Grant Agreement No.: 761802

D 1.1: General concept

MARCONI will enable fully interactive and personalised radio experiences

The deliverable D.1.1. describes the general concept of MARCONI on the basis of five objectives that will drive the vision, concept and approach the MARCONI consortium pursues in order to implement and validate the overall goal of MARCONI. The general concept contains use cases, the suggested methodology, general stakeholder feedback and an updated vision of the envisioned MARCONI system.

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Executive Summary

The overall objective of MARCONI is to enable fully interactive and personalised experiences, through integrating 'live' broadcast radio with digital platforms and social media, enabling better convergence around radio experiences.

To realize this vision of a next-gen, fully interactive and personalised radio experience, MARCONI sets forth **five specific objectives**. These objectives will drive the vision, concept and approach the MARCONI consortium pursues in order to implement and validate the overall goal of MARCONI.

The following five objectives are central to this concept:

1. Enable the listeners to interact with radio in a personalized way through their preferred (social) channel and remain connected;
2. Optimise tools and platforms for the radio editorial team to give them a better overview of interaction in order to engage more and better with their audience;
3. Build innovative services and platforms to enable automation of user interaction;
4. Validate the MARCONI concept by running large scale pilots;
5. Develop innovative new business models around personalised and automated interaction within the radio community.

The innovation in MARCONI will address user interaction management and interaction dashboards, the integration of customer relationship management (CRM) and radio production management, which does not yet exist in the market, and the introduction of intelligent agents into the radio production process, as well as the improvement of functionalities existing in current products.

In order to obtain the different objectives, this general concept describes a few possible user scenarios we foresee for end-users as well as for professional users. These user scenarios have to be refined and tested with professional users (editorial teams, DJ's) and end-users (current and potential radio listeners). These use cases have to be converted into prototypes, that will be developed and tested in the pilot phase of the project.

In order to do so, a total of four distinct piloting activities have been identified. These are:

1. Baseline measurement and data collection at the very start of the project;
2. Continuously running pilots at one or more radio stations;
3. Two large scale pilots focussed around large live events which already involve radio stations;
4. Open piloting activities involving external stakeholders in the final stage of MARCONI.

The foreseen methodology to obtain the above mentioned objectives and execute the pilot

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activities meets the following criteria:

- User driven approach;
- Continuous validation;
- Agile approach;
- Loosely coupled design;
- Legal assessment and privacy validation.

On several stages during the project, MARCONI will consult stakeholders and take their needs and comments at heart. At the end of the document we already added some stakeholders input to finetune this general concept. And finally we complete this document by sharing with you the next steps of the project.

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Abbreviations

API	Application programming interface
CRM	Customer relationship management
FOMO	Fear of missing out
GUI	Graphical user interface
H2020	European Union's Horizon 2020 research and innovation programme
HRadio	Hybrid Radio focuses on radio service innovations enabled by convergence
MARCONI	Multimedia and Augmented Radio Creation: Online, iNteractive, Individual
OTT	Over the top, a media distribution practice
PaaS	Platform-as-a-service
SaaS	Software-as-a-service
SMS	Short message service
StuBru	VRT Studio Brussel

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1. MARCONI | General concept

1.1. Introduction

The overall objective of MARCONI is to bring radio experiences to the next level and making it ready to remain as strong as it currently is over the next decades and enabling new ways of radio making.

1.2. Elevator pitch

MARCONI will enable fully interactive and personalised radio experiences, through integrating 'live' broadcast radio with digital platforms and social media, enabling better convergence around radio experiences.

In order to achieve this MARCONI will overcome technical and editorial challenges such as scalability of personalised interactions. MARCONI will bring integrated solutions for radio presenters to be active on several digital platforms and social media simultaneously and in a very efficient way.

MARCONI will create a software platform tackling these technical challenges. This platform will be released in a platform-as-a-service (PaaS) approach, allowing both large and small radio stations to move their radio experiences forward. Furthermore, MARCONI will extensively pilot the platform to ensure all the features are well aligned with stakeholders in the broadcast field, making it easy for them to keep up with relevant trends, like e.g. the introduction of hybrid broadband/broadcast radio services. The MARCONI platform and components will therefore be hybrid radio ready.

To realize this vision of a next-gen, fully interactive and personalised radio experiences, MARCONI sets forth **five specific objectives**. These objectives will drive the vision, concept and approach the MARCONI consortium pursues in order to implement and validate the overall goal of MARCONI.

1.3. Objectives

OBJECTIVE 1: INTERACT IN A PERSONALISED WAY

MARCONI will enable every listener in the radio community (audience) to interact with their favourite radio brands in a personalised way through their favourite communication channels. Moreover, MARCONI will ensure that people in the radio community remain connected to and can engage with the radio brand, even if they are not currently listening to 'live' radio; all in a way that respects user privacy.

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OBJECTIVE 1: EXPECTED OUTCOME

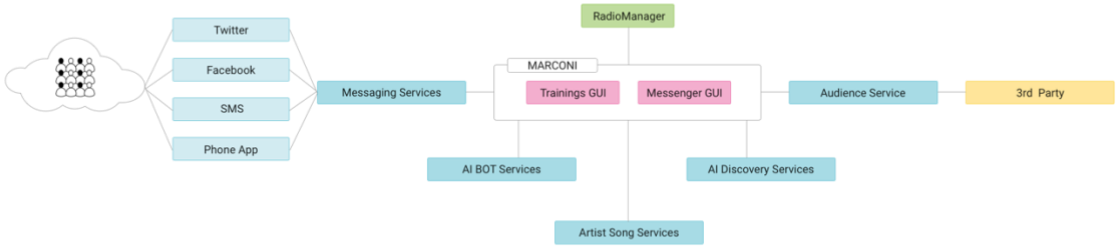

Figure 1: MARCONI System Diagram

An integration with at least five communication channels currently used by the radio community, which will allow the radio community to interactively engage with radio stations whenever and wherever they are, on every platform, and which has been validated against relevant regulations, such as privacy. MARCONI will take into account a variety of communication channels, both traditional ones as well as new ones. Examples of such include social media such as (but not limited to) Twitter, Facebook or Instagram; SMS; e-mail; RadioTag; or interaction through dedicated apps and on-line platforms of the radio stations, such as VRT's RadioPlus[1].

The MARCONI services will however be created in a flexible way such that is easy and fast to plug in new and upcoming communication channels. A qualitative assessment studying user engagement will validate this.

Irrespective of their communication medium preference, MARCONI will enable the radio audience to not only keep in touch with their radio brand, but also to actively engage with it. If supported by the leveraged communication medium, it will be possible for the consumer to review his or her cross-medium interaction history with the radiostation. Through the distribution of push messages, the radio brand can even keep non-listeners informed about

1 https://radioplus.be

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the events happening as part of a particular radio show and can even attempt to sway passive consumers into becoming active live listeners. Users will be able to include multimedia assets in their digital conversation with the radio station (e.g., pictures, videos, audio snippets).

By merging multiple independent communication channels into a single logical communication and interaction space, and by harnessing the presence of the radio network on social media, it becomes feasible to reach out to, and interact with, non-listeners. In the optimal case, such engagement can sufficiently spark a person's interest so that (s)he decides to tune in to the radio show (either through broadcast or OTT); in any case, it will positively attribute to the visibility of the radio station.

MARCONI envisions that listeners will receive answers through the platform(s) of their choice and that the end-user experience will differ per platform, hereby maximally leveraging each platform's positive traits and specific characteristics, while personalising the communication method to the consumer.

In order to enable these personalised interactive experiences for the radio community, the radio stations are in need of efficient tools and platforms to handle those interactions in an efficient way.

OBJECTIVE 2: OPTIMISE TOOLS AND PLATFORMS FOR THE RADIO EDITORIAL TEAM TO ENGAGE MORE AND BETTER WITH THEIR AUDIENCE

MARCONI will enable the radio presenter and/or editorial team to get a comprehensive, dynamic overview of what is happening in terms of listener interaction; to get insight into trending topics; to get insight into knowledge about individual listeners; to engage in interactions with individuals and to engage with its audience even if they are not actively listening to 'live' radio; by building innovative tools and platforms to enable this.

OBJECTIVE 2: EXPECTED OUTCOME

At least two professional radio production interface(s) will be developed, targeting different profiles within the editorial team (radio presenters, editorial team), which supports the different profiles to keep track of community interactions around their 'live' radio platforms. These interfaces include a *live view* and an *interaction view*.

The overall *live view* will be understandable in one glance and will be presented in such a way that it fits on a single screen, or is easy to browse using different tabs. Potential information sources that can be integrated in such an aggregated live feed include SMS messages, phone calls, Tweets, Facebook/Instagram posts, location-based posts, or data provided by any other relevant third-party API. It will be possible to customize this feed per show by, for example, following different Twitter hashtags or by connecting to different APIs depending on the needs and objectives of the show at hand.

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Of course, it is not feasible to engage with every single radio listener for every individual interaction (s)he is starting. **MARCONI will build upon innovative technology that enables scaling of 1-to-1 interaction to an entire radio community in an organized *interaction view*.**

OBJECTIVE 3: BUILD INNOVATIVE SERVICES AND PLATFORMS TO ENABLE AUTOMATION OF USER INTERACTION

MARCONI will build innovative services and platforms which enable automation of the user interaction with the radio channel for incoming text, audio, picture or video content. MARCONI will also provide the tools to radio organisations to easily manage such automated interactions themselves, integrated with their radio production system. The goal is to provide every interaction with an individual response within a reasonable amount of time.

OBJECTIVE 3: EXPECTED OUTCOME

A flexible and scalable platform which allows radio producers to easily interact with the audience by setting up services to automate the interaction and which provides intelligent responses to users in a reasonable amount of time.

From all the inputs they receive from their audience, radio makers typically cherry-pick and discuss only those messages and posts that are most relevant to the story they are currently trying to tell. As an unfortunate consequence, it is a current practice that most of the listener requests or contributions are left unresponded. MARCONI will enlist digital assistants, which will produce first-line automated responses as well as filter out the most relevant contributions. These assistants will be fully customizable by the radio station, to guarantee that every listener interaction is appropriately reacted to.

These intelligent digital assistants will play a crucial role in fulfilling this objective. While the straightforward mode of operation of such digital assistants consists of serving a uniform reply to each listener (which is already a considerable improvement compared to current practice in the radio broadcasting ecosystem), assistants could also be programmed to exploit contextual information about the involved user to be able to generate personalized responses. Care will be taken that the considered user context will be confined to contain only that information that the user has deliberately shared with the radio network or that could be inferred implicitly from his or her previous (public) interactions with the radio network.

In order to validate the concept, MARCONI will run several piloting activities within the scope of the project.

OBJECTIVE 4: VALIDATE THE CONCEPT BY RUNNING LARGE SCALE PILOTS

MARCONI will validate the concepts, platforms and interactive services by running several large scale piloting activities in several countries.

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OBJECTIVE 4: EXPECTED OUTCOME

A validated set of user interfaces and features of the core platform and its services for end-users of the radio community as well as for the radio stations. The validation will happen through involvement of at least five radio stations inside the consortium (VRT StuBru, VRT MNM, NPO Radio 2, NPO 3FM and Stadtfilter). At least another five will be attracted through open piloting activities in the final stage of the project.

OBJECTIVE 5: DEVELOP INNOVATIVE NEW BUSINESS MODELS AROUND PERSONALISED AND AUTOMATED INTERACTION WITHIN THE RADIO COMMUNITY

MARCONI will ensure its results also fit in the market from a business point of view.

OBJECTIVE 5: EXPECTED OUTCOME

A (set of) business model(s) demonstrating how the MARCONI platform and services fit into the diverse radio market. **MARCONI will generate two sets of business models, targeting for the exploitation of the platform as well as business models for radio stations with the platform.**

The radio landscape in Europe and beyond is extremely diverse: from large radio houses with several radio stations to extremely small local radio initiatives with limited budget and resources. MARCONI intends to create a solution that suits each of those types of radio companies. In order to achieve this, MARCONI will work on business models with different types of users (radio stations) in mind, targeting small and large radio companies. Furthermore, MARCONI will try to involve commercial radio stations and enable them to generate additional revenue.

1.4. New and improved products and services

Radio stations have already a long history of dealing with user feedback, and phone calls have for a long time been integrated into program making. Many stations have also embraced the use of social media channels in order to build a community and engage their audience. Unfortunately, this history is still manifest on the radio maker's desk: in addition to the equipment and tools needed for the core function of radio broadcasting, there are disjoint systems for handling direct interactions, monitoring and managing social media channels and systems like CRM's to document customer interactions. **The innovation in MARCONI will address user interaction management and interaction dashboards, the integration of CRM and radio production management, which does not yet exist on the market, and the introduction of intelligent agents into the radio production process, as well as the improvement of functionalities existing in current products.**

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1.4.1. USER INTERACTION MANAGEMENT

The communication with users involves a wide range of communication channels, and systems for dealing with specific services exist.

Some radio redaction systems such as *RadioManager* already offer some integration for social media channels. However, as new services and interaction methods appear, there is the need to (i) easily add support for new services and (ii) provide an integrated way of handling interactions across different channels, as well as keeping track of the communication history with a consumer across all channels. **MARCONI will encompass connections with social media, traditional communication streams (e.g. SMS and email) and new communication methods (e.g. communication features in phone applications/websites).**

The setup will be modular to ensure a future proof setup with the option to add future communication channels (e.g. new social media sources). The information from the messages should be extracted into textual, graphical, audio and audiovisual segments to be sure any multimedia content is covered. Next to the traditional communication we try to achieve to distribute structured information requests that can be used for polls and games to enrich the user experience of the broadcast for the consumer.

1.4.2. INTEGRATION OF CRM AND RADIO PRODUCTION MANAGEMENT

While some broadcasters do use customer relationship management (CRM) systems, those systems are disjoint from radio production and typically handled by different departments. The value of the data in the CRM system is not fully unleashed today, as it would need to be directly available when interacting with consumers during a radio show.

MARCONI will provide a platform that integrates radio production management and CRM functionalities. This can be a standalone solution for a small or medium size radiostation, or interface an existing company-wide CRM system for a large broadcaster.

1.4.3. INTERACTION DASHBOARDS

Interaction dashboards do exist for many communication channels, and there is a wide range of solutions for social media dashboards (e.g. Tweetdeck, Hootsuite, Coosto, Engagor). MARCONI will improve interaction dashboards in two aspects:

1. Instead of showing the original message like most communications dashboards, the new interfaces will extract the information from the different sources and give the radio makers the possibility to quickly use the information in their workflow.
2. The existing production dashboard for the radio makers will be integrated with the graphical user interface (GUI) for user interactions. **The backend of the system will automatically analyse messages in order to filter and cluster them.** While some can be processed and answered automatically, others will be flagged in the dashboard to be replied by a member of staff or to be used in the broadcast

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(social storytelling). The production GUI will be easy to understand and efficient for common tasks. The production GUI combines the basic radio maker tasks, e.g. rundown items, with all the new communication features. Also interfaces to control the agent plugins and setup and maintain business rules are part of this GUI.

1.4.4. INTELLIGENT AGENTS FOR RADIO INTERACTION

Assistants and agents are increasingly used to interactions with customers on common issues, for example in ordering processes or for customer support. However, this technology has not yet been made ready for radio, and MARCONI will be the first to do this.

Large radio stations may be able to afford teams that can handle at least a considerable share of the interactions with their consumers, but this is not the case for small and medium size stations. In addition, consumer expectations are changing, and conversational "WhatsApp-style" interactions are increasingly used (e.g., in recent job searching apps like Hokify[2]), so that every contribution should be answered. This requires to automate interaction-related tasks using intelligent agents. The agents are optional and plugable functionalities of the system that enable features like replying to the sender, filtering messages and answers on polls and analyse content (e.g. images and text).

1.4.5. HRADIO

On the one hand there is 'live' radio, which offers the same flow of information and music to all listeners, and on the other hand there are internet services that are fully personalized, such as Spotify. The HRadio project explores how it can combine the two (hybrid radio). MARCONI can help explore. For example, you can listen to the news and then combine that with a song from your Spotify, or just listen to traffic updates related to your route. Hybrid radio stands for a seamless combination of broadcast radio and internet technologies to make better radio. MARCONI can help implement those internet technologies which make it possible to have:

a fully interactive and personalised radio experience, through integrating 'live' broadcast radio with digital platforms and social media, enabling better convergence around radio experiences.

We have to explore how HRadio or parts of it can be integrated in our uses cases and how we can exchange knowledge and help each other a step further.

1.5. Summary

Despite the emergence of novel digital communication means (e.g. social media), radio broadcasting (and OTT streaming of radio shows) remains a highly popular medium that reaches millions of listeners on a daily basis. In the majority of the show formats that are

2 https://hokify.at

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aired by general purpose radio stations (e.g., infotainment, news and sports coverage, music-oriented programs), **interaction with the show's listeners matters** or even plays a pivotal role. In this context, it is curious that one of the earliest enabling technologies of listener interaction - the telephone - is nowadays still popular. In particular, anno 2016, listener input and feedback is still included in radio programs in the form of (excerpts from) telephone conversations between respectively the listener and a member of the radio show's production team. Over the years however, **complementary interaction channels** have surfaced that enable radio producers and listeners to engage with each other; examples include, but are not limited to, SMS, email and social media platforms. As such, the listener interaction opportunities in the radio broadcasting landscape are richer than ever before. Unfortunately, both at listener as well as at production side, **all these contemporary interaction opportunities currently reside in their respective isolated silos**. Stated differently, the interaction avenues are fractured and lack integration. This in turn hurts the efficacy, reach and scope with which listener interaction can be exploited in the context of online radio broadcasting.

The underlying fundamental concept of the MARCONI proposal consists of introducing convergence and integration with respect to the disjoint listener interaction spaces prevalent in the current radio broadcasting landscape. As mentioned previously, these interaction spaces encompass traditional communication channels (e.g., telephone, SMS) as well as digital innovations like social media. The envisaged convergence will benefit not only the listener (whose interaction opportunities with the radio show are significantly augmented) but also the radio production team (e.g., MARCONI will allow a radio show to engage with its audience members in a more personalized and meaningful way). In particular, MARCONI aims to 'take the next step' with respect to interactivity by **making the border between radio program content and user interactions more permeable**. This will help to transform the radio experience from a one-to-many broadcast conversation to a story developed collaboratively by respectively the radio show presenter and the audience.

The MARCONI platform will **build on existing tools and services**, integrating them into a **converged solution for radio listener interaction**. Some of these tools are already well established in contemporary radio production (e.g., editorial and redaction systems, playlist management), while others have emerged from different domains and are not yet in widespread use in the context of radio stations (e.g., social media dashboards, social CRM systems). Consortium members VRT and PLUX are well aware of (and skilled in) the former category, while IN2 is specialized in semantic technologies that belong to the latter category.

Also MARCONI will provide countless interactivity options for hybrid radio and therefore has a close link with the innovative HRadio project (also part of the research and innovation program Horizon 2020).

2. MARCONI | Use Cases

Please find below a few possible user scenarios we foresee for end-users as well as for radio makers.

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2.1. Introduction

In order to make viable cases for the radio community (i) and the radio editorial team (ii) we should make use cases for the short term, midterm and long term and include hybrid radio. In this chapter we describe possible use cases we foresee now, but we have to elaborate these cases in the next phases of the project.

Several co- creation workshops will be held mid-November until January with various editorial teams per radio station in order to examine the needs on their behalf. Together with members of the editorial team, we will co-create use cases, which is guided by a mapping methodology[3]. First, we will map their needs and assumptions with regard to interaction with listeners. Then, we will construct several concepts that respond to their needs. Ultimately, these concepts are rated in the group, which offers us insights on the values of radio production.

Besides co-creation workshops with the editorial teams, we will also host workshops with listeners. Here, we will deploy the same mapping methodology yet focus on the angle of the listener. We will map the reasons why the consume radio and audio in general. Which state of affairs preceded their action, which need states from the so called mood management diagram are relevant (see figure 2 on page 18)? If we discover why listeners tune in to the radio station from time to time, we can provide them with better context, better content and better responses when their need requires interaction.

3 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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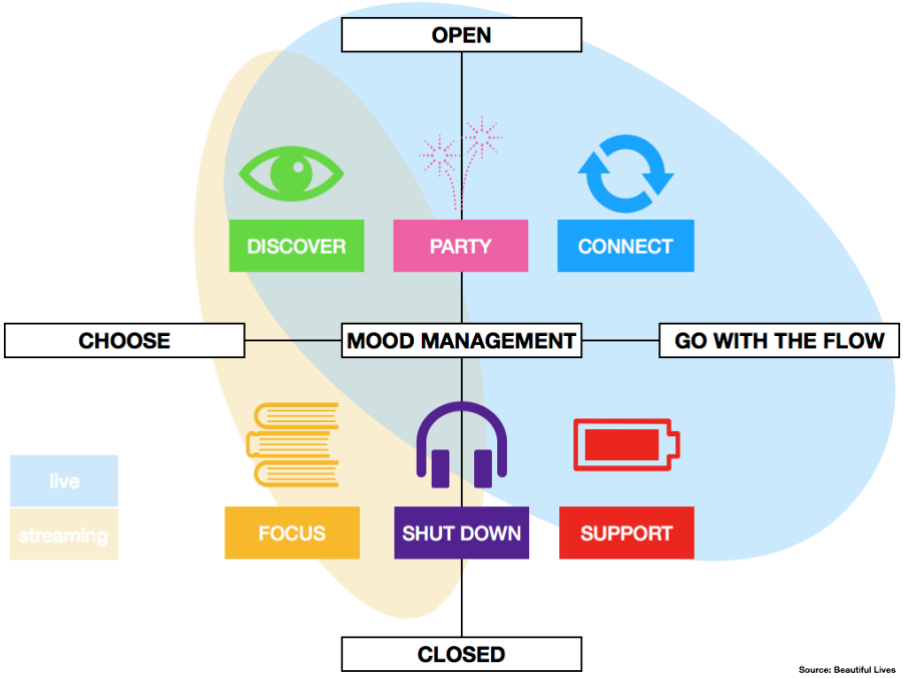

Figure 2: Mood Management Matrix by Beautiful Lives

In figure 2 we should integrate the passive vs. the active user. So therefore two user journeys will be created. We can safely assume that a more passive user is less likely to be willing to interact with the DJ or station. Here we can think of ways to get him/her to participate, think of e.g. a push notification - which may bring a passive listener into action.

Also a distinction must be made in short term and long term use cases. Below we will elaborate on possible use cases for each term.

2.2. Possible User scenarios

2.2.1. This is Grover…

Grover is a guy in his twenties, active on social media (Facebook and Instagram) and a big fan of Coldplay. He listens to the radio using the radio station's app, mainly in the morning, whilst getting ready for work, and in the evening, while preparing dinner. Grover frequently makes use of the app's song voting functionality. Being a Coldplay aficionado, Grover has expressed multiple 'thumb up' votes for Coldplay songs since he started using the app.

Whilst his 'live' radio listening patterns amount to only about an hour per day, Grover is connected with the radio station nearly 24/7, via posts by the radio station on social media. One day, during his lunch break at work, he receives a push notification from the radio station app to participate in a contest to win backstage tickets for a Coldplay concert next

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month. This notification was not sent to all users of the app, but only to those linked with Coldplay (e.g., deducted from song approval ratings expressed via the radio station's app). He taps the notification and is brought right into the app, where he can answer the contest question instantly. All contestants' answers are grouped in the MARCONI app for the radio crew, where winners can be picked either randomly or based on some evaluation criterion (e.g, quality or novelty of the listener contribution to the contest). By sending a push notification to a defined segment of listeners, as well as advertising the contest on the linear radio broadcast, the radio station reaches a larger group of people to participate in the contest.

Two minutes before the winner is announced, Grover gets a push message with a call to action to turn on the radio. Grover is unfortunately unable to comply, as he is currently at work. Luckily, directly after the winner was announced on the radio, the radio station also communicates the outcome of the contest as a push notification. At the same time, a message appears on Facebook, Twitter and Instagram with an option to re-play the audio clip of the winning listener. The message also holds a photo of the winner, scraped from one of his or her Social Media profiles. It turns out that Grover unfortunately did not win the contest, yet as a consolation prize he gets on the radio app an exclusive invitation to watch the future Coldplay concert live. This invitation is sent only to the people who have participated in the competition. Some time later, after the concert has taken place, the winner sends photos and videos about the event to the radio station (using the radio station's app), who in turn employ them to strengthen their online coverage of the concert (i.e., the photos and videos are posted on their website, Facebook and YouTube channel).

A central feature in this user scenario is the notification. To make this more tangible in short term, we created a new user story together with the radio makers called "Notify Me" as described in the following paragraph.

2.2.2. NOTIFY ME

This scenario highlights one element from the user scenario This is Grover…", namely that a user gets notified when something the radio system thinks is important for him will happen or is announced on the radio.

We made the assumption that the user has some degree of FOMO (fear of missing out) and that he/she needs a hand to stay up to date. In the "Notify Me" case VRT Studio Brussel can be that active guide.

Our goal is to make sure that the user gets a notification on the right moment with a trigger to the right content for him/her and engage him/her more with the live radio stream.

The full use case: Jessica is sitting on the train. She receives a notification. It's Studio Brussel, notifying her there is a new single from the Foo Fighters. The Studio Brussel app launches and instantly plays the new Foo Fighters single. Jessica grabs her earbuds and starts listening. She listens to the entire song but didn't really like this new song. And when the app asks what she thinks about it, she taps dislike. The app then asks her if she still

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wants to receive notifications about the Foo Fighters. Jessica taps 'Yes', after all she still likes the Foo Fighters, just not this song in particular. Jessica remains listening to the Studio Brussel app for the rest of her commute.

Below an extract of the visualization of this use case:

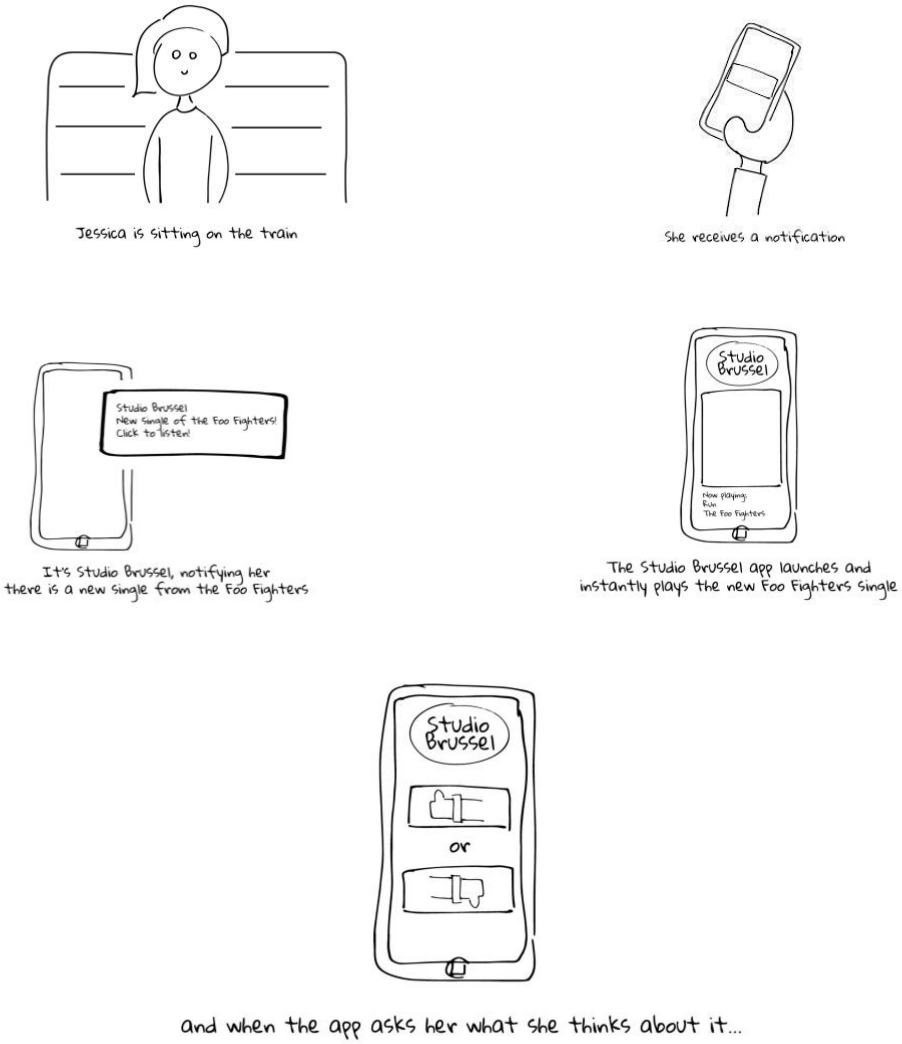

Figure 3: "Notify Me by VRT"

2.2.3. MEET ERNIE...

Contrary to Grover, Ernie is an all-day, loyal radio-listener who follows discussions throughout the day live. During the news, an incident is mentioned which is happening around the corner of where Ernie lives. He goes out to see what's going on there and makes

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some photos and videos, as well as an audio recording with some of the bystanders. He doesn't have the radio station's app installed on this smartphone, but luckily he can also share his content with the radio station by using a specific hashtag on Twitter and Instagram. Incoming content is automatically tagged by the MARCONI system, which facilitates discovery and curation by the editors. When Ernie's contribution is later used by the radio station (as part of their linear coverage of the involved incident), he's referenced by the radio presenter and his profile status increases. Future content sent in by Ernie will be ranked higher, based on this status.

2.2.4. HELLO ABBY!

Abby's work is a one hour drive from home, which inevitably results in a minimum of two hours lonely car driving per day. Fortunately, this is compensated for highly by tuning in to her favorite radio station. One day, that one song she loves but doesn't know the title of is playing on the radio. Alas, traffic is heavy and she didn't have the time to Shazam it or to look up the radio show's playlist using the app. A busy day at work follows and she forgets about the song until the week thereafter. She can't remember which day she heard the song, but she can remember it was last week and an announcement of a heavy accident with a tilt car was aired just before this song. She opens up the chat tab in the radio app and types 'Which song was playing last week just after the traffic announcement of the accident on E40 with the tilt car?'. The automatic bot of the MARCONI system analyses this sentence and returns a list of three possible songs, with 30-second previews. When Abby plays the second preview, she finally hears the song she's been looking for for years. She marks this song as the right answer, which is fed back to the MARCONI system for enhancing its reasoning algorithms that are responsible for the automatic response generation. The bot then asks whether she wants to star this song and if she wants a notification when it's played again on the radio. She convincingly answers 'Yes!'. A couple of weeks later, Abby gets a push notification with a call to action to turn on the radio. Two minutes later, the song is aired on the radio with compliments to Abby.

2.2.5. "DAILY"

This use case is for the long term and we have to investigate if it's feasible and in scope within the MARCONI project.

The hypothesis of this use case is that the radio schedule is not aligned with the time schedule of the user. For example, you have a 45 minute commute. In that timeslot you would like the hear the latest news, starting from the beginning of the show. If you hop on your car and you halfway fall in an item, that can be annoying and can give a user an incentive to switch to other services like Spotify/YouTube/etc., when he/she does not find what he/she wants.

The question was how we could make sure the user can listen to a combination of personalized content from the radio playlist and the radio live stream on the relevant time and place for him/her. When commuting we assume listeners would like to have a listening

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flow with a beginning and an end and not start e.g. their travelling half way in the news segment.

Jerry is sleeping. While asleep, the app is processing Jerry's agenda. It also looks up the current traffic update and it calculates the ideal commute time. A bit later, at 7:13, the alarm goes off. Jerry awakens and the radio starts playing. Jerry gets ready with the radio in the background. At 8:00 there is a new news update available. Jerry chooses to listen to it while on the road. Jerry is ready to go, he gets in his car and is on his way. The system calculates an entire playlist for Jerry to consume while commuting, consisting of a mix of personalized content and live radio. Once in his car, the radio starts playing the news update and afterwards continues with the calculated playlist. Even though in traffic, Jerry is a happy man.

Figure 4: "Daily by VRT"

In the mean time NPO is creating a possible client journey for a personalized audio concept. We have spoken to a couple of internal stakeholders and what's funny to see is that 'the cutting of fragments' is not enough. Every fragment should contain a certain flow. So when cutting 'live' audio fragments, the radio makers should create a new format, with a beginning

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and an end (and add radio jingles - else the difference between personalized content and live radio would be too much). So we have to keep this in mind when we further develop this use case.

2.3. Conclusion and next steps user scenarios

The above scenarios prove the feasibility to connect with people, even if they're not listening to the radio linearly, in an individual and personalized way. They also emphasize the need for an overall, integrated and organized view on listener interactions for the radio station crew. When contacting people on air, there is also the advantage of being maximally informed about that person (as exemplified by the radio team's experience scenario), to predict how s/he is going to react. Finally, the scenarios highlight the benefit of only selecting the relevant users to relay a push message to (instead of buggering every user upon every request), using the communication medium of their liking. These use cases are mainly related to the objectives 1 and 3 of the project

As stated in chapter 2.2, push notifications are a recurring feature in multiple user scenarios. In order to test those assumptions made, the VRT and NPO will try to do a small test in december with personalized push notifications. NPO would like to try a push notification system via Facebook Messenger during the popular Top 2000 (NPO Radio 2). Due to timings the decision is made to only use the in-app push notification system and not create a Top 2000 chatbot within the Messenger environment. We can only collect data if this option is

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used. Depending on the usage, we can decide if the data is relevant.

Figure 5: Example of in-app push functionality in NPO Radio 2 app

VRT has an interactive tool "Wall Of Moments", which is implemented in their radio apps. They will analyze if this user scenario can already be used for "De Tijdloze", a format where listeners can vote for their three most favourite songs of all time (VRT Studio Brussel), also broadcasted at the end of the year. Furthermore they will make a technical analysis with PluxBox to explore how they can work together. From these short term cases we can already take the learnings into the next steps of the project.

The use cases for the user still have to be sharpened. The NPO, VRT and radio Stadtfilter together with Hasselt University will develop several use cases on the mid and long term for end users and professional users (e.g. editorial teams, DJ's), which should be converted into prototypes, that are developed and tested in the pilot phase of the project.

2.4. Professional User scenario | Radio team & MARCONI

MARCONI can help editorial teams in creating more engaging content. Possible outcomes for the editorial teams can be found below.

During their afternoon radio show "Bert Max", presenter Bert and editor Elmo like to discuss hot topics from that day, hereby maximally involving listeners' opinions on the subject(s) at hand. In the MARCONI editorial dashboard, Elmo is presented an overall, integrated view of what's happening in terms of listener interaction and engagement in one glance, on one screen. This view includes SMS input, phone calls, Tweets, Facebook/Instagram messages and listener interactions collected via any relevant third party API configured in the MARCONI system. This live feed is customized per show, by following different hashtags or by connecting to different APIs. Furthermore, some of the posts are location based, which enables the editorial team to view (the provenances of) this live feed on a map, too.

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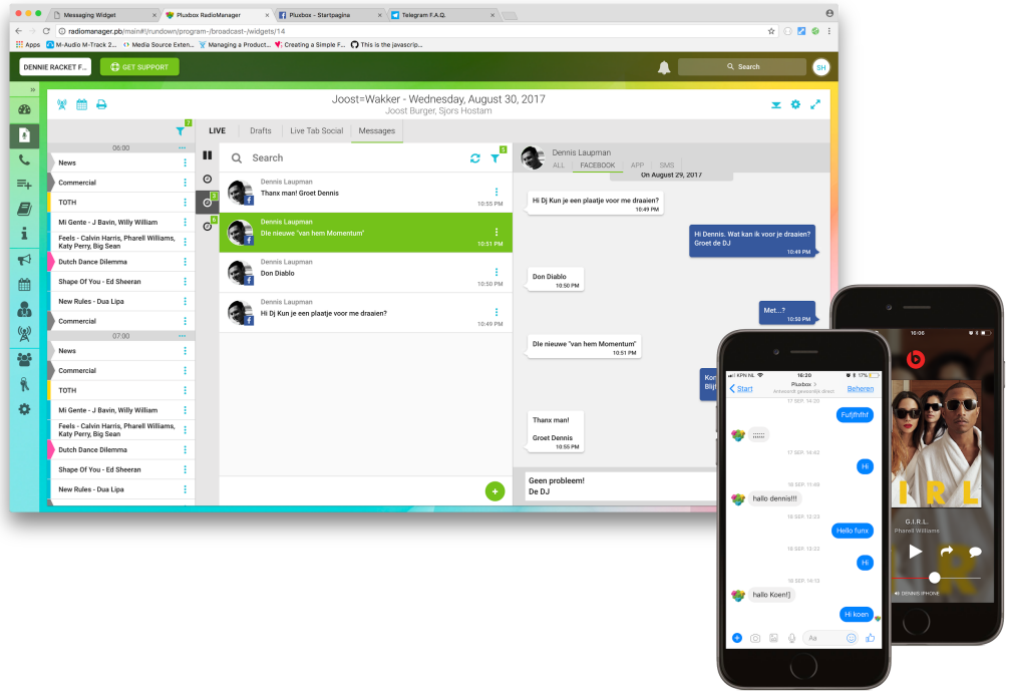

Figure 6: Example GUI of direct messages like SMS, Wall of Moment / (phone) App and Facebook Messenger

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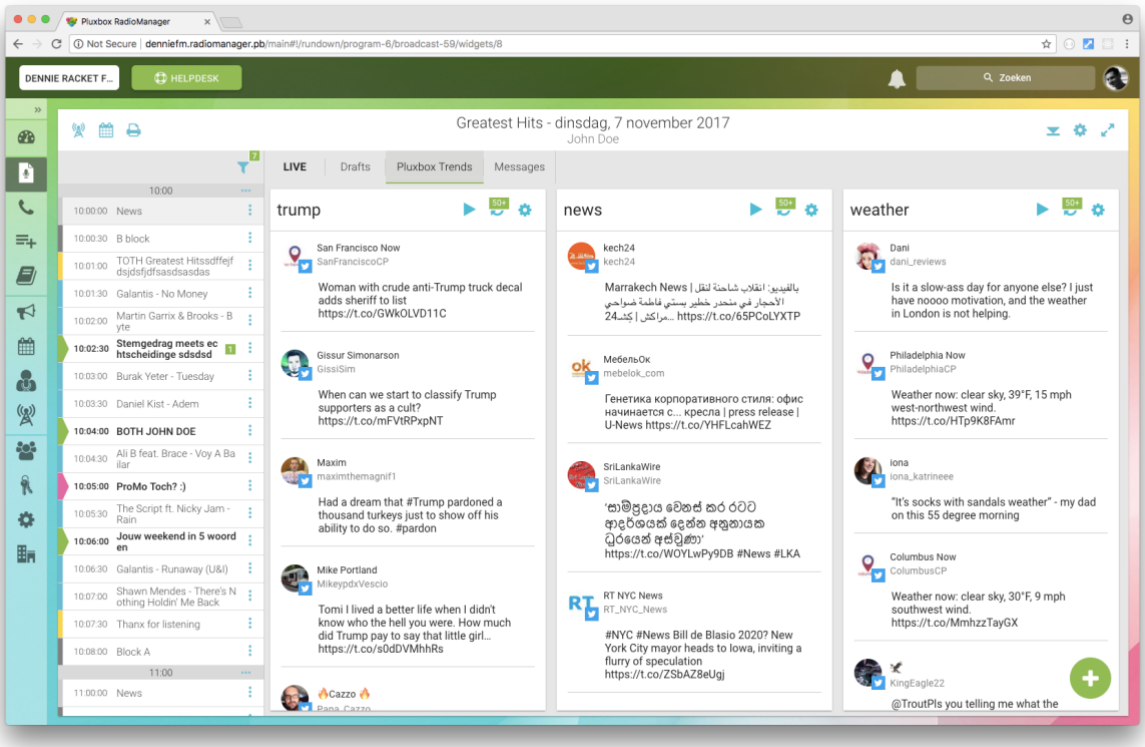

Figure 7: Example GUI of trending topics on Twitter or Instagram.
You can filter them by Hashtag or location (e.g., the vicinity of a festival or event).

Today's trending debate concerns a popular music festival of which the organizers have just announced their intent to organise the event not one, but two consecutive weekends this year. This announcement has sparked a fierce discussion between the pro-camp (e.g., festival-goers who really want to attend but were unable to secure tickets for the first weekend) and the con-camp (e.g., the neighbourhood who have to deal with an extra weekend of nuisance). Elmo has tweaked the MARCONI system to zoom in on this discussion, by following appropriate Twitter hashtags and by connecting to relevant third party data sources. In the MARCONI editorial app, Elmo is presented an overall, integrated view of what's happening in terms of listener interaction and engagement surrounding the trending topic in one glance, on one screen.

At some point during today's radio show, Bert and Elmo jointly decide to explicitly elicit feedback on the music festival topic from the pro- as well as the con-camp. Using the map in the MARCONI editorial app, editor Elmo is able to select all users (who are known to the station) in the vicinity of the town where the festival takes place. Using the straightforward interface, he sends them a push notification with the discussion topic and the question to join the discussion by sharing their opinion in the form of a textual message or by recording a short speech memo. Elmo then uses the MARCONI editorial app to send the same push notification to a group of listeners whose profile matches that of the festival's target audience (e.g., people of 16-40 years old, interested in dance music). Elmo configures

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intelligent agents to automate part of the subsequent interaction with listeners (e.g., by sending an auto-generated reply acknowledging each individual contribution by a listener) and to filter the most relevant standpoints. These standpoints are automatically categorized in pro and con groups to allow for easy management by Elmo. Opinions can additionally be tagged manually by Elmo for even finer granularity. When a relevant opinion comes up, he brings it to the attention of Bert, who weaves it into the radio show. The MARCONI editorial app also displays the persona of the author of the current standpoint and whether s/he is available for a live interview on the radio. Based on this information, Elmo can initiate a live interview which is subsequently handled on air by Bert. At the end of the radio show, highlights are sent to people who contributed to or showed interest in this episode. This task is again automated by a MARCONI agent configured by Elmo. The way the highlights are disseminated to individual users depends on their respective communication preferences, as shared by them with the radio station and stored in an internal MARCONI data warehouse. In particular, the agent will autonomously decide to distribute the discussion highlights to an individual user in the form of, for example, either an interactive story consumable via the radio station's dedicated app, a link to the online story on Twitter, or a short digest via SMS. An easy-to-digest summary of the discussion is also posted online, in a publicly accessible fashion.

2.5. Next steps professional user scenarios

The professional use cases are mainly related to objective 2 and 3 of the project. The use cases for the professional users have to be elaborated and sharpened in the same way as for end-users. The use cases for the end-users are a starting point for the professional users. We have to organise workshops with our end-users and have interviews with editorial teams and DJ's in order to finetune the cases, i.e. match the user needs with the possibilities and wishes from the editorial teams. Next steps are to rewrite the scenarios into viable cases where the need for the user and the need for the editorial team are measured. Each case, when tested, will provide us with valuable insights needed to tighten the concept of MARCONI. Finally the uses case have to be converted in prototypes that are developed and tested in the pilot phase of the project.

3. MARCONI | Methodology

3.1. User-driven approach

The MARCONI methodology will be largely user-centric. Stated differently, considerable efforts will be invested in consulting the envisioned MARCONI stakeholder groups to inform the design and development of the MARCONI concept. In this context, important activities at the start of the project will be requirements establishment and use cases specification, which will be carried out in close collaboration with representatives of the different MARCONI stakeholder profiles. Once an initial set of requirements and use cases will have been established, mock-ups and functional prototypes will be developed that will be evaluated by

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their respective target audiences to assess to what extent they address the identified requirements and how well they match with stakeholder expectations. Finally, the MARCONI proposal accommodates controlled as well as open piloting as an ultimate means to collect real life feedback on the integral MARCONI concept under (semi-)realistic deployments and thus ensure that the final outcomes of the project have a great market fit.

3.2. Continuous validation

Throughout the entire development of the MARCONI concept, prototyping and piloting will form an essential factor. The use of early-stage mock-ups and and later-stage functional prototypes will help to elicit feedback from involved stakeholder groups and will guarantee that developed MARCONI solutions align neatly with either the needs of the radio production market or the desires of listeners. Parallel to this prototyping effort, which will primarily concern isolated MARCONI functionalities and features, larger scale pilots will also be organized to verify the usability of the MARCONI concept as a whole. To maximize the market potential of the MARCONI concept, an open piloting phase, accessible to parties external to the project consortium, will be organized at the end of the project's lifecycle. The prototyping effort will be led by Hasselt University with its extensive experience with investigating and developing application layer innovations in the multimedia domain.

3.3. Agile approach

MARCONI will adopt an agile design and development approach that will be sufficiently lenient to cope with volatile end user requirements or longer term market evolutions. Prototyping and piloting tasks will be conducted throughout the lifetime of the project to collect feedback from the different stakeholder groups targeted by the MARCONI concept. The resulting insights will be fed back into MARCONI's design and implementation, this way giving rise to an iterative development process that maximally leans on, and is able to adapt to, prospective customer feedback. As a specific driver for the envisioned feedback loop, the consortium anticipates the deployment of an always-on prototype, accessible to (a subset of) MARCONI's radio stations (VRT, NPO, StadtFilter), with a bi-weekly software update cycle.

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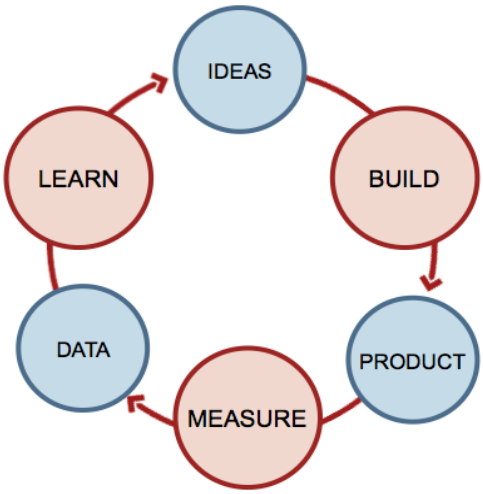

Figure 8: Eric Ries' Lean Startup feedback loop

The plan is to have three consecutive intensive SCRUM development cycles, each lasting for 5-7 months and leading to a stable version of the platform useful for large scale piloting activities. In between the SCRUM cycles, large scale piloting activities will take place around big events in which the radio stations participate.

3.4. Loosely coupled design

The innovations offered by the MARCONI concept will be compartmentalized in the form of dedicated services or so-called agents. These services will either offer customer-facing functionality or will be intended to act as building blocks that can be integrated to yield more multi-faceted, composited services. Agents will advertise clear input/output interface contracts to allow service composition. The advantages of a modular design that is centered around loosely coupled services are numerous:

- isolated development and testing of individual features ;
- increased flexibility and modularity (i.e., substituting the implementation of a service will not impact the operation of the services that depend on it);
- platform freedom (i.e., different services can run on different platforms);
- scalability (i.e., services can be deployed in a distributed fashion);
- the ease of composing complex services by mashing-up verified and validated components.

3.5. Legal assessment and privacy validation

Privacy as a core aspect is addressed with several elements of the MARCONI approach. The

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move from an anonymous service to a personalised platform with evident advantages for the user must be based on a best-practice privacy policy. The data subject has to give informed consent if they like to participate through this interactive radio platform. Different legal frameworks for a political agora or for catastrophes will be also analysed.

Privacy-enhancing technologies will be implemented based on a Privacy Impact Assessment. The platform offers the data subject easy access to his existing data, its sharing status and the datasets that have been actually shared. At any time, the data subject can change the share status and conditions of any data at will.

4. MARCONI | Pilot activity plan

In terms of validation of the MARCONI platform and its concepts, the plan is to extensively perform demonstration and piloting activities throughout the project. This meets objective 4 of the project. A total of four distinct piloting activities have been identified. These are:

1. Baseline measurement and data collection at the very start of the project;
2. Continuously running pilots at one or more radio stations;
3. Two large scale pilots focussed around large live events which already involve radio stations;
4. Open piloting activities involving external stakeholders in the final stage of MARCONI.

Additional stakeholders will be attracted (among others) through the dissemination channels provided by the European Broadcasting Union (EBU) and the Association of European Radios (AER), to which consortium members are closely connected.

5. MARCONI | Stakeholders feedback

The MARCONI system can help radio makers and radio stations realize their vision of a next-gen, fully interactive and personalised radio experience. We explained the concept of MARCONI and personalised radio to a couple of radio makers and broadcasting companies within the Netherlands. Their first response was positive and they were quite eager to learn more on MARCONI, as they are looking for ways to better connect with their audience and give their audience as well as radio makers better opportunities to easily interact with each other. Also they were looking for ways to personalise the radio experience. As we were curious on their perspective on personalised radio, we asked them about their vision of on personalization and what should we take into account when working on our use cases with regards to personalisation. Here are a couple of remarks which we believe are relevant for the MARCONI project:

- What is the starting point of the listening experience? With what mood will they start the app/ tune in, and how can we adapt our content to their moods so they instantly get what they want. This part will be examined in brainstorm sessions between mid november and January.

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- If you give your personalised content a skippable function, do keep in mind that people not always skip content because they don't like it. They may as well do this because they are eager to find out what's in store for them. So we have to be careful in how we interpret buttons/functionalities. A skip doesn't have to be negative, it could be out of curiosity.
- How can MARCONI be connected with voice devices like Alexa? What does this mean for the user stories and can we add voice recognition to the platform? We have to investigate on this.
- When personalising: keep in mind the context. When you provide content in a relevant context, people will tend to engage better with the provided content. Also adjust content to the time of day. Sync with the rhythm of your users.
- And with regards to the content: make sure that you not just cut & share it. When engaging with audio formats from your brand, people expect a radio experience. So start the audio format with a jingle, announce content, and end it like you would on air.

The last two points focus more on content. Which is good to keep in mind, as a personalised radio experience can only function when context and content are fitting. Of course as the project evolves more feedback is generated and will be used to sharpen the concept. We are looking forward to give updates about our progress.

6. MARCONI | Next steps

We have to concretise and elaborate the uses cases in more detail. Therefore we have to organise interviews and workshops with end-users as well with editorial teams. This needs to be done at VRT and NPO at least. We have to decide what fits in the MARCONI scope of the project and what doesn't. For each use case we have to determine the feasibility and in which period of the project they can be developed and executed (short term, mid-term or long term).
The uses cases must be converted in prototypes. In the meantime we have to develop a technical framework and be sure the framework fits the prototype needs.

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