Ideas MELting pot for TIC and Health science for Citizens in small communities (MELTIC)

WP4: Technological proposal for implementation
Deliverable D4: Technological proposal (M14)

April, 2021

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2 Summary

2.1 General Objective of MELTIC

The aim of the MELTIC project is to make research activities in ICT in the area of Health and Biomedicine more open, transparent and accessible in order to increase their social impact and thus contribute to improving the quality of life of European citizens in small communities.

Also, MELTIC brings together relevant stakeholder groups in order to co-create and come up with ideas and innovations for researchers in the area of Health and Biomedicine ICT.

2.2 Specific Objectives

The MELTIC project connects EU policies challenges with the specific demands of European citizens as stakeholders in small communities, the project analyses the impact of depopulation, healthcare needs, active aging, education gaps and climate change, and how the scientific disciplines of Information and Health Communication Technologies can find innovative ways to improve the quality of life. We have elaborated this reference document and will develop a technological proposal to support and encourage sociospatial interaction of citizens in small communities.

MELTIC pursues the fruitful cooperation among pratitioners with the aim of producing suitable ideas for research in topics such as self-learning, discriminatory information and addiction prevention (Compulsive gambling, gaming and betting) One of the challenges of this project is to find suitable answers regarding the role that smart technologies can play in the transformation of public spaces in small communities into people-friendly environments.

3 Objective of the technological proposal for implementation

The MELTIC project connects EU policies challenges with the specific demands of European citizens as stakeholders in small communities, the project analyses the impact of depopulation, healthcare needs, active aging, education gaps and climate change, and how the scientific disciplines of Information and Health Communication Technologies can find innovative ways to improve the quality of life. We have elaborated this reference document and will develop a technological proposal to support and encourage sociospatial interaction of citizens in small communities.

MELTIC has brought together stakeholders from Italy, Spain, Portugal and Romania to share their interests and values and generate new ideas, concepts, products or projects. It will also provide the opportunity to incorporate contributions on technical proposals such as online websites or applications.

MELTIC's proposed study, alongside contributions from practitioners, will also faciliate the identification of the potential impacts of new research ideas, as well as understanding the opportunities and risks that have not yet been systematically compared, discussed and evaluated. The consequences of these relationships have not yet been fully investigated. Long-term experiences and analysis do not yet exist, meaning that an ultimate evaluation of the consequences of ICT in small communities will require futher study in the near future. Due to the rapid development and application of new technologies there is a permanent need to monitor and support the work of ICT researchers, urban designers and social agents. The Stakeholder analysis sets the context for the co-creation process in order to meet the project's objectives. This analysis takes into account information supplied directly from the MELTIC partners working environment.

As a background to the stakeholder analysis it is necessary to point out that the use of smart technologies in public spaces is increasingly creating new forms of social interactions and practices, as well as creating new socio-spatial relations that promote interactions and communication between isolated and disperse communities. This results in the need to re-think social practices and the use of public spaces which could also have an impact on the development of ICTs and their devices.

The dialogue and connection between people (as users) with real and virtual worlds also opens up new requirements in advanced knowledge, not only in new ways of gathering information, but also in how to interpret the data. Also, there is an additional need to manage and disseminate the acquired knowledge. MELTIC analyses the current use and developments in electronics, information and telecommunications and the relevance they have on their daily lives, with almost every day something new being aggregated.

The Digital Experience Platform (DXP) proposed in this document provides content management capabilities and ease of integration with devices and various sources through headless technologies. The Digital Experience defines the interaction between users and technology and is an inovation

driven by user needs. Headless platforms, by definition, are prepared for omnichannel communication with the user.

For these reasons, this technological proposal was also developed with the concept of “Community in mind”: trying to create strong and active communities that allow rural populations to strengthen ties between their neighbors and other nearby populations, or indeed anywhere else in Europe. Technology facilitates the breaking down of distance barriers and makes it easier for people from different parts of Europe to share interests and strengthen ties, for groups of workers from different sectors to come into contact with each other, as well as citizens, associations ...

4 Technological proposal

This technological proposal is a Digital Experience Platform (DXP - Digital eXperience Platform) that provides content management capabilities and ease of integration with devices and various sources through headless technologies.

The **Digital Experience** defines the interaction between users and technology, but it is not an initiative driven by the latter; it is an initiative driven by user needs. There is a huge difference between simply using digital technology and taking advantage of it to improve the user experience and better meet their needs.
For example, reading a scanned document cannot be classified as a digital experience, as there is no difference to reading a physical copy. But an enhanced digital PDF can include cross-references to other documents, definitions, online collaborations, auto-translations, and digital signatures, qualitatively improving user interaction with the content of the document.

The technology platform "headless" has been on the the market for just a few years. These platforms do not limit access to their services through their own tools, but rather implement a wide variety of APIs (Application Program Interface) so that their services are accessible from any type of device, and even from any other type of platform.

Headless platforms, by definition, are prepared for **omnichannel communication** with the user: a) the content is found in one single place without the possibility of inconsistencies or ambiguities due to the distribultion of copies, b) interaction with the user is stored on the platform, regardless of the number and types of devices (computers, tablets, smartphones, ...) with which the service is accessed and c) they provide flexibility to content creators by not worrying about the way in which they will be presented to users .

We have known, from years of practice, that a standard and unmodified web user experience will be insufficient in meeting our objectives in MELTIC; there is no single design that will satisfy everyone. Omnichannel, together with headless technology, will faciliate the personaliztion of the user experience, providing content and services of interest to them based on their location, language, preferences and way of accessing the technological platform.

4.1 Interactions of ICT, public spaces and health

Partners carried out an exploratory study on stakeholders and their areas of work as well as the spatial and social aspects in small and isolated communities that could be enriched by means of ICT. The results are shown in the following Diagram 1 and were presented in D3:

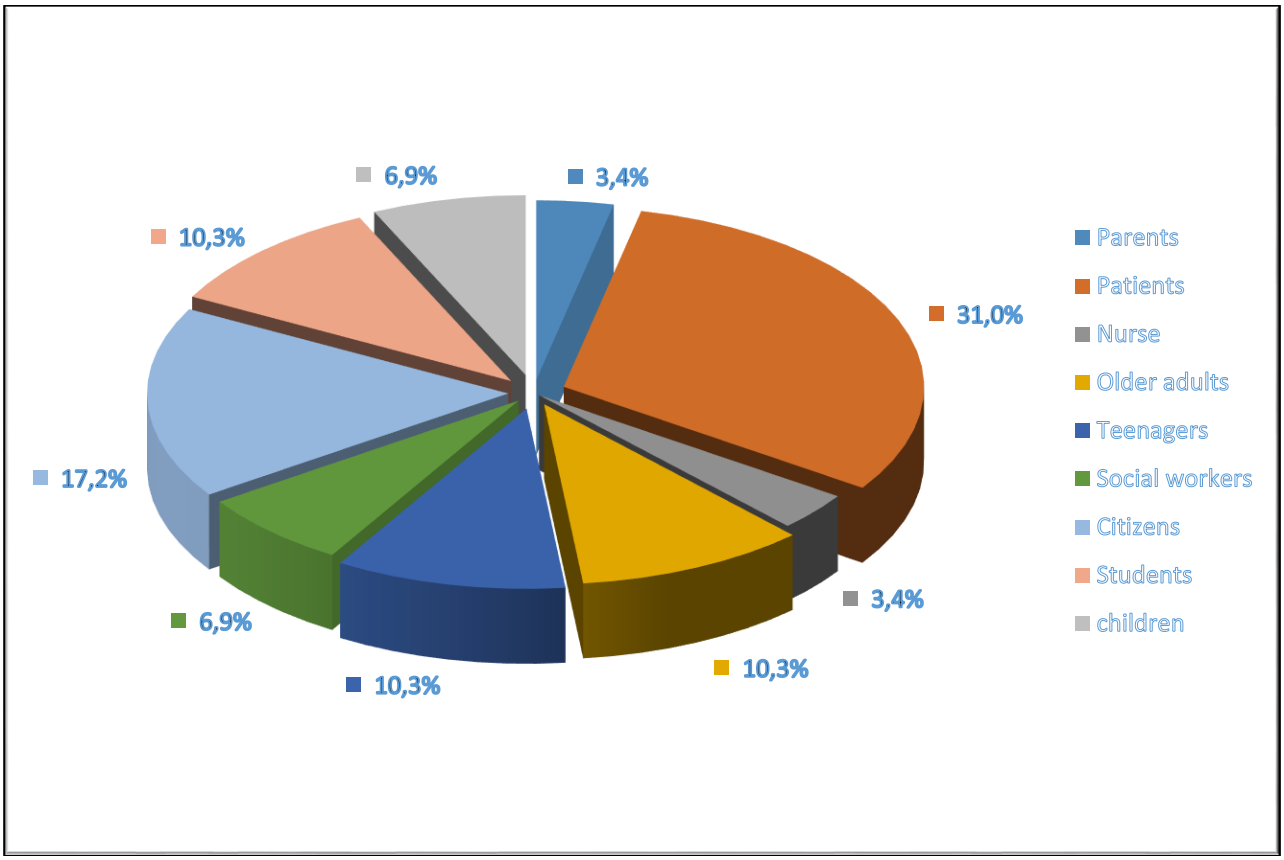

Fig. 1 Stakeholders Involved

The development of a technological proposal for citizens in small communities will be based on existing knowledge and experience regarding the interactions between ICT, public spaces and health in different ways:

1) The use of ICT devices in public spaces (phoning, texting, wi-fi, gaming),
2) ICT as an information transport network (internet, newsletter),
3) ICT as a tool for social and health reporting and planning (e-planning) - this includes the possibilities that ICT offers for connecting people in small communities (enhancing participation).
4) Interfaces of specific networks
5) Availability functions and services

Another key aspect in developing a technological proposal is the ability of ICT's to: allow on-demand access to content anytime and from nearly anywhere; engage individuals and groups of users to interact and congregate online and share information. The impact of ICT in public spaces is already

challenging tech designers and landscape architects to meet the needs of people living in an increasingly connected world.

5 MELTIC Digital eXperience Platform (DXP)

To meet the objectives of the WP4 package, the scope and functionality of the DXP platform, will be defined. A platfrom that aims to be the access point to a broad set of knowledge, services and experiences that will meet the needs identified by MELTIC partners and stakeholders.

The MELTIC DXP platform is defined as an ICT infrastructure based on open-source distributed architecture and adhereing to international standards, deployed in a virtual environment and allowing independence between services and hardware, providing a highly availabile, flexibile, scalable and secure service. IT infrastructure, in terms of communication and mass storage, will be redundant, with all the security and safe access features made available in order to avoid service faliures and unauthorized access.

The functionalities of the platform are conceived as modular components and / or microservices, with open interfaces, low coupling and high cohesion, which will provide security and high scalability in the services provided. Essentially, the microservices architecture implies the development of software as a set of small, modular services with unique processes, independent implementation, and communicating with each other through a simple and well-defined mechanism to meet the objectives of the project. .

5.1 Functional Requirements

5.1.1 TAGGING AND METADATA

To offer an optimal user experience, the platform will have a tagging and matching search engine for user preferences. Thanks to the MELTIC working groups, 4 large groups of metadata have been identified and are shown in the following diagram:

Fig. 2 MELTIC main groups of metadata

- **User profile:** set of user preferences registered in MELTIC DXP, to offer a customization of the platform according to their tastes and needs.
- **Location:** all content and services will be classified by their location characteristics.
- **Media:** identifies the type of content and services.

● **Contents:** topics or areas to which the contents and services belong, and which have been defined in the MELTIC working groups.

These 4 groups of metadata will be broken down in the following sections.

5.1.2 CONTENT SEARCH

The platform should enable users to find the desired information in an effective way.
2 types of search are proposed:

- Basic search: users can search by one or more categories, as well as in free text. They can also explore the existing categories to improve the search. The results can be ordered by different criteria (pending definition).
- Advanced search: the possibility of searching directly the content of the documents on the platform (Word, PDF, etc.) will be looked at, through the use of regular expressions: literal expressions, wildcards, etc. (Similar to Google).

5.1.3 CONTENT RECOMMENDATIONS

The content search should not be the only tool to access MELTIC resources. The existence of a content recommendation system for the user would be a key factor in achieving the objectives of the technological proposal.

This recommendation system would be based on the user's profile, their interests and needs, and on their previous behavior when using the web. It would allow MELTIC to show personalized content, hence improving the user experience.

5.1.4 CONTENT VISUALIZATION

The platform will provide a kind of " default" access to services and content via the web in a "responsive" way (adapting to any type of device), but as it is a "headless" platform, the different partners and stakeholders could develop their own interfaces and ways of accessing the contents.

5.1.5 CONTENT DISSEMINATION

The platform will have a multi-channel broadcast functionality: it will include, at least, the possibility of issuing newsletters with configurable content and/or rss feed.

5.1.6 USER PROFILE MANAGEMENT

Each user could have a profile in the platform containing different sections:

- user identification data (email, password),
- topics in which they are interested, and
- demographic-social data.

The areas of personal interests will be used to show users content in areas of personal interest, discarding -a priori- other content that does not suit their interests. The areas of interest identified so far (which could be expanded) are shown in the following diagram:

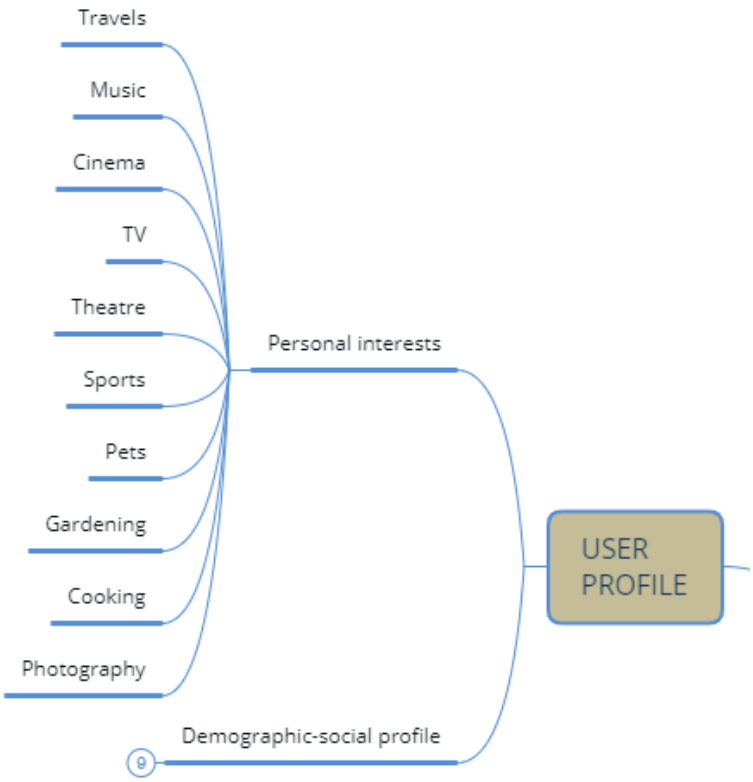

Fig. 3 User profile: personal interests preferences

Regarding the socio-demographic data, they are all optional, but will allow the user experience to be personalised according to their profile. The following diagram shows the categories in this area:

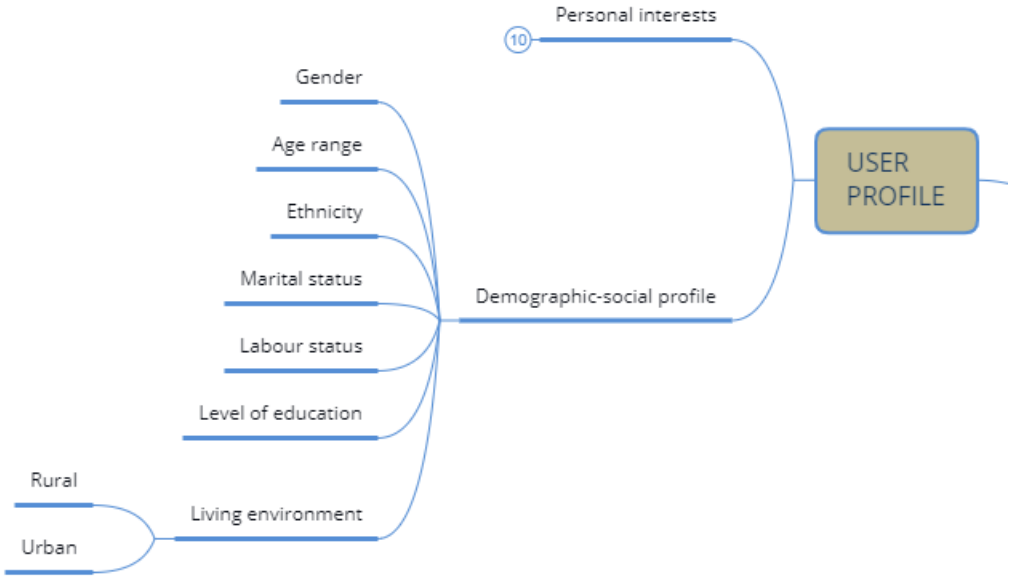

Fig. 4 User profile: demographic-social data

5.1.7 SUBMISSION AND CONTENT MANAGEMENT

The sending and updating of content on the platform is yet to be defined in the project, and an approval flow may be established so that said content is available to the entire population.

The content will be categorized at different levels:

- Language: the language of the content / service will be indicated, as well as any possible translations.
- Geographical location: The contents will also be hierarchized at a geographical level, prioritizing local content in order to be able search content later at a regional, national and / or European level.

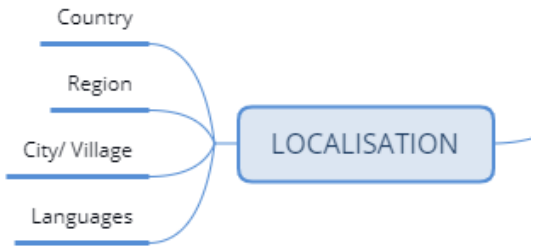

Fig. 5 User profile: localisation preferences

- Type of resource. A classification of content based on its format

Fig. 6 Media: type of contents and resources

- MELTIC areas of interest (defined in the working groups). All content / services belong to one of these areas. 64 categories have been identified and grouped into 7 subsections, but the platform will be flexible enough to expand / modify this classification to respond to future resources that are needed in a specific region or location. The categories are grouped into: support for rural activity, environment, citizen participation, health, education of the population, cultural heritage and community resources.

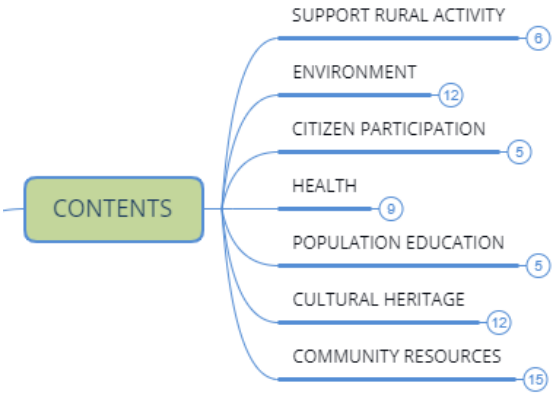

Fig. 7 MELTIC resources: main topics

The category tree for each of the seven subsections is detailed below.

Regarding the support of rural activity, the categories that have been defined so far are:

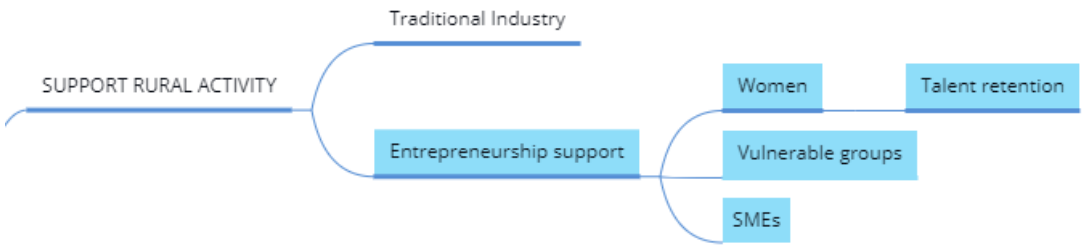

Fig. 8 Support rural activity categories

In the area of the environment, the categories are grouped into the sections "Training" and "Sustainable Environment":

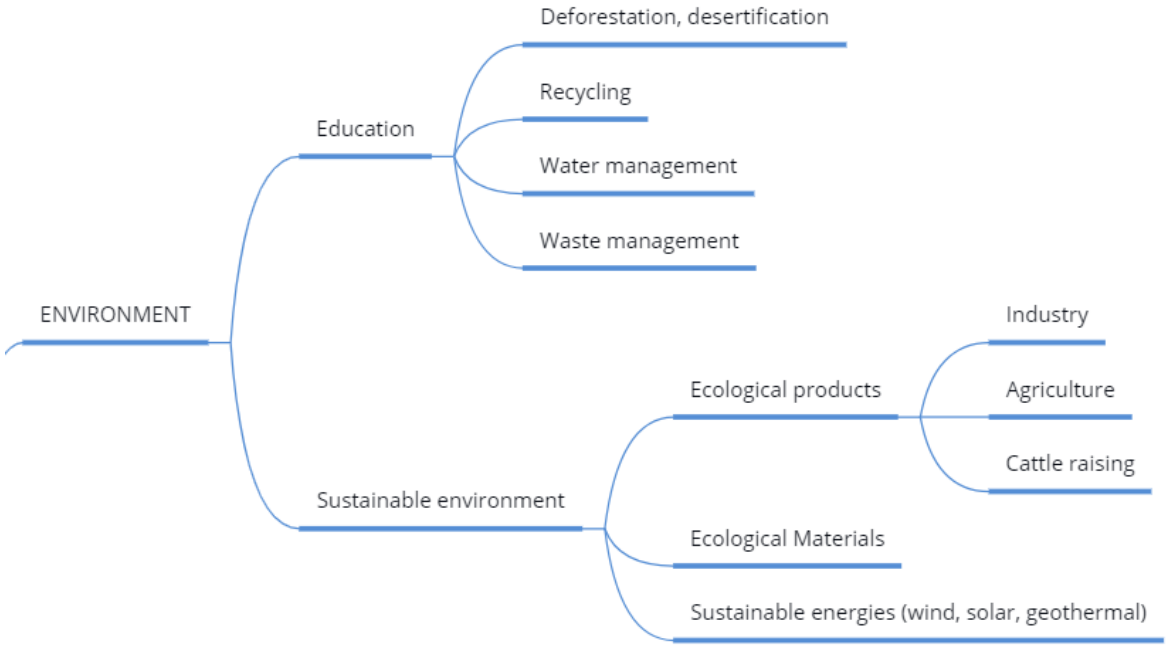

Fig. 9 Environment categories

In the area of citizen participation, the following categories have been identified:

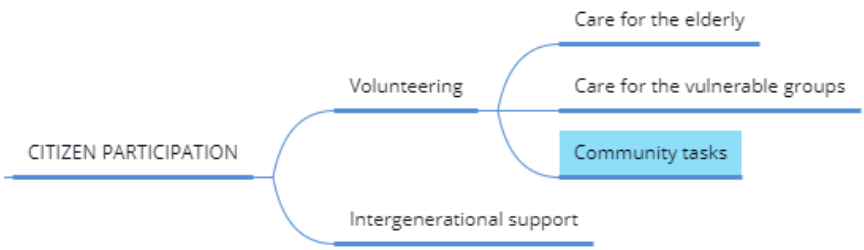

Fig. 10 Citizen participation categories

One of the most important areas is Health. 4 areas of special interest have been identified and need to be addressed, mainly in rural areas: training, online assistance, support for the elderly and mental health. The hierarchy tree is:

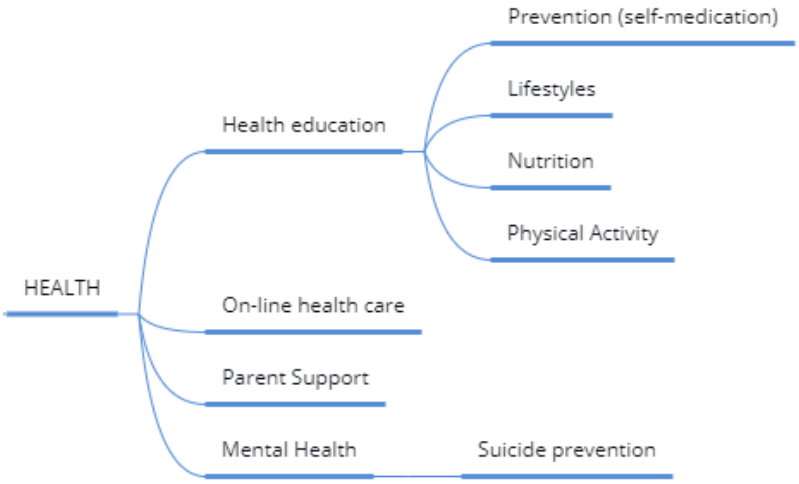

Fig. 11 Health categories

Education and an interest in maintaining educational structures in the rural environment are other areas of great concern detected in the working meetings. The categories that have been identified are:

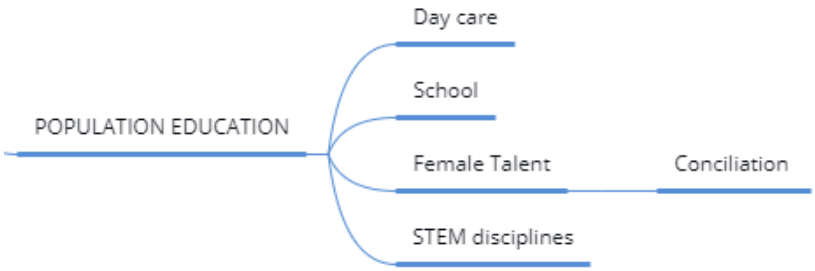

Fig. 12 Population education categories

The knowledge and dissemination of Europe's vast cultural heritage is an essential pillar of MELTIC. Much of this heritage is found in our villages, towns and rural areas; Knowing other cultures and promoting one's own, being aware of the importance of cultural diversity for the development of our societies and of Europe as a whole, is urgent and necessary. For this reason, the following hierarchy of categories has been defined:

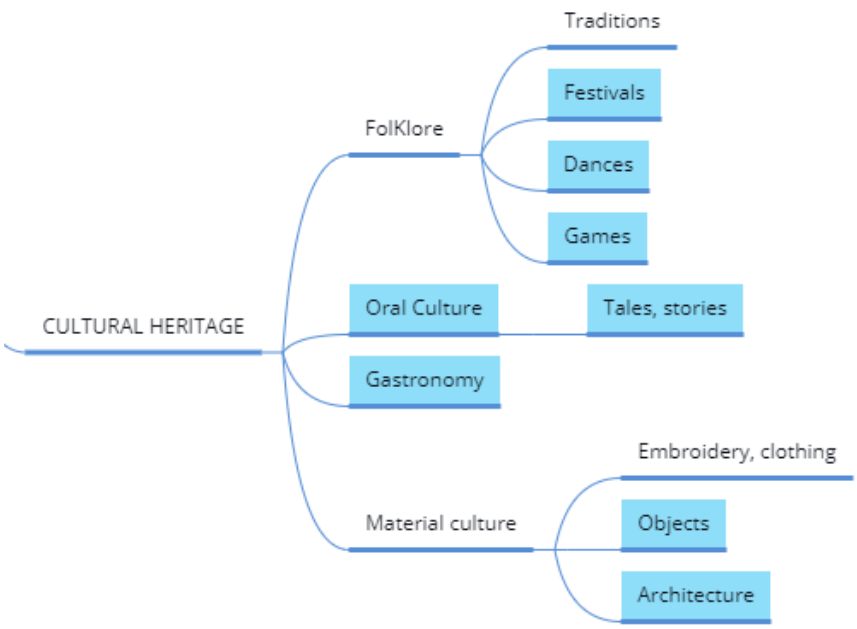

Fig. 13 Cultural heritage categories

Finally, community resources is another of the large areas that have been defined in the working groups. The identified categories address the concerns or worries of rural environments with regards to the deterioration of many of their services, among others: communications infrastructure, access to aid, technological resources, etc. The categories are shown in the following diagram:

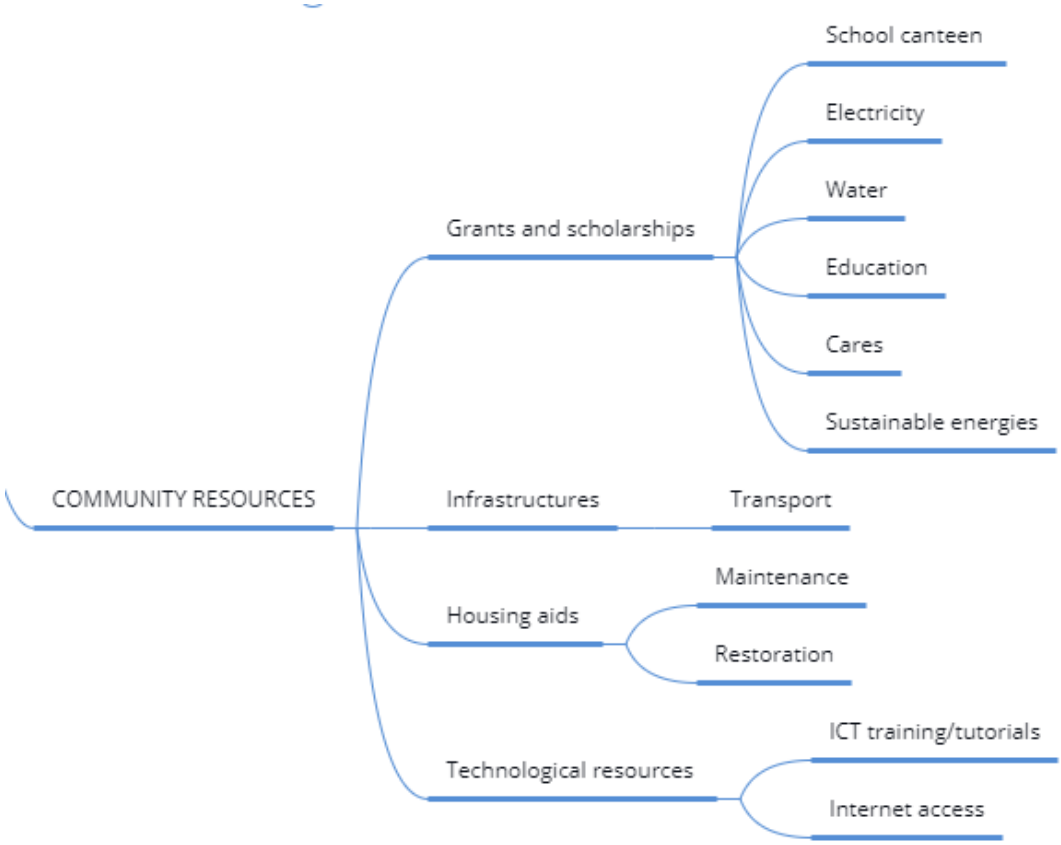

Fig. 14 Community resources categories

These categories will be used to tag MELTIC resources -as keywords- allowing them to be searched for later. The possibility of automatic tagging using existing cloud services will be examined.

The possibility of incorporating user tagging will also be looked at, this is where the user decides which annotations to establish for the proposed resources.

5.1.8 COMMUNICATION PROMOTION

As stated earlier, one of the technological goals within MELTIC is "to create new socio-spatial relations and promote interactions and communication between isolated and disperse communities."

The health crisis resulting from COVID-19 has clearly emphaised the essential role that technologies play in communication today. We have seen an explosion in the digital world, allowing citizens to carry out their work effectively, being able to communicate and collaborate with other people, family, friends and loved ones, boosting commerce, providing services, etc. And all this, on many occasions, completely spontaneously and without any prior planning.

MELTIC DXP should be a facilitator in this dialogue and in the connection between people, in both the real, and virtual world. Current ways of promoting this communication (forums, user groups, discussion groups, social networks, etc.) should be taken into account, as well as any other means / tools that may arise in the future in this ever-changing technological area.

5.1.9 HELP CHATBOT

Chabots are widely used in web services to provide first-rate support to users. The MELTIC DXP Chatbot can be the perfect solution for:

- helping users to quickly find content and services that would otherwise take time to search for,
- providing help in the use of the platform or the services it offers, and
- collecting usage and accessibility statistics (detecting weak points of the platform with regards to accessing content).

5.1.10 VOICE ASSISTANTS

Voice assistants are proving to be an excellent companion for older people, helping them to not only remember everyday tasks, but to combat loneliness and isolation.

In rural areas, where the population is mainly older, voice assistants can be a fantastic tool in making it easier to connect, not only with the digital world, but with the social one too. Voice assistants can make content and services accessible that would otherwise be out of reach for an older generation.

Virtually, any service offered by MELTIC DXP could be accessed through a voice assistant, but the scope of this, which is extremely varied, is yet to be defined,: The possibility of performing voice-guided gymnastics sessions, stress and anxiety control sessions, access to medical and / or institutional services, initiating video calls with other people with whom they share hobbies, etc.

5.2 Non-Functional Requirements

5.2.1 GENERAL ORGANIZATIONAL REQUIREMENTS

Initially, users registered on the platform (by email and password) will be restricted to MELTIC members. Once the privacy and data protection policies have been developed, as well as other procedures or agreements that may be necessary, the platform will be opened to the general public.

The system will be integrated into the overall infrastructure of the Instituto de Salud Carlos III (ISCIII); the ISCIII will ensure the security aspects of the system and its data and will include the system in the organization's existing Contingency Plans.

5.2.2 USABILITY AND ACCESSIBILITY REQUIREMENTS

- Developers and administrators will ensure the usability of the interface, in order to facilitate understanding and learn from user interaction, adapting the platform features to their behaviour. In this way, the system will have a proper support system, adapted to the context.
- Although it is not the objective of this project to adapt the open source modules in which the platform will be based to W3C accessibility standards, the interfaces will try to be adjusted to the accessibility standards adopted by European authorities.
- The initial default language within the system will be "English", and new languages could be included in the future. In this case, the default website of the platform will be adaptable to the user's preferred language, providing menus, dialogues and aid in the language specified in the user profile.
- The system will adapt to the actual space-time location of the user in order to maintain temporal coherence in the platform-wide community.
- Headless technology, together with the microservices paradigm, facilitate the development and simple integration of skins for voice assistants (Alexa, Echo, Siri ...) that will be an important accessibility tool for certain segments of the population (the elderly, people with disabilities, etc).

5.2.3 DESIGN AND PERFORMANCE REQUIREMENTS

The design will emphasize modularity, by facilitating:

- comprehensible logical architecture and programming code,
- changes in the data model,
- incorporation of new functionalities and
- maintenance of the former.

The hardware infrastructure, software platform and the intermediate layer (operating systems and middleware) shall not impose any restrictions on the number of registered users, or the referenced content. The system will be ready to accommodate simultaneous connection peaks.

The development of the system will attempt to reuse as much software as possible: to this end, the implementation will be supported as far as possible in pre-existing components:

- workflow engine
- database management systems
- a search engine (with high-level access to storage)
- an interface to the database management system (low-level access to storage).

5.2.4 REQUIREMENTS FOR QUALITY ASSURANCE

- Procedures shall be established for an efficient governance platform.
- Procedures for an efficient change management platform will be established.
- Appropriate measures will be taken to ensure compliance with the rules on the protection of personal data (Spanish Law 15/1999, RD 1720/2007 and subsequent developments in the

law) and the protection of intellectual property (Spanish legislative Decree 1/1996 and subsequent developments in the law).
- Records of relevant interactions are stored in order to calculate quality metrics.

5.2.5 EXPLOITATION

The system will have a module to provide statistical analysis of the content, the use of the platform, and further needs yet to be identified.

5.2.6 INTEGRATION AND INTEROPERABILITY

The platform must be able to integrate with the different systems that make up the IT ecosystem of organizations, as well as having the versatility and elements that will allow for innovation in the coming years, adapting to the new channels and applications that will emerge

The aim is that all the communities can benefit from the synergistic effect of the crossed and accumulated knowledge/resources. These interoperability procedures constitute a module focused on providing software interfaces (APIs) based on "machine-to-machine" standards, which allow search and information retrieval actions between different distributed systems and in a way that is transparent for users.

5.3 Actors specification

5.3.1 HUMAN ACTORS

Regarging the use of the platform, the actors (or user "roles") that have been identified so far are defined below.

5.3.2 ANONYMOUS USER

A user who is not registered in MELTIC DXP. They will have access to all the content and services that are defined as public.

5.3.3 USER

Registered user in MELTIC DXP with password access to private content and services. These services may include, among others:

- Send new content to the platform to be published after approval.
- Search for and download resources that are not available to the general public.
- Manage their profile information and update it when necessary.
- Manage the platform notifications through the defined broadcast options.
- Promote any content by giving a positive vote (star / flag system).

- Communicate with the Support Team regarding the platform.
- Contribute to ensuring quality by giving notification of bugs or failures to the Support Team or the website Administrator.
- Shaping the platform by identifying needs and improvements and notifying them to the website Administrator.

Users will initially come from MELTIC partners and stakeholders. They will have to provide all the information established as *required in their profiles in order to be granted access to the MELTIC DXP. The system provides each user with their own profile and with information to identify, authenticate and characterize themselves. The user is responsible for providing such information and to keep it updated.

5.3.4 REVIEWER TEAM

The "reviewer" role is a specialization of the "user" role. Reviewers are responsible for monitoring content uploaded by users through an approval workflow. This workflow (pending definition) will allow reviewers to either reject inappropriate content or accept it so that it becomes available on the platform.

5.3.5 SUPPORT TEAM

The Support Team is NOT a specialization of any of the former roles. It is a MELTIC team in the platform responsible for:

- Creating and sustaining a Knowledge Base for the platform including a “Frequently answered questions” site and tutorials or guidance material on the platform.
- Solving questions on the use of the platform and general searches.
- Manage suggestions regarding change management in the platform.

It is important to relate to people and not just simply collect data. The implementation of close and fast contact services will allow the Support Team to virtually accompany users and to never allow the users to find themselves alone when interacting with MELTIC DXP. The feeling of abandonment that a user perceives when not recieving any response, only leads to frustration and, finally, to abandoning the platform.

5.3.6 ADMINISTRATOR

In addition to the actors described above, there will be at least one technical administrator responsible for managing the data base and for software maintenance.

5.3.7 FACILITATING INSTITUTIONS

The facilitating institutions, through resources and public policies, can contribute to MELTIC by promoting the development of their own resources adapted to the idiosyncrasies of each location, encouraging the rural population to remain and facilitating economic growth in the region.

The participation of facilitating institutions is essential in achieving a sostenible development. The use of smart technologies in public spaces is increasingly creating new forms of social interactions and practices, which in turn creates new socio-spatial relations and promotes interactions and communication between isolated and disperse communities. This argues for the need to re-think public, local and private initiatives related to practices and the use of public spaces, which subsequently might also have an impact on the small communities. The intertwining of institutions in the real and virtual worlds also opens up new ways of advancing knowledge, gathering and interpreting the data, and disseminating the acquired knowledge.

6 MELTIC DXP design

In the following section we carry out a preliminary and high-level design of the MELTIC DXP platform. This design is divided into 2 parts:

- Functional structure: functional components to meet project requirements.
- Software architecture proposal: identification of possible software elements that could be integrated in order to achieve the proposed technological solution.

6.1 Functional Structure

The following diagram shows the most important components of the platform, grouped by user functionality:

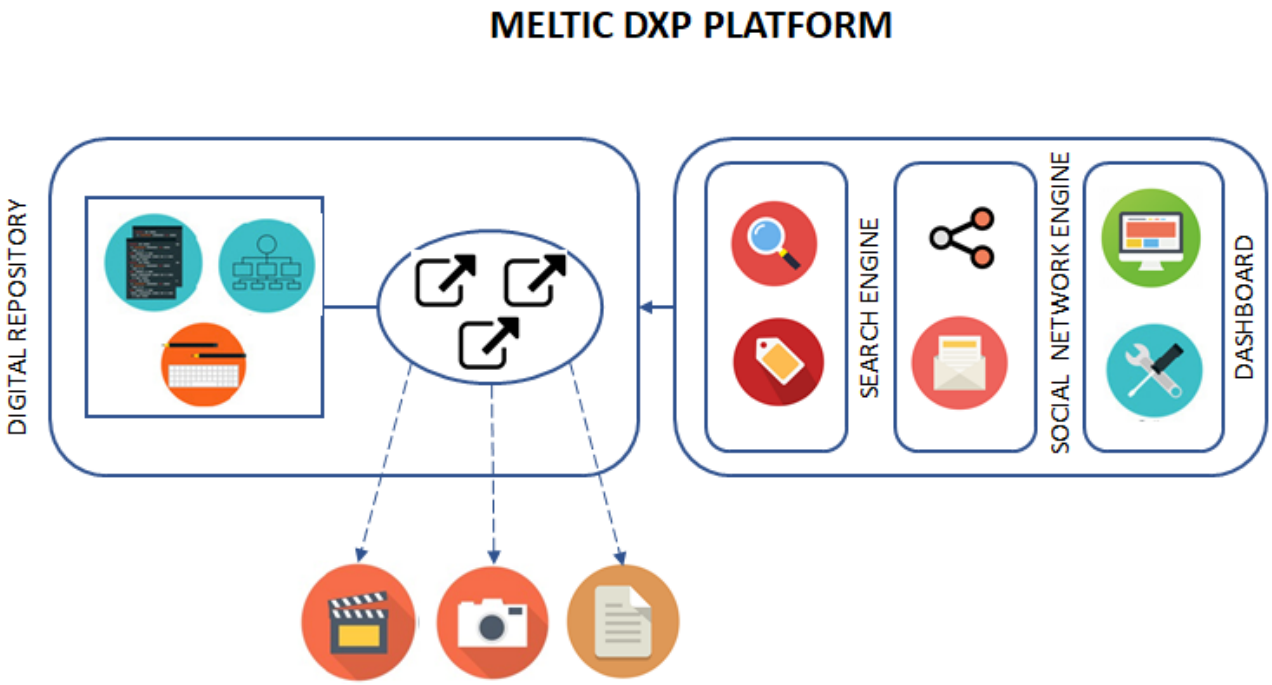

Fig. 15 Functional components of the METIC DPX Platform

Diagram represents 2 large blocks, an internal or private one that contains all the platform's resources (content and services), and an external or public-access one that offers the tools that are required to access MELTIC resources. Each of these components is detailed below.

6.1.1 DIGITAL REPOSITORY

The repository stores the content and services available in MELTIC. They are tagged according to the categorizations detailed above (language, location, type of content, area of interest, etc.) so they can be easily accessed by the user and based on their preferences.

The Digital Repository is not an information “silo”. Thanks to the platform's microservices and APIs, it is possible to integrate it with repositories from other organizations and institutions that also have this possibility of integrating and searching for resources. In this way, the MELTIC Digital Repository can become a large repository distributed at a local, regional, national or international level.

6.1.2 SEARCH ENGINE

The search engine is a set of tools to locate content and resources. It is not only based on the interests and preferences of the user, but it can perform searches at different levels (from local to international) and using search criteria that has been chosen by the user, including advanced text searches (similar to Google).
Search engine navigation will allow the user to locate resources at the level they choose: local, regional, national or international.

6.1.3 SOCIAL NETWORK ENGINE

An important aspect of the platform should be to help people from the rural world to get in touch with other groups with the same interests, or even to strengthen existing relationships, again within a digital environment. MELTIC DXP must facilitate and promote this communication, giving users all possible current and future tools:
● forums: by subject, region, ...
● blogs and / or spaces of common interests, maintained by the users themselves who share said interests (user groups, interest groups),
● newsletters,
● search by users for common interests, so that those giving authorization can expand their social circles,
● access to social networks of organizations, institutions and even users who give their consent,
● creation of on-line / off-line events at local, regional, national or international levels,
● gamification elements that favor relationships between users,
● promoting participation through rankings, recognitions or mentions,
● assessment of user interaction with the platform itself and with other users,
● possibility that users can publicly evaluate the contents and services,
● etc.

6.1.4 DASHBOARD

This component has 2 levels of application:

● At a user level: a place where you can find relevant information on your local or regional area, recently added content and services that are of interest to the user and based on user preferences,

records of user activity on the platform, direct access to contacts and the contents / services that are most frequentely used, etc.
● At an administration level: a space containing statistics on the use and activity of the platform, information on KPIs (Key Performance Indicator), user contact for errors or for requesting support, useful information to administer the website, etc. Through usage analysis, it will be possible to identify areas on the platform that need improving or expanding through ongoing improvements.

This last administration dashboard will show the possible KPIs that are defined in MELTIC DXP. These KPIs will allow valuable information on the use of the platform to be obtained by measuring the established variables, analyzing the results and effects of the defined strategies and taking decisions for their improvement.

6.1.5 OTHER COMPONENTS NOT REPRESENTED

To simplify its visualization other elements not shown in the previous diagram are:
● Workflow for sending and approving new content and / or services.
● User Profile Management, in which each user can establish their preferences and interests to personalize the behavior of the platform. Here, the user may also give their consent to be locatable or not through the social elements of the platform, seen previously in "Social Network Engine".
● Help elements: points of contact with the Support Team or use of the Chatbot, among others.

6.2 Software Architecture proposal

6.2.1 USE OF OPEN SOURCE SOFTWARE

The European Commission establishes, within its program *Interoperable Delivery of European eGovernment Services to Public Administrations, Businesses and Citizens*, the recommendation to use open source software in Public Administrations [1].

On October 21st, the European Commission approved the new Open Source Software Strategy 2020-2023. This is an important step towards achieving the goals of the overarching Digital Strategy of the Commission [2] and contributing to the Digital Europe Programme. The Digital Strategy establishes that “the European Commission will further encourage and leverage the transformative, innovative and collaborative potential of open source”.
The renewed 2020-2023 strategy puts a special emphasis on the sharing and reuse of software solutions, knowledge and expertise as well as on increasing the use of open source in information technologies and other strategic areas.

6.2.2 IDENTIFIED SOFTWARE COMPONENTS

In order to implement the project’s requirements, a stable information technology (IT) infrastructure has to be configured providing the functionalities described above.

The platform could be based on a distributed open source online architecture following international web standards, which will be deployed in a virtual environment allowing independence between services and hardware, providing the service with high maintenance, flexibility, scalability and availability. The Information Technology infrastructure, in terms of communication lines and mass storage, will be redundant, featuring all the available security elements and safety access in order to avoid service failures and unauthorized access.

The support for the basic functionalities could be provided through an ecosystem of open source modular components, with quality and stable open interfaces providing a high level of cohesion.

On this substrate all the functional modules will be implemented in the platform.
Access to the platform will be done through the Internet using personal identification procedures. Individual profiles that reflect permissions, roles, preferences and competencies were defined above in the Actor Specification section.

The main components of the proposed software architecture for MELTIC DXP and their relationships will be detailed below, and are shown in the following diagram:

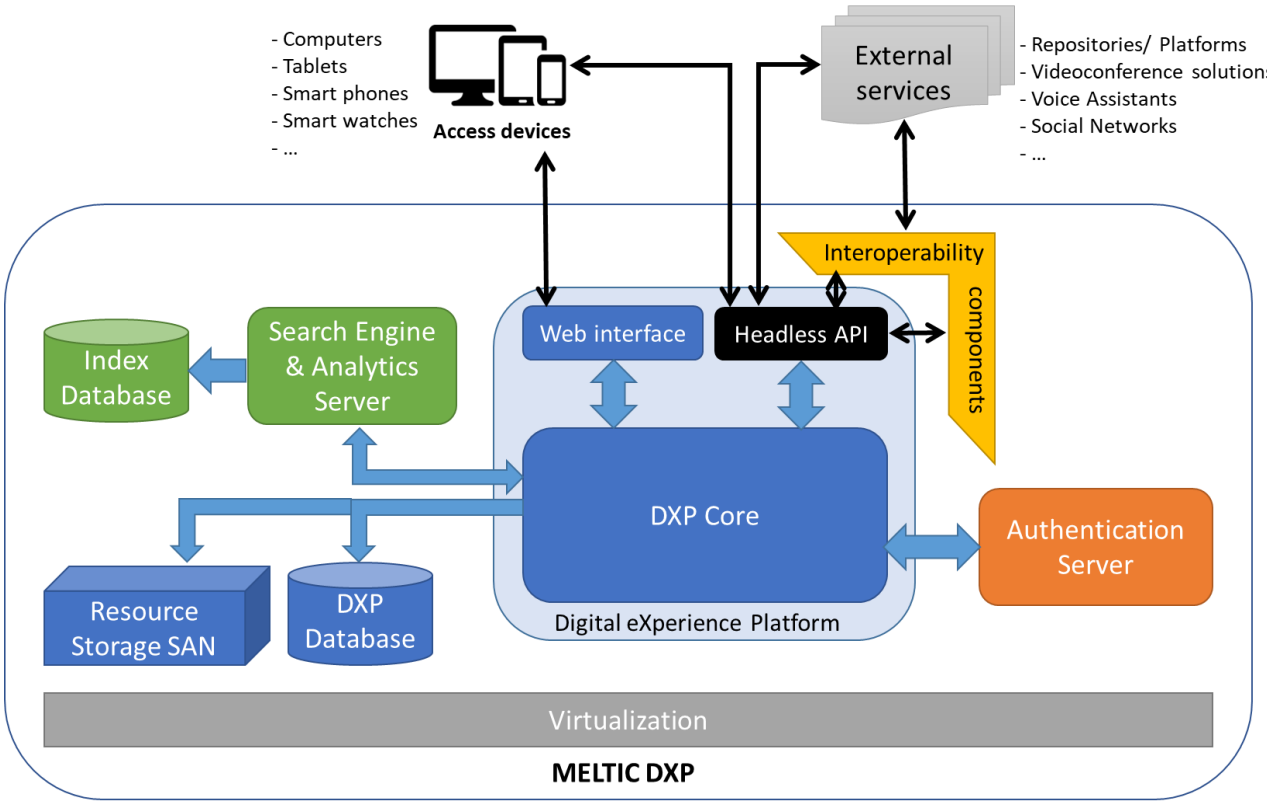

Fig. 16 Software Architecture proposal for the METIC DPX Platform

6.2.2.1 Access devices

These are the devices that users normally use to access the Internet: computers, phones, tablets, smart watches, etc.
Access to MELTIC DXP can be made through the website, provided as a default, or through customised apps and developments from third parties using the Headless API.

6.2.2.2 External services

MELTIC DXP is not conceived as an information and services silo, but as an interconnected tool enriched with third-party services: other repositories and platforms, voice assistants, chatbots, social networks, etc. This integration and interoperability with MELTIC DXP can be done through the use of the Headless API and / or the development of components for specific integrations that cannot make direct use of this Headless API.

6.2.2.3 Virtualization

The initial proposal is to use virtual machine architecture that allows horizontal and vertical scalability to guarantee the best experience in accessing MELTIC services, providing the required performance, availability, fault tolerance and reliability.

6.2.2.4 Authentication Server

The authentication server is an optional component for those organizations that require it.
Authentication is used as the basis for authorization, which determines whether a privilege may be granted to a particular user or process, privacy, which keeps information from becoming known to non-participants, and non-repudiation, the user cannot deny having done something that he was authorized to do or deny having participated in a process in which he has actually participated.

6.2.2.5 Digital eXperience Platform

This is the platform itself, and is the centerpiece of MELTIC DXP containing all the functionalities defined earlier in this document. It relies on the rest of the components to achieve its objective. It contains the DXP Core, Web Interface, and Headless API elements, as well as a direct relationship with the interoperability components that need to be developed.

6.2.2.6 DXP Database

It is the database with all the MELTIC DXP information. The database will not be directly accessible from the Internet, but must be located in the MZ (Militarized zone) of the network. It will be properly audited to detect unauthorized access.

6.2.2.7 Resource Storage SAN

This is the storage area for all the necessary resources of MELTIC DXP: documents, videos, presentations, etc.
The proposal of this document is for the existence of a Storage Area Network (SAN), an independent and dedicated high-speed network that interconnects and supplies storage to several servers. This SAN network guarantees fast and efficient access when resources are requested.

6.2.2.8 Rearch Engine & Analytics server + Index database

Nowadays it is essential to have an efficient analysis and search engine, to provide immediate answers to user needs. These engines do not carry out searches or analysis directly on the platform database, as they can greatly affect its performance given that they carry out tasks that consume a lot of the server's resources.

These search and analysis engines have their own database indexed with the information from the platform's original database, updating this information at the same time as the platform itself.

7 Demostration of the proposal

Here are presented a first approximation of the proposed MELTIC DXP platform.

In the following link may be accessed: http://meltic.uites.isciii.es

Some sections are presented in next Figures:

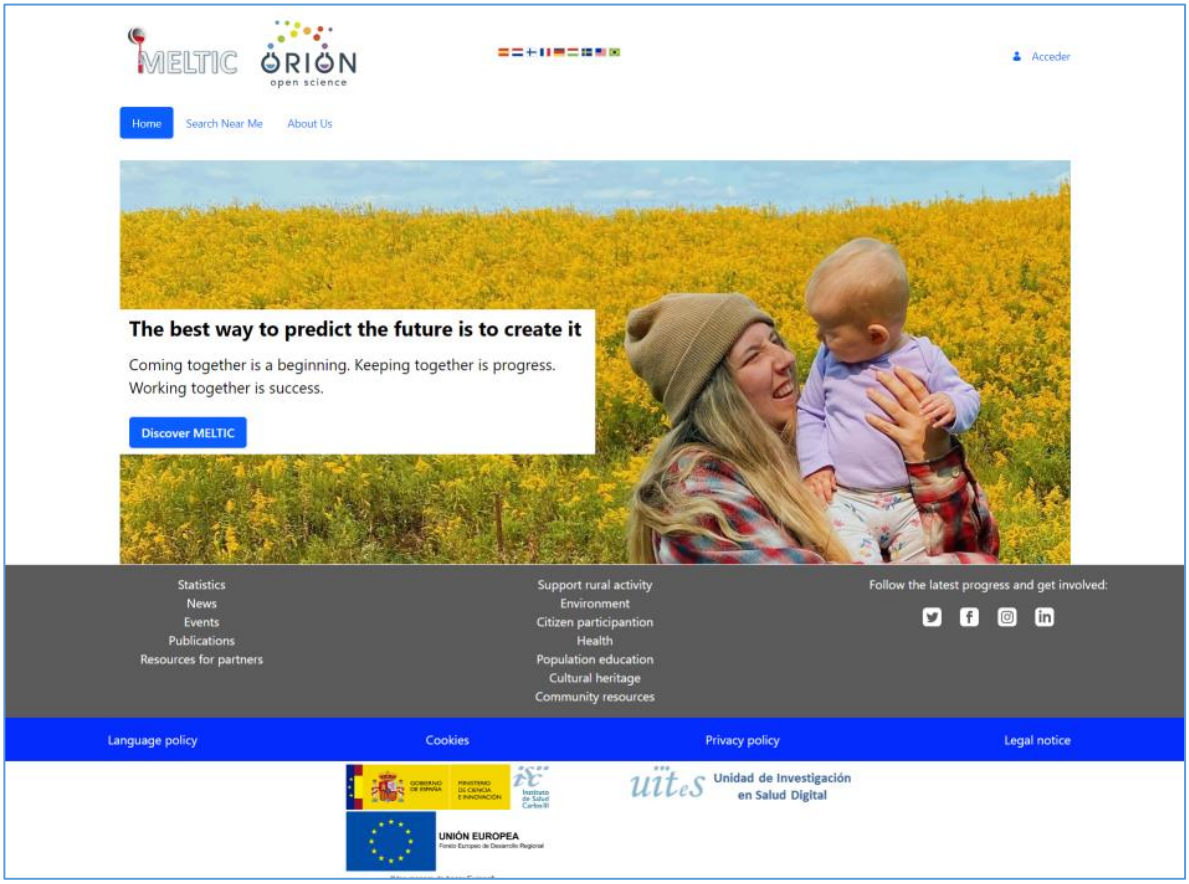

Fig. 17 Home

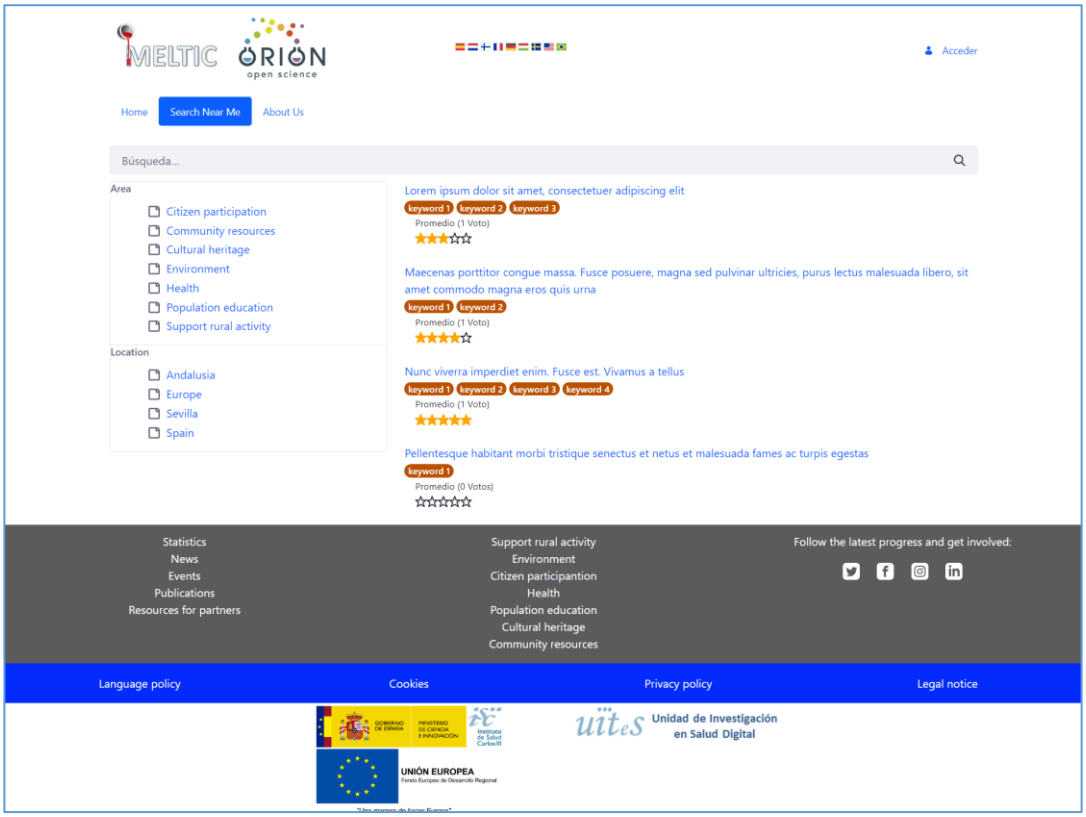

Fig. 188 Search Near Me

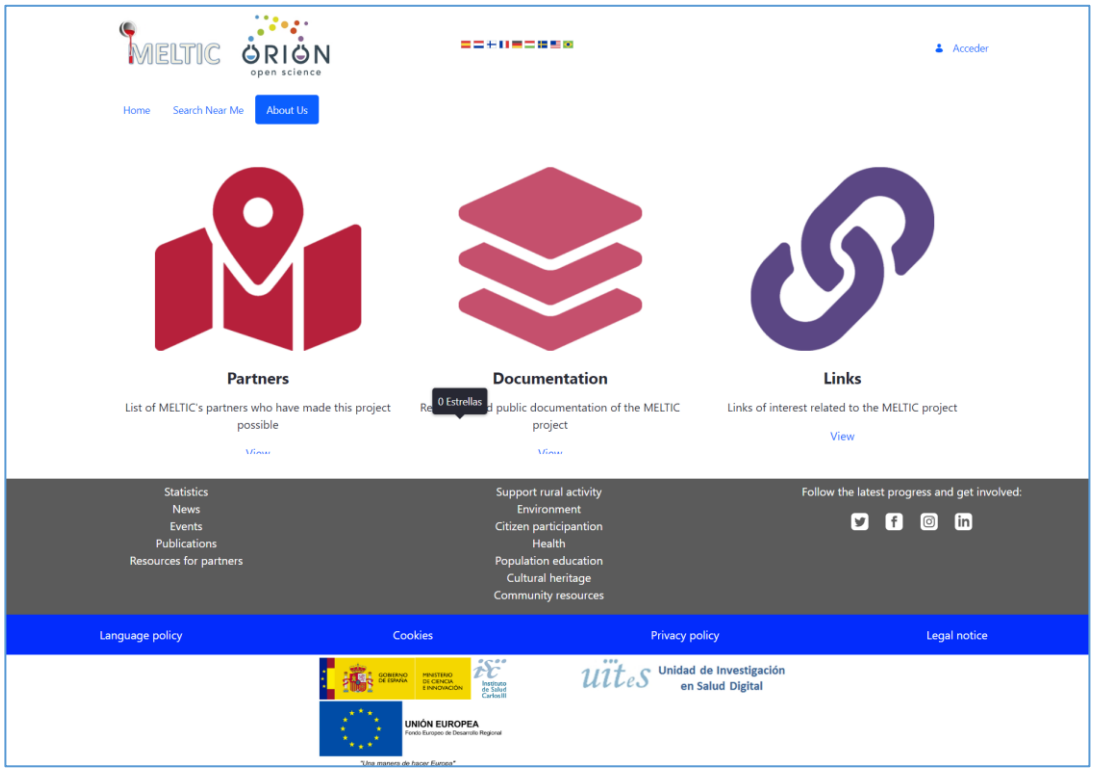

Fig. 199 About us

8 Tentative planning of activities

As a first approach to a development plan of MELTIC DX we have contemplated a 3-year project, with the following work packages and possible objectives:

- **WP1-Definition and Requirements Analysis** (6 months): definition of all the requirements of the MELTIC DXP platform, which will take as a starting point the current document and then go into more depth.

- **WP2-Functional and Technical Design** (7 months): functional and technical designs of the modules to be developed, based on a requirements analysis.

- **WP3-Development** (18 months): development of the platform. The components to be developed should be defined in the previous WPs, but some have already been identified in this document; User Profile, User Roles and Permissions System, Resource submission (tagging, approval workflow…), Content search (basic & advanced), etc.

- **WP4-Theming and Localisation** (3 months): Initially, the platform will be set up in areas where the pilots will take place, but it should be ready to be accessed in any EU language.

- **WP5-Integration & Deployment** (3 months): integration and deployment of the definitive version in order to launch the pilots.

- **WP6-ICT Infraestructure** (hardware, environments, monitoring, etc): This package will begin at the end of the first year (when development begins) and will be active throughout the whole project as specific actions will always be necessary regarding the technological infrastructure: servers, networks, resource monitoring, etc ...

- **WP7-Pilots, Feedback and Adaptations** (3 + 4 months): During the second year, the areas where the pilot projects will take place will be determined. These pilots will be carried out in the third year. During the pilots, feedback will be collected on usage and funcionality that will enable improvements to made to the platform, or for proposals regarding future improvements to be made.

- **WP8-Project Management**: Project management tasks will be carried out throughout the 3 years.

Below is showed the work schedule with an estimated execution time for each task:

MELTIC DXP Planning

	Year 1												Year 2												Year 3											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
WP1-Definition and Requirements Analysis																																				
WP2-Functional and Technical Design																																				
WP3-Development																																				
WP3.1-Development: User Profile, User's Roles and Permissions System																																				
WP3.2-Development: Resource's submission (tagging, approval worflow…)																																				
WP3.3-Development: Content search (basic & advanced). Search Engine.																																				
WP3.4-Development: Content dissemination																																				
WP3.5-Development: Help chatbot																																				
WP3.6-Development: Voice assistants																																				
WP3.7-Dashboard																																				
WP4-Theming and Localisation																																				
WP5-Integration & Deployment																																				
WP6-ICT Infraestructure (hardware, environments, monitoring, etc)																																				
WP7-Pilots, Feedback and Adaptations																																				
WP8-Project Management																																				

Fig. 20 MELTIC DXP Tentative planning of activities

9 Conclusions

Last October 2020, MELTIC set up an online discussion group in order to identify the ideas to be taken into consideration when dealing with the stakeholders. Due to the rapid development of technologies and their application, there is a permanent need to monitor and support the work of ICT researchers, urban designers and social agents. The analysis carried out in the co-creation process by the stakeholders within their own fields of work, meets the expected objectives of the project.

The stakeholder analysis highlighted that the use of smart technologies in public spaces is increasingly creating new forms of interaction and social practices, as well as creating new socio-spatial relationships and promoting interactions and communication between isolated and disperse communities. These types of new relationship scenarios drive the need to rethink social practices and the use of public spaces, which can also influence the development of ICTs and their devices. Website-based interventions play a key role in fostering the ubiquitous and proactive health and social oversight and care services of the future and have the potential to reach a large population by completing what is already available on the Internet.

The use of technologies to promote health and well-being is an idea highlighted by everyone. There is a great interest in getting healthcare professionals involved in the development of the Digital eXperience Platform (DXP) with the objective of promoting healthy behavior and well-being throughout life, from the early years right up to old age. Another aspect described is the possibility of cultural adaptation in different communities through the support of this web platform.

It provides content management capabilities and ease of integration with devices and various sources through headless technologies. **The Digital Experience** defines the interaction between users and technology, an initiative driven by user needs. Headless platforms are prepared for omnichannel communication and allow user experiences to be personalised, providing content and services of interest based on their location, language, preferences and mode of access to the technological platform.

10 References

[1] EU Open source software strategy. https://ec.europa.eu/info/departments/informatics/open-source-software-strategy_en

[2] European Commission Digital Strategy. https://ec.europa.eu/info/publications/EC-Digital-Strategy_en