill says 'Yes' and Alexa adds the number to Jill's personal music list **(UC-4.6.)**. Jill now wants to **switch to another radio station** and asks Alexa to turn on NPO Radio 1 (**UC-4.7)**. She likes to know **which program is playing** and she asks 'Which program am I listening to?' It turns out to be 'De Nieuws BV' from broadcaster BNNVARA, presented by WIllemijn Veenhoven and Patrick Lodiers (**UC-4.8**).

Jill likes to listen to 'De Nieuws BV' but not right now. So she says to Alexa '**Please save this program to my 'listen later list'.** To listen to this list Jill can say to Alexa, go to my 'listen later list'. This is possible to activate from every device where Jill is logged in with her Amazon Alexa account (**UC-4.9)**.

Later that day, Jill is listening to a show on a different radio station. Everyday listeners are asked for their opinion on a certain statement. Today it's 'Military service is good for youngsters and for society in general. Do you agree or not?'. Jill missed the statement introduction at the beginning of the show and asks Alexa **'What is the statement of today?' (UC-4.10).** While answering Alexa also asks Jill **'do you want to give your opinion on this matter?'**. Jill says 'Yes' and Alexa asks if she agrees or disagrees with the poll. Jill agrees and Alexa sends her opinion to the show **(UC-4.11)**.

On Christmas day and the Top 2000 is playing on NPO Radio 2. Jill asks Alexa to **put on Radio 2** with the Top 2000. She asks Alexa '**who is the number one this year?**'. Alexa answers 'its the same as last year: Bohemian Rhapsody from Queen'. Then Jill asks **'Where are we in the list at the moment'** and Alexa answers 'It's number 471 which is playing right now'. Jill also wants to know **how often Adele is in the Top 2000**. It turns out to be 6 times, with the highest rating on 27. Finally she likes to know **which DJ is presenting** right now and Alexa answers 'Gijs Staverman' **(UC-4.12).** Jill says **'please let Gijs know I think this is a fantastic song'** and Alexa sends the note to the studio. She asks 'do you want to **add this**

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number to your personal music list' and when Jill gives a positive answer it's added to her spotify list (**UC-4.13)**.

3.5 Overview

Use Case	Description
	Scenario 1 - Focus on Editors
UC-1.1	Editing/consulting a rundown list from external app (e.g. RadioManager)
UC-1.2	Presenting additional information (e.g. from API) that are connected items of the rundown
UC-1.3	Adding items to a rundown
UC-1.4	Approving items (e.g. user-generated content) in rundown
UC-1.5	Output items (e.g. user-generated content) on displays
UC-1.6	Recognizing user profiles
UC-1.7	Submit items via app
UC-1.8	Analysing items
UC-1.9	Automating suggestions based on analysis
UC-1.10	Providing the ability to type custom messages
UC-1.11	Recognizing words in incoming messages
UC-1.12	Notification when receiving messages/items of listeners
UC-1.13	Pre-programming buttons
UC-1.14	Integration with telephone system
UC-1.15	Send notification to 'Request permission for future use' to listeners
	Scenario 2 - Focus on Listeners
UC-1.16	Providing option to login with Facebook
UC-1.17	Save interests in profile
UC-1.18	Notification when receiving messages/items of radio station
UC-1.19	Play live stream
UC-1.20	Providing option to react on radio item
UC-1.21	Chatbot integration in Facebook messenger of radio station
UC-1.22	Pushing snippet/preview of radio items

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UC-1.23	Chatbot integration in website (for anonymous use)
UC-1.24	Providing option to login with MARCONI/radio station profile
UC-1.25	Allowing to time schedule notifications to listeners
UC- 1.26	Training of the chatbot
Scenario 3 - Co creating Content	
UC-2.1	Combine platforms in one app
UC-2.2	Pre-define platforms to combine
UC-2.3	Link incoming messages of listeners to radio shows
UC-2.4	Link geolocation to incoming messages
UC-2.5	Labelling items
UC-2.6	Allow label to be described
UC-2.7	Link label to categories
UC-2.8	Push messages to listener profiles within one category
UC-2.9	Allow to time schedule push messages
UC-2.10	Create feed of incoming messages
UC-2.11	Announcements
UC-2.12	Function to search incoming messages/items
UC-2.13	Categorizing incoming messages by type, user and content
UC-2.14	Drag items in app (e.g. RadioManager)
UC-2.15	Publish on website
Scenario 4 - Allowing Personal services	
UC-3.1	App that clusters access to radio stations
UC-3.2	Provide information about radio stations
UC-3.3	Provide function to listen live
UC-3.4	Provide function to login
UC-3.5	Provide function to set preferences
UC-3.6	Provide function to save radio item
UC-3.7	Allow to create personal (linked to profile) radio station
UC-3.8	Combine radio items
UC-3.9	Track location

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UC-3.10	Push suggestion of radio item
UC-3.11	Provide function to abort app
UC-3.12	Allow radio item to start automatically
UC-3.13	Switch to broadcast
UC-3.14	Provide function to select radio items
UC-3.15	Compose playlist based on profile
UC-3.16	Provide function to like radio items
UC-3.17	Save playlist
UC-3.18	Connect notifications to profile
	Scenario 5 - Providing Content on Demand
UC-4.1	Develop an app /skill for Alexa/google home
UC-4.2	Activate the radio + play the current show
UC-4.3	Activate a particular radio station (recognising stations)
UC-4.4	Analysing items (recognising songs)
UC-4.5	Automating suggestions based on analysis
UC-4.6	Add songs to a personal playlist (integrate in spotify)
UC-4.7	Switch radio stations
UC-4.8	Analysing items (recognising programs)
UC-4.9	Save for later / Listen later list
UC-4.10	Recognise spoken words
UC-4.11	Providing option to react on item
UC-4.12	Analysing items (position of a song/which DJ)
UC-4.13	Save interests in profile

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4 Requirements

Based on use cases described in Chapter 2, we deducted and defined the (technical) requirements for the MARCONI platform. Subsequently, we grouped these requirements by purpose, as outlined below. First, we focused on the editorial side by defining the editorial app for the radio editors and the lively environment of the studio. Thereafter, we targeted the end user experience of the listeners, both live and on-demand. Lastly, we outlined the (back-end) services needed to implement the functionalities that we described for editors and radio listeners.

4.1 A front-end app for radio editors

Radio editors will need a front-end app for managing their radio shows. They will need to be able to **create a new rundown for their show and add items (R-1.1)** to this rundown from several (third-party) sources. Therefore, this app needs to be able to easily **display content from third-party sources (R-1.2)**. Moreover, editors should be able to **approve or reject incoming user-generated content (R-1.3)** with this app. Other **third-parties will need to be able to integrate their services with this app (R-1.4)** as well (e.g. requesting approved photos to display in an external app).

As some conversations will be taken over by semi-automated bots from time to time, editors will need an **interface for configuring a conversation flow (R-1.5)** (e.g. asking for a phone number).

To follow up on incoming messages from different platforms and to respond to these messages in a universal way, the editorial app will need to feature a **unified feed of incoming messages (R-1.6)** and a **conversation interface (R-1.7)** to easily send text and media back to the user. An editor will need to be able to **configure this unified feed (R-1.8)** as well: with a functionality to enable or disable certain sources and to apply a filter (e.g. certain item types or text filters).

Organizing content will be achieved by offering an **extensive 'Google-like' search interface (R-1.9)** and by defining labels and subsequently attaching them to content. An editor needs to be able to **create such a label (R-1.10)** (e.g. a label for an item about traffic safety that will be aired during the next episode of a radio show). After creating a label, he needs to be able to **attach this label to any type of content (R-1.11)**. During the compilation of relevant pieces of content for a story, he has to be able to quickly **get an overview of content attached to this label (R-1.12)**.

This app needs a **section for managing users (R-1.13)**. Editors should be able to **select some characteristics of users (R-1.14)** (e.g. interested in rock music, likes live concerts), and **group users matching these characteristics (R-1.15)**. For such a group, certain **actions will need to be provided (R-1.16)** (e.g. create and send a general message).

4.2 Lively environment in the studio and online

Sent in content (photos and videos) are extensively used by the radio station in the studio as well as online. To achieve this, the studio requires screens that are able to **display approved user-generated content (R-2.1)**. Moreover, the **radio studio should be equipped with iBeacons (R-2.2)** in order to detect which people (using the radio station's app) are present. This location information will be used to **adapt the content displayed on the studio's screens**

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(R-2.3): content from people who are present are subtly featured marginally more than someone who is not there.

4.3 Live functionalities for listeners

During a radio show, MARCONI will provide opportunities for live interaction. To achieve the basic functionality of sending messages to a radio station and receiving (personal) responses back, users should be able to authenticate with the MARCONI system using an account of their choosing. This could be provided by using a **general OAuth implementation (R-3.1)** (e.g. with Facebook). Beyond logging in, it's our aim to integrate with existing messaging systems as much as possible, instead of building something new from the ground up. As Facebook is already widely used among listeners of our radio stations, an **integration with Facebook Messenger (R-3.2)** would be feasible. Lastly, a user should be able to **consult and edit their personal information (R-3.3)**.

Interaction will mostly be the result of a call to action on the radio broadcast, which leads to the requirement of being able to **listen to the live stream of the radio station (R-3.4)** and **find more information about this live stream (R-3.5)**. An example of such an interaction is **submitting a song to the radio station (R-3.6)** to help co-create a playlist from the radio station.

4.4 On-demand functionalities for listeners

Users will have **access to the on-demand archive by using a chatbot (R-4.1)**, in order to find what they're searching for more quickly than by consulting playlists or programme items. The MARCONI system will try to narrow down possible matches by asking follow-up questions. Of these matches, a **short preview will be made available (R-4.2)** for the user, so that they are able to quickly decide whether the match is correct or not. For more structured items, a **basic browsing interface (R-4.3)** is also offered. A user can indicate whether **he/she likes or dislikes the current item being played (R-4.4)** by tapping the appropriate button. When an item is played, a button to **create a playlist with relevant items (R-4.5)** is also shown. This playlist can be **saved for later use (R-4.6)** as well.

To match their musical preference as much as possible, users are able to **create their own personalised stream (R-4.7)** based on content made available by the radio station. When a user is not able to listen to an item instantly (e.g. because it doesn't fit his/her schedule), he/she is able to **save it for later (R-4.8)**. This item will be blended in seamlessly into a personalised stream later on. To anticipate upon interruptions (e.g. when a listener exits her car, the stream pauses), the app will **track the location and nearby peripherals and adjust the user experience to this (R-4.9)** (e.g. listener arrives at work and live stream resumes where it previously paused).

Users can also **receive notifications (R-4.10)** when items that could be relevant for them are shared by the radio station.

4.5 Content analysis services and conversation services

For providing a section to manage users, **a service for recognizing and clustering (anonymous) user profiles (R-5.1)** will need to be developed. This service will need to be able

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to analyse items in a rundown to **detect a listener's mood (R-5.2)** and to **derive interests (R-5.3)** (e.g. bands he/she likes, music genres etc.).

From text messages, **keywords** will be **extracted (R-5.5)**. Text messages and images should also be classified based on content to be **associated with a particular programme item (R-5.7, R-5.8).** Images will also be **filtered by location**, based on geotags or content **(R-5.9)**.

Media and text messages can be **filtered based on the extracted metadata (R-5.10)**. In order to quickly review results after filtering or searching, **proxies for quick preview** need to be created **(R-5.11)**.

While usual **conversation services (R-5.4)** are responding to messages of users, there are specific services for conversation types initiated by the back-end system, in particular, **asking for specific data/preferences and related permissions to use/store it (R-5.6)** and **asking for opinions about topics being discussed (R-5.12)**.

4.6 Storage and communication services

In order to communicate with users and notify them, a **service to handle sending/receiving messages (R-6.1)** needs to be present.

Editors will also need to be able to cluster and group users of the app. Information will be fed into the system from several sources (e.g. social media scraping). A service dedicated for this task will need to be developed that **populates the AudienceDB (R-6.2)**. A similar database with **artist and song information (R-6.3)** will also need to be constructed and maintained.

Information and metadata about the live stream, current playlists, rundown etc. will also need to be stored in a **separate database, only accessible to editors and crew (R-6.4)**. The part of this data that is available for the **public (and used for e.g. on-demand) will need to be stored separately (R-6.5)**.

To provide an easy-to-use, audio-based interface for listeners, an **integration with current smart speaker systems (R-6.6)**, such as Alexa, is beneficial.

4.7 Overview

Requirement	Description	Relevant use cases
A front-end app for radio editors		
R-1.1	Editing/consulting a rundown list from external app (e.g. RadioManager)	UC-1.1, UC-1.2, UC-1.3, UC-1.13 UC-2.1, UC-2.5, UC-2.14,

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		UC-2.15, UC-3.2
R-1.2	Display content from third-party sources	UC-1.2, UC-1.5
R-1.3	Approving/Selecting/Replying incoming messages integrated in the radio workflow	UC-1.4, UC-1.5, UC-1.6, UC-1.9, UC-1.10, UC-2.1, UC-2.3, UC-2.4, UC-2.10, UC-2.6, UC-2.11, UC-2.5, UC-2.14,
R-1.4	APIs for third-party service integration	UC-1.13
R-1.5	Interface for configuring a conversation flow	UC-1.9, UC-1.10, UC-1.13, UC-1.14
R-1.6	Unified feed of incoming messages (e.g. SMS, radio station's app, Facebook Messenger)	UC-2.1
R-1.7	Conversation interface to chat with users (text and media)	UC-2.11
R-1.8	Configure unified feed (editing sources and filters)	UC-2.2, UC-2.10
R-1.9	Search interface for content	UC-2.12
R-1.10	Create a new label	UC-2.5
R-1.11	Attach a label to items	UC-2.6
R-1.12	View content attached to a label	UC-2.13

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R-1.13	Editing/consulting listeners information	UC-1.2, UC-1.14, UC-2.7
R-1.14	Search/select user-generated content from send in media and social media platforms	UC-2.12, UC-2.13, UC-2.14
R-1.15	Group users based on characteristics	UC-2.6
R-1.16	Sending messages/actions to groups of listeners	UC-2.8, UC-2.9
Lively environment		
R-2.1	Display user-generated content on a display	UC-1.5
R-2.2	Equip the radio studio with iBeacons to detect nearby users of the app	UC-1.6
R-2.3	Adapt displayed content to iBeacon data	UC-1.6
Live functionalities for listeners		
R.3-1	Login with OAuth (e.g. Facebook)	UC-1.16, UC-3.4, UC-1.24
R-3.2	Integration with Facebook Messenger	UC-1.16, UC-1.21
R-3.3	Edit preferences and account information	UC-3.5,
R-3.4	Listen to the live stream of the radio station	UC-1.19, UC-3.1, UC-3.3, UC-3.8,
R-3.5	Receive extra information on a live stream (Now On Air/News/EPG)	UC-3.2

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R-3.6	Search for and submit a song to to the radio station	UC-1.20
On-demand functionalities for listeners		
R-4.1	Make on-demand content searchable via a chat interface	UC-1.23
R-4.2	Preview on-demand content	UC-1.22
R-4.3	Interface for browsing content	UC-3.14
R-4.4	Like/dislike item	UC-3.16
R-4.5	Create a playlist with relevant items	UC-3.15
R-4.6	Save playlist	YC-3.17
R-4.7	Create a personalised stream	UC-3.7, UC-3.8, UC-3.11, UC-3.13
R-4.8	Postpone content in on-demand	UC-3.6, UC-3.10, UC-3.11
R-4.9	Track location and peripherals to adjust user experience	UC-3.9
R-4.10	Ability to receive a notification	UC-3.18
Content analysis and conversation services		
R-5.1	A service for recognizing and clustering user profiles	UC-2.7

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R-5.2	Text Sentiment Analysis (API system)	UC-1.8, UC-1.17
R-5.3	Named entity extraction	UC-1.8, UC-1.11, UC-1.17, UC-2.3
R-5.4	Textual Conversation service	UC-1.8, UC-1.9, UC-1.18, UC-1.21, UC-4.4, UC-4.5, UC-4.7, UC-4.8, UC-4.10, UC-4.12
R-5.5	Keyword extraction from text messages	UC-1.11, UC-1.17
R-5.6	Service for asking data and permissions that go along with this data to listeners	UC-1.13, UC-1.14, UC-1.15, UC-4.6, UC-4.13
R-5.7	Associate text messages with programme item	UC-2.3, UC-2.11
R-5.8	Associate images with programme item	UC-2.3
R-5.9	Extract location from geotag or estimate from content	UC-2.4
R-5.10	Filter text and multimedia messages based on extracted metadata	UC-2.10
R-5.11	Create proxies of media items for quick preview	UC-2.12
R-5.12	Service for asking opinions on current discussion topics	UC-4.11
Storage and communication services		
R-6.1	Incoming/Outgoing message bus to send and	UC-1.13, UC-1.7, UC-

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	retrieve messages to end users	1.12, UC-1.15, UC-1.25, UC-2.21
R-6.2	AudienceDB Microservice	UC-1.6, UC-1.14, UC-1.15, UC-1.17, UC-1.25, UC-3.6, UC-4.9, UC-4.11
R-6.3	ArtistDB Microservice	UC-1.20, UC-3.15
R-6.4	Radio information storage (items, EPG, guests, playlist)	UC-4.8, UC-4.4, UC-4.12
R-6.5	OnDemandDB MicroService	UC-3.6, UC-3.7, UC-3.8
R-6.6	Smart speaker integration	UC-4.1-13

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5 Conclusions and next steps

This document describes 4 initial user scenarios for MARCONI linked with 6 general requirements. The user scenarios are based on the outcome of workshops all the partners organised with a similar methodology. An analysis of these scenarios has resulted in a list of more detailed requirements. The next step is to prototype, validate, prioritize and iterate these scenarios and requirements.

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APPENDIX A

This appendix A contains the script for the co-design workshop with radio makers, as distributed to NPO and SFilter.

1. Co-design Workshop with radio producers

1.1 Methodology: co-creation

Method:

- mapping (map-it, Huybrechts et al.) of needs, concepts and ideas
- inspiration cards (Halskov et al.) to make ideas concrete

Participants: +- 16 radio producers, distributed over 2 groups

Moderators: 2 + 1 'flying' moderator who keeps track of time of both groups

Important: **Document the workshop!** Take pictures (ideally, the 'flying' moderator can take care), record video or audio (as a way to log the discussion) and take notes on the map to clarify the keywords that are written by participants.

Typically for this method, participants are heard in the order of the table, starting left from the moderator and following the clock counterclockwise. This provides the opportunity for everybody to speak up.

1.2 Preparation

- Print map on A0, stickers on sticker sheets
- Provide pens, scrap paper

1.3 Script

10u30

Arrival and coffee

10u40

A. Introduction:
    a. goal project Marconi, presenting European (media) partners
    b. method, see slides: https://drive.google.com/open?id=1VL2EgeBiYOFtmzmjU_A58uksSgFb5mJQ
    c. optional: user stories from VRT as example (also in slides)
    d. Overall research question of the workshop: How do radio producers (including radio hosts) interact with listeners?

Timing: 10 minutes

10u50 ----------

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1. “An open question to start with: what does interaction mean for you and your show? On the sticker sheet, a number of values are predefined in a non-exhaustive list, including:

- Involving (example: involving listeners in an event)
- Informing (example: an accident that happened and was reported by a listener to the radio host)
- Responding (example: a radio host responds to a suggestion made by a listener)
- Connecting (example: radio producers connect listeners, and citizens in general)
- Recruiting (example: radio producers recruit listeners to keep listening to the show)

There are also stickers that are left blank. Choose one or two, fill in if you want.”

(Intention: mapping values of radio producers)

Moderator: First participant on your right starts with sticking a value on the map. If values are repeated by other participants, encourage them to stick it close to the other stickers of that value on the map.

Timing: 1 minute to write down value, for all

Mapping: 1 minute per participants

Total: 10 minutes

11u00 ----------

2. “Can you write down a frustration on one of the goals that are already on the map. For example, it frustrates me as an interviewer that an interviewee does not pronounce very well and thus will not be very understandable on the radio.”

Sticker: frustrated face

(Intention: Identifying problems, how can we contribute to augment the values of the first round?)

Timing: 1 minute to write down frustration

Mapping: 1,5 minute per participant

Total: 13 minutes

11u13 ----------

3. “ In the following round we will brainstorm. Choose one of the frustrations at hand and think of a solution. Read the inspiration cards that are meant to trigger ideas. Do not think exclusively in terms of existing technology such as smartphone applications. Also, do not think of technical feasibility.

Write down on the sticker with the empty space how your idea could work. You get 7 minutes to look through the cards and write down your idea. It can be more than one in this time!”

Moderator: If the story of the participant is unclear, write down clarifying sentences on the map. Connect concepts, make summaries, add clarifications…. In this round, participants may freewheel, it’s not necessary the idea is really possible.

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Timing: 7 minutes preparation for the group

Mapping: 2 minutes per participant

Total: 26 minutes

11u40 ----------

4. What are the risks, problems or pitfalls of the ideas that are presented on this map?

Sticker: explanation mark

(Intention: understand criticism)

Timing: 1 minute

Mapping: 1 minute per participant

Total: 10 minutes

11u50 ----------

5. Can we think of a solution for these pitfalls?

Sticker: light bulb

(Intention: connecting ideas)

Timing: 2 minutes

Mapping: 1 minutes per participants

Total: 10 minutes

12u00 ----------

6. IN GROUP: we have 2 locks to distribute in group over the map. After the break, we will continue to work on the concepts made by the other group. Thus, they will also discuss our concepts. Do we want to protect our concepts? Which ones? We can select 2 in group. Why did we choose these concepts? Can we give them a name?

Sticker: lock

Sticker: my name

(Intention: making ideas concrete)

Timing: 7 minutes in group

12u10 ----------

BREAK

12u40 ----------

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7. GROUP: the map moves together with one participant of the group to the other table. This participant presents the work process and the outcomes, i.e. the concepts.

Timing: 5 minutes

12u45 ----------

8. GROUP: bombing

Which concepts do you find not so interesting and why?

We can bomb two concepts or aspects of concepts to this map. Everybody should write this down for him or herself, i.e. what should be bombed. We will not stick every bomb on the map, we will select two in group.

Sticker: bomb

(Intention: exposing problems, allowing people to express critique to form a basis for the next iteration).

Moderator: writes down the motivation of 2 bombs that are the consensus of the group

Timing: 1 minute

Mapping: 1 minute per participant

Total: 10 minutes

12u55 ----------

9. GROUP: Do we have solutions?

Sticker: light bulb

(Intention: iterating the concepts of the first rounds)

Timing: 9 minutes

13u05 ----------

10. What do you like about these solutions?

Sticker: thumbs up

(Intention: understanding what could be a good solution)

Timing: 1 minute

Mapping: 1 minute per participant

Total: 10 minutes

13u15 ---------- OPTIONAL ROUND! Skip when in need of time ----------

10. GROUP: Ok, we have now iterated the concepts of the other group. Can we give our improved concept a name?

Sticker: my name

Timing: 5 minutes

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13u20 ----------

11. The moderators present the iterated concepts to the 2 groups, and allow discussions to emerge. The map may be attached to the wall for a better view.

(Intention: provide feedback of the workshop)

Moderator: adds important discussion points to the map

13u30 ----------

12. Conclusion workshop by the moderator, including a word of thank and the next steps.

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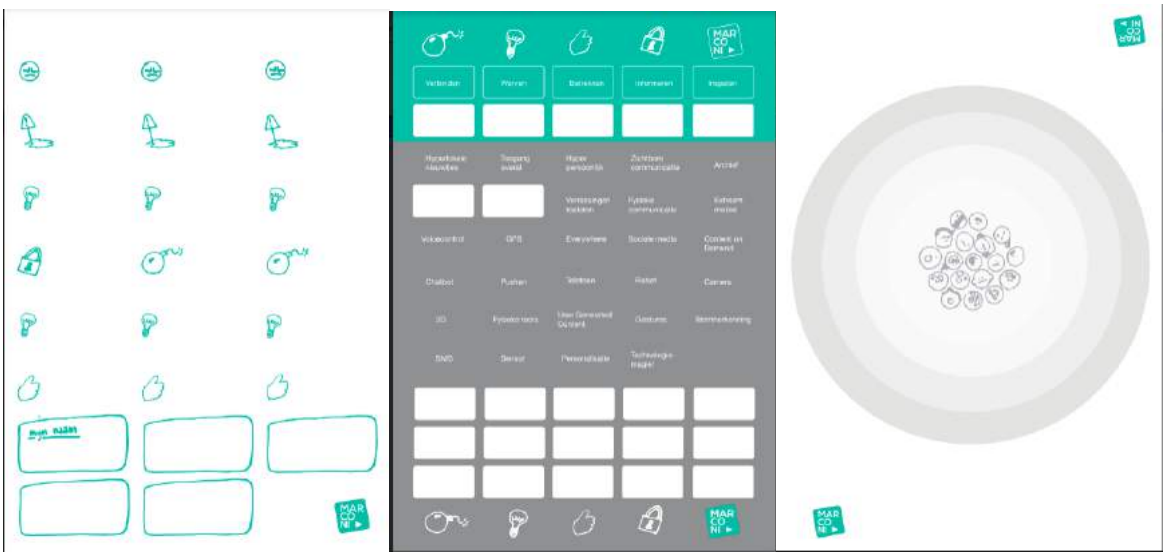
APPENDIX B

This appendix B includes a screenshot of the design of the sticker sheet templates and the map used in the co-design workshops.



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APPENDIX C

This appendix C contains the observation sheet template.

Number of interactions:

	To request songs	To participate in games	To spontaneously have contact
Block 1 till 16:20			
Block 2 till 16:40			
Block 3 till 17:00			
Block 4 till 17:20			
Block 5 till 17:40			
Block 6 till 18:00			

Room for general observations:

APPENDIX D

This appendix D contains the informed consent template (in Dutch).

Geïnformeerde toestemming

Titel van het onderzoek: Marconi - workshop user scenario's

Naam + contactgegevens onderzoeker:

------- name researcher -----

Auguste Reyerslaan 8

1043 Brussel

-------- e-mail address --------

----- telephone number ------

Doel en methodologie van het onderzoek:

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Het doel van het project is om de interactie tussen luisteraar en radiomaker te verbeteren door middel van bestaande en nieuwe (digitale) technologie. Via deze co-creatie workshop zullen we een aantal reeds geformuleerde user stories bespreken alsook nieuwe bedenken. Een user story is een kort stappenplan waarin het gebruik van een digitale technologie wordt uiteengezet van begin tot einde.

Duur van het experiment:

Het project loopt 3 jaar (tot augustus 2020)

De workshop duurt 3u (14u tot 17u)

- Ik begrijp wat van mij verwacht wordt tijdens dit onderzoek.
- Ik weet dat ik zal deelnemen aan volgende:
    - Workshop met brainstorm
- Ik begrijp dat mijn deelname aan deze studie vrijwillig is. Ik heb het recht om mijn deelname op elk moment stop te zetten. Daarvoor hoef ik geen reden te geven en ik weet dat daaruit geen nadeel voor mij mag ontstaan.
- Ik weet dat deze workshop gefilmd wordt. Er worden ook foto's genomen. Mijn gezicht wordt daarbij niet herkenbaar naar buiten gebracht, anonimiteit en de vertrouwelijkheid van de gegevens is in elk stadium van het onderzoek gewaarborgd.
- De resultaten van dit onderzoek kunnen gebruikt worden voor wetenschappelijke doeleinden en mogen gepubliceerd worden. Mijn naam wordt daarbij niet gepubliceerd, anonimiteit en de vertrouwelijkheid van de gegevens is in elk stadium van het onderzoek gewaarborgd.
- Ik wil graag op de hoogte gehouden worden van de resultaten van dit onderzoek. De onderzoeker mag mij hiervoor contacteren op het volgende e-mailadres:
- Voor vragen weet ik dat ik na mijn deelname terecht kan bij: sandy.claes@vrt.be, *0476/67 38 76 zie ook bovenaan voor adres*

Ik heb bovenstaande informatie gelezen en begrepen en heb antwoord gekregen op al mijn vragen betreffende deze studie. Ik stem toe om deel te nemen.

Datum:

Naam en handtekening deelnemer Naam en handtekening onderzoeker

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APPENDIX E

MARCONI Functionalities/Services

Name	Description	Dependencies	Train-able/ custo-misable[1]	Input(s)	Output(s)	Responsible partner	Development schedule
Metadata extraction services							
Face detection			N	image, video	region	JRS	ready to be integrated
Face recognition			T	image, video	region, identifier	JRS	ready for M8
Visual location matching		Visual descriptor extraction &indexing	S	descriptor/set of descriptors	similarity score, time range, regions	JRS	ready for M8
Visual descriptor extraction and indexing			N	image, video	(set of) descriptors	JRS	ready for M8
Visual classification			T	image, video		JRS	Tbd (fixed set of classes in M8)
Logo detection			S	image, video		JRS	ready to be integrated
NER	Language specific		Y	text		UNIVIE	
Topic detection	Language specific		T	text		UNIVIE	
Visual quality analysis			N	image, video	quality descriptors	JRS	first set ready to be integrated

[1] N .. no, Y .. can be trained/customised, T .. must be trained, S .. requires samples/database

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