



D1.2 – FuturePulse Requirements v1

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Author/s: Quimi Luzón (BMAT), Sophie Andersson Hammarbäck (PGM)

Contributor/s: FuturePulse Consortium

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Author(s)	Quimi Luzón (BMAT), Sophie Andersson Hammarbäck (PGM)
Contributor(s)	FuturePulse Consortium
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1 Executive Summary

This deliverable presents the analysis of user requirements for the FuturePulse project. This analysis resulted in the first version of the requirements to be implemented and the data sources needed to accomplish this implementation.

We present in this document all the approaches we have made to industry stakeholders and reflect their wishes in the set of requirements we have come up with. These requirements will be redefined iteratively as we continue to understand the needs of all the music industry stakeholders we address.

This document includes the definition of these requirements by the three use case leaders: Playground Music (record label use case), Bass Nation (live music use case) and Soundtrack Your Brand (music platform use case).

This deliverable is intended to highlight the importance of progressive definition of requirements, which affects the whole project and its proper development.

It also describes the methodology carried out by both the use case leaders and FuturePulse technical partners during the definition of the requirements.

Here are also presented the decisions made by FuturePulse consortium in terms of technical feasibility and data sourcing evaluation, as well as the considerations taken to categorize the requirements in terms of typology.

This document also includes requirements that have been identified as possible future implementations in the platform.

2 Introduction and Relation to other WPs/Tasks

The co-design of the FuturePulse project is strongly related to the analysis of the user requirements.

The use cases of FuturePulse and the resulting platform are only possible after this co-design process, which follows the examination of the existing music platforms and applications with similar functionalities to FuturePulse already performed and materialized in the deliverable 1.1., Music Industry Innovation Report.

The definition of the requirements will also define the music features, data sources and its collection process executed in **WP2 – Data Collection, Analysis and Indexing**. The technical feasibility of most of the user requirements is totally aligned with the availability of music data sources. Then, this deliverable is related to **WP2** in a decisive way.

In a similar way as in WP2, the progress of **WP3 – Predictive Analytics and Recommendations** is determined by the definition of the user requirements. The diverse granularity of popularity is defined in several of the user requirements described in this document, as well as audience profiling.

FuturePulse architecture and platform design, carried out in **WP4 – Platform Integration and Application Development** tasks, is also dependent on the user requirements described in this document. Requirements will give specific focus towards FuturePulse system architecture.

In a direct way, the user requirements will dictate the path-forward in the development of the three FuturePulse pilots. The design, planning, operation and validation of the three pilots define **WP5 – Pilots and Evaluation** tasks.

2.1 Purpose and Scope

The overall goal of the requirements study is to collect, analyse and synthesize the requirements of music industry stakeholders. After the first stage of the analysis, the results are exposed in this document. In this stage we considered to define high-level requirements from use cases, with the focus set on developing open user scenarios.

The main stakeholders of FuturePulse are divided in three categories. For record labels, which user scenarios were defined with two test cases in mind: an album from an internationally recognized band and a hit by a music producer on musical platforms. This could be conceived as a limitation of the scope of the requirements, but the aim of this approach is to define highly extensive requirements for this use case. The study of these user scenarios has resulted in requirements focused on the area of audience measurement and prediction.

Live music stakeholders, consisting in venues, promoters and festival organizers, are now focused on a complex ecosystem: electronic music. Data from electronic artists and events is more complicated to gather than in other genres, which makes more difficult to elaborate analysis and prediction tools for this case.

Music platform stakeholder requirements are defined by the needs of B2B music platform users. After a survey (comprehensively explained in section 3.2) that reached hundreds of responses from key stakeholders, some requirements had to be redefined. There were also changes in requirements priorities after interpreting survey results.

Live music and music platform requirements, focus primarily on the areas of music attributes and metadata acquisition, although audience prediction tasks are also required.

During the following months, more industry experts and key people -especially from the record label and live music sides- will be approached by means of an online survey distributed via mail.

Another document (D1.4) will be delivered at the end of FuturePulse co-design process, after the second user requirements analysis process. There will also be described co-design activities such as dedicated workshops.

After the preliminary user scenarios are configured, the emphasis will then focus on defining user stories and the functional requirements associated to them.

A proper configuration of user scenarios and subsequent requirements analysis will let us understand the user needs and smoothly distribute the tasks to perform during the whole duration of the project.

Outstanding work at this stage of the project is crucial for the rest of project activities, having a special relevance in forthcoming activities such as the development of FuturePulse architecture and large-scale pilots.

The architecture design and definition will be provided in a more technical deliverable (D.4.2), where will be detailed the technical specifications of the expected FuturePulse platform and its modules.

2.2 Methodology and Structure of the Deliverable

This document is structured as follows:

- Section 3 describes the methodology carried out in the definition, evaluation and validation of the user requirements. It is also described the criteria decided by the consortium to cluster all the requirements.
- Section 4 defines all the user requirements, divided among the three use cases of FuturePulse project: Record Label, Live Music and Music Platform.
- Section 5 describes the methodology carried out in the definition, evaluation and validation of the user requirements.
- Section 6 concludes the document.

3 Methodology

One of the goals of FuturePulse is to be positioned in the highly dynamic landscape of online music. With this purpose in mind, all the partners are involved in the definition of the open user scenarios and detailed user stories organized around the three project use cases.

A wide understanding of the market and its stakeholders started with the study conducted during the configuration of the first version of the Music Industry Innovation Report (D1.1). This document sets out the opportunities and the expectations from FuturePulse by all the stakeholders, inside and outside the consortium.

The methodology adopted involved both technical developers and music industry stakeholders, so we needed to create an understandable environment where all partners engaged could understand the needs and wishes of the users.

It was also a priority to achieve some characteristics that user requirements had to meet given their relevance to the rest of tasks and developments in FuturePulse. All requirements must be:

- Understandable and unambiguous, any open issue about different ways of interpreting a requirement definition should be clarified.
- Consistent according to the motivation of each user scenario.
- Relevant for, at least, one stakeholder group.
- Traceable, they must include information on author, feasibility, etc.
- Feasible or, at least, the feasibility of the requirements will be analysed, and technical partners will evaluate if the requirements can be implemented within the scope of the project.

The set of requirements has been configured through an iterative process, until these requirements meet the characteristics above defined and the technical side of FuturePulse had the information enough to distribute and contextualize the work among the tasks within the scope of the project.

Based on these characteristics and technical feasibility, requirements were initially categorized with three colours: a) **green**: the requirement is unambiguous, consistent, relevant and there were identified the tools and data sources needed to achieve it, b) **yellow**: some of the characteristics and/or tools needed are not identified yet and c) **red**: a broader study is needed to understand or meet the proposed requirement and assess whether it is in within the scope of the project.

Although we have come to define a broad set of requirements that covers much of the industry's needs, this iterative definition process will continue to be carried out throughout the rest of the project. This progressive process will be reflected in the new version of the requirements, presented when the project is at an advanced state of progress. Once the needs of the entire range of stakeholders have been collected, several joint working sessions have been dedicated to a) fully understand the descriptions and motivations for each requirements and b) evaluate technical feasibility of the initial requirements.

After the technical feedback has been provided and the reviewed by the user case leaders, the requirements were modified according to what has been discussed.

This activity had been done in a weekly basis, through regular working sessions, until a workshop was held to reach the final version of the user scenarios. During this last session, we carried out an exhaustive one-by-one review of the requirements.

During these iterations, many decisions have been taken regarding the technical feasibility of the requirements, the clustering of user scenarios (described in section 3.2 and from which three groups are derived: audience metrics, music attributes and additional metadata) and tools and data sources needed.

A pivotal topic that had to be taken into account during this iterative process is the data sourcing due to the characteristics of the scenarios. Both forecasting and characterization activities need accurate data on which to rely and be developed.

Other iterative process in which use cases were involved is the definition of relevant music genres. Due the heterogeneity of the music industry ecosystem, the use case leaders needed to work in a connected and related list of music genres. This made it possible to limit the wide range of musical genres to a finite list of categories that can be used to make the developments in which the genre analysis was implicit.

We obtained two different genres lists. One list tries to collect all the genres with which FuturePulse will work, and another relates a great variety of electronic music sub-genres to a wider genre.

3.1 Requirement structure

Each requirement is divided in the following sections:

- **Short title** – Short but descriptive title, helping to contextualize what is described in the following sections
- **Description** – Self-contained description of the requirement, from which it must be possible to extract the information necessary to assign a technical manager and link with the necessary tasks of the project.
- **Motivation** – This section must describe the reasons that led the use case leaders to consider the requirement, providing information on the relevance of the requirement to the industry.
- **Priority** – It should measure the relevance and necessity of the developments derived from this user scenario. It must also consider the importance of its achievement for the success of FuturePulse.
- **Preliminary technical assessment** – This section is the result of all the technical evaluations made during the user scenarios definition process. It must, if possible, provide information on their market presence.
- **Linked task** – FuturePulse tasks that must be carried out in the direction marked by the fulfilment of these requirements.
- **Technical partners engaged** – Consortium technical partners that will lead the processes associated to the tasks linked to this requirement.
- **Data availability and sourcing** – Data sources and data provider (if applicable).
- **Cluster** – Categorization of each requirement based on its characteristics and data sourcing

3.2 Stakeholder involvement (survey)

As a part of the task of identifying valid and correct requirements for the background music streaming platform use case (SYB) we conducted an online survey with different kinds of businesses in eight countries: United States, United Kingdom, Sweden, France, Germany, Spain, Italy and Greece.

The purpose of the survey was to understand how restaurants, retail stores, bars, hospitalities, gyms, supermarkets, dentists and medical practitioners, entertainment establishments, cafés, and other forms of companies are using music in their venues, as well as what kind of audio and sound variables they see as most important for their businesses, providing useful input for what user requirements to focus on.

Recommendation and discovery is key in the FuturePulse project. For this use case the recommendation and discovery of what music to play in commercial establishments is central.

3.2.1 General description of methodology and tools

In total, 42 questions were asked. These questions were decided upon through an internal process where we put much effort into formulating questions that would be appealing and interesting. Since businesses usually have more important things to do than answer to a lot of questions, we decided to use simple Likert scales for most of the questions, making the answering process as easy and quick as possible. The average time for filling out the survey was 9 minutes.

Survey Monkey was used for constructing the online survey and Cint.com was used to find the correct respondents. In total, 791 respondents, each respondent representing an individual company, answered the survey, with this geographical composition:

Country	Nr of resp.
United States	124
United Kingdom	103
Germany	102
Sweden	102
Italy	102
Spain	101
France	95
Greece	86
TOTAL	791

3.2.2 Target groups and business types

For the SYB use case, retail stores are the most important businesses area, where the largest increase of music usage is also happening. Therefore, 27% of total businesses were chosen among retail stores.

To get as broad and large a picture of the music needs among businesses we tried to reach out for both large and small companies. A few of them had more than 5 000 locations (a location being a single physical establishment), while the majority of the respondents came from companies with 1-5 locations.

Business area	Nr of resp.
Restaurants	75
Retail stores	219
Bar & Night Club	37
Café & Bakery	43
Hospitality	92
Gym & Fitness	29
Supermarket	29
Dentistry & Medical	43
Wellness & Beauty	86
Leisure & Entertainment	162
TOTAL	791

Size (nr of locations)	Nr of resp.
1	476
2-5	132
6-10	43
11-25	33
26-50	20
51-100	14
101-250	10
251-500	14
501-1000	7
1001-5000	5
More than 5 000	10

This selection of businesses provided a good sample for understanding the needs of companies when it comes to music usage in regard to the streaming background music platform use case, and made it possible to confirm which requirements that are the most important for Future Pulse to focus on.

3.2.3 Results and impact of the survey on requirements definition

There were large differences between the different countries regarding whether music was used at all in the premises. In USA, 86% of the respondents played music in their businesses, while only 47.5% played music in Spain. This correlates well with SYB knowledge on where the background music business is more or less developed, giving an opportunity for FuturePulse to provide better solutions than existing.

Country	USA	UK	Sweden	France	Germany	Spain	Italy	Greece
Play %	86%	64%	61%	49.5%	54%	47.5%	53%	59%

One important issue that respondents highlighted was how they wanted music to influence "moods", as well as to maintain specific "energies" in retail stores or other establishments. The majority of the respondents said that energy levels are one of the main reasons why they choose to play music at all, and how music influences moods was the most important variable. Another important reason for playing music was that the companies felt music was an important tool for developing their brand.

A surprising result was the differences between countries when it comes to the legality of the music played. In United Kingdom i.e., companies deemed it very important that the music they played in their locations were legally cleared for commercial use, while it was not as important for companies in France and Germany.

Another surprising result was how many of the businesses that were not using any commercial solution for their music rotation, but instead used regular consumer focused platforms like YouTube, Spotify and Internet radio.

Platform (multiple choices)	% of resp.
YouTube	56%
Spotify consumer	38%
Internet Radio	27%
Windows Media	26%
iTunes	26%
Soundcloud	18%
Apple Music	17%
Pandora for Cons.	14%
Play Network	6%
Wimp/Tidal	6%
Sonos	6%
Pandora for Busin.	6%
Soundtrack Busin.	5%
Mood Media	3%

When the respondents were to rank how important different variables in music were in regard to their customers experience, willingness to purchase, satisfaction and willingness to stay longer, mood became the highest. Most of the respondents also highlighted that knowing how music influence the mood among the staff is important. The six most important overall requirements for these businesses were:

1. Music that influences moods and feelings,
2. Music that upholds a certain energy level (depending on what kind of business it was, some businesses wants lower energy levels, other higher)
3. Recognition levels of the music being played,

4. The tempo, or BPM, of the music being played,
5. The genre of the music,
6. How popular music is among the customers to the business.

Previous to the survey, the project had ranked the importance of the requirements in a different order, hence the survey made it possible for us to understand which requirements that are the most important to focus on. Future Pulse can here provide a novel solution making it possible for background music providers to base the choices, recommendation and discovery of music for businesses, on parameters that does not exist on the market today, such as what moods the music is creating for a certain brand, the level of recognition of music in a territory, energy levels etc.

An interesting finding was that results differed somewhat between different countries, something to take into account for the streaming music platform use case. Although music's influence on moods where the most important, there were f.e. differences between countries like Germany and Spain, where German businesses thought music and moods were 25% more important than in Spain.

Another big difference was the requirement of being able to filter explicit content, were businesses from USA, Spain and Greece thought it was very important to filter out explicit content, while countries like Germany and Sweden did not believe it to be very important. Overall one can draw the conclusion that countries where religion has a larger importance, the requirement of filtering out explicit music becomes essential. Businesses in USA believed that explicit content had 30% more effect on their customers purchase behavior, than f.e. in Germany.

Differences can also be seen when it comes to how businesses believes that the genre of music, influence how long customers are staying. Respondents in Greece thought that the genre being played influenced customer's length of stay 23% more than businesses from France.

Another finding was that different countries value the country of origin of a track differently. In USA and Spain, the importance of the origin is clearly higher then in Germany and Sweden. Businesses in USA believed that the country of origin for the music hade 28% higher impact on customers satisfaction then in Germany.

Fade in and fade out on tracks, was another requirement that we tested towards the respondents. Situations when the music is disappearing can have a significant effect on the mood and feeling in a physical environment. Businesses believed that avoiding such situations would have most effect on customer's satisfaction levels.

Overall, the survey has given us a very good view over which requirements to focus on for the SYB use case in the FuturePulse project. There are still a lot of data to analyze, and it will be further analyzed and followed up with a second study in additional countries.

3.3 Clustering considerations

For a better understanding and workload distribution, requirements are classified into three clusters: **audience metrics**, **music attributes** and **additional metadata**.

3.3.1 Audience metrics

This cluster tries to gather all the requirements related to the understanding of the impact of music within several audiences. Target audiences' relevance are different for the many stakeholders involved.

The analysis of the audiences must consider different markets, ages, audience gender, music genres, etc. Many of these metrics are not provided by any platform in the market, so this analysis will result in complex and state-of-the-art quantized metrics to be managed by the FuturePulse platform.

<i>PGM_REQ#1</i>	Predict streaming based on artist reference groups
<i>PGM_REQ#5</i>	Genres trending for each market
<i>PGM_REQ#6</i>	Release day impact on success
<i>PGM_REQ#9</i>	Season related streaming changes
<i>PGM_REQ#11</i>	Blogs & Media vs Streaming & Download & Radio
<i>BN_REQ#5</i>	Artist popularity in a given genre
<i>BN_REQ#6</i>	Growth of artist popularity
<i>BN_REQ#9</i>	Genre popularity
<i>BN_REQ#11</i>	Social media analysis over Live performance & Live event Fanbase Feedback
<i>SYB_REQ#1</i>	Recognition level of a track
<i>SYB_REQ#2</i>	Popularity level of a track
<i>PGM_REQ#15</i>	Genre popularity for each market

3.3.2 Music attributes

Attributes that will be obtained by music audio analysis.

<i>SYB_REQ#4</i>	Genre of a track
<i>SYB_REQ#6</i>	Energy level in a track
<i>SYB_REQ#10</i>	Gender of vocals in a track or instrumental
<i>SYB_REQ#11</i>	Moods related to a track
<i>SYB_REQ#12</i>	BPM in a track
<i>SYB_REQ#13</i>	Fade in and fade out of a track
<i>SYB_REQ#14</i>	Major or minor in a track
<i>BN_REQ#1</i>	Genre of electronic music

3.3.3 Additional metadata

This cluster was created regarding the needs of obtaining several information that must be extracted from the audio files or obtained by the input from FuturePulse users.

<i>SYB_REQ#8</i>	Release year of a track
<i>SYB_REQ#9</i>	Origin of a track
<i>BN_REQ#3</i>	Discography and typical visuals per artist
<i>BN_REQ#21</i>	Past gigs
<i>BN_REQ#22</i>	User input to FuturePulse system

4 User Requirements

4.1 Record Label Use Case Requirements

There are a lot of sources of information for actors in the music industry today. It pours from audio and video streaming services, from social media as well as "old media" and broadcasting. We have both digital and physical sales figures on detailed level, but we need to be able to collect, analyze and evaluate all this information in one place.

With the right set of data presented in the right way we could find new ways to market and build artist careers and to sell music. We want and need more insight to how the market works, what music works where, and how to reach the potential music consumer of the music we are releasing. We simply need a more structured business intelligence and analysis tool.

4.1.1 PGM_REQ#1 – Predict streaming based on artist reference groups

Description

Predict streaming numbers for first week/month/year of release for all DSPs (Digital Service Providers). With DSPs we mean: Spotify, Apple Music, Deezer, Tidal, iTunes, YouTube, Vevo or any local alternatives that we might not know of.

Motivation

This is useful in order to predict the success of new releases when there is no previous track record. With artist reference groups one could predict the outcome of a similar artist (to be released).

<i>Priority</i>	MUST
<i>Preliminary technical assessment</i>	<p>In the first version, this requirement refers to just assigning the reference groups/labels to the artists (mostly manually). At a second stage, we will investigate the technical feasibility of automatically predicting them, and then explore whether they correlate with success level/streaming volume.</p> <p>At least currently this looks like a big challenge. An in-between solution could be to make predictions about popularity levels (or ranges) and not precise numbers.</p>
<i>Linked tasks</i>	2.1, 3.1
<i>Technical partners engaged</i>	ATC, CERTH
<i>Data availability sourcing</i>	Historical sales and streaming data provided by Kontor New Media (Playground). Broadcasting numbers (BMAT). Social media mining: Facebook, Youtube, Twitter (only future data)
<i>Cluster</i>	Audience metrics

4.1.2 PGM_REQ#5 – Genres trending for each market

Description

Predict trending genres in different territories and investigate re-occurring patterns. Do genre trends that are big in Europe always follow North America? Where do trends start and how do they expand - are there common denominators? Does social media follow suit; can you see the same movement in social media as in streaming and sales / chart positions etc. Present movements on timeline to visualize the trends on a global level.

Motivation

This could help record companies with the A&R process and to make better decisions on what type of artists to sign. Could also help with the export process and to understand where to spend marketing budget for local acts in certain foreign territories.

<i>Priority</i>	SHOULD
<i>Preliminary technical assessment</i>	Does not exist on the market. Specifically, if the predictive perspective is to be used. Directly attached to SYB_REQ#2 (Popularity level of a track).
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Spotify top charts, general charts, broadcast data, DSPs
<i>Cluster</i>	Audience metrics

4.1.3 PGM_REQ#6 – Release day impact on success

Description

Map out correlations between release day and playlist additions / social media shares / streaming numbers. Most tracks are released on Fridays (global release day). We want to know if this is optimal for all releases or if there are exceptions. Do the results differ with regards to genre or target group? Maybe releasing a track on a different day means less competition, this is the kind of information we find useful. Present a comparison between tracks released on Friday and all other weekdays with regards to number of streams, number of playlist additions (divided in organic and curated) and social media impact (ie number of shares). We should be able to sort results by genre to see if that impact the correlations.

Motivation

Useful for record companies when scheduling a project in order to maximize the outcome and also push correctly to streaming platforms.

<i>Priority</i>	SHOULD
<i>Preliminary technical assessment</i>	This requirement is feasible to the extent that FuturePulse will have a positive feedback from Kontor Media.
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Historical sales and streaming data sprovided by Kontor New Media (Playground).
<i>Cluster</i>	Audience metrics

4.1.4 PGM_REQ#9 – Season related streaming changes

Description

Identify season related patterns in the way we listen to music. Find optimal time for releasing a single/album/video or launch an artist project given a specific genre / type of artist. Map out what genres grow during what season and if it differs between countries.

Motivation

Useful for record companies when scheduling a project in order to maximise the outcome and also push correctly to streaming platforms.

<i>Priority</i>	COULD
<i>Preliminary technical assessment</i>	This requirement is feasible to the extent that FuturePulse will have a positive feedback from Kontor Media.
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Historical sales and streaming data provided by Kontor New Media (Playground).
<i>Cluster</i>	Audience metrics

4.1.5 PGM_REQ#11 – Blogs & Media vs Streaming, Download & Radio

Description

Identify how blog & media coverage correlate with streaming and downloads. Measure the importance of media coverage for an artist. How does the coverage impact the social media and streaming numbers and radio plays? If possible also identify if there are differences between reviews and blogs etc.

Motivation

This is useful when deciding on promotion actions and spending. We are often hiring external promotion agencies in selected areas for artist in different genres but find it hard to evaluate the impact and the actual return of this investment.

<i>Priority</i>	COULD
<i>Preliminary technical assessment</i>	This requirement is feasible to the extent that FuturePulse will have a positive feedback from Meltwater API and Kontor New Media.
<i>Linked tasks</i>	2.1, 2.2, 2.3, 3.1
<i>Technical partners engaged</i>	CERTH, BMAT, Musimap
<i>Data availability sourcing</i>	Social media mining and web mining
<i>Cluster</i>	Audience metrics

4.2 Live Music Use Case Requirements

Live music industry uses various information data sources like record sales, past events ticket sales, broadcasting performance. However, it is mainly driven by internet-based data like streaming performance and a lot on social media performance and interactions. Live music use case is probably the less automated of the three use cases as it requires a lot on human knowledge and word to mouth recommendation, tied up to the music production (labels) industry analysis of the market as being released on a label is one of the main entry point for an artist to perform in events.

Being the least digitally assisted use case could be seen as a weak point in a sense that live music industry do not have many already existing databases and analysis tools; but it is also a strength because there is a lot of innovation opportunities in live music ecosystem, such as being able to refine by artificial intelligence an event's line-up regarding the music genres, audience, fanbase, targeted mood of an event in order to maximize the impact on potential customers; to have the ability to book the right and differentiating artists and upcoming artists based on predictive analysis to reach new customers to retain. Bass Nation will work with a selected number of live music clubs and festivals to help them enhance their line up's, be different from their competitors and grow audience and attention using the Future Pulse predictive platform.

4.2.1 BN_REQ#1 – Genre of electronic music

Description

Identify the genre / subgenre of an electronic music track.

Motivation

Genre identification is very important for live music Use Case. Concerts, gigs or festivals are set up around genres. Festival stages are usually divided by sub-genres.

<i>Priority</i>	MUST (5)
<i>Preliminary technical assessment</i>	Based on electronic music genres examples provided by Bass Nation. The technical partners engaged will evaluate how far we can detect sub-genres in electronic music based on our inputs. Possible if training data are provided
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	Electronic music genres examples provided by BN. The data will be tracks owned by Bass Nation and extracted web excerpts. Bass Nation already evaluated the feasibility of electronic music subgenres identification with IRCAM.
<i>Cluster</i>	Music attributes

4.2.2 **BN_REQ#3 – Discography and Typical visuals per artist**

Description

Full discography (with charts performance) and common visuals. Merge of previous requirements.

Motivation

Those additional metadata will help end users narrowing their choice of artists to book in their events and visuals of the artist/releases will make the end user UI nice looking and captivating.

<i>Priority</i>	COULD (1)
<i>Preliminary technical assessment</i>	Based on music database (and charts). `Discogs API can provide full discography and image for an artist and release. This could be displayed on user request. It is going to be harder to gather charts for smaller electronic music subgenres.
<i>Linked tasks</i>	2.1, 2.2, 2.3
<i>Technical partners engaged</i>	Musimap
<i>Data availability sourcing</i>	Discogs dB and API. Web crawling.
<i>Cluster</i>	Additional metadata

4.2.3 **BN_REQ#5 – Artist popularity in a given genre**

Description

Identify the popularity of an artist in an electronic music genre or sub-genre.

Motivation

The ability to separate popularity by genres is extremely important for our Use Case. We will need to classify popular artists for a given subgenre for end users who are looking to do a musical event around a specific subgenre or a multistage event proposing several stages with several subgenres of electronic music.

<i>Priority</i>	MUST (5)
<i>Preliminary technical assessment</i>	Based on social media, charts, number of bookings and streaming platform data.
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	CERTH, Musimap
<i>Data availability sourcing</i>	Electronic music charts.
<i>Cluster</i>	Audience metrics

4.2.4 BN_REQ#6 – Growth of artist popularity

Description

Growth of popularity on a week / month / year basis.

Motivation

With this req. we will be able to deliver our users an overview of an artist popularity per genre and help them in their final decision. (eg well known artist that is performing less since a year vs. a less known one that is performing better because of a social buzz, a release, etc).

<i>Priority</i>	MUST (4)
<i>Preliminary technical assessment</i>	Based on social media, charts, number of bookings and streaming platform data.
<i>Linked tasks</i>	3.2
<i>Technical partners engaged</i>	BMAT, CERTH, Musimap
<i>Data availability sourcing</i>	Electronic music charts.
<i>Cluster</i>	Audience metrics

4.2.5 BN_REQ#9 – Genre popularity

Description

Give short and long-term popularity of a genre.

Motivation

This will help users to make a decision on selecting a particular music genre for their event/stage. In case of a multistage event, secondary stages are often used as a differentiator against competitors.

<i>Priority</i>	MUST (5)
<i>Preliminary technical assessment</i>	Based on social media, number of bookings, number of events/stages in festival for this genre, record and ticket sales.
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	BMAT, CERTH, Musimap
<i>Data availability sourcing</i>	Social media, streaming, p2p and web mining
<i>Cluster</i>	Audience metrics

4.2.6 **BN_REQ#11– Social media analysis over Live performance & Live event Fanbase feedback**

Description

Reach and success by social media platform - Growth, engagement, feedback on live performances. We define Live Fanbase feedback as the impact of a gig, a tour on the artists fanbase (post event fanbase engagement): growth rate, interaction, etc.

Merge of multiple previous requirements from Bass Nation.

Motivation

For our use case it is important to separate "everyday" social analysis from before/after event social media analysis and to have this data for each social media platform separately.

<i>Priority</i>	MUST (4)
<i>Preliminary technical assessment</i>	Based on social media, video channels (YouTube, Vimeo) and streaming platform data. Feasible as long as there are social media data for the artist.
<i>Linked tasks</i>	2.3 (2.1, 2.2, 2.3 for previous BN14)
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Social media, streaming, web mining
<i>Cluster</i>	Audience metrics

4.2.7 BN_REQ#21– Past gigs

Description

Where and when did the artist play.

Merge of previous BN_REQ#11, REQ#12, REQ#13 and REQ#14.

Motivation

Will help promoters to have an overview on where an artist plays before and/or after the event he's trying to set up. A promoter won't book the same artist (except headliners) who played 2 weeks ago in a near location.

<i>Priority</i>	MUST (4)
<i>Preliminary technical assessment</i>	Based on social media analysis (some examples are Bandsintown, already crawled FB events...) Part of the artist popularity but could be displayed as a standalone feature (including social media feedback performance on past event).
<i>Linked tasks</i>	2.3
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Social Media (Facebook), past events, Google, Bands in Town, ResidentAdvisor, SongKick
<i>Cluster</i>	Additional metadata

4.2.8 BN_REQ#22 – User input to FuturePulse system

Description

Where and when did the artist play.

Artist profile is defined by the age, gender, etc. Admin information is defined by management contact, booking contact, performance price, etc. Cancellation rate is defined by the number of performances cancelled in the past 6 / 12 / 18 months and the reasons (missed flights, illness, etc). Artist attitude is defined by the “easiness” or “difficultness” of an artist and their requirements level (rider, etc).

Merge of multiple previous requirements from Bass Nation.

Motivation

This requirement has been added to fulfill a need from Live Music use case regarding numerous important information to be displayed to the end user by FuturePulse final interface.

<i>Priority</i>	MUST (4)
<i>Preliminary technical assessment</i>	Based on user input or web and social media crawling. Having the ability to display artists professional contact with details would be a plus for users once they have made their choice. Cancellation rate: decision maker info for users as they calculate a risk factor of an artist. Artist attitude: could be difficult to achieve but could be a real plus. Some artists have high level requirements which need to be fulfilled. Gaining access to those requirements at the decision level could be very interesting for users.
<i>Linked tasks</i>	4.1, 4.2
<i>Technical partners engaged</i>	ATC
<i>Data availability sourcing</i>	Manual input by us or end user (account settings)
<i>Cluster</i>	Additional metadata

4.3 Music Platform Use Case Requirements

Background music providers based on a streaming solution are to a large extent using manual processes when finding and choosing music that matches brands and establishments. Editors are trying to construct playlists that are suitable for specific businesses areas, and in this work, it is essential that some of these processes are automated if brand fit music are to be scaled.

A thorough review of the research that has been made during the latest 50 years around background music (by means of more than 200 studies) and its impact on businesses revenues as well as end customers satisfaction, length of stay etc., together with the survey conducted as a part of the FuturePulse project, have revealed that these requirements are the most important to focus on.

4.3.1 SYB_REQ#1 – Recognition level of a track

Description

The current level of recognition, or awareness, of a track per market as defined in ISO 3166-1. This could further be enriched with recognition levels for certain age and gender groups per market. Historical data also important, for each territory. Could be represented as a float 0-100. Might be more historically based.

Motivation

Recognition levels can be used in governing f.e. how long customers stays in establishments. The survey among businesses showed that Recognition placed nr 3 in what they considered to be the most important variable. Different countries have different music histories, hence estimating the recognition levels should be done for each market.

<i>Priority</i>	MUST (5)
<i>Preliminary technical assessment</i>	Does not exist on the market. Model for how to estimate recognition levels needs to be developed.
<i>Linked tasks</i>	3.1, 2.1, 2.2
<i>Technical partners engaged</i>	BMAT, CERTH, Musimap
<i>Data availability sourcing</i>	Charts historically, All popularity proxies: views, shares, retweets, etc.; airplay monitoring.
<i>Cluster</i>	Audience metrics

4.3.2 SYB_REQ#2 – Popularity level of a track

Description

The current popularity of a track per market as defined in ISO 3166-1. This could further be enriched with popularity levels for certain age and gender groups per market, as well

as a categorization of popularity into different "popularities". Could be represented as a float 0-100. Might be more contemporary based.

Motivation

The popularity level of music has proven important in background music. In the survey, popularity was the sixth most important variable for businesses. Needs to be divided by markets.

<i>Priority</i>	MUST (5)
<i>Preliminary technical assessment</i>	Does not exist on the market. Model for how to estimate recognition levels needs to be developed.
<i>Linked tasks</i>	3.1, 2.1, 2.2
<i>Technical partners engaged</i>	BMAT, CERTH, Musimap
<i>Data availability sourcing</i>	Charts historically, streaming and downloads charts historically, All popularity proxies: views, shares, retweets, etc.; BMAT airplay monitoring
<i>Cluster</i>	Audience metrics

4.3.3 SYB_REQ#4 – Genre of a track

Description

Identify one or more of the following; African, Ambient, Bass, Blues, Classical, Country, Dance/EDM, Dancehall/Reggaeton, Disco, Experimental, Folk, Funk, Hiphop, House/Techno, Indie, Jazz, Lounge, Mariachi, Pop, R&B, Reggae/Dub, Rock, Salsa, Samba/Bossa Nova, Singer-Songwriter, Soul.

Motivation

The genre of a song is an indicator of what kind of music one is dealing with. For the editors of playlists at music background providers, genres make it possible to quicker find music that suits certain brands.

<i>Priority</i>	MUST (4)
<i>Preliminary technical assessment</i>	Exists. FuturePulse needs to agree upon a united set of genres. Possible if training data are provided
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	Existing partners genre lists combined into one joint genre set. Created jointly at requirements workshop.
<i>Cluster</i>	Music attributes

4.3.4 SYB_REQ#6 – Energy level in a track

Description

Information about perceived energy in a track by combined analysis. For example, it might be composite from acoustic energy and bpm, or others. Proposed here as a float from 0.0-1.0.

Motivation

The energy level in a song is very important for how customers experience the brand and the visit to an establishment. In the survey, energy ranked as the second most important by businesses.

<i>Priority</i>	SHOULD (4)
<i>Preliminary technical assessment</i>	Does not exist in the market. Might need studies with focus groups. Possible if training data are provided
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	Sample of manual annotation of energy levels in tracks provided by SYB (1 000 - 10 000)
<i>Cluster</i>	Music attributes

4.3.5 SYB_REQ#8 – Release year for a track

Description

The year that the track was released. Often the same as the album's release year, but not always. E.g. if the track is a remaster or reissue, the year might be another than the year when the track was originally released.

Motivation

Information about when a track was released is an also an indicator of what a song contains. Together with genre information it makes it easier for editors to find correct music for playlists.

<i>Priority</i>	COULD (4)
<i>Preliminary technical assessment</i>	Exists. Based on the ISRC code. For example, in UKUNI9700663 "97" would be the year.
<i>Linked tasks</i>	2.1, 2.2, 2.3
<i>Technical partners engaged</i>	SYB, ATC
<i>Data availability sourcing</i>	ISRC codes provided for tracks being used.
<i>Cluster</i>	Additional Metadata

4.3.6 SYB_REQ#9 – Origin of a track

Description

Information about the country of origin for a track, with country codes as defined in ISO 3166-1.

Motivation

The origin of a track is information that can be used when choosing music for different markets.

<i>Priority</i>	COULD (3)
<i>Preliminary technical assessment</i>	Does partly exist.
<i>Linked tasks</i>	2.1, 2.2, 2.3
<i>Technical partners engaged</i>	SYB, ATC
<i>Data availability sourcing</i>	ISRC code, f.e. SE for Sweden, US for USA etc
<i>Cluster</i>	Additional Metadata

4.3.7 SYB_REQ#10 – Gender of vocals in a track, or instrumental

Description

Information on which gender the vocals is mainly sung by. One or more of the following: Vocals = Female, Male, Instrumental, Other.

Motivation

Information on whether music is instrumental or not is important, since some brands are keener on having less vocals in their sound environment.

<i>Priority</i>	COULD (3)
<i>Preliminary technical assessment</i>	Does not exist on the market. Would need either development of novel audio analysis, or manual tagging.
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	Annotated data with audio files from SYB. Also data provided by IRCAM.
<i>Cluster</i>	Music attributes

4.3.8 SYB_REQ#11 – Moods related to a track

Description

Data on what kind of moods that a certain track generally generates in an audience, such as happiness, sadness, hate, joy etc. High level mood classification might be needed, such as based on combined values in genre, vocals, year, language, bpm etc.

Motivation

Information about what moods that are related to specific tracks. This was ranked as the most important variable in the survey among businesses.

<i>Priority</i>	COULD (2)
<i>Preliminary technical assessment</i>	Exist. Possible if training data are provided
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	SYB annotated data sample; Musimap is developing a mood recognition algorithm
<i>Cluster</i>	Music attributes

4.3.9 SYB_REQ#12 – BPM in a track

Description

The general Beats Per Minute for a certain track, or tempo. Instead of average BPM, information on what bpm is dominant in most part of the track might be used.

Motivation

BPM ranked as number 4 in the survey among businesses. The BPM of music describes, combined with information on energy and moods, a track's characteristics, which makes it easier for editors and businesses to choose suitable music.

<i>Priority</i>	COULD (2)
<i>Preliminary technical assessment</i>	Exist. Testing a smaller sample from SYB.
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	IRCAM has bpm detector. Musimap employs a 3rd party one (to be checked if it can be used)
<i>Cluster</i>	Music attributes

4.3.10 SYB_REQ#13 – Fade in and fade out of a track

Description

Information of how long a fade in/out is in seconds, if existing, for a track.

Motivation

Amplitude is a variable that is important in providing sound environments that matches the brand and establishment. I.e. long fades could influence visitors experience at restaurants and cafés.

<i>Priority</i>	COULD (2)
<i>Preliminary technical assessment</i>	Exist. Testing a smaller sample from SYB.
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	IRCAM has an algorithm, to be checked
<i>Cluster</i>	Music attributes

4.3.11 SYB_REQ#14 – Major or minor in a track

Description

Could be binary values but could also be more refined with strong or weak variables for each.

Motivation

Information on major or minor is an indicator of the "feeling" of a track.

<i>Priority</i>	COULD (1)
<i>Preliminary technical assessment</i>	Exist.
<i>Linked tasks</i>	2.4
<i>Technical partners engaged</i>	IRCAM, Musimap
<i>Data availability sourcing</i>	IRCAM has an algorithm, to be checked
<i>Cluster</i>	Music attributes

4.3.12 SYB_REQ#15 – Genre popularity for each market

Description

Returns a specific genres popularity divided per market. Also includes top artists and tracks for each genre. Could be further enriched with genre popularity divided by age and gender groups per market.

Motivation

If a certain genre is very popular in a specific country, music from that genre could preferable be chosen as background music.

<i>Priority</i>	COULD (1)
<i>Preliminary technical assessment</i>	Does not exist on the market. Specifically, if the predictive perspective is to be used. Directly attached to SYB_REQ#2 (Popularity level of a track).
<i>Linked tasks</i>	3.1
<i>Technical partners engaged</i>	CERTH
<i>Data availability sourcing</i>	Spotify top charts, general charts, broadcast data
<i>Cluster</i>	Audience metrics

4.4 Requirements to be reconsidered in the next stages of the project

4.4.1 SYB_REQ#3 – Genre popularity for each market

Description

The current liking level of a track per market as defined in ISO 3166-1. This could further be enriched with the liking levels for certain age and gender groups per market. Liking levels in social media, YouTube etc.

4.4.2 SYB_REQ#5 – Explicit content in a track

Description

A Boolean solution, 1 or 0. Preferable this data would also be available if a track have explicit visuals, i.e. in a music video, even though the lyrics themselves might not be explicit.

4.4.3 SYB_REQ#7 – Language of vocals/lyrics

Description

One or more language codes, if applicable, from ISO 639-1, i.e. `en` = English. If the track has vocals, information on the language of the vocals/lyrics is needed.

4.4.4 PGM_REQ#2 – A combined visual timeline for streaming statistics of an artist

Description

Statistics from YouTube and DSPs visualized in a combined interactive graph. The solution should include the possibility to manually enter "events", as simple marks in the timeline, that could influence streaming quantities, such as the start of an ad campaign, an addition of a song to a playlist, or other events. Stats represented should be both nr of listeners and nr of streams, on a daily basis. Could further be enriched with predictive prognosis based on earlier effects for a specific artist.

Motivation

The timeline would make it possible to compare different streaming platforms with each other, for individual artists. It would make it possible to understand how YouTube consumption translates into streaming on DSPs (Spotify, Apple Music etc.). It would also make it possible to understand the effect of different forms of events, such as campaigns, live performances, playlist adding's etc. The effects of such events should be saved for each artist, making it possible to create prognoses of how a likewise future event could influence streaming on different platforms.

4.4.5 PGM_REQ#3 – Measure streaming and share-frequency with regards to demographics/target groups

Description

Based on a number of demographical groups, identify the patterns for streaming and sharing music, i.e. how a track "grows". Present data on track basis in order to see if the demographics change over time and if so how. Platforms investigated: Facebook,

YouTube and Spotify (due to lack of detailed statistics from other platforms). Other platforms to be added if statistics is available.

Motivation

What platforms are used for music consumption in the different age/gender groups in different countries? How do the different groups share music and are can one find patterns in how a track grows? I.e. from local fans to global or from one age group to another. The reason for this requirement is to have better knowledge in how to establish the right target groups for campaigns.

4.4.6 PGM_REQ#4 – Reference groups and success levels

Description

In order for any predictions to be made one would need to create reference groups and measure success. Few artists have the kind of historical data needed for qualitative predictions. Therefor we would need the submitted data to be analyzed and grouped together. We also need to create some sort of scale to measure success. Suggestions for this would need to be discussed further but could be similar to ""selling gold"", is X streams = success level 1, XX streams = success level 2.

As a start PGM will create a couple of test groups with between 10-20 artists in each group.

In the FuturePulse platform it could be useful to have the option to categorize artists in order to be able to compare them to reference groups. This would have to be defined manually by the end users.

Motivation

In order for any predictions to be made one would need to create reference groups and measure success. Few artists have the kind of historical data needed for qualitative predictions. Therefor we would need the submitted data to be analyzed and grouped together. We also need to create some sort of scale to measure success. Suggestions for this would need to be discussed further but could be similar to ""selling gold"", is X streams = success level 1, XX streams = success level 2.

Groups should probably be genre based and would need to be big enough and correlate enough to be used as reference, should probably also overlap as little as possible. How we create these groups is a question for a larger group to discuss but we believe it will be difficult to make predictions based solely on artist-by-artist cases.

Examples of groups:

""female singer songwriters with no previous released material""

""all men rock group with no previous released material""

""male singer songwriter with one previous released album that reached success level 2 within six months, success level 3 within 2 years"".

4.4.7 PGM_REQ#7 – Trending artist discovery

Description

Recommend a list of emerging artists that are trending in one platform vs others.

Motivation

If we have knowledge about platforms where certain genres/target groups are more consumed/present it would help us in the marketing of music and when scouting for new artists within those genres. If hip hop fans are streaming music on YouTube, then emerging new talents will post their work there and that's where a record company's A&R should be scouting.

4.4.8 PGM_REQ#8 – Impact from additions on curated vs organic streams

Description

Identify how streaming numbers develop when tracks are added to playlists. Map out the differences and common denominators between additions on organic vs curated streaming. Identify patterns, ie additions on organic playlists leads to additions on curated playlists or vice versa.

Motivation

It would be very useful to know if a certain type of track (genre/type of artist) performs better on Spotify if it gets early support from curators or if the long-term success is better achieved through organic streaming, which would mean that the marketing/promotion shall be directed to directly towards end consumers.

4.4.9 PGM_REQ#10 – Playlist related streaming

Description

If a song is featured in a specific e.g. Spotify curated playlist – how many streams will that playlist generate. We can see that certain playlists are very important when growing streams – what's the common denominator.

Motivation

This can be helpful when pitching songs towards various playlists and their editors.

4.4.10 BN_REQ#2 – Live track identification

Description

Identify track, artist name, data from release: date of release, length, type of release (digital, cd...), part of an album, an EP, unique release.

Motivation

This requirement was first intended to match the idea of track identification in the overall FuturePulse solution and part of the genre identification. An artist could produce different music genres. Live music identification is not mandatory for our use case but should be part of the overall music tracking to set up an efficient live artist popularity (this could be a discussion for req. v2).

4.4.11 BN_REQ#7 – Growth of new track popularity

Description

Growth of popularity for a new release / track.

Motivation

A successful new electronic music track for an artist is usually the only gateway for an artist popularity regarding events' booking. This can help a decision maker if, for example, an artist has been making a recent hit that is toying the charts since a month while not being known for his other tracks. A user could decide that this artist is interesting to have on his lineup because of this hit.

4.4.12 BN_REQ#8 – Top upcoming artists per genre

Description

Identify who are the most popular upcoming artists per genre.

Motivation

An internal top of upcoming artists per subgenre is a must have, including cross-subgenres recommendation to establish the best performing booking. Upcoming artists are often the only differentiator in a complex multistage line up. Having the opportunity to have a pre-selection of new talents would help promoters to select either an artist instead of another or to find an artist they didn't heard about before using FuturePulse solution.

4.4.13 BN_REQ#10 – Artist fanbase analysis

Description

Based on demographics, gender, age, country, travel, level of merchandising purchase, etc.

Motivation

An overview of the fanbase is important for event promotion. This req. was also meant to be part of the first vision BN has of the 'artist popularity'.

4.4.14 BN_REQ#12 – Communication performance

Description

Semantic analysis: Analyze the keywords that qualify the artist = i.e.: nice, hard, happy, etc. List of keywords that would impact best the artist announcement for a given event. Timing: Analyze the best moment to trigger artist announcement for a specific event regarding its fanbase. Future fans: Best keyword match to reach event participants outside the given artist fanbase. Optimization: List of keywords that would impact best the artist announcement for a given event. Optimization, timing, semantic analysis for artist description and qualified tags to reach non-fans users.

Merge of BN_REQ#12, BN_REQ#13, BN_REQ#14, BN_REQ#15 and BN_REQ#16.

Motivation

An overview of the fanbase is important for event promotion. This req. was also meant to be part of the first vision BN has of the 'artist popularity'.

4.4.15 BN_REQ#17 – Emotional analysis of artists

Description

- 1) Mood/emotion analysis on the artists releases / tracks
 - 2) Mood to color. Heat map i.e.: heat linked to happiness generated by the artist = red.
- Merge of BN_REQ#17 and BN_REQ#18.

Motivation

What emotions does the artist trigger would be a real plus for promoters to set up a coherent event's lineup or a stage's lineup.

4.4.16 BN_REQ#19 – Type of performance

Description

Djing, Digital Live performance, Vocals, using analog instruments etc.

Motivation

This is purely informative but quite important when doing an event's backline: Dj backline is easier to setup than an electronic music live that is easier to setup than an "unplugged" performance.

4.4.17 BN_REQ#20 – Length of performance

Description

Usual and average duration of the artists performance (1 hours, 30 minutes, long Dj set, all night long, etc.).

Motivation

A full lineup in a gig or festival is tied to timing. Some artists won't play less than x hours while others have a "xy minutes" digital performance that cannot be changed.

4.4.18 BN_REQ#23 – Artist visual mood / visual ID

Description

What does the artists performance drives visually and what does he / and his fanbase share as visual content.

Motivation

This could be a nice feature to have in FuturePulse solution as the visual ID of an artist gained importance recently with the development of shared music and event's experience over internet. Promoters are looking to book artists whose visual IDs are matching their event's concept.

4.4.19 BN_REQ#24 – Artists visual performance look

Description

What type of visuals, stage design, live perf, etc. during the artists performance.

Motivation

Same as BN23 but in a live situation taking into account the stage design work.

5 Conclusions

This document details the work done by all the partners to obtain a wide and complete set of requirements that will be a key reference for the next stages of the project. Pilots and exploitation will be strongly related to the success we obtain while meeting these requirements.

After this first round of user scenarios definition, a plan for finalising the definition of the user stories is already being followed both by users and technology developers. This plan needs to establish the required flexibility for all the partners to understand and synthesize the needs of a complex industry.

FuturePulse must be close to all the stakeholder groups and users so that the final version of open user scenarios and detailed user stories can cover all the industry requirements.

Parallel to the industry research, we will emphasize our work on the analysis of all the technical assessments and feasibility issues, as well as the availability of all the necessary data sources.