UNIVERSITÀ DI PISA

Project Design & Management for Data Science

Final Report

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Introduction

The scope of this report is to describe all the methods and stages leading to the design of a smart solution to a specific need of a possible user of OpenStage. A Design Thinking approach was used to do this, especially the three criteria (desirability, feasibility and viability) kept us on the right track during the need analysis and service design.

With this report we look forward in providing valuable insights and suggestions to Open Stage, hopefully being helpful with their goal of democratizing music and culture.

Desirability

1. Introduction

The main goal of this chapter is to document how we identified and examined possible users of OpenStage [14] and their needs.

In the first part we will present a description of the methods we used to develop the need hypothesis and the need statements, starting from how we identified the users and needs and how we validated the hypotheses. The methods that were used to evaluate a need statement and measure the three variables (number of users, importance and confidence) will then be explained.

The second part will show the outputs that have been obtained using the methods described in the first part. Tables will be presented to summarize users, needs, need hypotheses and the results of measurements on need statements.

2. Methods

2.1. User and Need

The first step done for identifying potential users of Open Stage and their needs was to do a Wild Brainstorming with all group members. This is a qualitative, non-structured method, but it was employed in firsts phases of our initials meeting, when wasn't so clear what to do, how to do it. It gave us a rough idea of which users we wanted to focus our attention on the next phases. It was also employed to define a more structured way to brainstorm with clear simple rules, getting ideas from the web ([5], [6]) and called it Brain5torm [7]. We also decided to keep a Time Log [9] of our meetings.

After that we decided to adopt a more quantitative approach using data from various websites such as Google Trend [10] which allows you to analyse data from searches made by users on Google (and related services, such as YouTube). It is necessary to know the frequency of search on the Web of the keywords and allows you to carry out this kind of analysis by selecting the geographic area of interest, the language, the topic category and the time period. Thanks to the analysis results that are shown by Google Trends it is possible to have a complete picture of the trend in the popularity of the keywords searched, evaluating

the results over time. This was used for finding interesting trends of search on google regarding music.
Another useful site for identifying users and validate some hypothesis is Miur Statistics [11] (official statistics published by the Italian ministry of education). They provide quantitative information about Italian population and provides also a picture of different phenomena through data for evaluations and assessments.

Scientific and informative papers [13] [5] [4] [12] has helped us a lot in studying a phenomenon, having already collected and analysed data relating to a particular problem.
A very useful qualitative method used was observe people and artist interacting with Open Stage. During Internet festivals days in Pisa an Open Stage totem was installed [16], so we had the opportunity to see users in action. This was helpful in validating users that emerge from previous phases and discover new potential users which were not come upon previous phases, adopting Open Stage app's terminology to define better the vague term "user" (also translated by us into "Entity"): "User" became who didn't perform but enjoy the totem, "Artist" is who performed using actively the Totem, "Others" are the remained entities.

2.2. Needs Hypothesis

The methods used to formulate need hypothesis are like those used to find users and need.

We started with a ten-minutes Wild Brainstorming focusing on users found in previous phase, then we forced the associated need into a verb [12] using Brain5torm, ending with a list of couples (user and need).

Then, we vote the couples that we believe were more interesting and we put in the Surprise Box the couples temporarily discarded (ill defined, wrong granularity, not real need, ...).

Again, we dedicated another Brain5torm session to formulate the hypothesis related with each couple, focusing on which ones we believe are true, then we check each hypothesis correctness and formalism using examples and advice given during class-time and inferred by Scientific and informative papers. So, we ended up with a list of triplets (user, need, hypothesis), filling again the Surprise box with the triplets temporarily discarded.

We kept into consideration these triplets to prepare EEE Questionary [8], basing on Entities, their actual Experience in OpenStage days in Pisa and the Experiments we wanted to test.

After submitting the EEE Questionary during Open Stage days, we selected triplets that are suitable for our study, mainly basing on total amount of data collected (Miur Statistics, Google Trend, EEE Questionary answers).

We also read about other method to came into contact more deeply with Entities, after collecting data about them, but we didn't formalize yet what we catch [17][18][19].

We finally examined the mistakes or imprecisions done within this phase, using Brain5torm and taking notes of them.

2.3. Need statements and assessment

How N° of users is calculated?

N° of users is calculated using, if available, official statistics or reliable data from good authorities.

How is importance calculated?

Importance is calculated by referring to the notorious **Maslow pyramid** [15]. The idea is to assign each highlighted need to a certain level of the pyramid.
More specifically at each level a specific coefficient (going from 0 to 1) will be assigned which follows the Maslow hierarchy. We start from the bottom level (physiological need) at which we assign the highest coefficient 1, representing the most intense and important needs. Going along way up to the top of the pyramid the coefficient decreases towards 0, until the peak of the last level, self-actualization. Since we have 5 levels, the coefficient varies by ± 0.2 for each.

How is confidence calculated?

We believed that the overall confidence was better represented if combined. The hunch is about splitting it into two subsets, one regarding the confidence we have about the value of the N° of users and the other one regarding the confidence about the importance judgement.
Each sub-confidence level is represented by a coefficient going from 0 to 1, where 0 represents “not confident at all” and 1 “100% sure”.

The overall value of confidence is computed by doing the arithmetic mean of the two.

$$Total\ confidence = \frac{Confidence_{n^\circ\ of\ users} + Confidence_{\ importance}}{2}$$

How is the total calculated?

The total is computed by:

$$Total = Log(N^\circ\ of\ users) * importance * Total\ confidence$$

Since N° of users have too much difference in the order of magnitude between statements, it’s better to use the Log.

3. Results

In this section we will report the results that came from the methods describe in the previous chapter.

3.1. Users and Needs

All the users found using the methods described are presented in table 1.
As a result of the first **Brain5torm** meeting, we found out the first group of users that we wanted to focus on: 18-30 y.o. musicians without a band, freshman, passing musician, 30-40 y.o. tourists in city centers at night.

After this first phase we had the opportunity to observe an Open Stage Totem in action, during which we found out new user needs that we didn't discover during the first brainstorming session. In this occasion we observed that some Open Stage artist had problem with setup their instrument that required a lot of time and resulted in shortest time for performance.

Classical music artists were found through research on google trends and scientific papers. We started from a subjective observation: Italians are less and less interested in classic music. Focusing on the user (or on the classical musician), we have trivially assumed that “Italian classical musicians need more audiences.”

We searched for data relating to the trend of interest in classical music using **Google Trend**. By querying Google Trend with the keyword "musica classica" and with the genre "musica classica" we have noticed a decline in searches over the years (From 2004 to today).

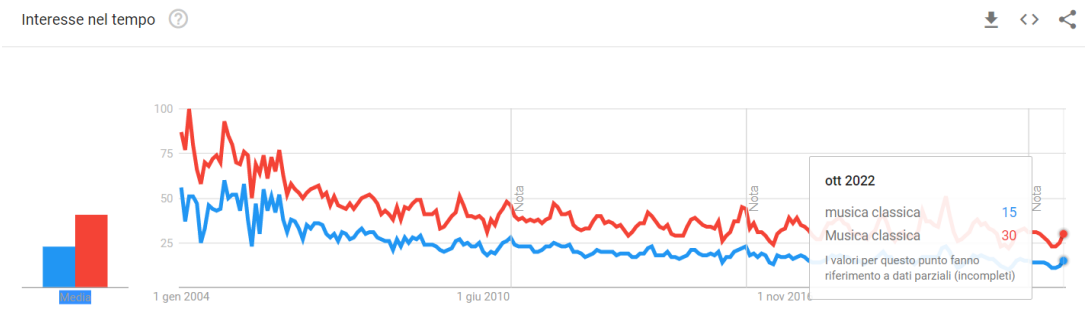

Figure 1: Google Trend search for keyword "musica classica" and category "Musica classica"(2004-2022)

Then continuing with another subjective observation (according to which people listen more to classical music as background music) we ran another query on Google trend, specifying the search platform (YouTube).

Figure 2: Google Trend search for keyword "musica classica" on YouTube (2008-2022)

Google Trend shows us that the search for classical music on a streaming platform (like YouTube) has had a steady increase in recent years (from 2008 to today).

We assumed that people listen to classical music as an accompaniment while doing other activities. We have consequently changed the need: Italian Classical Musicians need to build a live audience.

Then, we search for some statistic data about classical music audience in Italy.

A scientific publication [1] shows that 45% of the sample of interviewees declare that they have never gone to a classical music concert and only 8% are interested in the genre and often go to concerts (Ottavia Arenella & Giovanna Segre, 2019). Once we have collected enough data and the hypothesis has been validated, using Maslow's pyramid we defined the need statement:

“Italian classical musicians need to build a live audience in order to obtain esteem and appreciation from the public.”

From no knowledge we have assumed that foreign children find it difficult to integrate among their peers. By carrying out statistical research we have noticed that foreign students born abroad have greater difficulties in establishing relationships with their peers. We used Istat data from a survey carried out in 2015 and published in 2020 to identify the user (the foreign student with non-Italian citizenship) and their related needs. Statistics show that 20% of foreign students declare that they do not attend any school mates outside school hours (against 9% of Italians) [2]. Using school performance as an indicator of integration (because it is a quantitative, visible and easy to measure indicator), we have defined the following hypothesis:

“Foreign students born abroad need to integrate socially among their peers, so if we look at how many foreign students born abroad are late in school compared to Italian students, then we will see that late foreign students are 30% more than Italian students”.

To test the hypothesis, we used Istat data relating to school performance which highlighted the difference between Italian and foreign-born students. According to Ministry data [3], in the 2018/2019 school year, students with non-Italian citizenship who lag regular school attendance are 30.1% compared to 9.1% of Italian students (a difference of 20%). After having validated the hypothesis, we arrived at the following statement: Foreign students born abroad need to integrate socially among their peers to feel more confident and motivated within society.

	User	Need
1	18-30 y.o. musicians without a band	Find people to play with
2	30-40 y.o. tourists in city centers at night	Enjoy the popular places meeting locals in safe places
3	Freshmen	Need to improve their English
4	Musician on holiday in tourist location	Need to perform live without carrying their instruments with them
5	Pub owners that are organizing their live music season	To check artists performing live before hiring them
6	Italian musician of classical music	A live audience
7	Foreign student born abroad	To integrate socially among their peers

8	Open Stage artists	a place where they feel recognized while performing
9	Conservatory's students in Lucca	Needs to validate their university project

Table 1: result of users and needs found

3.2. Need Hypothesis

The following need hypotheses were developed from the users and needs found

	User	Need
1	18-30 y.o. musicians without a band	Find people to play with
	So, if we ask young musician if they struggle to find people to play with, then 30% of them will respond positively	
2	30-40 y.o. tourists in city centers at night	Enjoy the popular places meeting locals in safe places
	So, if we provide hotels with a map of Totem's location, then we'll see that 40% of tourists join the experience on their first night in the city.	
3	Freshmen	To improve their English
	So, if we organize a free English lesson in a park then we'll see that 60% of attenders are freshmen	
4	Musician on holiday in tourist location	To perform live without carrying their instruments with them
	So, if we ask musicians on holiday if they would like to play without carrying their instruments, then 60% will respond positively	
5	Pub owners that are organizing their live music season	Need to choose artists performing live before hiring them
	So, if we provide a totem near pubs areas, then we'll see that 40% of artists are asked to perform in pubs	
6	Italian musician of classical music	Need a live audience
	if we ask how many people regularly go to classical music events, then we will see that only 10% of people go often to these events.	
7	Foreign students born abroad	To integrate socially among their peers
	if we look at how many foreign students born abroad are late in school compared to Italian students, then we will see that late foreign students are 30% more than Italian students	
8	Open Stage artists	a place where they feel recognized while performing
	So, if we ask artist if they not feel valued on the stage, then 80% will say yes.	
9	Conservatory's students in Lucca	To validate their university project
	So, if we organize an event dedicated to conservatory's students' exhibitions, then we'll see that 50% of them in exams receive grades higher than before.	

Table 2: Need hypothesis

3.3. Need statements and assessment

As a result of the tests conducted on the previously defined need hypotheses, the following **need statements** were obtained. To define the goal of each user, we focused on why the need is important for the user. It was not possible to test all the need hypotheses, due to lack of data and the inability to administer questionnaires to some users.

A summary table of all the validated hypotheses is presented below:

	USER	NEED	GOAL
1	O.S. artists	a place where they feel recognized while performing	to reach more people with their music
2	18-30 y.o. musicians without a band	Find people to play with	Socialize with new artists and create new music
3	Street artists	To speed up the set-up process	To have more time for playing and not wasting it in setup process
4	Classical Italian musicians	build a live audience	obtain esteem and appreciation from the public.
5	Foreign students in Italy	integrate socially among their peers	feel more confident and motivated within society.

Table 3: Need statement table

Need Statement	N° of users	Importance	Confidence	Total
1	2200 (0.95 conf)	0.75 (0.8 conf)	0.88	2.21
2	1 million (0.2 conf) [23, 24]	0.55 (0.6 conf)	0.38	1.26
3	10000 (0.2 conf) [4]	0.3 (0.6 conf)	0.40	0.48
4	43000 (0.2 conf) [21]	0.5 (0.6 conf)	0.40	0.93
5	219300 (0.9 conf) [3]	0.6 (0.6 conf)	0. 65	2.08

Table 4: Need assessment table

4. Final Decision

As we can see from the need assessment table the need statement number 1 has gained the highest score, so this will be the statement on which we'll going to focus from now on. All of us agree on the difficulties linked to it since it's very general and abstract, but we also agree on the fascinating sides of it. Putting all these elements together we expect to be exposed to multiple solutions, though the convergence process will have a relevant role in the next phase.

Feasibility

1. Introduction

In this chapter we will focus on the used methods to identify solutions for the previously chosen need, subsequently we'll shift the focus on the feasibility of the found solutions and, in the last part, evaluate them to choose the best one. The chapter concludes with a brief user journey description for the best solution.

2. Methods

2.1 Methods for solution generation

Our approach to generate solutions started *collecting* ideas with the **Brain5storm** already used for the user and need identification part, this time backed by the **AI X design Toolkit** deck card. Since the deck is composed by 6 cards and an overall of 24 "what-if" prompts, we decided to explore it seeking for inspiration.

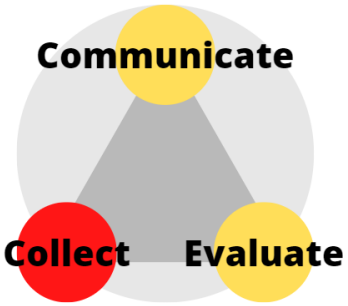

Figure3. Both Brain5torm and AI X design Toolkit has been employed in the collection phase.

While surfing through the deck, we marked every what if prompt which awakened an intuition, naming them **triggering statements**.

From the intuition we then developed a raw idea which were tested with 2 fundamental questions:

1. Is the solution data driven?
2. Is the solution fitting the need?

These two questions were named as **Scilla and Cariddi** since an idea, to access the next phase, must pass both.

If an idea can pass Scilla and Cariddi can be further analysed and evaluated.

In the analysis phase the main goal was to better understand how the solution works and how can be implemented, considering all the linked pros and cons. Detailed analysis are provided in Section 3.

The last step in the generation process was to evaluate the solutions, regarding:

1. Need fitting
2. Technical feasibility
3. Economic feasibility

This part will be comprehensively explained in Subsection 2.2

2.2 FET-Evaluation: a method to evaluate solutions

We created a tailored method to evaluate each solution, called **FET evaluation**. This method aims to evaluate three different aspects of the solution and then assign a final score, namely the **FET score.**

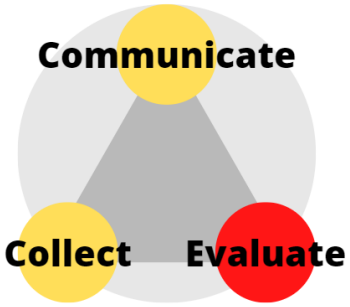

Figure 4. FET method has been employed both in the evaluation phase.

The evaluated aspects are:

- Need fitting (F)
- Economic evaluation (E)
- Technical evaluation (T)

At the end of these evaluations, all the values have been combined to obtain a single, synthetic score.

Need fitting

Since the original need was too much generic and ambiguous, we decided to split it into "sub-needs" as show in the following figure:

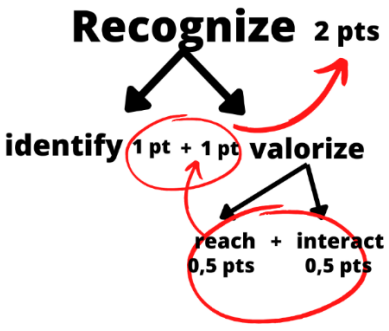

Figure 5: Infographic of the need structure.

This subdivision helped us to give each solution a more accurate score, depending on which sub-need it satisfied, assigning different points to each need. The more sub-needs are satisfied, the higher is the score.

To easily evaluate fitting, each sub-need has been associated with a question:

- Identify. Is the solution able to increase the chance for the artist to be identified by the attendees and focus the attention on him? (1 point)
- Reach. Is the solution able to make the artist's music reachable to listeners outside the live performance? (0.5 point)
- Interact. Is the solution able to improve the interaction between the artist and the attendees? Or ease the interaction between the artist and the company? (0.5 point)

Technical evaluation

Based on our analysis, every solution has been evaluated with a degree ranging between 1 and 10, representing how much technically deployable the solution is. The degree was also weighted with a confidence value ranging between 0 and 1, the same logic as a needs assessment.

Economic evaluation

The technical part is highly influenced by its economic feasibility; therefore, it was dutiful to judge it. We realized that finding accurate monetary estimates is not trivial at all since all the solutions imply software and a hardware component. While for the hardware is simpler to find precise values, evaluating software it's fuzzier. Therefore, we gave very approximate monetary ranges to each solution, also here associated with a degree ranging from 1 to 10, weighted by a certain degree of confidence ranging from 0 to 1. The high uncertainty around these values is represented by the low confidence linked to each degree.

FET- score: Final score

The final score was computed as follows:

$$FET = Final\_score = NF * (T_w + E_W)$$

$$T_w = Technical\_score_w = Grade_T * Confidence_T$$

$$E_w = Economic\_score_w = Grade_E * Confidence_E$$

2.3 User Journey: a method to communicate a solution

The next step is to define the user experience for the best solution we have found. On the web many definitions of user experience are available [28] (there are different, inconsistent,

and non-standardized definitions of the same term). So, we have chosen to use the Harvard definition [29]:

*"The extent to which a **product** can be used by specified **users** to achieve specified **goals** with **effectiveness**, **efficiency** and **satisfaction** in a specified **context of use**"*

The user journey is used to map out the journey that typical users might take to reach their goal. This journey is then redesigned to form an 'ideal' user journey with an optimal **user experience**.

To better define and visualize the user journey for a given solution, we used the **journey map.** A customer journey map is used when you know where you want to focus. By focusing on one specific journey, we could learn instances of frustration and difficulty, and where to build a more efficient interface for the solution.

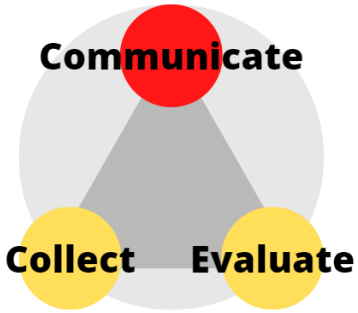

Figure 6. The User journey method has been employed in the communication phase.

3. Solutions

Through the application of the previously described methods, the following possible solutions have been found

3.1 Emotional recognition

USED CARD	*TRIGGERING STATEMENT*
Affective	What if you can sense and respond to your users' emotions?
Deep personalization	What if you can tailor the content for everyone?

Description

This solution aims to implement both hardware and software related to the emotional recognition framework.

To perform emotional recognition various algorithms are available, such as Support Vector Machine SVM, K-Nearest Neighbours (k-NN) or Random Forest. Even if they're based on

different paradigms and we can argue about which of them is the best at performing specific tasks, they all share a common path:

They all require datasets used to train and tests them to maximize their accuracy.

Luckily, a good amount of data is already available to train these algorithms. Below some of the most used datasets are listed.

1. AffectNet [30]
2. Extended Cohn-Kanade Dataset (CK+) [31]
3. Google Facial Expression Comparison Dataset [32]
4. FER-2013 [33]

To be fully transparent we must mention that not all the publicly available datasets can be used for commercial purposes. Though, while we can rely on them especially at the beginning, is recommended to start collecting private data as soon as possible.

The trickiest part of the solution's implementation is surely the hardware part. The most used hardware objects for this task are surely cameras to capture video, and sensors to fill camera's weaknesses. For example, cameras can have a hard life when there's light scarcity or bad weather for outdoor totems. In these cases, sensors are more precise. Then the right choice of the hardware is not trivial at all. If the chosen hardware is not powerful enough, then this may lead either to highly undesirable delays in processing or a drop in the quality of the solution. For other tasks that don't require a lot of computational resources, the choice of too powerful hardware could cause a too expensive solution, not properly exploited. Another relevant issue concerns privacy.

Once emotional recognition is implemented, we can use it to provide the artist with direct feedbacks on the overall audience's feelings. These can be made explicit by means of led band lights attached on the totem, which assume different colours for different emotions. Once the performance is terminated, a summary of the artist's "engagement performance" will be sent on his OpenStage app profile. Now he can see which was the predominant feeling of the audience, for how long it lasted and when that changed. The app can also suggest to artists other artists with better engagement performances in order get in touch with them and learn key tips and tricks.

Evaluation

From a technical perspective the software section seem doable since its core is the training of the chosen algorithm. We can't say the same for the hardware part, but at least the totem is already crafted for additional sensors. The assigned grade is 6, with a confidence of 0.6.

From an economical perspective, the overall cost of the system floats on thousands of dollars. The assigned grade is 4, with a confidence of 0.3.

In terms of need fitting, the satisfied sub-need is just "interact" since this solution create a unique communication path between the performer and audience's feelings. Summary results

also provide an additional service to artists, enhancing the link between OpenStage and its users.

3.2 Smart notification through Beacon Technology

USED CARD	*TRIGGERING STATEMENT*
Context-aware	What if you understand where your user is and what they're doing?

Description

It is possible to use Beacon Technologies (in combination with the totem and the application of Open Stage) to improve the reachability of the artist and his/her recognition during a performance [26]. The beacons are small, wireless device that transmit a signal that other devices can "see". An example of application of this technology is in public transport with the mobile ticketing system called "Be in-Be out" (BIBO). With this Beacon feature it possible to determine when a traveller enters and exits a station or a public transport vehicle. Using smart beacons, the operator can easily calculate how long the user was using the service.

Thanks to its flexibility and its developing tools (SDK, APIs and dashboard) it is possible to apply Beacon technology in a plenty of case.

For example, this technology has already been used to provide context-aware and localized information to event attendees, improving both your in-app and event experience [27].

By installing a beacon in a totem, it is possible to send to the attendees of a performance a personalized push notification containing various information such as social media link, date and place of a future event or simply information about the artist (without the app being opened). Thanks to the app of Open Stage and thanks to the flexibility of the software behind the Beacon is possible for the artist personalize the message that it will be send.

Beacon solution evaluation

With "Beacon solution" we can increase the artist's reachability thanks to push notifications and, more in detail, it can make artist's music reachable to listeners outside the live performance (through, for example, social link in the notifications). However, nothing can increase the interaction of listeners with the artist and the possibility to be more identified during the performance (in fact, the notification can cause attendee's attention more focused on screen than on artist). The total score for need fitting satisfaction is 0.5.

From an economic_perspective it is a very inexpensive technology (around hundreds of euros) that is easy to implement, both at the software level (thanks to the specially developed SDKs and APIs) and at the hardware level (easy to install and maintain). So, there is a unique implementation cost given by the implementation cost of the Beacon in a totem. The assigned grade is 8 with a conf of 0.8.

The assigned grade, in terms of technical evaluation, is 9 with a confidence of 0.5 (because the uncertainty about the software development).

3.3 Recommendation algorithm that suggests best totem to perform

USED CARD	*TRIGGERING STATEMENT*
Deep personalization	What if you can tailor the content for each individual?

Description

The location and time of a performance is crucial for an artist to reach the best audience suitable for his music. The solution at this problem is a recommendation algorithm that suggest the best totem suitable for the genre of music that an artist play.

To accomplish that is needed to record data of how many people attend an open stage performance, time of performance and the genre of music that an artist plays. For the first one is possible to record people participation throw Beacon Technologies as described before, this type of technology can also be used to known how many people are in proximity of an open stage totem and for how long they stayed. The other information is already recorded by open stage service and can be easily retrieved.
The system will get better and will provide more accurate recommendation as time goes on and more date will be collected.

Evaluation

From a technical point of view the implementation of the system is doable, the only hardware needed is a Beacon installed on the totem, that is doable as the totem is already built to install such technology. For the software part it is necessary to implement a recommendation algorithm, and show the results on the app.

The only problem concerns the collection of data since is a system built for the recommendation of the totem, we can't use external datasets for training, so a first part of data collection is required.
The assigned grade is 8, with a confidence of 0.7.

From an economical perspective, the beacons are cheap ranging from 70 to 140 dollars, the other cost concern the actual implementation of the system. The assigned grade 7, with a confidence of 0,6.

In terms of need fitting, the satisfied sub-needs are "Identify" because an artist can feel identified better if in front of him there is the right audience for his music and "Reach" because more audience during a live performance means more people reached by the artist with his music.

4. Results and final decision

After assigning weights as explained, we computed each result using the formulae described before:

Id	*Nickname*	*NF*	*T_W*	*E_W*	*FET-score*
1	EmoRec	0,5	6 x 0,6	4 x 0,4	2,6
2	BeaTec	0,5	9 x 0,8	8 x 0,5	5,6
3	RecAlg	1,5	8 x 0,7	7 x 0,6	14,7

Table 5. Summary table of FET score for each solution .

From the results we have chosen to continue with the solution with the highest score i.e., the third solution, the recommendation algorithm.

For sake of completeness, a workflow summarizing all previous steps is provided below.

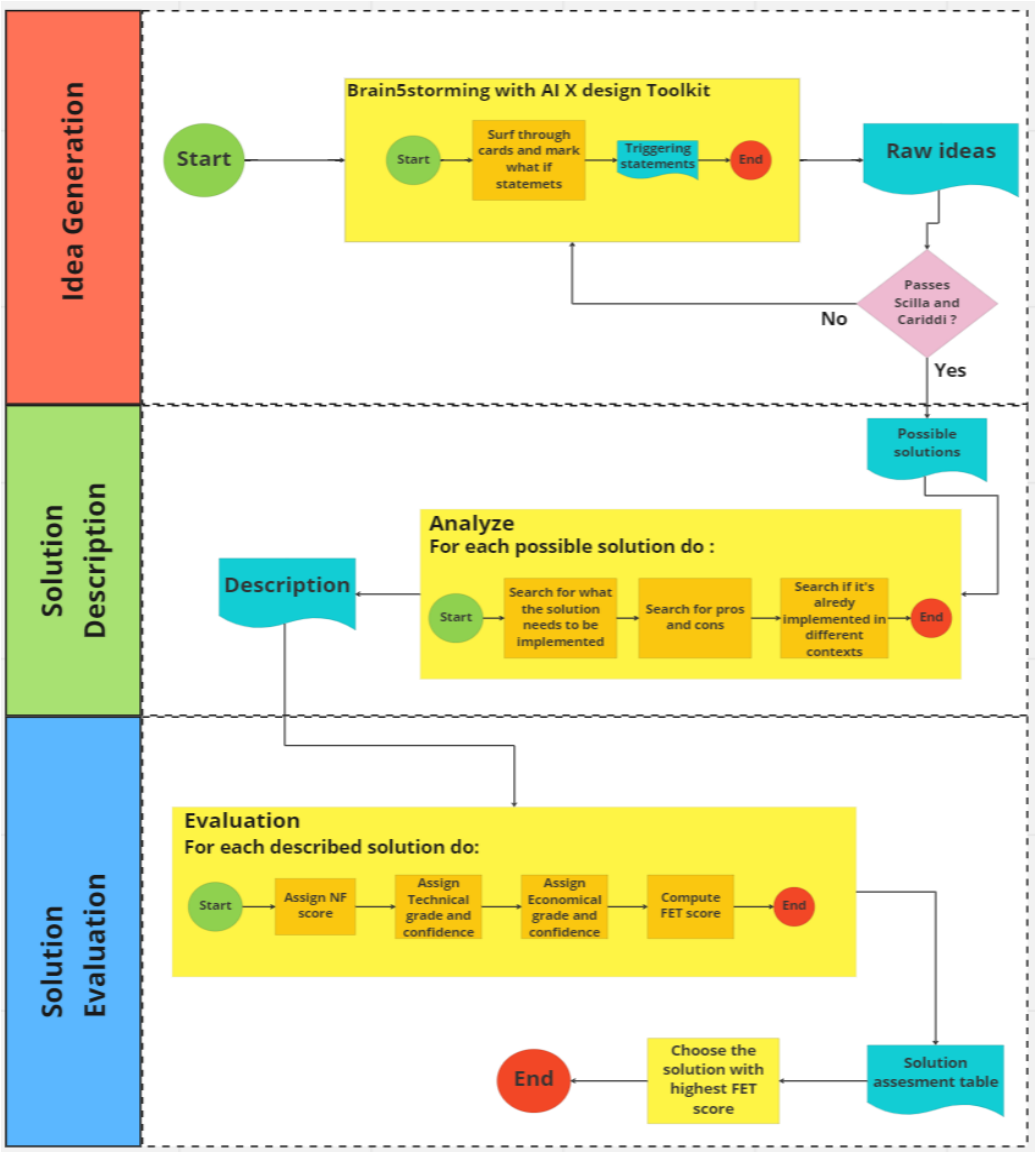

Figure 7. Feasibility workflow; Own production.

Journey map

We present the following journey map that describes step-by-step how a user interacts with the solution chosen in the previous phase. The process is mapped from the user perspective in a **best case**, describing what happens at each stage of the interaction focusing on the expectation and emotion of the user.

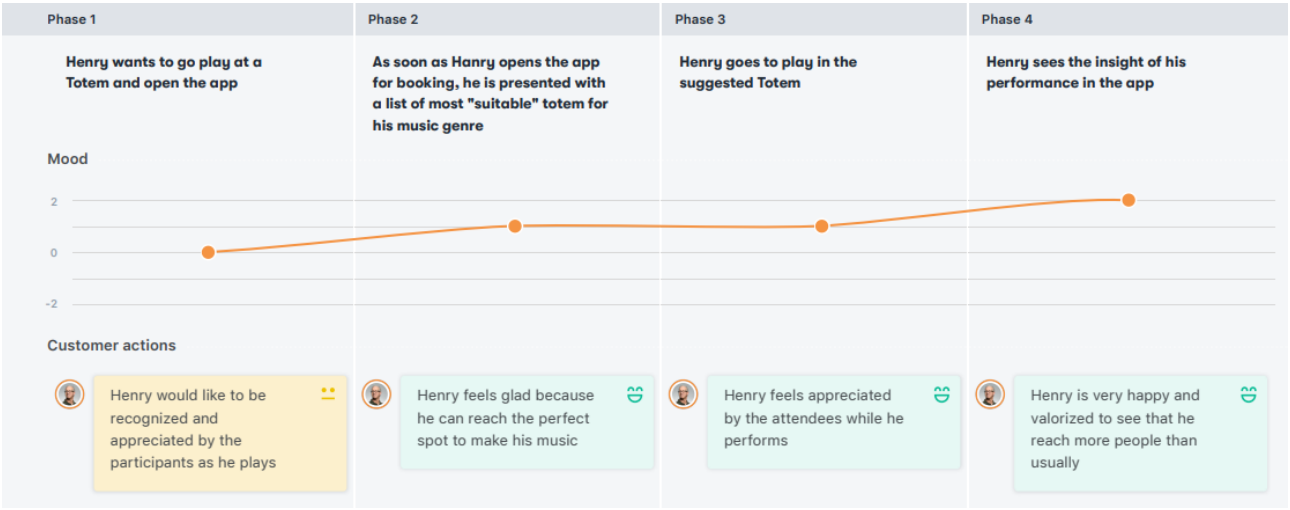

Figure 8. User journey illustration for the final solution.

Viability

1. Introduction

The objective of this chapter is to present how the OpenStage business model changes with the introduction of TMS (Totem Matching System). For this purpose, the impact canvas [34] is used, which can visually represent how the company creates, develops, and delivers value for its customers.

In order to explain how our solution has influenced the previous canvas, each block will be analyzed individually, highlighting each time the most significant changes made to the previous business model. It is also important to warn the reader that for the nature of the solution the canvas maintains some sections unaltered, and often the changes are in an empowerment of already-existing features.

2. Impact canvas

2.1. Audience segment and Beneficiaries

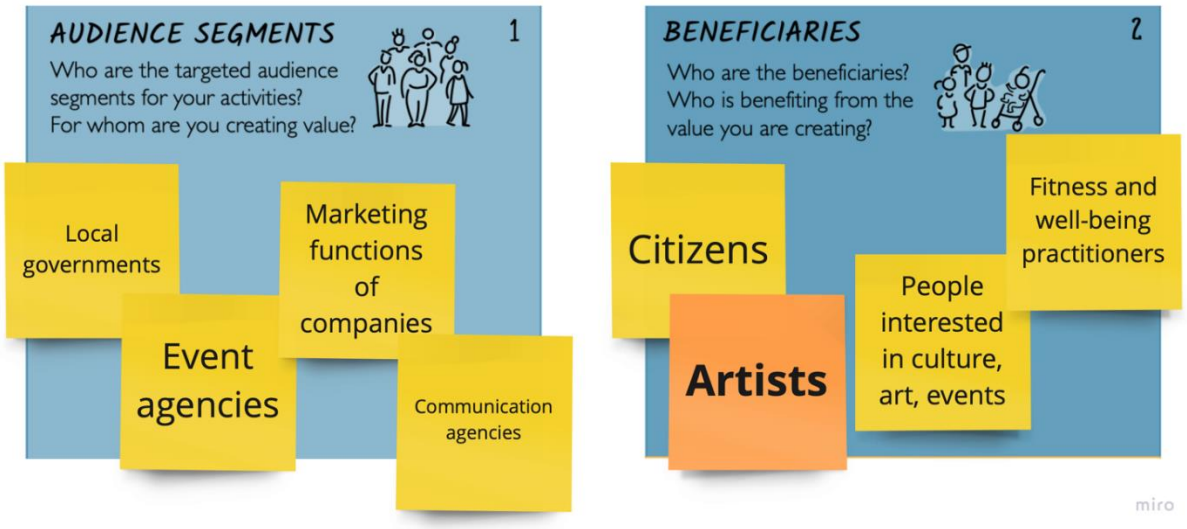

Figure 9. Audience segments and beneficiaries, snapshot of Impact canvas

These frames remain essentially the same: we refer with our TMS solution to the same segments of audience and beneficiaries, since the goal of our solution is to provide an additional service that leverage opportunities easing user reachability and improve artist's and user's experiences. Then, we focus more on artists that have already installed the application and can easily try this new feature, without revolutionizing their main previous usage habits.

2.2. Social challenge and Needs

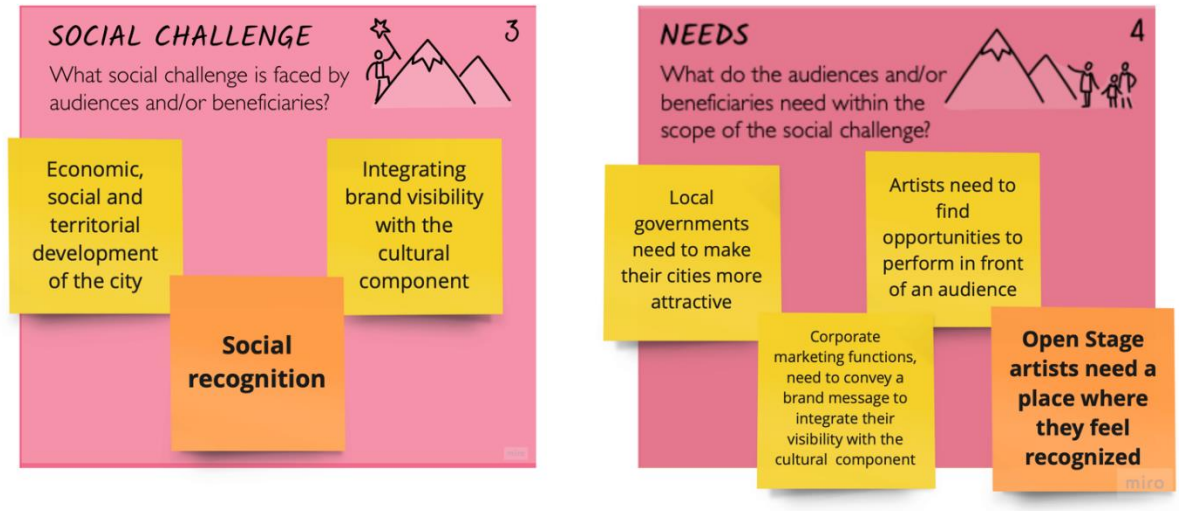

Figure 9. Social challenge and Needs, snapshot of Impact canvas

The original Openstage set of social challenges and beneficiaries' needs can't be altered or diverted by any further features, thanks to the strength of values that it promotes. So, the main social challenges and needs essentially remain the same.

"Open stage artists need a place where they feel recognized" is the most relevant need we found in the desirability phase. Hence, this is the need around which we ideated and defined our solution, in an artist-centered way.

Focusing on the artists, the social recognition aspect, pushed by the need to feel recognized will be empowered and better addressed: the artist can choose the better environmental context for its performances.

2.3. Solution

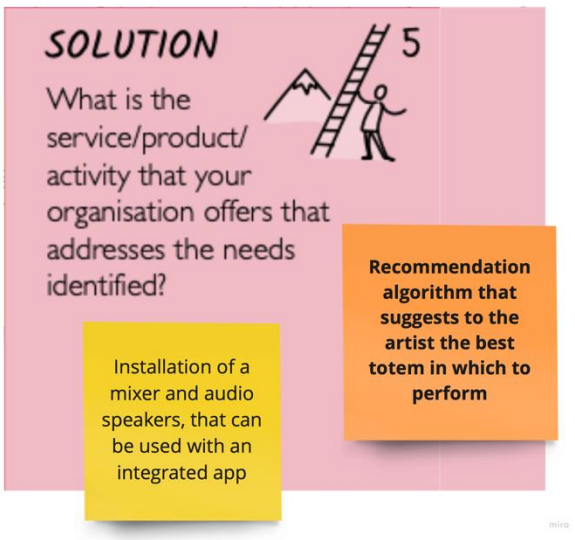

Figure 10. Solution, snapshot of Impact canvas

Our solution lays on underneath infrastructure and expand basic, original features with incremental and scalable efforts that can easily been adapted and updated for further needs: the recommendation algorithm can be an adaptive tool to manage needs over time and give users a more personalized way to enjoy the experience. It is also a tool to retrieve data, that can be analyzed to address further choices along OS's life phases.

2.4. Unique value proposition and Existing alternatives

Figure 11. Unique value proposition and existing alternatives, snapshot of Impact canvas

With our solution we empower the possibility to match similar-interested people in the "right" places, and it can be a big opportunity for those who follow economical, personal or both objectives. In fact, the solution increases the possibility for an artist to find the best audience for his performance. For a musician this can be translated as being able to reach the perfect spot for his musical genre or, having collected much more data through the beacon technology and app's insights, being able to reach the best spot for his "contents".

Given the highly specialized field in which the solution will be applied, it is difficult to find a real and "tangible" **existing alternative**. We therefore looked for a business model that was similar, that is, one that offers a value proposition by applying a similar solution to a field different from that of Open Stage.

Recommendation algorithms that provide targeted content sharing are widely used across many social platforms. Among these, the closest in terms of business model are **TikTok, Tinder and Spotify**. The platform offers a space where users can easily become inspired to explore and publish their own creative content; as example, what powers TikTok is its artificial intelligence technology: unlike other popular social media and entertainment platform, its users receive **desired content without** needing to **explicitly search** and select options. In parallel, the artificial intelligence algorithm applied to Open Stage will have the task of providing the right audience with the right content, without this being explicitly requested by the audience.

Just as the platform allows advertisers to directly contact influencers who match their target market demographic, in the same way the artificial intelligence algorithm integrated in the

Open Stage can easily provide useful insights for **targeted advertising** to brands willing to get known in a certain area.

2.5. Channels

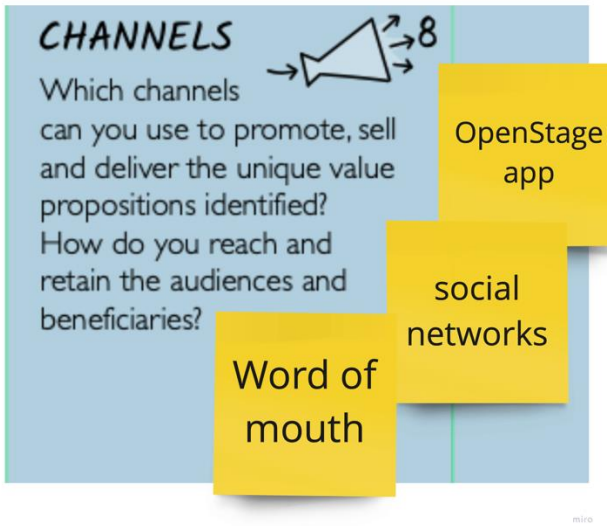

Figure 11. Channels, snapshot of Impact canvas

Default channels already employed by OS will be the same with which we can promote the value of our solution, but since the solution will be implemented directly on app this specific channel will gain more and more relevance as the user base increases.

If artists are satisfied by the new feature, word of mouth and social networks will also become relevant channels to leverage on.

2.6. Cost structure and financial sustainability

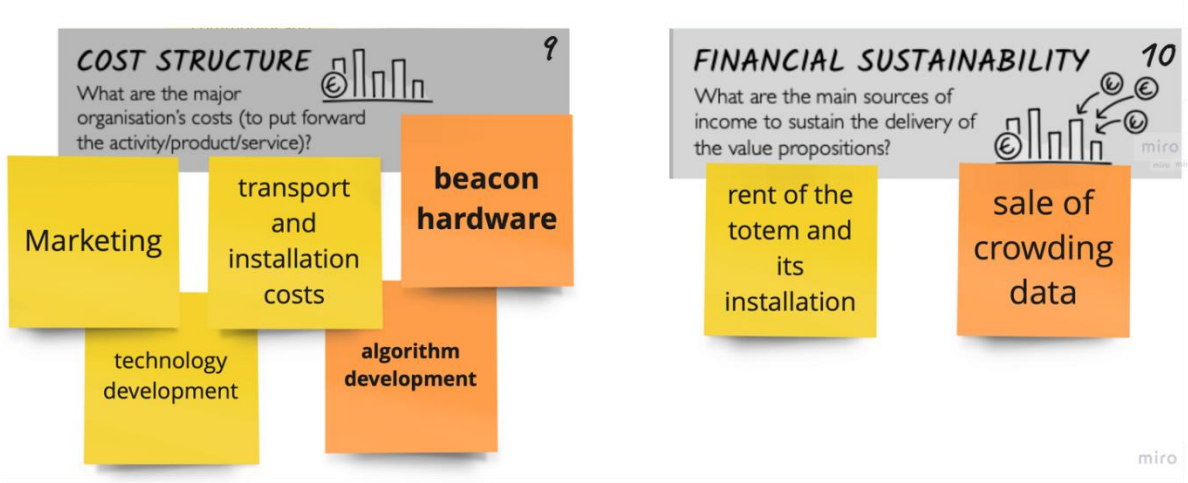

Figure 12. Cost structure and financial sustainability, snapshot of Impact canvas

To the cost structure have been added the costs relating to the necessary hardware for the solution and those for the implementation of the recommendation algorithm. The other principal cost of open stage remains the same.

We strongly believe that with this little investment the service that OS can give is more attractive also for indirect beneficiaries, that can become more prone to invest on OS for their primary economical and socio-cultural objectives.

Our solution may be capable to broad OS's revenues streams. For example, providing useful insights for targeted advertising to brands willing to get known in a certain area or sell crowding data to municipalities to monitor the presence of people in places where totems are installed.

2.7. Impact and Impact measures

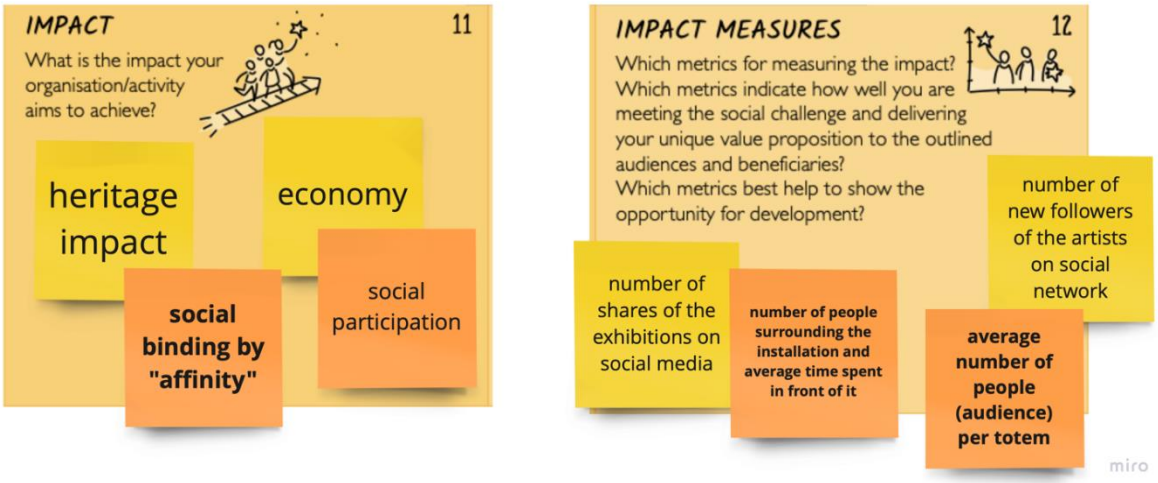

Figure 13. Impact and impact measures, snapshot of Impact canvas

The social impact of Open Stage is enhanced as the solution proposes to increase the artist's audience and consequently the influx of participants in the performances. Since the algorithm aims to find the best totem for the artist, a "**social binding**" phenomenon can develop around the totem. This is also due to the possibility of "grouping" an audience with similar tastes around the totem at a certain moment of the day.

It is important to measure how the introduction of the algorithm impacts on the artist's visibility and audience. Since the solution doesn't override the impact that OpenStage already has, the same metrics are used. Particularly important metrics are the **number of people** and the **average time** spent in front of a totem: sensors can give us the count of people who attend a certain performance, and then is possible to calculate the average of it per day, per performance or per a given time slot. These metrics can be used to verify the **effectiveness of the solution** on each individual artist, simply by comparing the same metric before and after the introduction of the solution.

2.8. Data and Data sources

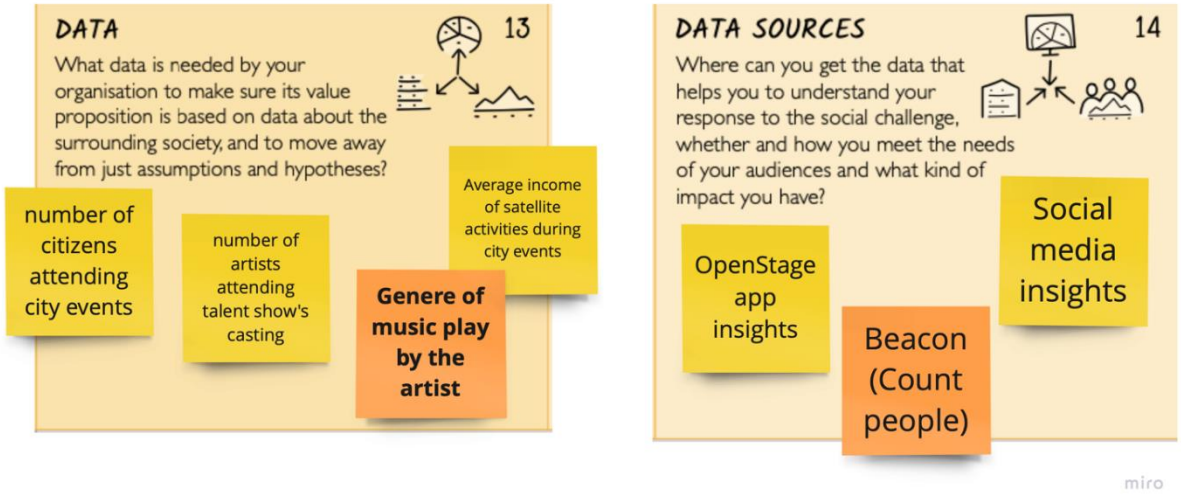

Figure 14. Data and data sources, snapshot of Impact canvas

Insights can track marketing performances and give a measure of interactions occurred, also, employing Beacon to collect a large amount of data, it's easier to make estimation, evaluate ratios, find patterns and guide further market research thorough meaningful data guide.

Our solution need to collect specific data such as (A = from artists; T= from totem):

1. Music genre played by the artist (A)
2. City where he wants to play (A)
3. Preferred time slot (A)
4. Artist's name (T)
5. People count from sensors, differentiating between who passes and who stay (T)
6. Average stay time of audience (T)
7. Genre played at each performance (T)
8. Duration of each performance, specifying start time and end time (T)

Beacon Technology allows us to enlarge the real-time acquiring of data, in our thoughts very important to catch first raw data (first impressions) and enrich them later with more structured and aimed information. Data described in the previous Data section is retrieved from the artist and the totem.

Every time an artist wants to perform will be asked to insert the data denoted by "(A)" in the Data section.

Then, after each performance, the totem will generate and send to OpenStage databases a summary of the just ended performance containing the data denoted by "(T)".

Combining (A) and (T) data the algorithm will be able to suggest the best totem to each performer, based on their music genre, fittest location and best time slot.

3. Final Conclusions

Our solution represents a good balance between an incremental innovation and a disruptive [35] one. It is incremental since it focuses on making existing products or services more competitive, in this case by providing an additional feature that integrates into the existing environment. But it contains also traces of disruptiveness since it implements a new technology never used in the past by the company, which will force them to face new challenges.

We think that this mix represents a sweet spot between the need to improve the quality of the product and the capability of satisfying the user's needs, but also taking into account the necessity of expanding as soon as possible. Being the first mover in a certain field, as OpenStage is, always represents an enviable advantage base, but this must be protected and reinforced over time.

The suggestion from our solution is exactly this, in fact we see it as a great feature for a more mature OpenStage, given the fact that to be as effective as possible TMS needs way more data from way more artists and totems.

Once these conditions are met, we truly believe that the solution will bring considerable additional value, both for users and OpenStage.

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