GRANULAR

DIGITAL PLATFORM AND TOOLKIT

D7.2

AUGUST 2023

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D7.2 Digital platform and toolkit

Project name	GRANULAR: Giving Rural Actors Novel data and re-Useable tools to Lead public Action in Rural areas
Website	www.ruralgranular.eu
Document type	Deliverable
Status	Final version
Dissemination level	Public
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Executive summary

This document is the Digital Platform and Toolkit report for the GRANULAR Digital Platform. It has been developed to fulfil the needs of the project's Deliverable 7.2. It summarises the work conducted in the GRANULAR Digital Platform (Task 7.3) and the GRANULAR Digital Toolkit (Task 7.4).

The purpose of this document is to provide documentation of the methodology followed, and an overview of the Digital Platform. The document illustrates the activities performed to describe the scope of the platform, user needs, functional and non-functional requirements, description of design and deployment details, as well as future steps regarding the platform's development and legacy after the project's end.

The GRANULAR Digital Platform aims to provide a **repository** that will integrate different types of data. Data are either obtained or developed from various sources. In addition, the Digital Platform will integrate **visualization interfaces** to facilitate the exploration of novel data indicators and **tools** and to enable the collaboration of researchers (Virtual Research Environment). The generated data are expected to inform rural policies and are connected to the GRANULAR Rural Compass, aimed at characterizing rural diversity. The platform is currently being developed and managed by the Agricultural University of Athens.

1. Introduction

The purpose of this report is to document the work implemented in **Task 7.3** ("GRANULAR Digital Platform") and **Task 7.4** ("GRANULAR Digital Toolkit") for the **development of the** GRANULAR digital platform and the **toolkit available from it** during the first year of the project. The **main objectives** of the platform are to: (i) enable **access** to **rural-related data** either obtained or developed in the project; (ii) facilitate the **exploration** of **rural-related data** and **indicators**; (iii) enable **collaboration** among researchers. To meet these objectives, the platform development work takes place together with the work in Work Packages 3 ("Novel open data sources for rural areas") and 4 ("Development of tools and indicators to characterise rural diversity") for the generation and provision of datasets and indicators.

Researchers and **young scientists**, **policymakers**, **advisors**, **rural citizens**, **practitioners** (**farmers/ foresters**) **NGO representatives**, **innovation brokers**, as well as **educators/trainers** and **students/trainees** (i.e., the rural actors involved in the project's Multi-Actor Labs) are the **user groups targeted** for the GRANULAR digital platform. Access to rural-relevant data is fulfilled by the **GRANULAR repository** delivering datasets pertaining to rural topics. The exploration of rural data and indicators is promoted from the digital platform's visualization toolkit. Finally, the access to datasets together with the GRANULAR platform's visualization capabilities promote liaisons between researchers.

In this report, we present the work undertaken for the development of the first two versions of the digital platform, namely the **prototype version** and the **Minimum Viable Product** (**MVP**) **version**. The work already done involved: (i) the **scoping** of the GRANULAR digital platform; (ii) the **identification of user needs** and the **definition of platform requirements**; (iii) the **design** and **development** of the prototype version of the digital platform; (iv) the **evaluation** of the prototype version; and (v) the **adaptation of user needs** and **platform requirements**, based on the feedback from the prototype platform version's evaluation, towards **developing the MVP**.

The main audience of this document is associates involved in Research and Innovation projects working on the **advancement of scientific research** and **testing of innovations** on a **representative set of rural situations** in Europe. This includes the project consortium, which comprises, among others, **researchers**, **NGO representatives**, **policymakers,** as well as, **representatives** of **public authorities** and **administrations**. Other stakeholder groups with an interest in the work presented in this report are **project managers**, **software developers** and **architects**, as well as **service** and **product developers** wanting to get insights into the platform implementation work (on top of details about the digital platform's scope and content).

This document is structured as follows: **Section 2** explains the terminology used throughout the report. **Section 3** provides an overview of the methodology and the timeframe in which it was implemented. An overview of the digital platform (namely, its MVP version) is provided in **Section 4**. **Section 5** describes the digital platform's design and development. The process of user input collection for making design- and development-related decisions is reported in **Section 6**. User needs and platform requirements (functional and non-functional) are detailed in **Section 7** and **Section 8** respectively. The design of the prototype and MVP versions of the platform is documented in **Section 9**. Information on the development of the platform is available in **Section 10**. Finally, **Section 11** provides some insightful conclusions regarding the development process, while focusing on the steps to be taken next regarding the platform's development, as well as an initial discussion on the GRANULAR digital platform's longevity and exploitation after the project's end.

2. Terminology

Term	Description
Prototype platform version	The version of the platform that aims to demonstrate some rudimentary and tangible features as a means of displaying the platform's feasibility. This version of the platform was released at the end of April 2023.
Minimum Viable Product (MVP)	The version of the digital platform whose objective is to be accessible by users, providing them with enough features to attract feedback. The MVP version of the digital platform was released at the end of August 2023.
Multi-Actor Labs	The Multi-Actor Labs (MALs) are European-wide, multi-actor and multi-stakeholders' networks willing to develop solutions for the development of place-based, integrated and tailored policies to drive the sustainable transition of rural areas and communities. MALs are created, based on appropriately selected rural contexts, to cover the wide socio-economical, environmental, behavioural, demographic and cultural diversity of European rural areas.
User need	A need that a user has of the digital platform, which must be successfully met for the user to get the right outcome for them.
Functional requirement	A function that the platform (or a component of the platform) must perform.
Non-functional requirement	A general attribute that describes the digital platform's operational capabilities and constraints.
Performance requirement	Attributes that define how well the platform can execute functions under certain conditions.
Security requirement	Attributes that define the necessary security functionalities of the platform.
Stimulus/Response sequence	The series of interactions between the user of the digital platform and the digital platform's resulting function.
Backlog	An accumulation of platform features that are to be implemented.
Platform deployment	All relevant activities performed to render the platform available to use.
Virtual Private Network	A mechanism for creating secure connection between two networks.
Content Management System	An application that is used to manage content, allowing multiple contributors to create, edit and publish.
Long-Term Vision of Rural Areas	Vision of the European Commission in identifying challenges and concerns of rural areas and highlighting some of the most promising opportunities that are available to these regions. The Vision proposes a Rural Pact and a EU Rural Action Plan, which aim to make rural Europe stronger, connected, resilient and prosperous.

3. Aims and Objectives of the GRANULAR Digital Platform

The GRANULAR digital platform aims at fostering **collaboration**, **engagement**, and **knowledge sharing** among the **rural actors** involved in the project's **Multi-Actor Labs**. It will serve as a **central hub** where members of the Multi-Actor Labs and other stakeholders can share and access datasets relevant to rural areas along with corresponding codes to conduct analyses. The Digital Platform will also grant users the ability to replicate or build upon existing datasets and analyses. In addition to promoting data and code transparency, the GRANULAR digital platform empowers its users to **access knowledge** through its **visualization interface** that effectively communicates the conceptualization and latest findings on rurality and rural diversity.

Through seamless data and code uploads, downloads, and visualization features the GRANULAR digital platform creates an **open** and **inclusive environment** that enhances and supports **co-creation** and **co-learning**. The digital platform aims to contribute to the **development of a sustainable**, **inclusive**, and **resilient rural future** by promoting the EU's Long-Term Vision for Rural Areas (LTVRA) that encourages innovation and rural-proof policies.

The GRANULAR digital platform follows a **user-centric approach** in defining the preferences and needs of its users in the design process aiming at higher user engagement. During the evaluation survey to collect users' feedback on the prototype version of this platform, the survey respondents provided insights into **Multi-Actor Labs** exhibiting an increased interest in the platform.

Table 1 presents the identified target groups together with the **objectives** that the GRANULAR digital platform shall accomplish for each separately. It is important to note that different members and stakeholder groups may probably have **different** (and even **divergent**) **motivations** for engaging with the platform. Overall, the GRANULAR digital platform's target is to **create an inclusive environment** for all stakeholders where their interests align to establish a thriving ecosystem.

Table 1: Objective that the GRANULAR digital platforms will serve for its diverse stakeholders.

Stakeholder	Platform's objective for target group
Researchers & young scientists	1) Provide open access rural data and analysis code, FAIR in design, to achieve cutting-edge research on rural diversity; 2) Engage them in proactively sharing their findings with other stakeholders.
Educators/trainers & students/trainees	Provide open access rural data and analysis code to increase awareness, involvement, and sensitivity of younger generations on rural challenges.
Policymakers	Provide and visualise the latest findings of rural indicators and data at the sub-regional, local, or functional level, to support evidence-based decisions and drive better-informed, rural-proof policies.
Advisors	1) Provide easy access to data and analytics for making data-informed guidance and support of their rural community; 2) Empower proactive involvement and contribution with information on their rural areas.
NGO representatives	1) Provide data and visualisations to raise awareness, mobilize support for their causes; 2) Facilitate participation in voluntary activities.
Innovation brokers	1)Provide data and visualisations that allow for the monitoring and evaluation of current practices; 2) Identify future trends and patterns to support evidence-based advocacy of rural-proof policies; 3) create a collaborative and synergistic environment between rural communities and other stakeholders.
Rural citizens	Provide access to information and services that empower residents with valuable knowledge and insights to foster a feeling of belonging and unity towards a more inclusive and sustainable future.
Farmers/foresters	Provide analytics that allow data-driven decisions, adoption, and/or adaption to new rural policies considering the long-term sustainability of the rural areas.

The MVP version of the GRANULAR digital platform marks the accomplishment of an **initial milestone** in the pursuit of the overarching objective of the platform and its specific objectives tailored to each of the Multi-Actor Labs. The feedback gathered from the prototype platform version evaluation survey, and particularly the free-text comments

received, have played, and will also play in the future, a **pivotal role in gaining insights** that will enable the enhancement of the platform in catering effectively to the unique needs of the diverse user groups.

4. Overview of the GRANULAR digital platform

The GRANULAR digital platform delivers a repository of rural datasets generated both within and outside the project, as well as visualization capabilities towards facilitating an in-depth exploration of rural data and indicators. These objectives are expected to expedite the collaboration between researchers and cater to the needs of the members of the Multi Actor Labs. This aim of this section is to provide a walkthrough of the GRANULAR Digital Platform by focusing on the information and content delivered to its users, as well as key capabilities. The GRANULAR repository of rural datasets and the visualization toolkit are the two modules of the digital platform. Access to these two modules is enabled by specific items in the digital platform's menu ("Repository" and "Visualization toolkit") as shown in Figure 1 below.

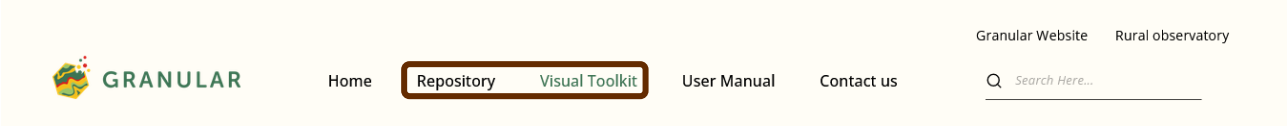


Figure 1: Menu items enabling access to the GRANULAR digital platform's repository and visualization toolkit modules.

Apart from that, there are also visual and textual prompts available in the landing page of the platform facilitating access to the two modules. Figure 2 below illustrates the section of the digital platform's landing page indicating the availability (and potential to access) of the repository of rural datasets. Similar prompts are also present for the visualisation toolkit of the platform.

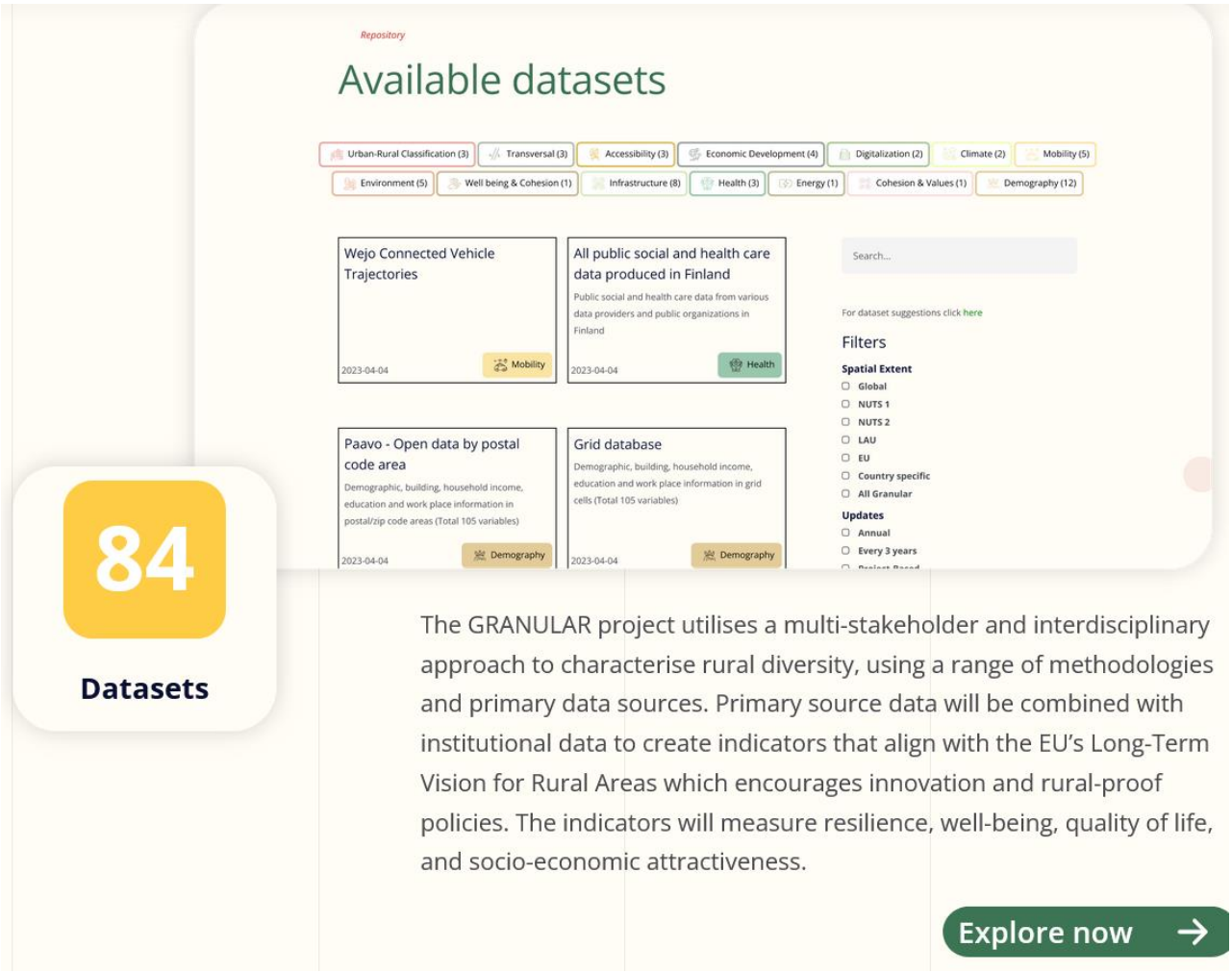


Figure 2: The section in the digital platform's landing page that provides the visual and textual prompts indicating the potential to access the repository of rural datasets.

The datasets available in the GRANULAR digital platform's repository are grouped into 11 categories: Demography and Migration, Environment and Energy, Infrastructure and Accessibility, Health, Economic Development, Labor

Market, Living Conditions and Social Inclusion, Rural Typologies, Administration and Governance, Agriculture and Food, Recreation. These categories facilitate access to datasets in a structured manner.

The categories used to group the datasets available in the GRANULAR repository have been defined by following and extending the categorization used in the Rural Observatory[1] (Demography and migration; Environment and energy; Health; Infrastructure and accessibility; Economic development; Labor market; Living conditions and social inclusion). Figure 3 below shows the section of the digital platform's landing page outlining the categories into which the rural datasets (available in the repository) are grouped. A detailed presentation of the dataset categories used together with a description of each category is provided in Section 9 ("Design of the GRANULAR Digital Platform").

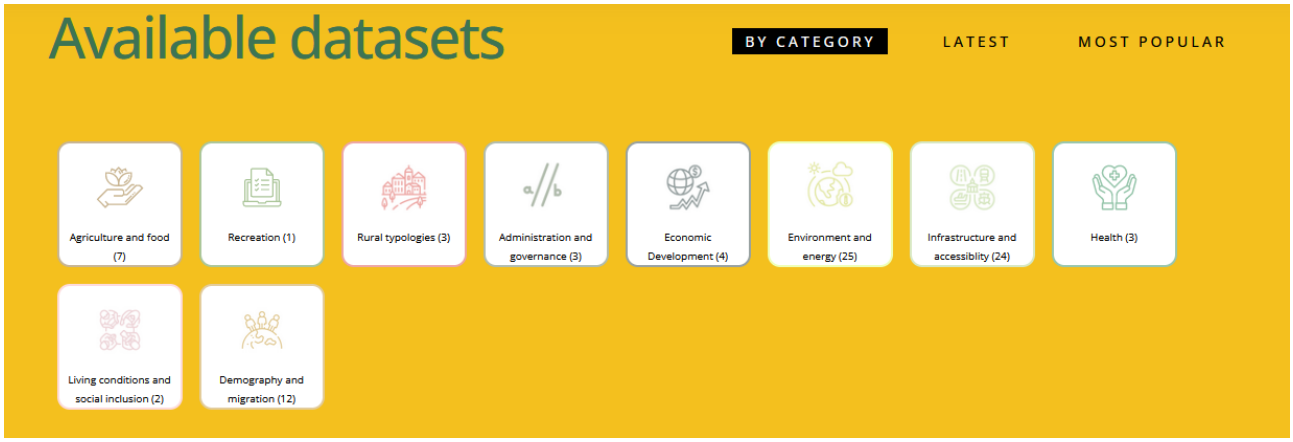


Figure 3: Grouping of the rural datasets available in the GRANULAR repository into categories.

Access to datasets with respect to when they were made available into the GRANULAR digital platform's repository (i.e., "latest" datasets), as well as their popularity, is also enabled (see Figure 4 below).

Figure 4: Access to rural datasets based on when they were added to the repository, as well as their popularity.

Orienting the platform users towards the scope of the GRANULAR Digital Platform, as well as the aim and objectives of the project is one of the prominent features of the platform. Figure 5 below shows the section of the landing page where information about the GRANULAR Digital Platform's scope is provided.

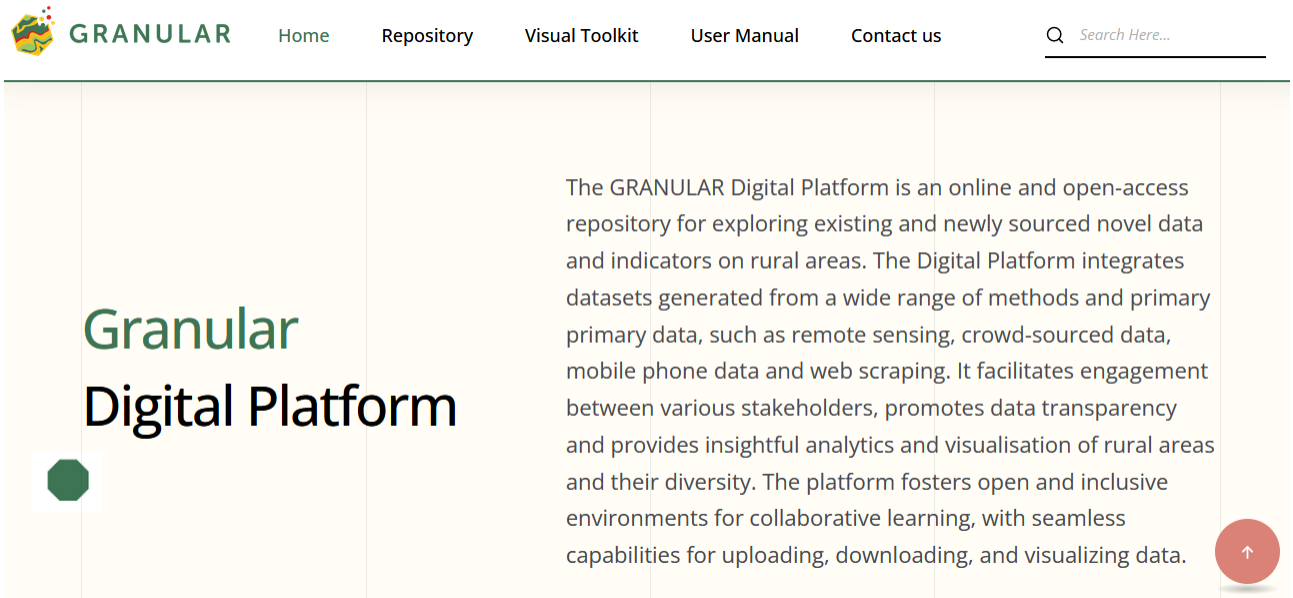


Figure 5: Information about the GRANULAR Digital Platform's scope available from the platform's landing page.

[1] https://observatory.rural-vision.europa.eu/?lng=en&ctx=RUROBS

Figure 6 illustrates the section of the platform's landing page, where information about the project is provided.

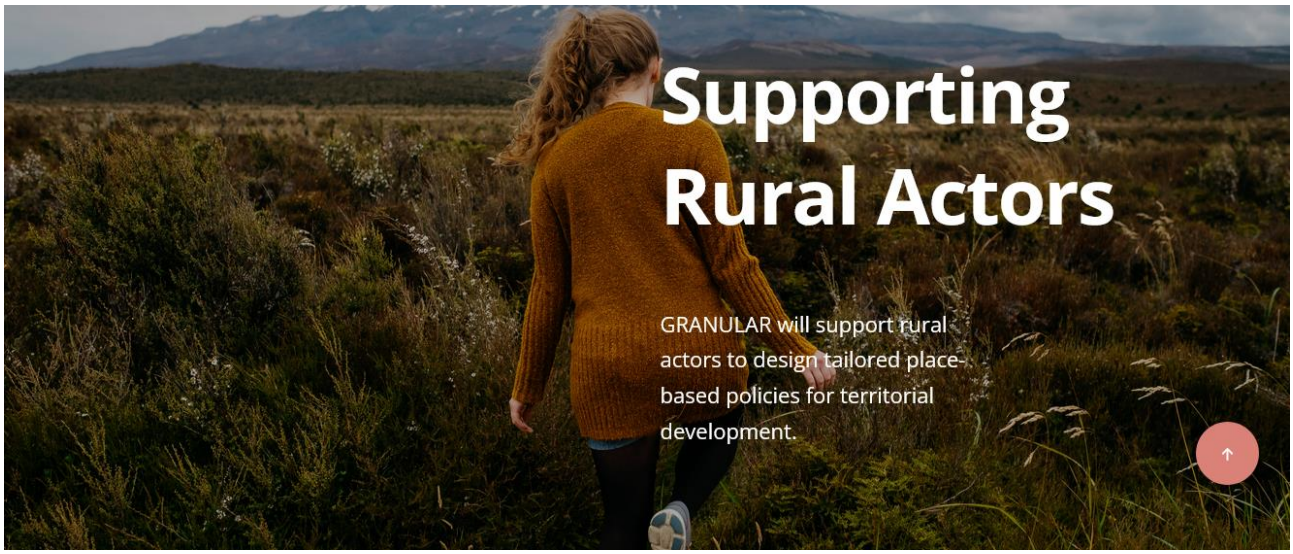


Figure 6: Information about the GRANULAR project's scope available from the platform's landing page.

The digital platform enables access to the GRANULAR project's official website and the Rural Observatory as shown in Figure 7 below. The Rural Observatory is considered a resource of increased interest for the work undertaken in the context of the project and thus being tightly associated with the goals and intended outcomes of the GRANULAR project. These links may be found above the search bar in the platform's header menu.

Figure 7: Access to external resources (namely, the GRANULAR project's official website and the Rural Observatory) enabled by dedicated menu items.

A list of Frequently Asked Questions (FAQs) is also available in the platform's landing page (see Figure 8 below).

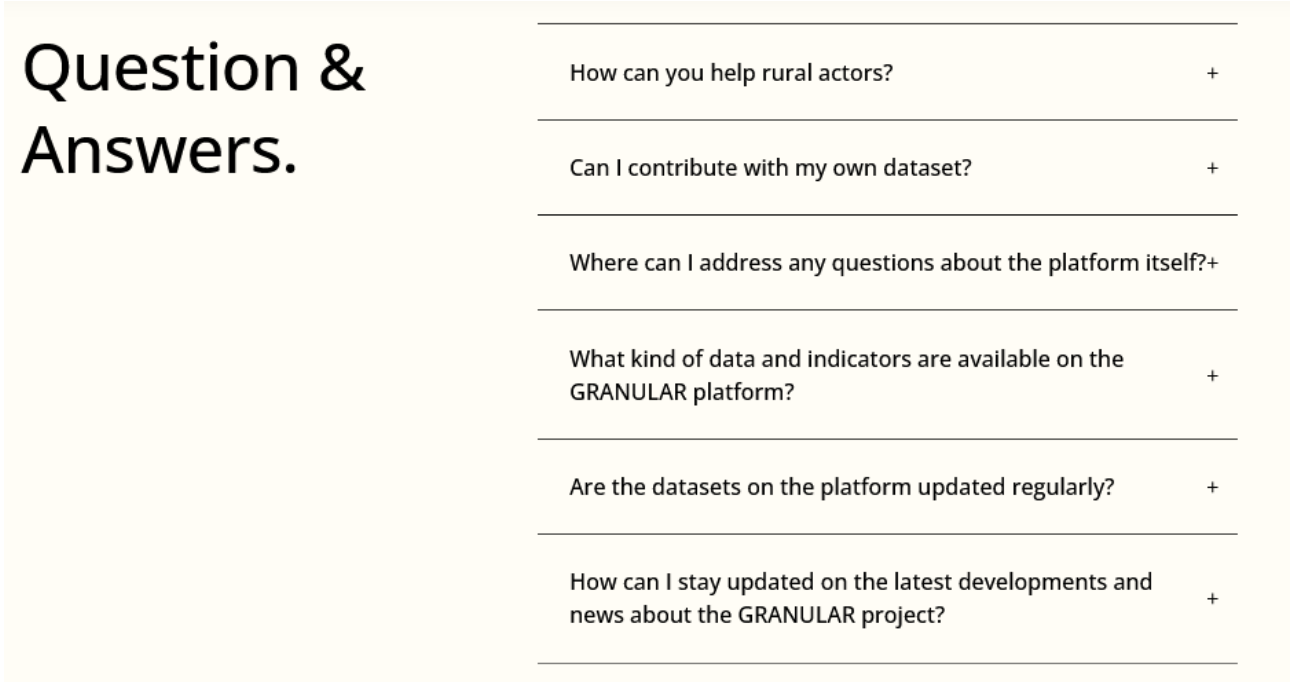


Figure 8: FAQ section in the GRANULAR digital platform's landing page.

A user manual presenting the GRANULAR Digital Platform's modules, as well as explaining their functionalities, can be accessed using a dedicated item in the platform's menu (see Figure 9 below).

Figure 9: Access to the GRANULAR digital platform's user manual.

GRANULAR repository of rural datasets

When entering the GRANULAR repository, an overview of the dataset categories is provided as illustrated in Figure 10 below. The user may select one or more of those categories and see (and browse) the datasets available for all the categories selected. By default, all datasets (falling into all the dataset categories used in the GRANULAR digital platform's repository) are displayed. A short description/explanation of what each dataset category is about becomes available on demand by hovering the mouse over each category label.

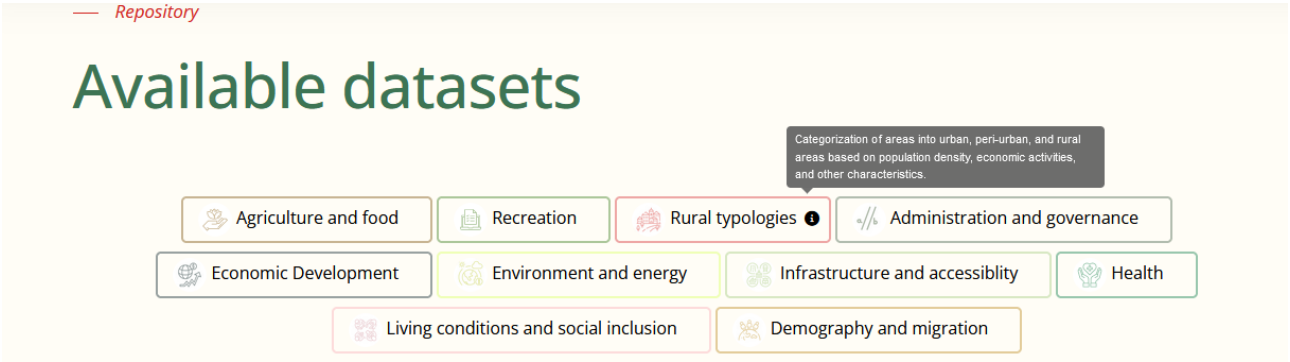


Figure 10: Dataset categories and category descriptions displayed in the GRANULAR digital platform's repository.

The GRANULAR digital platform enables access to a total number of 84 datasets grouped into 11 categories (the number of datasets that were made available in the prototype version of the platform was 53). An overview of all the datasets available in the repository is provided to the user by default. After accessing the repository, the users will be presented with a list of all presently available datasets.

For each dataset, the user gets information about its title, a short textual description providing accounts of what the dataset is about, as well as the category it belongs to and the date of its addition to the repository of the GRANULAR Digital Platform. The number of datasets displayed can be narrowed down by selecting one or more categories from

the list of the dataset categories used to group the datasets in the repository, or by selecting one or more values for the filters provided (the list of the filters available is shown on the right side of Figure 11 below).

Figure 11: Overview of the rural datasets available in the repository of the GRANULAR Digital Platform.

To strengthen the sense of belonging to the GRANULAR Digital Platform and its repository of rural datasets, the users of the digital platform have the potential to suggest datasets for the repository themselves. This capability is available through the use of a dataset suggestion form, which can be accessed by following the visual and textual prompts in the GRANULAR Digital Platform (see Figure 12).

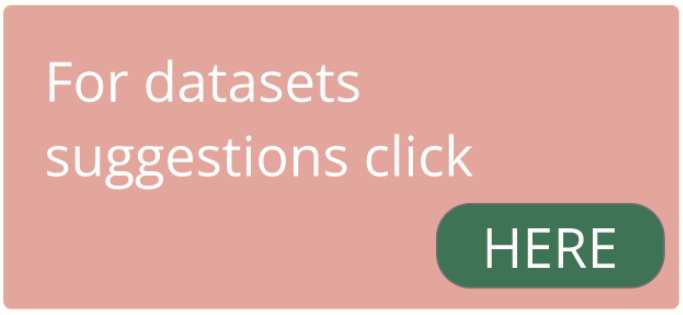


Figure 12: The visual and textual prompt used in the GRANULAR Digital Platform to direct users to the form for suggesting datasets.

The dataset presentation page is at the core of the repository of the GRANULAR Digital Platform. This page provides the user with all the information related to a rural dataset. As shown in Figures 13 and 14 below, there is a range of information that the user gets when browsing the datasets available in the repository. The title of the dataset as well as the category it belongs to, the date on which it was added to the repository and the source of the dataset are the pieces of information the user receives first from the dataset presentation page. A short description of the dataset is also provided together with dataset-related tags.

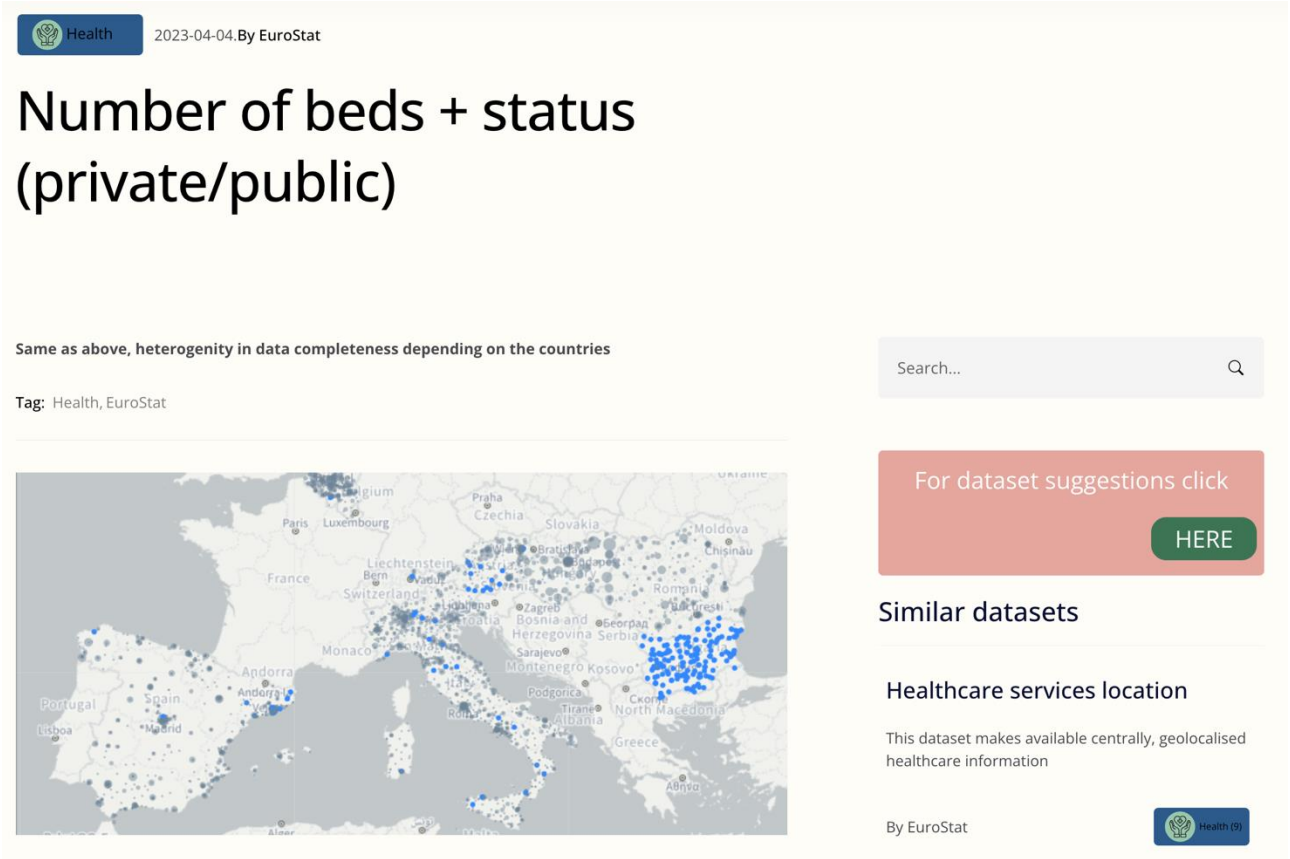


Figure 13: Information displayed when viewing a dataset's presentation page, including its tags, preview, and description.

A preview of the dataset or an image of relevance to the dataset presented forms a central visual element having a prevalent position in the dataset presentation page (see Figure 13 and Figure 14). The metadata of the dataset (namely, background information about the dataset) constitutes an important part of information delivered for the dataset with the aim to better inform the user about what the dataset is about before accessing the dataset itself. The title of the dataset, the name(s) of the person(s) or any other kind of entity/-ties involved in the creation of the dataset, the type of data in the dataset, as well as spatial and temporal characteristics of the data in the dataset are pieces of dataset-related information delivered to the user. A detailed presentation of the metadata of the datasets in the repository of the GRANULAR Digital Platform is provided in Section 9 ("Design of the GRANULAR Digital Platform") of this report. Recommendations of similar datasets (right-hand side of Figure 14 below) form an important part of the experience delivered to the user by allowing the exploration of more datasets on top of the one viewed, thus enabling for further insights into similar dimensions of rurality. The potential to access the dataset suggestion form is available from the dataset presentation page as well (top right corner of Figure 14).

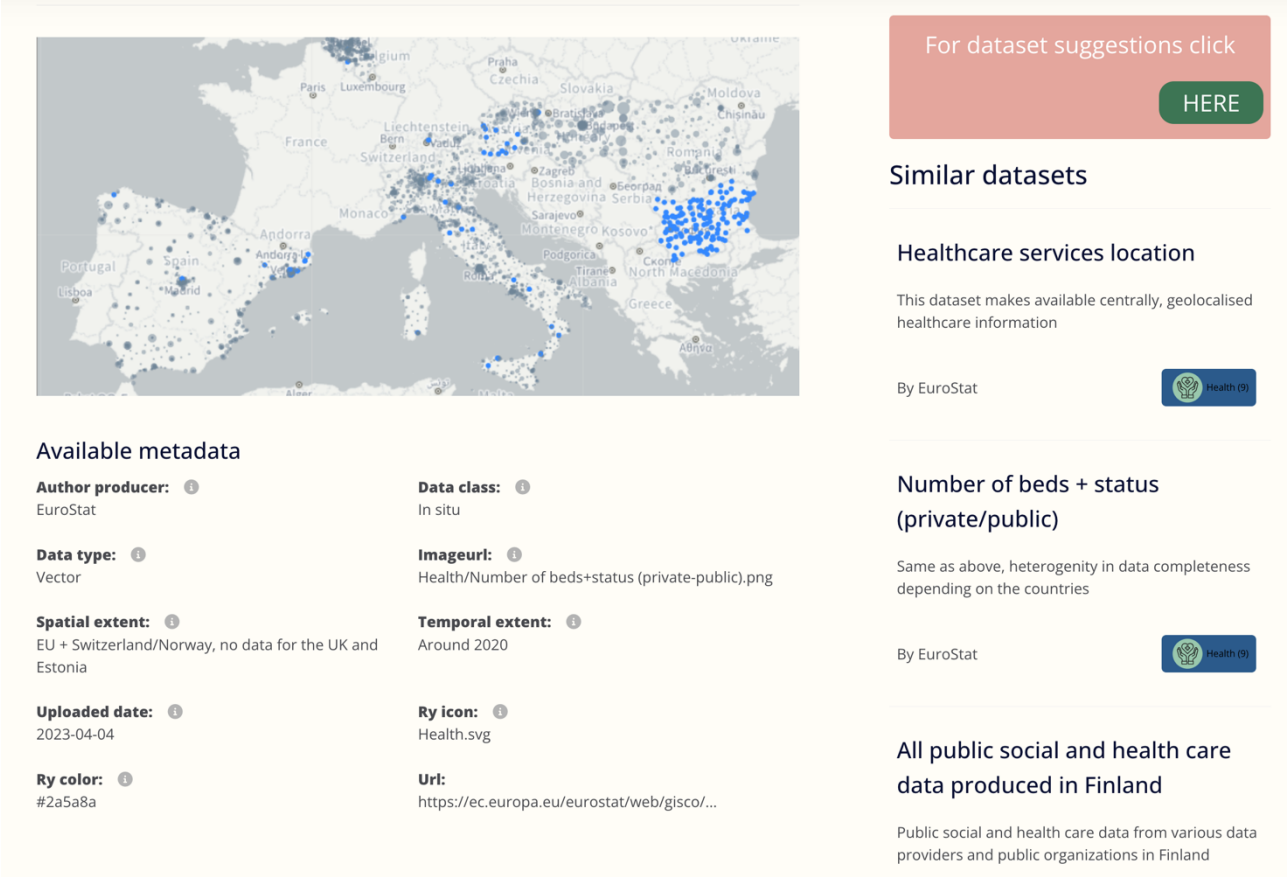


Figure 14: Dataset-related metadata and similar dataset recommendations provided from the dataset presentation page of the repository.

Visualization toolkit

The visualization toolkit of the GRANULAR digital platform aims to provide the means for an in-depth exploration of various aspects and dimensions of rurality through the delivery of dynamic visualizations of indicators. In the MVP version of the GRANULAR digital platform, we have decided to deliver some initial visualization-related capabilities so as to shed light on the potential of delivering indicator visualizations from a user experience point of view. To this end, the capabilities of the GRANULAR digital platform's visualization toolkit focus on the visualization of indicators related to the metadata of the datasets in the repository (e.g., updates on an annual dataset). The indicators that are visualised in the MVP version of the digital platform are defined in Section 9 ("Design of the GRANULAR Digital Platform"). These indicators are not the rural-related indicators defined as part of the work in progress in the project, but rather indicators used for "experimental" purposes in order to make conclusions about the experience of the user when using the GRANULAR visualization toolkit.

Figure 15: Types of charts used for the visualization of indicators in the GRANULAR visualization toolkit: (i) bar chart; (ii) doughnut chart; (iii) nightingale chart.

When entering the visualization toolkit, there is the option of selecting one or more of the categories of indicators available (Geographic coverage of dataset; Dataset update frequency; Datasets per data class; Datasets per data type; Free-of-charge access to data). A dashboard is presented containing the visualizations of the indicators in the indicator category/-ries selected by the user. By choosing an indicator category (Figure 16), a chart providing a visualization of all the indicators in the category is generated.

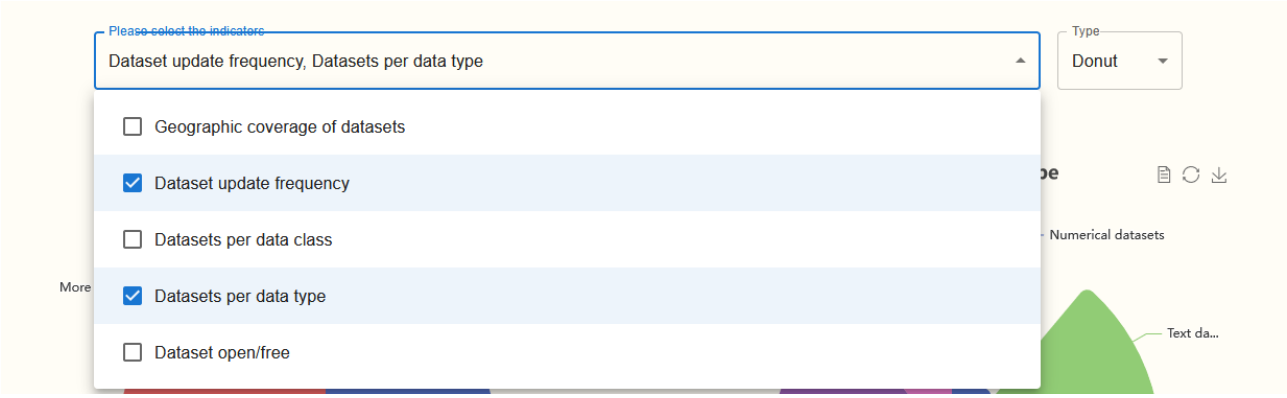


Figure 16: The indicator category drop-down menu.

To have the visualization delivered, there is the option of selecting among a range of three different types of charts: bar chart, doughnut chart, and nightingale chart (see Figure 15 above). The types of charts provided have been selected based on the results of a survey held for the needs of investigating visualization-related needs of the users (details are available in Section 6.1.2 of the report). The number of indicators visualized in the chart can be changed dynamically, thus the user can deliver a visualization of as many indicators as needed. The visualization toolkit offers chart download options. Each chart can be exported as a.csv file also including the metadata of the chart. The dashboard with all the indicator visualizations can be downloaded in a .pdf format. The indicators currently visualized will be gradually substituted by the indicators developed as part of the work done in the project.

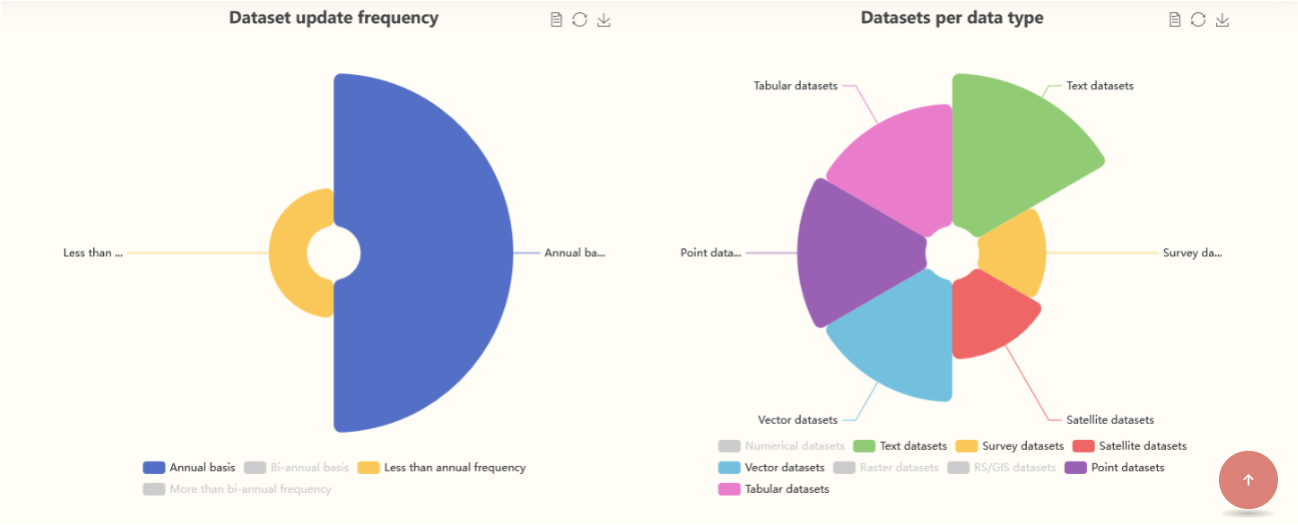


Figure 17: Visualisation of two different indicators. Note the greyed-out labels represent deselected categories, which are not displayed.

5. Methodology

This section provides an overview of the **GRANULAR digital platform's design** and **development methodology**. Our methodology follows the **agile development approach**, which is characterised by a dynamic and responsive process (see Figure 18). Unlike traditional heavyweight linear and sequential methods, agile embraces an iterative and adaptive cycle to address complexities and uncertainties inherent to the development and maintenance of digital tools (Javanmard & Alian, 2015).

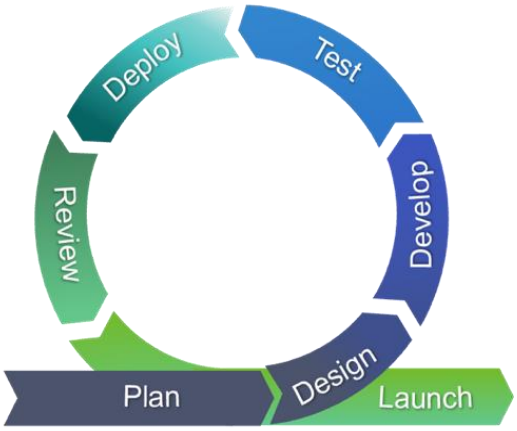


Figure 18: Agile Model

Iterative user-feedback guides, allow a breakdown of the design processes into chunks of requirements and features to produce functional increments of the platform. Communication and commitment to refinements derived from timely collected feedback allow prioritisation of the adaptations and alignment with the evolving user needs and preferences. Maintenance of a backlog of features, enhancements, and fixes worked at each iteration, is of utmost importance to ensure that the platform evolves towards its said objectives. The creation of an MVP product creates a foundational version of the platform that allows quick deployment and testing to ensure frequent product releases highly adaptable and resilient to evolving preferences and new insights.

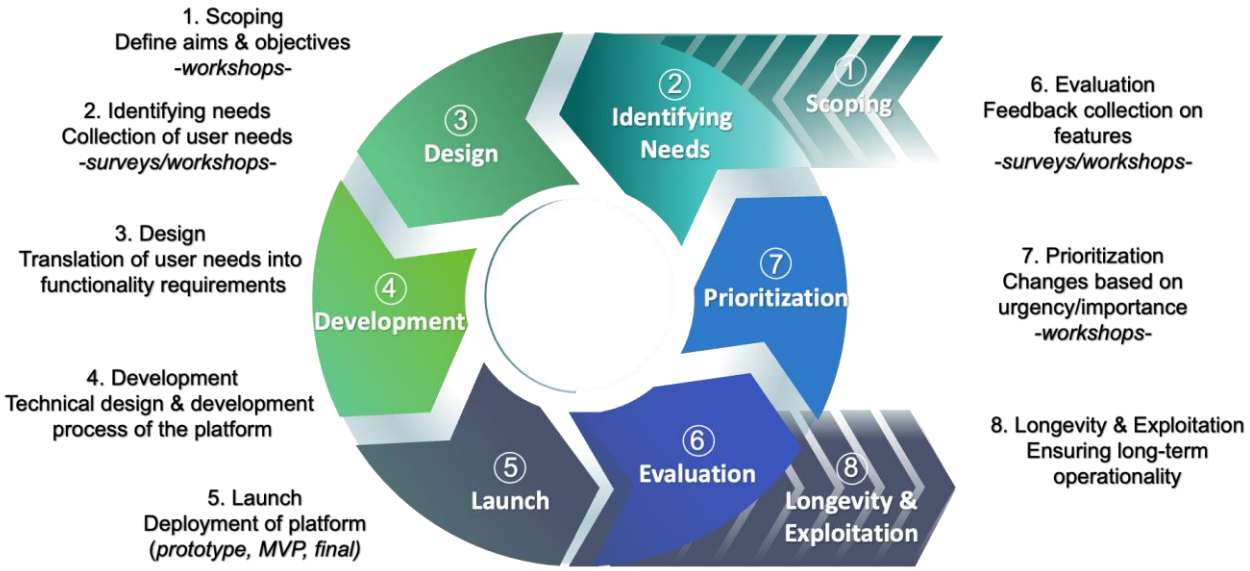


Figure **19** illustrates the iterative process followed for the implementation of the agile methodology in the GRANULAR digital platform's design and development.

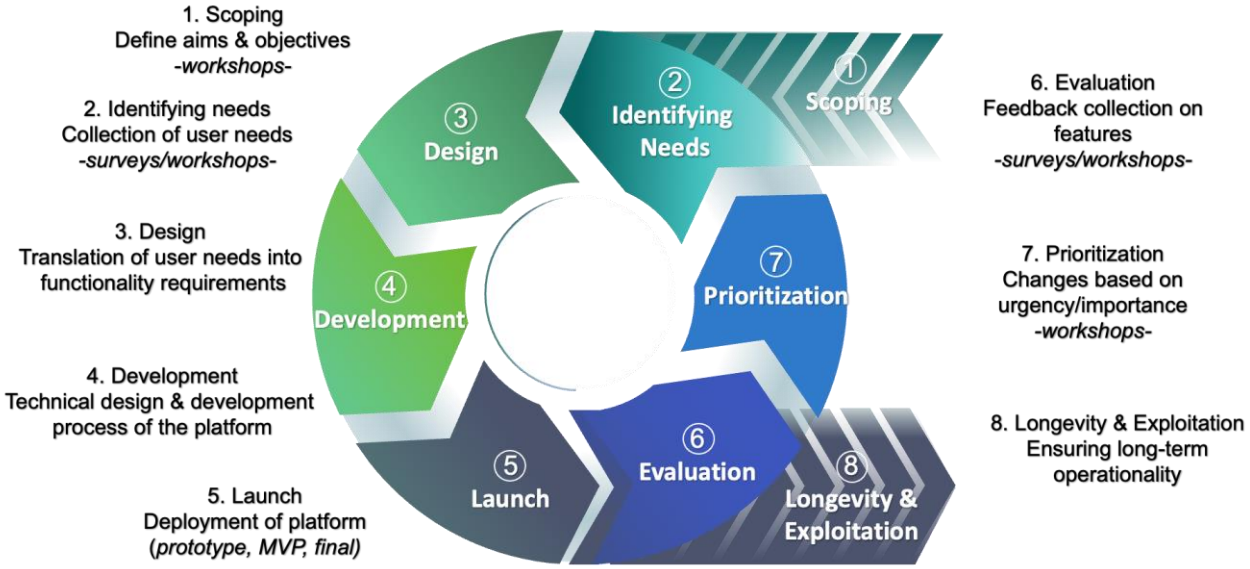


Figure 19: Methodology of the GRANULAR digital platform.

Below, a brief explanation of the **phases** involved is provided.

- **Phase 1: Scoping**

  Examination of the scope of the digital platform to gain an in-depth understanding of what the digital platform is meant to achieve.

- **Phase 2: User need identification**

  Activities performed to acquire input to identify user needs, including surveys and user-driven sessions to collect feedback.

- **Phase 3: Design and development**

  The design of the GRANULAR digital platform involving the process of "translating" the acquired user needs into functionalities for the platform.

- **Phase 4: Development**

  The process of development of the GRANULAR digital platform.

- **Phase 5: Deployment**

  Release and deployment of the platform in its existing form (prototype, MVP, final).

- **Phase 6: Evaluation and feedback collection**

  The process of collecting input from users on the already established features of the platform, through surveys and user-driven sessions.

- **Phase 7: Prioritization of changes and adaptations planning**

  Identification of changes and adaptations to be made to the GRANULAR digital platform, as well as of their urgency and implementation importance, following a process of internal feedback assessment (the internal review of the obtained feedback from the platform's development team.)

- **Phase 8: Longevity and exploitation**

  The actions to be taken to ensure the platform stays operational even after the project's end.

6. Collection of user inputs for the GRANULAR digital platform

This section reports the **activities implemented** to better identify and frame the **scope** of the GRANULAR digital platform. For this purpose, **inputs,** and **user feedback on the initial versions of the platform** were collected as part of the following activities:

- **Digital platform workshop** in the project's General Assembly Meeting in Montpellier (1-3 February 2023).
- **Internal session** with the coordination team and the Work Package leaders on the prototype version of the digital platform (April 2023).
- Prototype platform **evaluation survey** (June 2023).
- Visualization-related needs **exploration survey** (July 2023).

An overview of these activities is provided in Table 2 and detailed in the following subsections.

Table 2: Overview of digital platform-related user input and feedback collection activities.

Activity	Date	Feedback Collected	Audience
Collection of User Needs for Phases 1&2 – (Digital Platform Workshop)	February 2023	• Existing knowledge and familiarity with databases of rural-related datasets and/or visualization tools. • Previous experience and problems faced from the interaction with databases and/or visualization tools. • Initial insights regarding the scope and user base of the digital platform. • Metadata to consider for the description of the rural datasets to be hosted in the platform.	Executive Board
Collection of User Needs for Phase 6 - Prototype Version Evaluation Session	April 2023	• Features of the Prototype Version	Executive Board
Collection of User Needs for Phase 2 - Visualisation-related User Needs survey	June 2023	• Functions and features of the Rural Observatory (considered as a test case to explore dynamic visualisation options). • Scope and features of the GRANULAR digital platform's visualisation toolkit. • Types of graphs and charts to be considered for the visualisation toolkit of the GRANULAR digital platform.	Executive Board, Living Lab Members
Collection of User Needs for Phase 6 - Prototype Platform Evaluation Survey	July 2023	• Feedback on the prototype version of the GRANULAR digital platform. • Importance of the GRANULAR digital platform to Living Lab members. • Attitudes towards the evaluation of datasets from users.	Executive Board, Living Lab Members

6.1. GRANULAR digital platform scoping

A **scoping session** took place at the first project General Assembly in Montpellier. This session was aimed at making initial decisions about the objectives of the GRANULAR digital platform and capture the needs of the platform

end-users. Moreover, a **survey** for the **collection of the views and inputs of users** related to capabilities for **data** and **indicator visualization** was carried out at the beginning of July 2023.

6.1.1. Digital Platform Workshop, Consortium Meeting in Montpellier

A session was held during the first GRANULAR General Assembly in Montpellier (1-3 February 2023), to **collect initial insights** and **input** about what the **scope of the GRANULAR digital platform** should be. The session was attended by the GRANULAR Executive Board and partner organizations.

An interactive poll tool was used to collect participants' feedback on: (i) existing knowledge and familiarity with databases of rural-related datasets and/or visualization tools; (ii) previous experience and problems faced from the interaction with databases and/or visualization tools; (iii) initial insights regarding the scope and user base of the digital platform; and (iv) metadata to consider for the description of the rural datasets to be hosted in the platform. The number of consortium members who joined the workshop and participated in the poll was six (6) The survey items are presented in full in Annex 01.

The key findings of that session were the following:

- Most of the respondents have already used at least one tool providing visualizations of rural indicators. Incompatibility with some web browsers, lack of analysis functionalities, lack of geo-scope definition, difficulty in data downloading, poor performance/delay, and lack of instructions for first-time users were some of the issues encountered when using indicator visualization tools.
- The most important platform function identified by the participants would be to have **readily available rural datasets** alongside **basic visualization capabilities**. Researchers, practitioners, public authorities, as well as rural citizens were proposed as the main dataset providers.
- The **groups** identified as the **most likely to use the GRANULAR digital platform** were practitioners, rural citizens, policy makers, and researchers.

The input collected from the scoping session and the key findings that were drawn led to an initial description of the user needs (Section 7) and the specification of functional and non-functional requirements for the prototype version of the GRANULAR digital platform (Section 8).

6.1.2. Visualisation-related need and attitude-capturing survey

Considering the **visualisation tools** to be developed for the GRANULAR digital platform, members of the consortium and Living Lab facilitators, participated in an online survey aiming to investigate visualisation-related attitudes and preferences. To provide a stimulus for the elicitation of responses, the visualisation capabilities of the "My Place" module of the Rural Observatory[2] were presented prior to the survey.

The survey participants were prompted to provide their feedback on the following topics: (i) functions and features of the Rural Observatory; (ii) scope and features of the GRANULAR digital platform's visualisation toolkit; (iii) types of graphs and charts to be considered for the visualisation toolkit of the GRANULAR digital platform. The number of responses collected were eleven (11). The survey ran for a week.

The **main findings** are presented below[3]:

Feedback on the Rural Observatory platform

The scope of the "MyPlace" module appears to be clear. Finding a region of interest by using the module's search function is easy and straightforward. Although indicator categories are easy to spot, a description or explanation of each indicator category would be a nice-to-have-feature. Indicators, graphs, and charts were found easy to understand, with clear and readable visuals.

Textual description of the indicators visualized in the Rural Observatory are considered as a useful and important feature. The availability of different charts and graphs for the visualization of each indicator was a feature considered as important.

[2] https://observatory.rural-vision.europa.eu/?lng=en&ctx=RUROBS

[3] The survey questions together with a detailed presentation of the survey results are available in Annex 02.

In addition to the above, some other features of the "My Place" module of the Rural Observatory found to be attractive to the survey participants were the following: (i) ability to download datasets in specific formats; (ii) dashboard feature allowing for dataset overview; (iii) trend feature allowing to view changes over time; (iv) potential to compare different regions; and (v) the easy navigation. The overlap between different tools and the lack of detailed information on data sources were the most important shortcomings mentioned.

Input on the scope and features of the GRANULAR platform's visualization toolkit

According to the survey respondents, the GRANULAR digital platform's visualization toolkit should provide the visualization of indicators related to both the Living Labs and Replication Labs of the project. It was reported that users should be able to suggest new indicators for visualization. Respondents appear to prefer the availability of indicator descriptions/explanations by default rather than on a demand basis. Also, it was noted that information and visualizations should be delivered through a dashboard that the user can configure and adapt. Furthermore, users should have access to datasets used for indicator computation and visualization.

Feedback on different types of graphs and charts

Most of the respondents stated that they are familiar with pie charts and bar charts, and they frequently make use of both. Line charts and histograms garnered similar responses to pie and bar charts. On the other hand, said that they did not use bullet graphs often, even though they are familiar with them. Box and whisker plots did not seem to be used quite as often either. All respondents reported familiarity with area maps, even if not everyone prefers to use them frequently. Finally, most of the respondents do not appear to use heatmaps, although many of them are highly familiar with them.

6.2. Collection of user feedback on the prototype version of the GRANULAR digital platform

6.2.1. Session for the internal evaluation of the digital platform's prototype version

Following the design and development of the prototype version of the GRANULAR digital platform (see Section 7), an **online evaluation session**, before its public release, took place on the 26th of April 2023. Feedback was provided by the project's Executive Board. Some indicative points of action, identified by drawing upon the feedback collected, were the following:

Add filtering options to enable users to customise the list of results they obtain from a search operation.
Provide the persistent identifier/DOI of the datasets delivered from the platform (if any).
Provide short textual descriptions of the categories used to group the datasets available from the platform.
Add coloured icons for dataset categories to make navigation even more effective.
Provide a link to the Rural Observatory in the platform's menu.
Add a contact form enabling the user to report any issue of interest.

6.2.2. Prototype platform version evaluation survey

After the **presentation** of the **digital platform** at the **Annual Knowledge Exchange meeting** in Ede, the Netherlands (19th of June 2023), an **online survey** for the **evaluation of the prototype version of the platform** was conducted. The aim of the survey was to **obtain feedback on the content and features** already available in the platform. A total number of thirteen (13) responses were received.

The survey was made up of five (5) sections, namely: (i) background information; (ii) familiarity and previous experience with digital platforms; (iii) feedback on the GRANULAR digital platform; (iv) importance of the GRANULAR digital platform to Living Lab members; (v) attitudes towards the evaluation of datasets from users. Both **closed** and **open questions** were used. The items included in the survey are available in Annex 03.

The respondents were members of the project's consortium and Living Lab members. In some cases, they had both roles in the project. Regarding their background, most of them were researchers and advisors. Almost all participants stated that they use digital technologies a lot (over 40 hours per week), with the majority using a personal computer

and smartphone. Work, leisure, education, and online purchases were the most popular digital technology uses that were reported. The survey participants reported that they enjoyed using digital technologies, which allow them to be more productive and communicate more efficiently. Most of the respondents have used digital platforms as part of their involvement in other projects. Advanced search capabilities, filtering options, personalisation and content management, ability to download data in different formats, visualisation capabilities, simple layout, and accessibility are the features mentioned to be preferred the most.

The analysis of the responses collected on the closed survey questions related to feedback on the prototype platform features led to the following conclusions (the detailed results of the survey are available in Annex 03):

Most survey respondents stated that it was **easy to find a dataset**, as well as **discern its category**. Yet, they had different views on whether the categories were enough to group the datasets (although, they expressed that the number of dataset categories should not be decreased). They reported that the **labels used to name the dataset categories** are **clear** and **easy to comprehend**. Most respondents found the **images** used to visually illustrate the dataset categories as **indicative of the category** they represent.

There was a **balance in the perceptions** of the respondents about whether the dataset **metadata** is deemed as **helpful to understand what datasets are about**. **Explanations/descriptions of the metadata** were reported as **important** to provide clear indications of what each metadata concerns.

The information on the landing page of the platform appears to be **enough to help users understand what the project's objectives are**; however, it is **not enough** to **facilitate a clear understanding** of **what the platform is about**.

Navigation in the digital platform is considered **easy** with the respondents not reporting any issues.

Finally, providing **users** the **ability** to **suggest datasets themselves** collected almost unanimously positive responses from the survey respondents.

Regarding the importance of the GRANULAR digital platform to the members of the Living Labs, the following points were highlighted:

The survey respondents expressed **Living Lab members should access datasets**, as well as **suggest new datasets and dataset categories**.

The stakeholder types perceived as more likely to show interest in the GRANULAR platform, according to the survey respondents, were predominantly **researchers**, **advisors**, **policy makers**, and **students**. Fewer respondents opted for educators, NGO representatives, and representatives of public authorities.

The responses to the closed questions in the section about attitudes towards user-led dataset evaluation led to the conclusions listed below:

Respondents stated that **dataset ratings** and **comments** would be **both considered** to decide if a dataset is useful to the user. The potential to **rate datasets** and **comment on them** was **generally considered as important**.

Although dataset ratings and comments are considered helpful, the survey respondents appear to **not be eager** to rate datasets and provide comments themselves. Even if dataset ratings and comments can be provided in an anonymous mode, the survey respondents appear to be still reluctant to rate datasets and/or provide comments on them.

Apart from close-ended questions, the survey participants were asked to respond to open-ended questions and provide feedback related to: (i) anything they considered important for the improvement of the GRANULAR digital platform; (ii) opinions about the way(s) in which the GRANULAR digital platform could prove to be useful for the members of the project's Living Labs. The full list of responses provided to the items mentioned above can be found in Annex 03.

After collecting the free-text responses/comments provided to the open questions of the survey, an evaluation was held by the AUA team. A total number of seven (7) people from the AUA team took part in the evaluation. Evaluation was made across two dimensions: (i) the **generic** – **specific dimension** (i.e., evaluation of the extent to which the

response is generic/specific); and (ii) the **non-actionable** – **actionable dimension** (evaluation of the extent to which the response/comment is non-actionable/actionable). Comments were rated on their specificity depending on how effectively they described the context of change on a feature. On the other hand, comments were rated on their actionability based on whether the feedback that was being provided was tangible and clear. The evaluation was made using 10-point rating scales (0-10) across the dimensions of actionability and specificity.

Based on the results of this evaluation exercise, the free-text responses were placed on a 2x2 grid defined by the generic/specific and non-actionable/ actionable axes (see Figure 20 below).

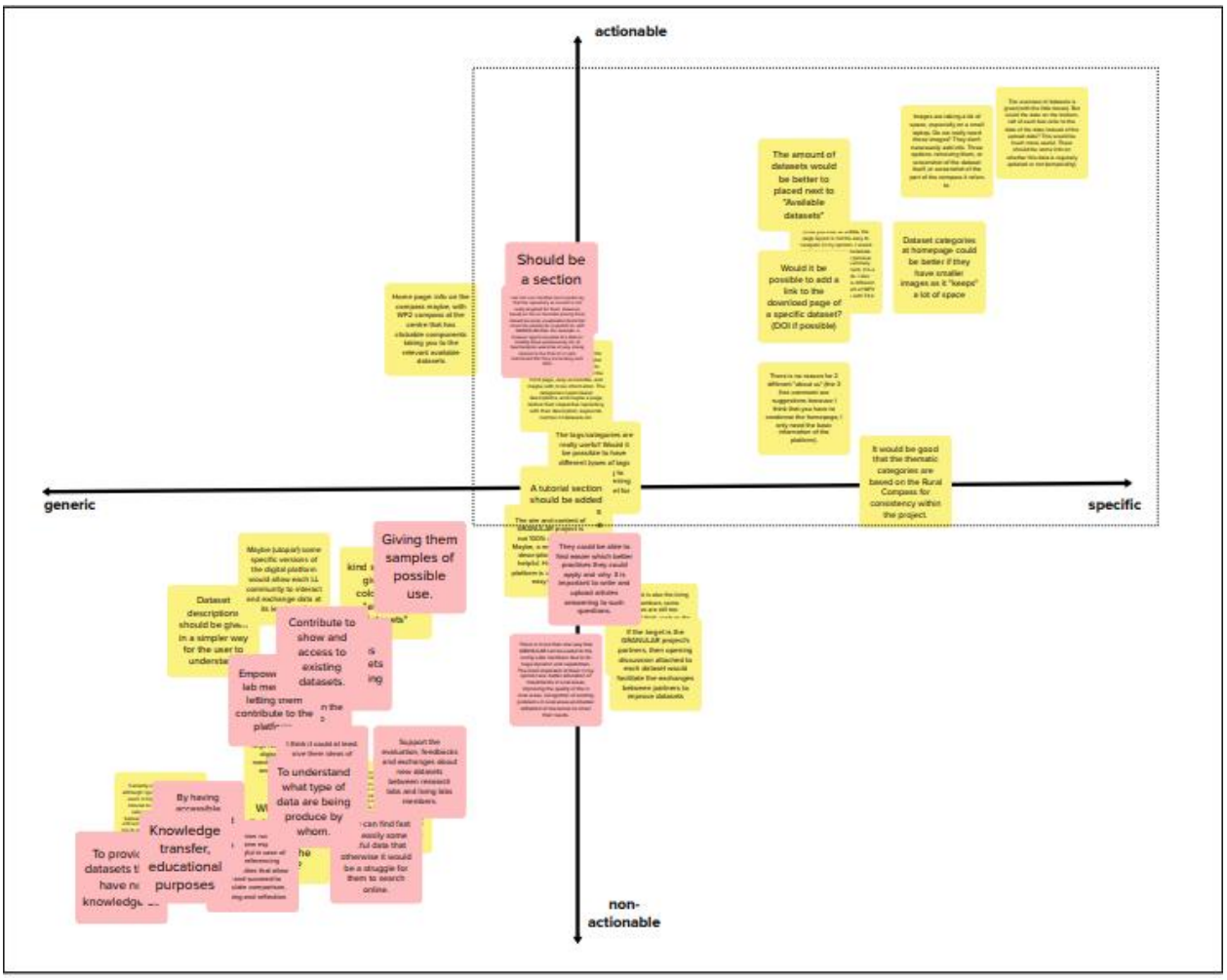
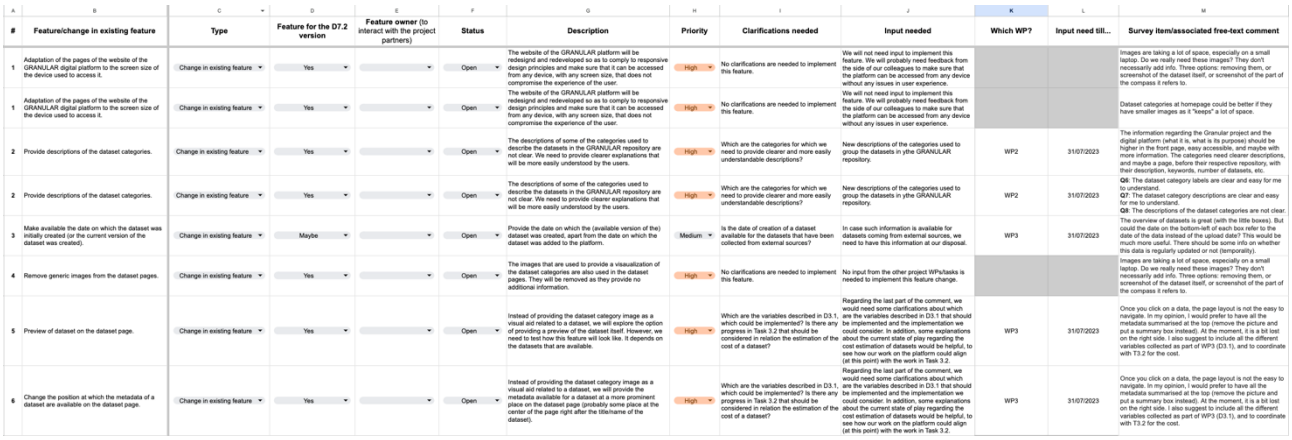


Figure 20: Diagram illustrating the results of the evaluation of the free-text responses/comments across the two evaluation dimensions (generic-specific and non-actionable - actionable). The board can be seen in full here.

The comments with an average specificity and actionability score **above 5 points** were selected as the comments to focus on for the **update** of **user needs** and **requirements** for the **MVP version of the platform**. Considering the results obtained from the analysis of the responses to the closed survey questions, as well as the free-text comments rated with an average score of more than 5 points (along the 10-point rating scale) in both evaluation dimensions, a **list of new features/changes to existing features** was created to steer the development-related work for the MVP version of the platform. This list was used as a **backlog** (see Figure 21 below) from the **development team** to keep track of the work done regarding the addition of new features and the implementation of changes to existing ones.



#	Feature/change in existing feature	Type	Feature for the D7.2 version	Feature owner (to interact with the project partners)	Status	Description	Priority	Clarifications needed	Input needed	Which WP?	Input need till...	Survey item/associated free-text comment
1	Adaptation of the pages of the website of the GRANULAR digital platform to the screen size of the device used to access it.	Change in existing feature	Yes		Open	The website of the GRANULAR platform will be redesignd and redeveloped so as to comply to responsive design principles and make sure that it can be accessed from any device, with any screen size, that does not compromise the experience of the user.	High	No clarifications are needed to implement this feature.	We will not need input to implement this feature. We will probably need feedback from the side of our colleagues to make sure that the platform can be accessed from any device without any issues in user experience.			Images are taking a lot of space, especially on a small laptop. Do we really need these images? They don't necessarily add info. Three options: removing them, or screenshot of the dataset itself, or screenshot of the part of the compass it refers to.
1	Adaptation of the pages of the website of the GRANULAR digital platform to the screen size of the device used to access it.	Change in existing feature	Yes		Open	The website of the GRANULAR platform will be redesignd and redeveloped so as to comply to responsive design principles and make sure that it can be accessed from any device, with any screen size, that does not compromise the experience of the user.	High	No clarifications are needed to implement this feature.	We will not need input to implement this feature. We will probably need feedback from the side of our colleagues to make sure that the platform can be accessed from any device without any issues in user experience.			Dataset categories at homepage could be better if they have smaller images as it "keeps" a lot of space.
2	Provide descriptions of the dataset categories.	Change in existing feature	Yes		Open	The descriptions of some of the categories used to describe the datasets in the GRANULAR repository are not clear. We need to provide clearer explanations that will be more easily understood by the users.	High	Which are the categories for which we need to provide clearer and more easily understandable descriptions?	New descriptions of the categories used to group the datasets in ythe GRANULAR repository.	WP2	31/07/2023	The information regarding the Granular project and the digital platform (what it is, what is its purpose) should be higher in the front page, easy accessible, and maybe with more information. The categories need clearer descriptions, and maybe a page, before their respective repository, with their description, keywords, number of datasets, etc.
2	Provide descriptions of the dataset categories.	Change in existing feature	Yes		Open	The descriptions of some of the categories used to describe the datasets in the GRANULAR repository are not clear. We need to provide clearer explanations that will be more easily understood by the users.	High	Which are the categories for which we need to provide clearer and more easily understandable descriptions?	New descriptions of the categories used to group the datasets in ythe GRANULAR repository.	WP2	31/07/2023	**Q6**: The dataset category labels are clear and easy for me to understand. **Q7**: The dataset category descriptions are clear and easy for me to understand. **Q8**: The descriptions of the dataset categories are not clear.
3	Make available the date on which the dataset was initially created (or the current version of the dataset was created).	Change in existing feature	Maybe		Open	Provide the date on which the (available version of the) dataset was created, apart from the date on which the dataset was added to the platform.	Medium	Is the date of creation of a dataset available for the datasets that have been collected from external sources?	In case such information is available for datasets coming from external sources, we need to have this information at our disposal.	WP3	31/07/2023	The overview of datasets is great (with the little boxes). But could the date on the bottom-left of each box refer to the date of the data instead of the upload date? This would be much more useful. There should be some info on whether this data is regularly updated or not (temporality).
4	Remove generic images from the dataset pages.	Change in existing feature	Yes		Open	The images that are used to provide a visualization of the dataset categories are also used in the dataset pages. They will be removed as they provide no additional information.	High	No clarifications are needed to implement this feature.	No input from the other project WPs/tasks is needed to implement this feature change.			Images are taking a lot of space, especially on a small laptop. Do we really need these images? They don't necessarily add info. Three options: removing them, or screenshot of the dataset itself, or screenshot of the part of the compass it refers to.
5	Preview of dataset on the dataset page.	Change in existing feature	Yes		Open	Instead of providing the dataset category image as a visual aid related to a dataset, we will explore the option of providing a preview of the dataset itself. However, we need to test how this feature will look like. It depends on the datasets that are available.	High	Which are the variables described in D3.1, which could be implemented? Is there any progress in Task 3.2 that should be considered in relation the estimation of the cost of a dataset?	Regarding the last part of the comment, we would need some clarifications about which are the variables described in D3.1 that should be implemented and the implementation we could consider. In addition, some explanations about the current state of play regarding the cost estimation of datasets would be helpful, to see how our work on the platform could align (at this point) with the work in Task 3.2.	WP3	31/07/2023	Once you click on a data, the page layout is not the easy to navigate. In my opinion, I would prefer to have all the metadata summarised at the top (remove the picture and put a summary box instead). At the moment, it is a bit lost on the right side. I also suggest to include all the different variables collected as part of WP3 (D3.1), and to coordinate with T3.2 for the cost.
6	Change the position at which the metadata of a dataset are available on the dataset page.	Change in existing feature	Yes		Open	Instead of providing the dataset category image as a visual aid related to a dataset, we will provide the metadata available for a dataset at a more prominent place on the dataset page (probably some place at the center of the page right after the title/name of the dataset).	High	Which are the variables described in D3.1, which could be implemented? Is there any progress in Task 3.2 that should be considered in relation the estimation of the cost of a dataset?	Regarding the last part of the comment, we would need some clarifications about which are the variables described in D3.1 that should be implemented and the implementation we could consider. In addition, some explanations about the current state of play regarding the cost estimation of datasets would be helpful, to see how our work on the platform could align (at this point) with the work in Task 3.2.	WP3	31/07/2023	Once you click on a data, the page layout is not the easy to navigate. In my opinion, I would prefer to have all the metadata summarised at the top (remove the picture and put a summary box instead). At the moment, it is a bit lost on the right side. I also suggest to include all the different variables collected as part of WP3 (D3.1), and to coordinate with T3.2 for the cost.

Figure 21: Presentation of the backlog, detailing all the features to be added or updated.

The backlog contained information on the change to be implemented, in the case of an existing feature, or the new feature to be added, the priority of the feature (whether it would be implemented for the MVP version of the platform), as well as the contributions needed by the project partners to implement the feature successfully.

7. User Needs

The **needs of users** related to the GRANULAR digital platform were defined by drawing upon the **key findings** and **conclusions** of the Montpellier Digital Platform workshop. **Updates** on user needs were made based on the results of the prototype platform internal evaluation session, held on April 26th, 2023, as well as the feedback collected from the online survey implemented after the Annual Knowledge Exchange meeting. User needs are presented using an identifier of the form UN##, its description, its relation to the prototype or MVP platform version (or both), as well as relevant details (if applicable). User need descriptions are provided in Table 3 below.

Table 3: GRANULAR digital platform user needs.

User Need	Prototype Version	MVP Version	Details
UN01: Easily navigate through the platform so as to find pages and information of interest without spending much time.	Yes	Yes	
UN02: Access to rural datasets so as to be able to obtain data-driven insights into dimensions of rurality.	Yes	Yes	• Access to metadata in a processable format was implemented for the Prototype version. • Access to visualisations in a processable format was implemented in the MVP version. • Access to datasets in processable formats is available since the Prototype version.
UN03: Clear indications about how to find datasets and information so as not to spend much time on spotting and accessing them.	Yes	Yes	
UN04: Access to well- described background information (metadata) related to rural datasets so as to easily spot and obtain information of interest regarding the dataset.	Yes	Yes	
UN05: Access (meta)data and visualisations in a processable format so as to obtain useful insights.	No	Yes	
UN06: Access usage guidelines/instructions so as to be able to learn how to use the platform.	No	Yes	These guidelines will be available in the MVP version of the platform, in the form of a PDF document.
UN07: Access to data and information without needing to authenticate so as to not spend time logging-in.	Yes	Yes	

UN08: Clear indications about how to access (meta)data and visualisations, in a processable format so as to not spend much time obtaining them.	No	Yes	Visualisations will become available on the MVP version of the platform.
UN09: Access to (meta)data and visualisations in a processable format, using open standards, so as to not need propriety software to use or process them.	No	Yes	• The Prototype version of the platform featured 53 datasets. • The MVP version of the platform features 90 datasets.
UN10: Access to (meta)data related visualisations of indicators so as to obtain ready-to-use and disseminate insights about various dimensions of rurality.	No	Yes	Visualisations will become available on the MVP version of the platform.
UN11: Access to well- described background information (metadata) related to indicator visualisations so as to easily spot and obtain information of interest regarding the indicator visualisations.	No	Yes	Visualisations will become available on the MVP version of the platform.
UN12: Configuration of the information and data delivered so as to not be overwhelmed with unnecessary details.	Yes	Yes	

8. Functional and non-functional requirements of the GRANULAR digital platform

8.1. Functional requirements

The functional requirements of the GRANULAR platform, defined for its prototype and MVP versions, are presented in this section. Functional requirements are presented using an identifier of the form FN##, a title, the associated user needs, as well as an indication of the platform version (prototype and/or MVP) it pertains to. Additional details are provided if necessary. They are grouped into categories (access to datasets and visualizations, dataset search and filtering) for a clearer organization and delivery of the intended information.

Table 4: Functional requirements of the GRANULAR digital platform.

Category	Functional Requirement	Associated User Need(s)	Prototype Version	MVP Version	Details
Access to datasets and visualisations	**FR01:** Access to datasets.	UN02, UN03	Yes	Yes	
	FR02: Access to visualisations of indicators	UN05, UN08	Yes	Yes	
Dataset search and filtering	**FR03:** Search available datasets	None	Yes	Yes	This is a common practice applied to digital platforms, therefore, is not related to any user needs.
	FR04: Filter search results	UN12	Yes	Yes	
	FR05: Filter datasets based on popularity/date of release on the platform	UN12	Yes	Yes	
Dataset and visualisation information	**FR06:** Grouping of datasets into categories	UN02, UN03, UN08, UN12	Yes	Yes	
	FR07: Availability of background information on the available datasets	UN08, UN09, UN12	Yes	Yes	
	FR08: Availability of background information for the provided visualisations	UN10, UN11, UN12	No	Yes	Visualisations to be added in the MVP version of the platform.

Textual and visual cues to access information	**FR09:** Textual and Visual Cues to enable the access to data and information	UN04	Yes	Yes	
	FR10: Navigation system	UN01	Yes	Yes	
Communication	**FR11:** Potential of contact with the project's coordination and platform's admin teams	None	Yes	Yes	It is common practice in digital platforms to have contact details of those directly involved in the development and maintenance of the platform.
	FR12: Links to external relevant resources	None	Yes	Yes	The platform currently links to the Rural Observatory and Rural Observatory websites.
	FR13: General information about the platform	UN06	No	Yes	A Q&A section, as well as usage guidelines will be implemented in the MVP versions of the platform.

8.2. Non-functional requirements

This section presents the non-functional requirements of the GRANULAR platform. Non-functional requirements describe qualities, characteristics, and constraints of a system, rather than specific behaviours or functions. These requirements specify how the system should perform, rather than what it should do. The platform's requirements fully align with the project's Data Management Plan and Ethical guidelines. In the scope of the GRANULAR digital platform, non-functional requirements in the frame of performance and security are presented next.

8.2.1. Performance requirements

Performance requirements relate to the criteria under which the platform should operate. These criteria focus on the ability of the platform to perform its operations, within a specific operational environment, in an efficient and effective way.

Response time
Response time can be defined as the maximum acceptable time it takes for the platform to respond to a user action/ request. The GRANULAR digital platform should work as a progressive web application providing fast response time to user actions and requests such as page load, transaction processing, search query execution and more.

- **Requirement**: The platform should have a maximum response time of 2 seconds and normal response time of 1 second.
- **Validation**: The response time of the platform can be validated through real-time monitoring of the requests on the production server.

Throughput
Throughput can be defined as the number of concurrent user requests the platform should be able to handle within a specified timeframe.

- **Requirement**: The platform should be able to process a minimum throughput of 1000 user requests per second.
- **Validation**: Load testing can be used to validate the throughput of the platform in the production server.

Resource Utilisation
Resource utilisation can be defined as the maximum allowed consumption of system resources in terms of CPU, memory, disk usage and network bandwidth.

- **Requirement**: The GRANULAR digital platform should certain that utilisation of CPU will remain below 70%, memory utilisation below 80% and disk usage below 70% within normal operations.
- **Validation**: Resource utilisation can be validated via real-time system monitoring and performance testing.

Availability
Availability can be defined as the desired uptime percentage that indicates the amount of time the system should be accessible and operational for the end-users.

- **Requirement**: The web platform should have a minimum availability of 99.9% during a calendar month.
- **Validation**: Availability can be validated via monitoring tools that record uptime and downtime events. The analysis of these events can produce the actual availability percentage and compare it with the target requirement.

8.2.2. Security Requirements

Security requirements are about security measures that need to be addressed. They focus on protecting the system, its data, and its users from unauthorised access, data breaches, and other security threats.

Authorisation and Access Control
Authorisation and access control mechanisms allow for systems to restrict access to specific sets of functionalities/ operations, data and or resources based on a set of rules and policies set by the system owner.

- **Requirement**: The platform should enforce appropriate authorisation and access control policies to restrict user access to specific functionalities, data, or resources based on their roles and privileges.
- **Validation**: Testing and security assessment procedures can be used to validate this requirement.

Data confidentiality
The platform should protect sensitive data by implementing appropriate encryption mechanisms, both during transit and storage. This includes using secure protocols (e.g., HTTPS) for data transmission and encryption algorithms (e.g., AES) for data at rest to prevent unauthorised access and data breaches.

- **Requirement**: Implement security protocols.
- **Validation**: Security assessments and audits (i.e., penetration testing) can be used to validate this requirement.

Data integrity
The GRANULAR digital platform should ensure data integrity by implementing mechanisms to detect and prevent unauthorised or unintended modifications to data, ensuring its accuracy and reliability.

- **Requirement**: Implement data integrity mechanisms.
- **Validation**: Data integrity can be validated via testing and audits during data input, validation processes, backup, and recovery tests.

Secure coding practices
The source code of the platform should follow secure and best coding practices to avoid or at least mitigate common vulnerabilities (i.e., SQL injection, cross-site scripting etc) and ensure the overall security of the system.

- **Requirement**: Implement best coding practices.
- **Validation**: The effectiveness of secure coding practices can be validated through code reviews, static code analysis, security testing, and vulnerability scanning.

Access Logs
The platform should maintain extensive audit logs of user activities and events in a secure location. These logs should be monitored to detect and respond to security (or any other) incidents or suspicious activities.

- **Requirement**: Log all user activities and monitor.
- **Validation**: The effectiveness of audit logging and monitoring can be validated through periodic reviews of log entries, incident response drills, and audits of security controls.

Security Updates
The platform should regularly receive and apply security updates to address known vulnerabilities, software bugs, and emerging security threats. The updates should be obtained from reliable sources and applied in a timely manner to ensure the platform's security remains up to date.

- **Requirement**: Perform security updates on software and database.
- **Validation**: Security updates can be validated through vulnerability scanning, penetration testing, and security assessments.

Private Network
The platform should be hosted on a private network (VPN), providing the highest standards of security to protect against unauthorized access, data breaches, and malicious activities. This VPN is hosted by IAMM.

- **Requirement**: Safeguard information, maintain data integrity, and minimize the risk of network disruptions or unauthorized access.
- **Validation**: The specified security measures are regularly reviewed and updated, and the network passes security checks without major vulnerabilities or breaches.

Data Encryption
The platform should implement robust encryption mechanisms to ensure the confidentiality and integrity of sensitive data.

- **Requirement**: Protect sensitive information from unauthorized access and tampering and maintain the privacy and security of data throughout the platform’s lifecycle.
- **Validation**: Highly sensitive data is appropriately encrypted according to data classification, encryption keys are securely managed, and encryption processes do not adversely impact system performance.

Cookies and Analytics
The platform should effectively manage cookies and analytics to enhance user experience, privacy, and performance.

- **Requirement**: Manage of cookies and analytics to ensure user privacy and optimize the application's performance. Cookies and analytics will only be tracked after the user has agreed to provide permission.
- **Validation**: Cookies and analytics are effectively managed in accordance with privacy regulations (including the General Data Protection Regulation), user preferences are respected at all times, and performance remains optimal. Regular auditing should confirm compliance and adherence to best practices. In the scope of the GRANULAR platform, MATOMO analytics are used to track and analyse the user experience and navigation in the platform.

9. Design of the GRANULAR digital platform

In this section, decisions and implementation that has taken place both at the conceptual (i.e., in relation to the logic of the GRANULAR Digital Platform) and the user experience levels are presented. Regarding the design work done at the conceptual level, the categories used to group the datasets in the GRANULAR Digital Platform's repository are presented and defined together with the metadata of the datasets and the indicators considered at this stage of the digital platform's development for user experience investigation and evaluation purposes (Section 9.1). In Section 9.2 ("User Interfaces"), the features of the GRANULAR Digital Platform are presented by focusing on both versions of the platform developed in the first year of the project, as well as on the new features introduced in the MVP version of the platform and the changes made to existing features (compared to the prototype version).

9.1. Conceptual Design

9.1.1. Rural dataset categories

The categories for grouping the datasets in the repository of the GRANULAR digital platform so as to enable a better user experience based on a structured dataset delivery, have been defined through as the result of the joint efforts of the Executive Board of the GRANULAR project. Apart from facilitating a structured way to access the datasets in the repository, the idea behind the identification, definition, and use of dataset categories has been to appropriately frame and communicate the range and diversity of the dimensions and aspects of rurality captured in the data of the delivered datasets. Table 5 below presents the dataset categories used in the prototype version of the GRANULAR Digital Platform together with their definitions.

Table 5: Categories used to group and deliver datasets from the repository of the prototype version of the GRANULAR Digital Platform, and their definitions.

Category	Definition
Demography	Study of human population, including its size, structure, distribution, and dynamics.
Migration	Movement of people from one place to another, typically across national or regional boundaries, in search of better opportunities, security, or other reasons.
Climate	Long-term average weather patterns and conditions of a region or the planet, including temperature, precipitation, and other atmospheric elements.
Environment	Natural ecosystems, resources, and the built environment.
Energy	Production, distribution, and consumption of energy resources, including fossil fuels, renewable sources, and electricity.
Infrastructure	Physical and organisational structures, systems, and facilities that are necessary for the functioning of a society or economy.
Accessibility	Ease of access and availability of goods, services, opportunities, and information to different segments of the population.
Digitalization	Integration and use of digital technologies in various aspects of society and the economy.
Mobility	Movement of people and goods within and between regions, including transportation systems and patterns of migration.
Health	Physical, mental, and social well-being of individuals and populations.

Economic development	Economic well-being and living standards improvement in a region or country, measured by indicators such as GDP, employment, income, and poverty.
Labour market	System of employment and work arrangements within an economy, including the demand for and supply of labour, wages, employment policies, and regulations.
Cohesion and values	Social, cultural, and political bonds that hold communities together, including shared values, norms, and beliefs.
Well-being and cohesion	Overall quality of life and social cohesion within a society or community.
Urban-rural classification	Categorization of areas into urban, peri-urban, and rural areas based on population density, economic activities, and other characteristics.
Transversal	Cross-cutting issues or themes that have relevance and impact across different sectors or areas of society.

To better align with other relevant projects and efforts, such as the Rural Observatory, the list of dataset categories was decided to change for the MVP version of the GRANULAR Digital Platform. The decision taken by the project's Executive Board was to adopt the categories used in the Rural Observatory for grouping indicators covering social, economic, and environmental dimensions of EU territories (namely: Demography and migration; Environment and energy; Health; Infrastructure and accessibility; Economic development; Labour market; Living conditions and social inclusion). The list of categories of the Rural Observatory has been appropriately extended by adding the categories "Rural typologies", "Administration and governance", "Agriculture and food", and "Recreation" to better capture the diversity in dimensions and aspects of rurality covered by the datasets available in the repository of the GRANULAR Digital Platform. Table 6 below presents the updated list of dataset categories used in the MVP platform version, their definition, as well as an indication of whether the category is used in the Rural Observatory or defined in the GRANULAR project as part of extending the Rural Observatory's list of categories. The definitions of all the dataset categories have been developed in the context of the GRANULAR project as no definitions are available from the Rural Observatory for the categories used by it for grouping indicators. To create and provide these definitions, the results of the prototype version of the GRANULAR Digital Platform were considered (see Section 6.2.2 for a detailed discussion on the results and findings that were obtained from the survey for the evaluation of the prototype version of the GRANULAR Digital Platform).

Table 6: Dataset categories used in the MVP version of the GRANULAR Digital Platform as the result of elaborating on the list of categories used in the prototype version and building upon the Rural Observatory's categorisation of indicators.

Category	Definition	Defined in Rural Observatory
Demography and migration	Study of human population, including its size, structure, distribution, and dynamics.	YES
Environment and energy	**Environment**: The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival; **Energy**: Usable power (such as heat or electricity).	YES
Infrastructure and accessibility	Characteristics of public services and utilities (e.g., digital networks and data speeds; distance to transport hubs, education, health facilities).	YES

Health	Physical, mental, and social well-being of individuals and populations.	YES
Economic development	Economic well-being and living standards improvement in a region or country, measured by indicators such as GDP, employment, income, and poverty.	YES
Labour market	System of employment and work arrangements within an economy, including the demand for and supply of labour, wages, employment policies, and regulations.	YES
Living conditions and social inclusion	Material living conditions focusing on income and consumption, and materials deprivation of living conditions of households including social pressures.	YES
Rural typologies	Methods used to categorise an area according to its rural characteristics.	NO
Administration and governance	Institutions and public services, citizenship.	NO
Agriculture and food	**Agriculture**: The science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products; **Food**: Material consisting essentially of protein, carbohydrate, and fat used in the body of an organism to sustain growth, repair, and vital processes and to furnish energy.	NO
Recreation	Way(s) of enjoying oneself when not working.	NO

The changes made to the list of dataset categories in the MVP version of the platform (compared to the GRANULAR Digital Platform's prototype) have resulted in a more condensed list of categories (11 categories as opposed to the 16 categories used in the prototype version), as well as an alignment with similar categorisation efforts undertaken in the context of relevant initiatives and projects. Table 7 below shows how the dataset categories used in the digital platform's prototype version map to the categories defined and used in the MVP platform version.

Table 7: Dataset categories used in the digital platform's prototype mapped to those used in the MVP platform version.

Dataset category used in the prototype version	Mapped to dataset category in the MVP version
Demography; Migration	Demography and migration
Environment; Climate; Energy	Environment and energy
Infrastructure; Accessibility; Digitalisation; Mobility	Infrastructure and accessibility
Health	Health
Economic development	Economic development

Labour market	Labour market
Cohesion and values; Well-being and cohesion	Living conditions and social inclusion
Urban-rural classification	Rural typologies
Transversal	Administration and governance
-	Agriculture and food
-	Recreation

It needs to be noted that the categorisation of the datasets delivered through the repository of the GRANULAR digital platform is work in progress. This means that the categorisation of the rural datasets will be revisited with the aim to implement any changes/adaptations deemed as necessary as soon as more datasets (either available from external sources or created within the context of the GRANULAR project) come in.

9.1.2. Rural dataset metadata

The process of creating a standardised list of metadata for the datasets has been an ongoing discussion between the members of the Executive Board of the GRANULAR project. Metadata is extremely important in rendering the datasets available and findable by the GRANULAR repository's users, while facilitating an easily maintainable and extensible organisation of those in the repository. Table 8 below shows the metadata defined and used in the MVP version of the GRANULAR Digital Platform, brief descriptions of those, as well as the types of their values. The definition and use of metadata as part of datasets organisation and delivery to the users is work in progress, meaning that they will be revisited and revised in the light of any changes/adaptations that may considered necessary as new datasets will be coming in.

Table 8: Metadata of the datasets available in the repository of the GRANULAR Digital Platform, brief descriptions of those and value types.

Metadata property	Metadata property description	Value type
Title	The name of the dataset.	string
Author/producer	The person, organization, or agency responsible for creating or compiling the dataset.	string
Data class	The category of the data based on its primary characteristics and origin/source.	string
Data type	The type of data contained in the dataset.	string
Description	A detailed overview of the dataset, including information about its contents, purpose and any other significant features.	string
DOI	The Digital Object Identifier (DOI) assigned to the dataset, which provides a unique and persistent link to its location on the internet.	string
DOI API	The API endpoint related to the dataset's DOI, which can be used to programmatically access the dataset or its metadata.	URL
License	The license under which the dataset is released stipulates how the data can be used, shared, or modified. This field can also list costs of purchasing a proprietary data.	URL or string
Access	Type of access to the dataset depending on whether it is available at a cost or free of charge.	string
Rural compass	The rural functional area, as described by the rural compass, the dataset relates to (Residential, Recreational, Environmental, Productive).	string
Granularity	The geographic level of detail the data in the dataset relates to.	string

Temporal extent	The time period covered by the dataset.	string
Updates	Information about the frequency at which the dataset gets updated or revisions of it become available.	string
Uploaded date	The date when the dataset was uploaded or added to the repository.	date

9.1.3. Rural dataset indicators

The provision of visualization capabilities is a key feature of the GRANULAR Digital Platform and particularly of its visualization toolkit. Given the fact that the definition of indicators (and their computation using the available datasets) addressing the various dimensions and aspects of rurality, based on the work done on the Rural Compass, is an effort in progress, it has been decided to explore the visualization capabilities to be delivered by the respective toolkit of the GRANULAR Digital Platform (Visualization toolkit) by using a set of tentative indicators. These indicators have been defined considering various aspects of the rural datasets available in the repository (captured in the values of metadata of the datasets) and are grouped into five (5) categories: (i) Geographic coverage of datasets; (ii) Dataset update frequency; (iii) Datasets per data class; (iv) Datasets per data type; (v) Cost considerations for data access.

Table 9: Indicators related to dataset metadata used in the MVP version of the platform (Visualization toolkit) to deliver visualization capabilities and investigate implications from a user experience perspective.

Indicator category	Indicator	Associated metadata property
Geographic coverage of datasets	• Geographic coverage at the "grid" level • Geographic coverage at the "LAU" level • Geographic coverage at national level • Geographic coverage at the NUTS2 level • Geographic coverage at the NUTS3 level • Not available	Granularity
Dataset update frequency	• Update on a daily basis • Update on a monthly basis • Update on a quarterly basis • Update on an annual basis • Update at a less than annual frequency	Frequency
Datasets per data class	• Aerial photos and satellite data • Census-based data • Infrastructure-/buildings-related data • RS and GIS reference data • Citizen data • Crowdsourcing data • Geometries • Government data • OSM data • Heterogeneous data • Hybrid data • In-situ data • Model data • Photos • Point location data • Public social and healthcare data • Simulated data • Social media data • Statistics data • Survey data	Data class

	• Topographic mapping data • Webscrapping data	
Datasets per data type	• Database data • Q/R matrices • Point data • Raster data • Tabular data • Vector data • Tabular and vector data • Vector/raster data	Data type
Cost considerations for data access	• Free-of-charge access • Cost-based access • Mixed (free-of-charge and cost-based) access • Not available	Access

As the project work on the Rural Compass and the definition of rural-related indicators will be progressing, the set of indicators currently considered for the delivery of visualization capabilities and functionalities, and the exploration of the impact they have on the experience of the user, will be gradually substituted by the rural indicators defined in the project. Building upon the findings and results from the visualization-related perceptions and needs survey (see Section 6.1.2), as well as the feedback that will be collected on the visualization capabilities of the platform, rigorous conclusions will be drawn about the "what" and "how" of the GRANULAR Digital Platform's Visualization toolkit.

9.2. User Interfaces

9.2.1. Prototype Version

The prototype version of the platform was launched in April 2023. It provided access to a repository of datasets covering a broad area of topics and dimensions related to rurality. The datasets were made available together with background information (metadata), which indicated important information for the dataset (e.g., the creator of the dataset, the dataset's date of creation, geographic scope of data). The prototype version of the platform featured **53 datasets** across 16 categories (see Section 9.1.1 for a detailed presentation of the dataset categories used in the prototype version of the GRANULAR Digital Platform and their definitions). The features of the prototype version of the GRANULAR platform are presented below. Each feature is associated with one or more functional requirements. A brief description is also provided.

Feature 01: Dataset list

Associated Functional Requirement(s): FR01

Description: The users of the GRANULAR Digital Platform are able to access a broad list of rural datasets, available in the digital platform's repository, by selecting the "Repository" item in the platform menu (see Figure 22).

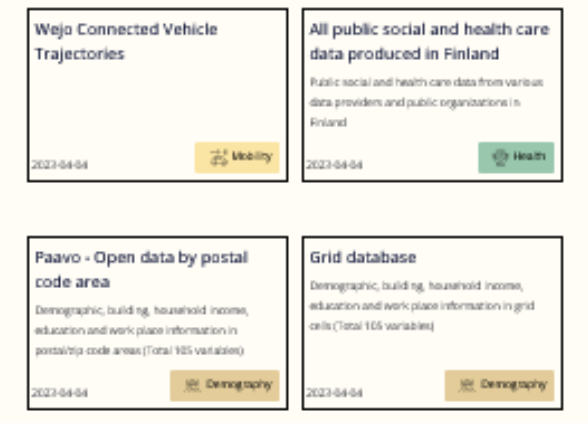


Figure 22: List of available datasets.

Feature 02: Search function

Associated Functional Requirement(s): FR03

Description: Users can submit search queries in the GRANULAR digital platform's search function by using free-text keywords or key phrases (see Figure 23).

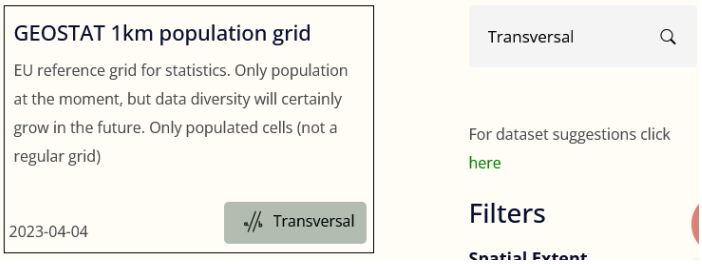


Figure 23: The GRANULAR digital platform's search function

Feature 03: Dataset labels

Associated Functional Requirement(s): FR01, FR06

Description: Users can select and view datasets based on the labels used to describe them. The results returned correspond to the dataset category chosen. One or more categories may be chosen to get datasets and have them displayed. The category label is also shown on the dataset presentation page (see Figure 24).

Figure 24: Dataset category-related labels used to tag the datasets available in the GRANULAR digital platform.

Feature 04: Dataset category view & description

Associated Functional Requirement(s): FR01, FR06

Description: Users can view the dataset categories used to group the datasets in the repository of the platform. Clicking on the arrows allows to scroll through the available categories (see Figure 25), while hovering over the categories provides a brief description.

Figure 25: Dataset categories present on the homepage.

Feature 05: Filter application

Associated Functional Requirement(s): FR04

Description: Users can use predetermined filters to narrow down the search results. Multiple filters may be selected. After opting for the desired filters, the user may click on the "Apply Filters" button to execute the filtering operation. By clicking on the "Remove Filters", the filters previously selected are cleared (see Figure 26).

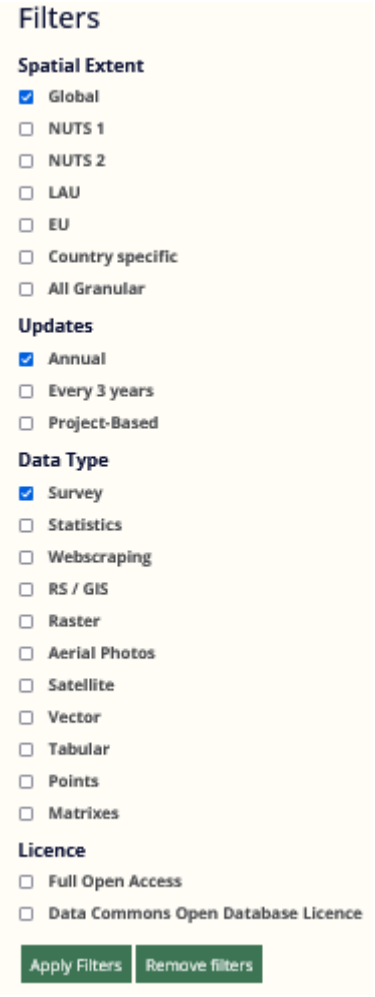


Figure 26: The GRANULAR digital platform's search results filtering options

Feature 06: Display of dataset metadata

Associated Functional Requirement(s): FR07

Description: Users have access to and are able to view the metadata of a dataset available on the page where the dataset is delivered and presented (see Figure 27).

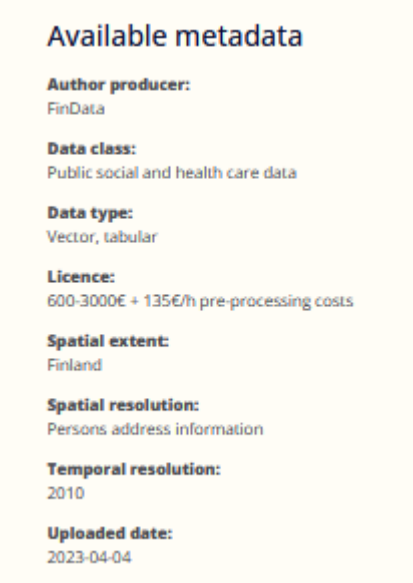


Figure 27: Metadata of datasets available on the GRANULAR digital dataset page

Feature 07: Filtering and sorting of datasets by popularity/data of addition to the repository

Associated Functional Requirements: FR05

Description: Users can view the datasets that were last added to the platform, as well as the most popular datasets (see Figure 28).

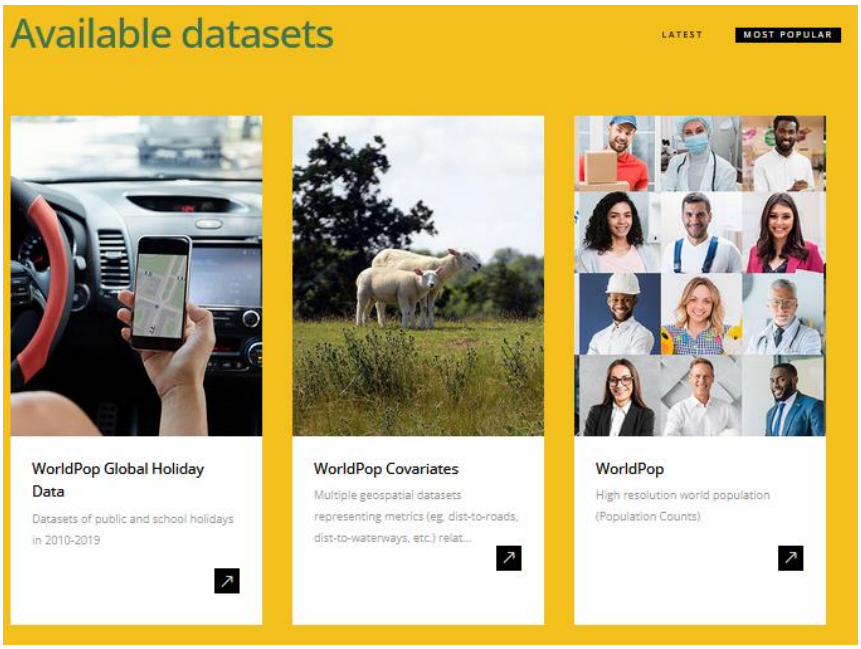


Figure 28: The latest/most Popular sorting and filtering function of the GRANULAR digital platform

Feature 08: Metadata download

Associated Functional Requirement(s): FR07

Description: Users can download the metadata available for a dataset by clicking on the “Download” button on a dataset’s page. The metadata downloaded is available in csv format (open data format) (see Figure 29).

Figure 29: The "download metadata" feature of the GRANULAR digital platform

Feature 09: Dataset tags

Associated Functional Requirements: FR06

Description: Users can view tags providing information about a dataset (e.g., the category the dataset belongs to) on the dataset page (see Figure 30).

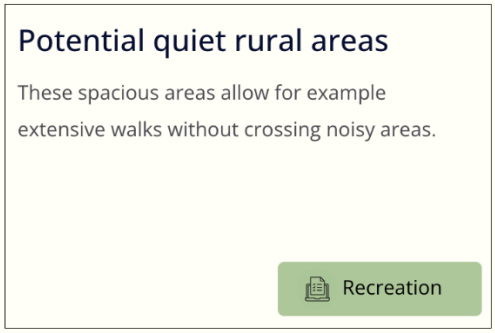


Figure 30: The dataset tag feature of the GRANULAR digital platform

Feature 10: Contact Form

Associated Functional Requirement(s): FR11

Description: Users can access and use a contact form by selecting the "Contact Us" option available in the platform's menu. Users can fill in the topic for which they want to reach out to the digital platform's admin team (General, Platform, Dataset Suggestion), provide their contact details, and give a rationale for their contact (see Figure 31).

Figure 31: The GRANULAR digital platform's contact form.

Feature 11: Project contacts

Associated Functional Requirement(s): FR11

Description: Users can directly email the GRANULAR project's and platform's selected contacts by clicking on their communication details on the footer of each page of the digital platform. These contacts include the project coordinator, the person-in-charge for the GRANULAR project's communication & dissemination activities, as well as the platform's admin and development team (see Figure 32).

Figure 32: Contact details of persons/teams involved in the project

Feature 12: Navigation system

Associated Functional Requirement(s): FR10

Description: A menu of items/options is available at the top of each page of the GRANULAR Digital Platform providing options for the navigation of the user in the platform (see Figure 33).

Figure 33: The GRANULAR digital platform's menu being the primary system for navigating into the platform

Feature 13: Access to external resources

Associated Functional Requirement(s): FR12

Description: The "GRANULAR website" and "Rural Observatory" items available in the GRANULAR Digital Platform's menu allow to access external resources of relevance and interest (see Figure 34).

Figure 34: The GRANULAR digital platform's menu being the primary system for navigating into the platform

Feature 14: Information for user orientation

Associated Functional Requirement(s): FR13

Description: Information about the digital platform's scope, as well as the project's aim and objectives are delivered with the aim to achieve a better user orientation and capture of their interest (see Figure 35).

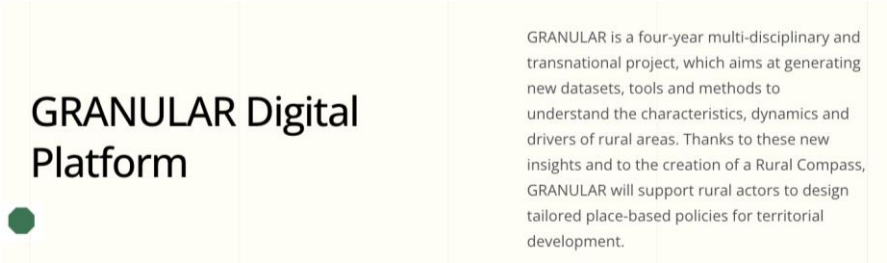


Figure 35: The GRANULAR digital platform's menu being the primary system for navigating into the platform

Feature 15: Dataset Suggestion

Associated Functional Requirement(s): FR01, FR11

Description: Users may select the "Dataset Suggestion" option from the contact form, which allows them to communicate potential datasets that may be relevant to the repository (see Figure 36).

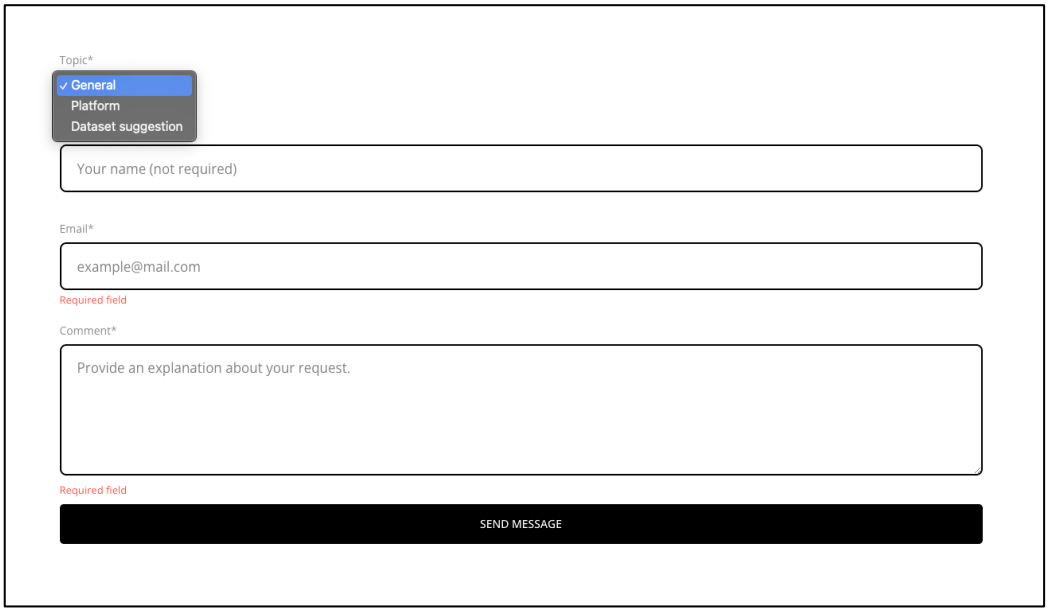


Figure 36: The GRANULAR digital platform's contact form, featuring the dataset suggestion form.

9.2.2. Minimum Viable Product (MVP) Version

The MVP version of the platform was released at the end of August 2023. This version contains updates and changes that arose as part of the feedback received from the prototype version evaluation survey undertaken after the Annual Knowledge Exchange meeting, as well as the survey to collect input on visualization capabilities. In this section, new features that were added to the GRANULAR Digital Platform as well as changes to existing features (as part of the work done towards addressing the feedback collected form the survey for the prototype platform version evaluation) are presented and explained.

Changes to existing features

Updated Feature 04: Dataset category view

Associated Functional Requirement(s): FR01, FR06

Description: The home page now features icons with all available categories, alongside a filtering option by latest or most popular datasets. Hovering over the

Figure 37: The display of the categories on the GRANULAR homepage.

categories provides a brief description of the category. (See Figure 37 and Figure 38).

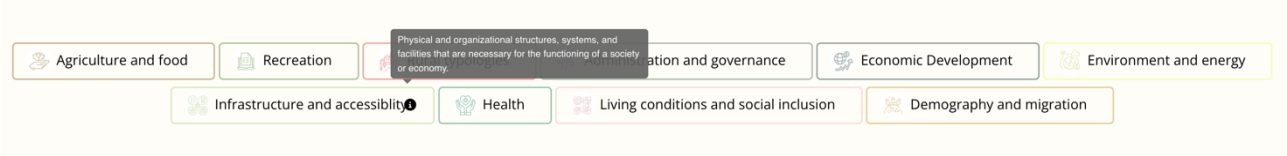


Figure 38: The description of the categories displayed when hovered over.

Feature 06: Display of dataset metadata | **Associated Functional Requirement(s)**: FR07

Description: The metadata displayed under each dataset's page is now accompanied by a short description of the category when hovering over the button next to the metadata property's title (see Figure 39).

Figure 39: Description of metadata property.

Feature 12: Navigation system | **Associated Functional Requirement(s)**: FR10
Description: The GRANULAR header section now provides access to the Repository, Visualisation Toolkit, User Manual and Contact Us modules of the platform. Links to the GRANULAR website and Rural Observatory have been moved above the search bar (see Figure 40).

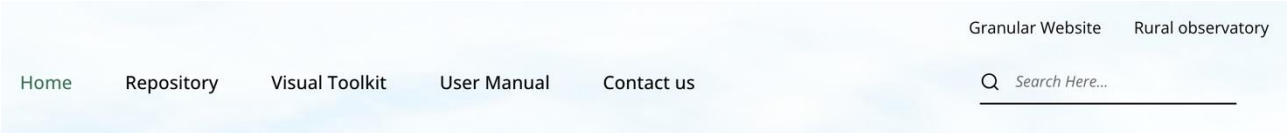


Figure 40: The GRANULAR digital platform's navigation system.

Updated Feature 15: Dataset Suggestion

Associated Functional Requirement(s): FR01, FR11
Description: Users may click on the "Dataset Suggestion" button available within the repository, which directs them to fill out a form with the details of the dataset to be suggested.

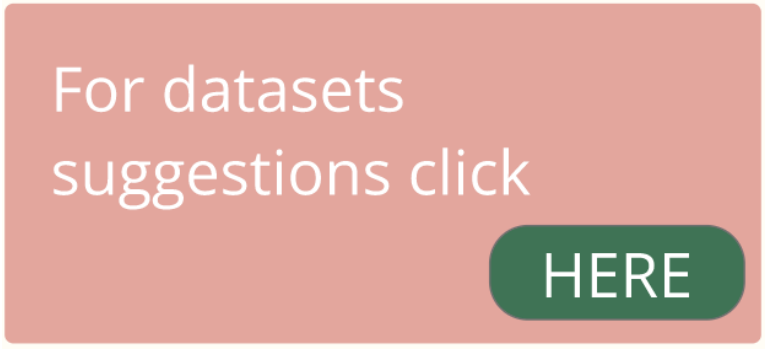


Figure 41: Dataset suggestion button.

New features

Feature 16: Indicator visualizations

Associated Functional Requirement(s): FR02

Description: The Visualization toolkit of the GRANULAR digital platform provides functionalities and capabilities for the visualization of indicators related to the metadata of the datasets available in the repository. Three different types of charts are used to deliver the indicator visualizations (bar chart, doughnut chart, nightingale chart). The displayed information includes the title and category of the indicator, the legend and the accompanying labels. More than one category of indicators may be visualised at once.

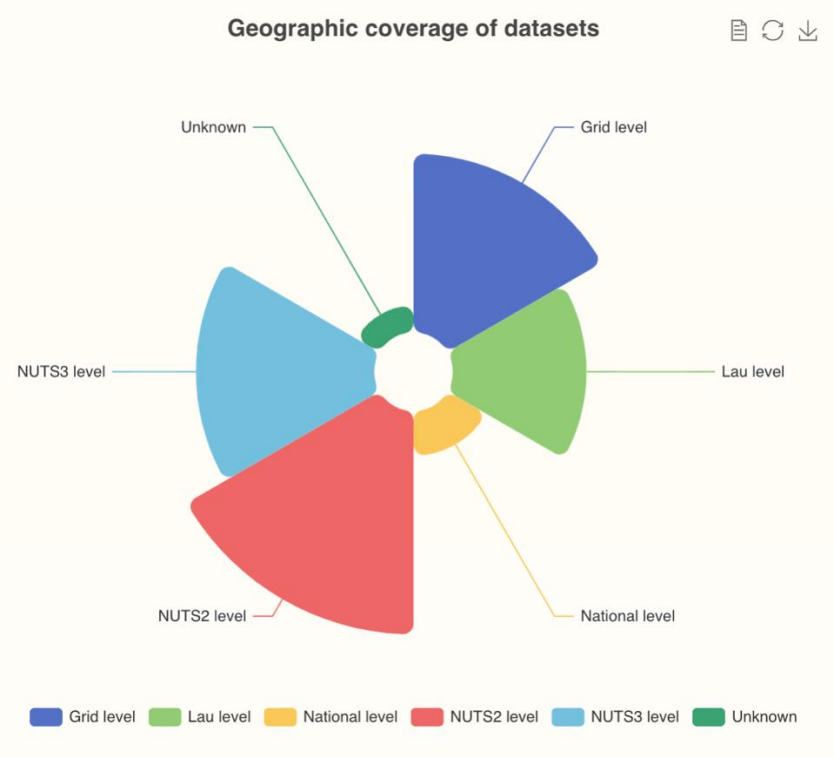


Figure 42: Indicator visualization capabilities provided by the visualization toolkit of the GRANULAR Digital Platform

Feature 17: Download of generated visualisation | **Associated Functional Requirement(s)**: FR02
Description: Users will be able to download the generated visualisation of the selected indicators by clicking the "Save as…" button. The visualisation will be then downloaded in .csv format.

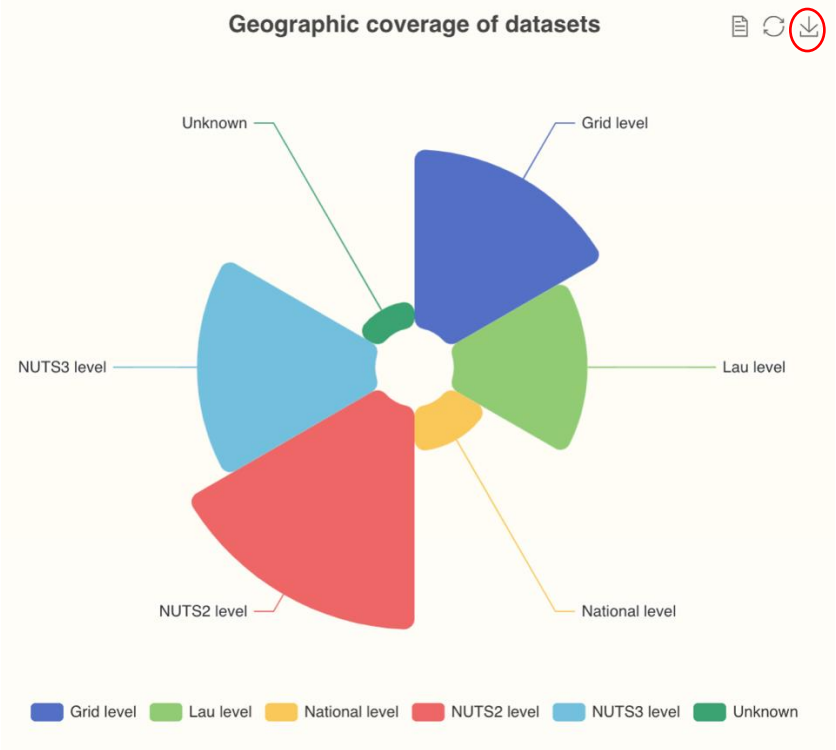


Figure 43: The download button, as highlighted, allows the download of the visualisation in .csv format.

Feature 18: Metadata of indicator visualization charts | **Associated Functional Requirement(s)**: FR08

Description: After generating a visualisation, background information regarding the indicators and visualisation may be provided by clicking the “Data View” button (see Figure 44 below).

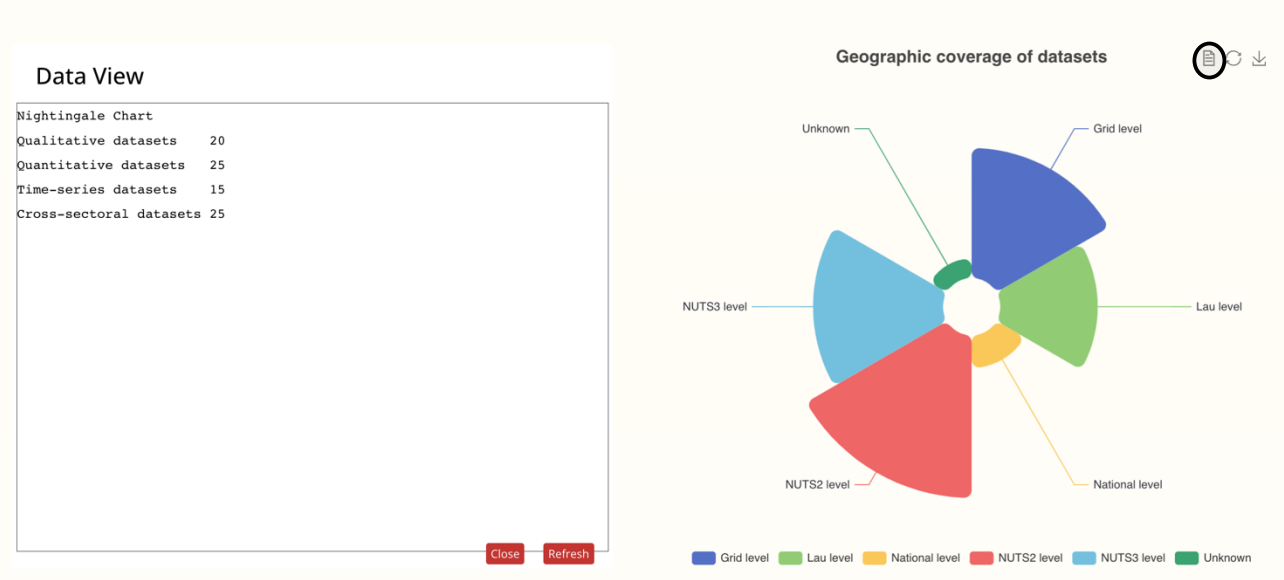


Figure 44: The information provided by the “Data View” button of the visualisation.

Feature 19: User manual

Associated Functional Requirement(s): FR13

Description: A manual of instructions about how the modules of the digital platform, what they provide to the user and how they work is available to the users.

Figure 45: The user manual of the GRANULAR digital platform.

10. Development of the GRANULAR digital platform

10.1 Front-end development

The front-end development of the GRANULAR digital platform has been made using React[4], a dynamic JavaScript framework renowned for its versatility and performance. By drawing upon the React framework's capabilities, the platform's interface comes to life, enabling seamless interactions that captivate users. React.js is an open-source JavaScript framework and library developed by Facebook. It is used to develop interactive user interfaces and web applications quickly and efficiently with less code than the code needed in the case of working with vanilla JavaScript. As mentioned in the article "What is React.js? (Uses, Examples, & More)" by David Herbert[5], React allows the development of applications by creating reusable components that can be considered as independent blocks. These components are individual pieces of a final interface, which, when assembled, form the application's interface.

10.2 Back-end development

The template used for the design of the GRANULAR digital platform was Jano. Jano is based on the Bootstrap v5.0 framework. Its well-organized code structure and thoughtful use of components make customization and integration of the specific project requirements remarkably efficient. Jano's functionalities ensure optimal responsiveness and cross-device compatibility for a seamless user experience.

The back-end side of the GRANULAR digital platform, or server-side as it is also usually called, uses Drupal[6] for its modularity with the actual data (datasets) and FastAPI[7] for the communication between the server and the client (back-end to front-end). FastAPI is responsible for the calls that the client will make to access specific data from the server with specifications to acquire the desired responses.

Drupal is a versatile open-source content management system (CMS) known for its flexibility and scalability, commonly used in web application framework and content management. Drupal's modular flexibility, robust security, and accessibility make it a prime choice to utilize and organize different assets of any digital platform[8].

FastAPI is a modern, high-performance Python web framework designed for building APIs. FastAPI stands out for its speed, automatic documentation, type safety, and simplicity, making it an excellent choice for developing robust and high-performance APIs with Python. Its asynchronous capabilities, security features and data validation additionally boost its appeal for developing robust and efficient APIs.

The code produced for the development of the GRANULAR digital platform will be made available on the GRANULAR project's GitHub repository. The code will be made freely available under an open license, allowing all interested parties to access and reuse it at their own volition.

[4] https://react.dev/
[5] https://blog.hubspot.com/website/react-js
[6] https://www.drupal.org/
[7] https://fastapi.tiangolo.com/
[8] https://www.drupal.org/docs/7/understanding-drupal/what-are-some-of-the-commonly-advantages-of-drupal

11. Next steps

The aim of this Section is to provide: (i) a succinct overview of the user preferences that have been derived from the comprehensive analysis of survey data. (ii) an outline of the platform development-related work to be done b by end of 2023/beginning of 2024 and on (continuous platform development), and (iii) some initial ideas about how the GRANULAR digital platform could continue to exist after the end of the project (longevity of the GRANULAR digital platform and exploitation).

11.1. Conclusions on platform development

The GRANULAR platform follows a user-centric design approach, where the needs and preferences of its users are prioritized to define its functional requirements in an effective interface design. While survey results and conclusions emanate from a relatively limited audience of respondents, the determinations reached, were underpinned and scaled up by the amalgamation of the findings with the long-term experience and expertise held by the AUA team.

Amidst the dynamic and continuously evolving digital landscape, user preferences exhibit a discernible degree of consistency. This phenomenon holds true, particularly in cases where the users of digital tools come from diverse backgrounds and possess varied perspectives. General trends that can be concluded by the analysis of the surveys, highlight the preference of the users in interfacing with clear simple navigation features with straightforward interactions supported by concise textual and visual material. Results indicate the preference for less overwhelming analytics and visualizations with the progressive and logical organization of the displayed information to satisfy the needs of the diverse audience of the platform.

11.2. Continuous platform development

Based on the methodology presented in Section 3, the GRANULAR digital platform will be regularly updated and ameliorated based on the feedback collected from its users. The development process of the GRANULAR platform will focus on implementing features and functionalities that will emerge from feedback collection processes, similarly to the work done in 2023. The platform will continue to be updated and features will be added, until the project's end in October 2026.

11.3. Longevity of the GRANULAR digital platform and exploitation

This Section of the deliverable serves as an introductory exploration of ideas, aiming to establish an initial framework for defining and addressing the sustainability and longevity of digital platforms. It outlines a preliminary plan that sets the groundwork for future discussions, more comprehensive analysis, and strategies to ensure the enduring success of the GRANULAR platform in a viable business plan.

The concepts of longevity and sustainability encompass multi-faced dimensions, which can often introduce ambiguity. Sustainability is a multidimensional concept with various definitions over time often referring to "long-term viability", and "continuity of an activity". This implies, that actions do not compromise opportunities for future individuals to enjoy similar levels of utility". Given the complexity of the definition, it is vital in the context of platform development, to establish a clear foundation that aligns for responsible forward-thinking development practices. Frameworks such as the Sustainable Development Goals (SDGs) and the Green Software Engineering Principles can serve as guiding references or crafting the definition.
A repository of existing and newly sourced rural data sources and methods will be expanded over the course of the project and will be ingested into the GRANULAR digital platform. The continuation of the research and innovation results developed within the MALs beyond the project's lifetime is of increased importance for the GRANULAR platform's longevity and sustainability.

In the ongoing development and growth of the GRANULAR digital platform, a sustainability plan will effectively address the influence and intertwined effect of environmental, legal, social and economic aspects on its long-term continuity.

Despite the lower environmental footprint (e.g., paper use, energy, greenhouse gas emissions) over the traditional physical systems, digital platforms remain to require a significant number of resources, for the operation (powering and cooling) and maintenance of their infrastructure. Environmental impact of digital infrastructures is linked to computing facilities hosted in data centres. This is to be examined very carefully to optimise data storage and computing tasks. The balance between these two aspects is one of the most delicate points of any Project Data Management.

Streamlined hardware management, aligned with stringent environmental standards, the latest technological equipment, and sophisticated mechanisms can have a commendable reduction in energy consumption and result into a tangible decrease in the overall carbon footprint. Hot and Cold Storage needs should be considered from the very beginning of the project, as well as very long-term data archiving requirements. Beyond data that will be officially delivered, intermediate products storage should also be considered. Indeed, it is very usual to consider that if some intermediate data are easy to be produced using very reliable and robust workflows, it is not necessary to store them. However, it should be kept in mind that from an environmental point of view, computing is very much more expensive than data storage, and this is still accentuated if we consider cold storage as for example a magnetic-band based storage. Cold storage can bring some strong archiving constraints though, such as the availability of reliable hardware readers every time data is needed.

In addition to the environmental impact, legal considerations are continuously raised regarding data-digital content privacy and security, moderation, and transparency. Considering the non-commercial nature of the GRANULAR digital platform and its serving purpose, guidelines around the protection of intellectual outputs with specifying terms and conditions of reuse, under which the dissemination material could become available during and after the project's completion. There are various licensing schemes that allow depositors to authorize second parties in using their data and software. The most common and widely used licensing suite that could be considered a great candidate for the repository of the GRANULAR platform is Creative Commons (CC) (*Creative Commons | University of Minnesota Libraries*, 2023).

A key element of the social dimension of the platform's continuity refers to user inclusiveness or user empowerment, defined as, the practice to enable and encourage users to actively participate, collaborate and take ownership of their experiences within a digital platform. Engagement of the MALs will also be fostering a sense of participation and contribution over time, which will potentially positively impact the reputation of the digital platform to new users and stakeholders and will ensure better data quality and lead to sustained success and longevity of the platform (Neri et al., 2021). Additionally, the rapidly changing digital landscape leads to new emerging technologies that influence rural diversity, user needs, and preferences. Considering the far-reaching consequences of outdated information on the long-term sustainability a plan that proactively addresses these changing expectations is of high importance.

Last but driving dimension of the longevity and sustainability of digital platforms is economic sustainability. Regarding platform types, the European Parliament (2017) distinguishes commercial and non-commercial platforms. In a comprehensive plan, it is of vital importance to include a detailed cost analysis that accounts for the resources required to maintain the technological infrastructure and software, to update the digital content, and the human labour required to ensure the long-term smooth operation of the web application. The longevity and sustainability of the GRANULAR platform require adequate and reliable sources of funding so that data is preserved and delivered properly. One of the ways to ensure the platform's sustainability and longevity is by integrating the generated outputs of the project with the EU-FarmBook, a project whose objective revolves around collecting and organizing these outputs in one database. This endeavor will allow the GRANULAR project's outputs to be preserved and perpetuated even beyond the end of the project.

Technically speaking, GRANULAR Digital Legacy Sustainability will be based on the five pillars of reproducible computational research as described by Ziemann et al, 2023[9]. This includes FAIR and persistent data sharing, code version control and persistent sharing, Compute Environment Control, Literate programming and Documentation. This is also compatible with the traditional three pillars of Open Science which are Open Data, Open Source (Software) and Open Access (scientific papers).

9 Ziemann, M., Poulain, P., & Bora, A. (2023). The five pillars of computational reproducibility: Bioinformatics and beyond.

As mentioned in Section 9.1.2, a reliable GRANULAR dataset metadata template ensuring that every Dataset in GRANULAR Repository will respect the FAIR principles is in preparation, aligned with the project's Data Management Plan. This will guarantee the persistent data sharing.

Code version control, compute environment Control, Literate programming and Documentation are all new practices leading to workflows reproducibility. As described by Ziemann et. al., this includes the use of:

- Distributed version control systems (such as Subversion, git) for every Software Development and the need of license definitions from the very beginning. For software long-term archiving purposes, the registration of codes in repositories such as Zenodo or Software Heritage are strongly recommended.
- Virtual Machines or Containers (such as docker) to guarantee computing environment full reproducibility in spite of global computing environments quick evolution.
- simple, flexible, scalable configuring tools such as Ansible and its YAML declarative language to ensure fully reproducible infrastructure and environment configuration, application deployment as well as some parts of data preprocessing and management.
- literate programming, which is a combination of analytical code and human readable text (typically Markdown scripts and Jupyter Notebooks)
- Continuous Integration automatic processes to ensure the robustness of every infrastructure deployment and workflow reproducibility.

Those new practices will be strongly encouraged in the GRANULAR project, including the GRANULAR digital platform deployment itself. Nevertheless, we must keep in mind that the important amount of technical and human resources needed to trigger this deep change in research work inhabits is not always available. Even if the expected return of investment of this initial effort is very high, we will need to adapt to the real possibilities in each context.

References

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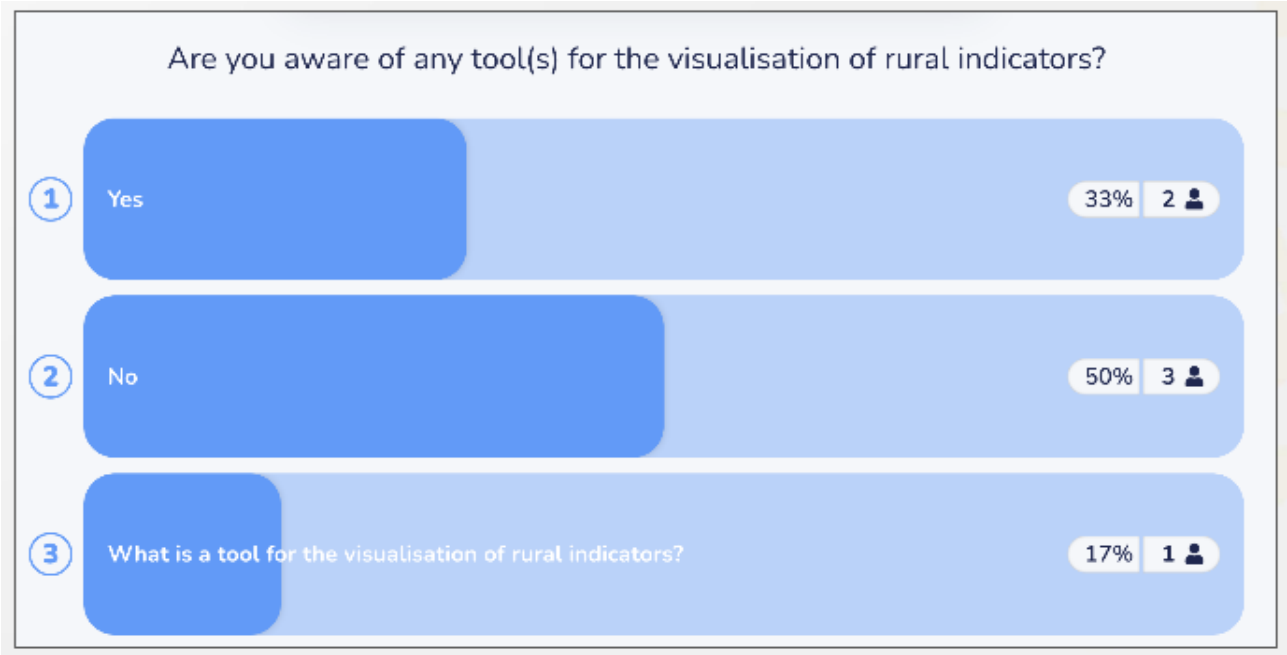
Masanet, E., Shehabi, A., Lei, N., Smith, S., & Koomey, J. (2020). Recalibrating global data center energy-use estimates. *Science*, *367*(6481), 984–986. https://doi.org/10.1126/SCIENCE.ABA3758

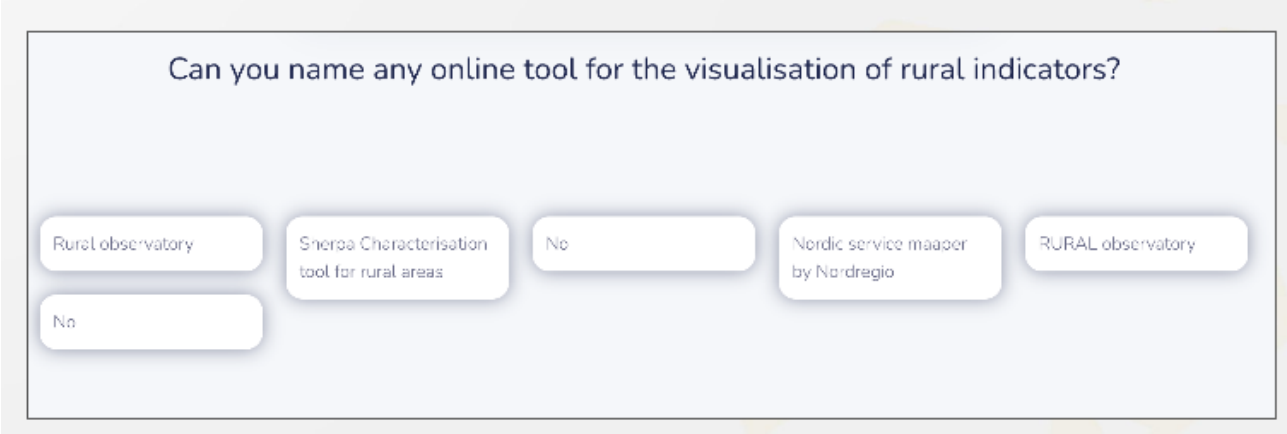
Neri, A., Sweet, J., Klasko, S. K., Jafar, B., Ruehl, G., & Smith, R. (2021). *Digital Culture: The Driving Force of Digital Transformation*.

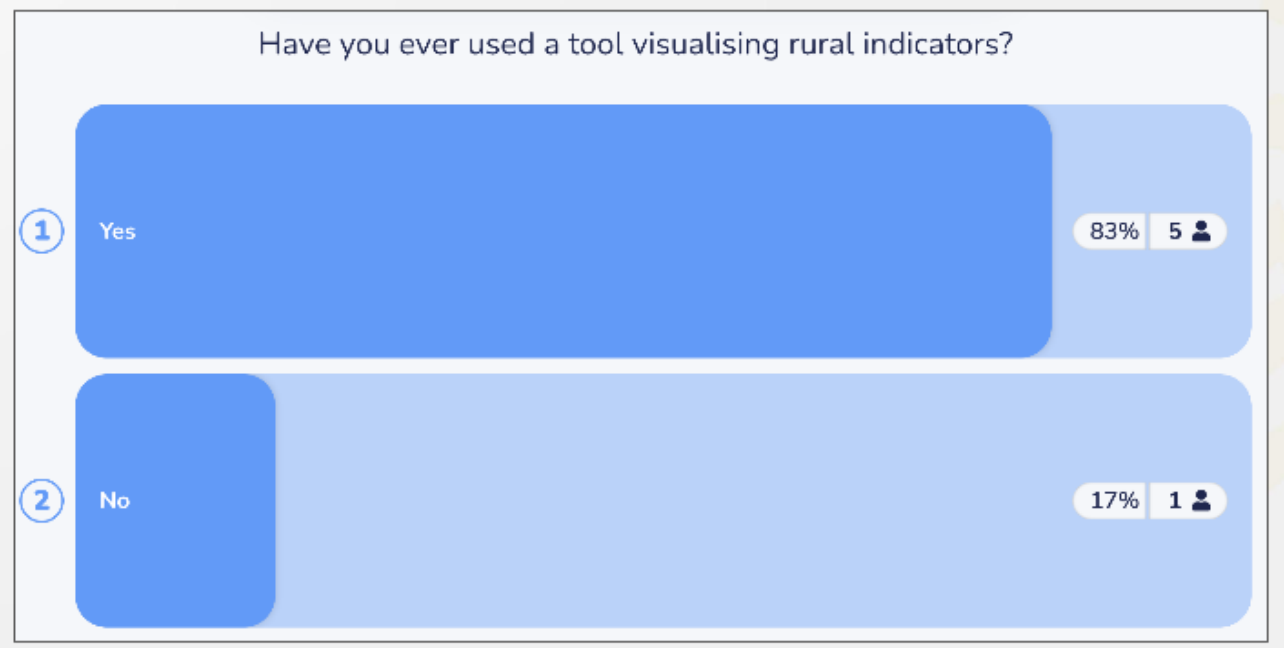
Javanmard, M., & Alian, M. (2015). *Comparison between Agile and Traditional software development methodologies*. 2nd National Conference on Applied Research in Computer Science and Information Technology, Tehran - Payam Noor University. https://www.researchgate.net/publication/274918013_Comparison_between_Agile_and_Traditional_software_development_methodologies.

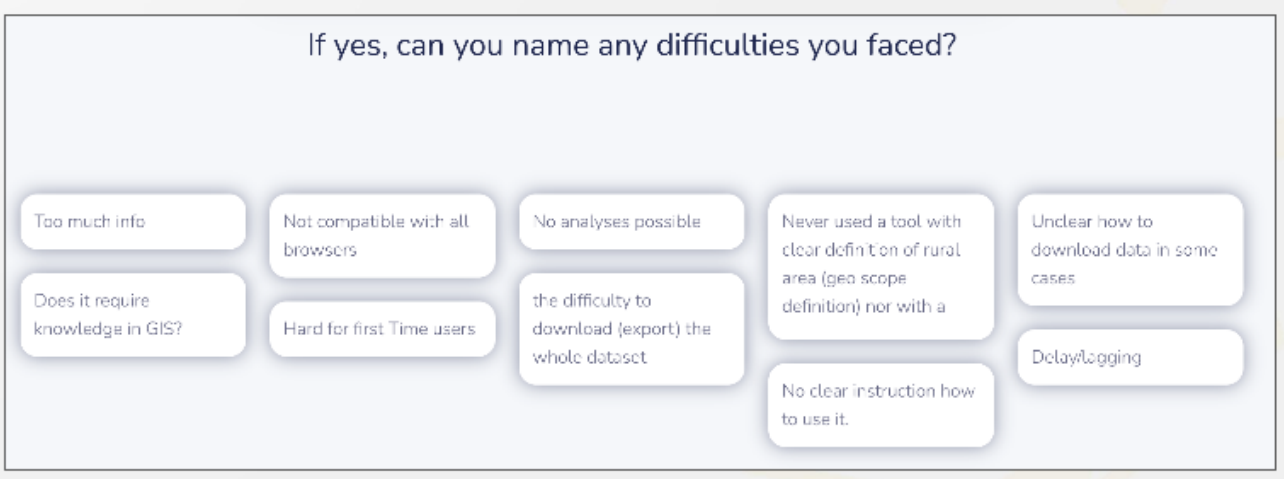
Annex 1. Digital Platform Workshop Poll

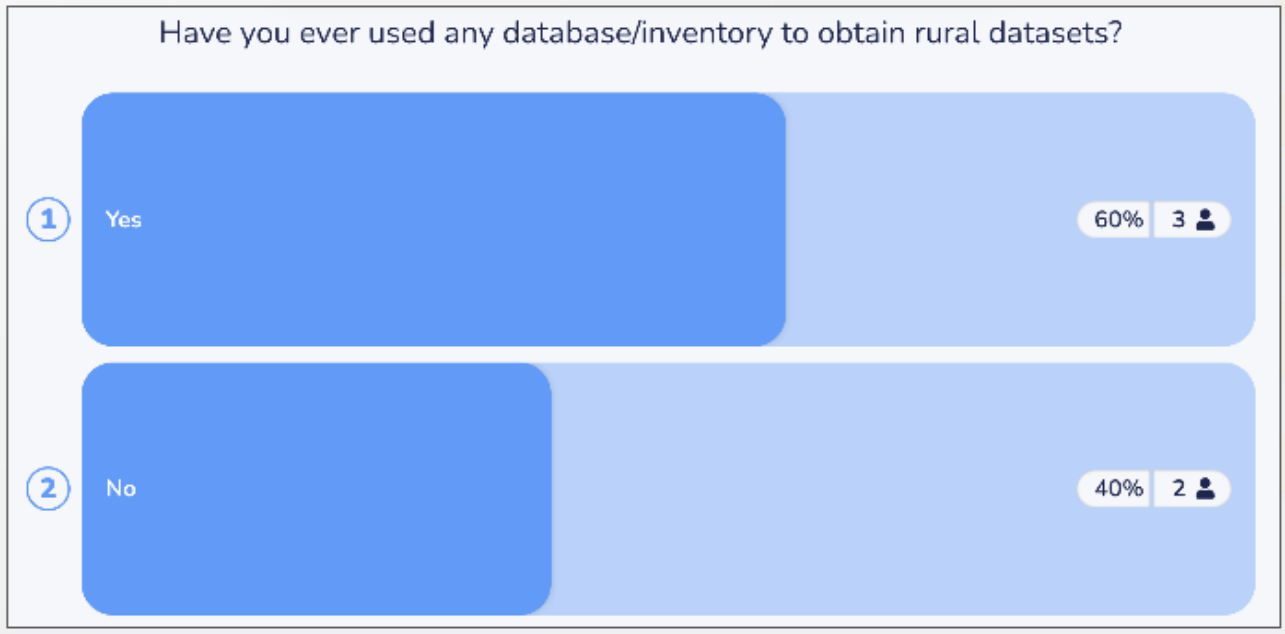
This Annex contains the questions provided in the Digital Platform Workshop Poll in Montpellier, in February 2023.

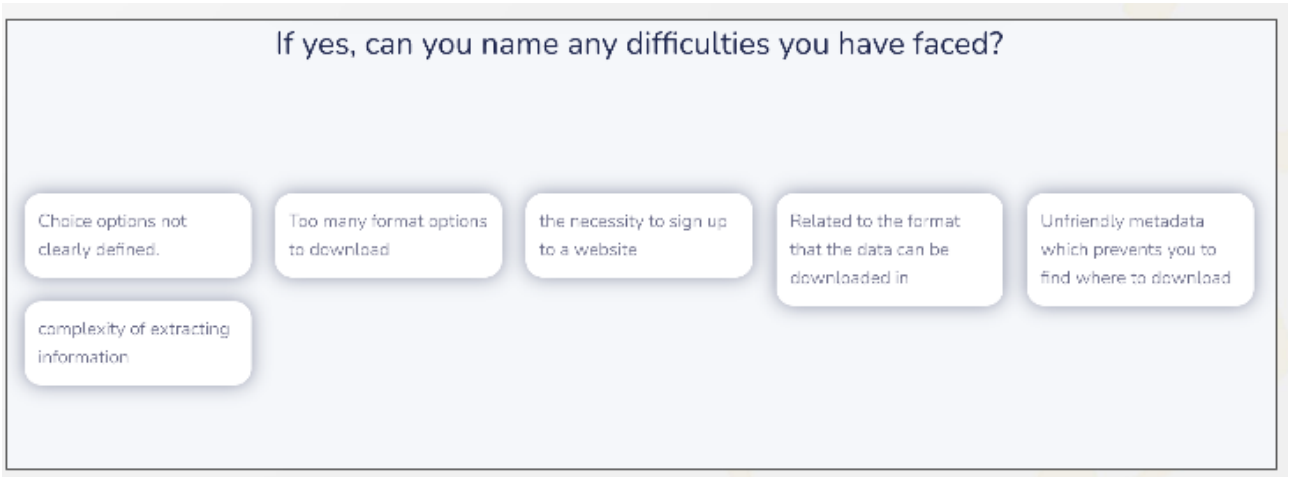


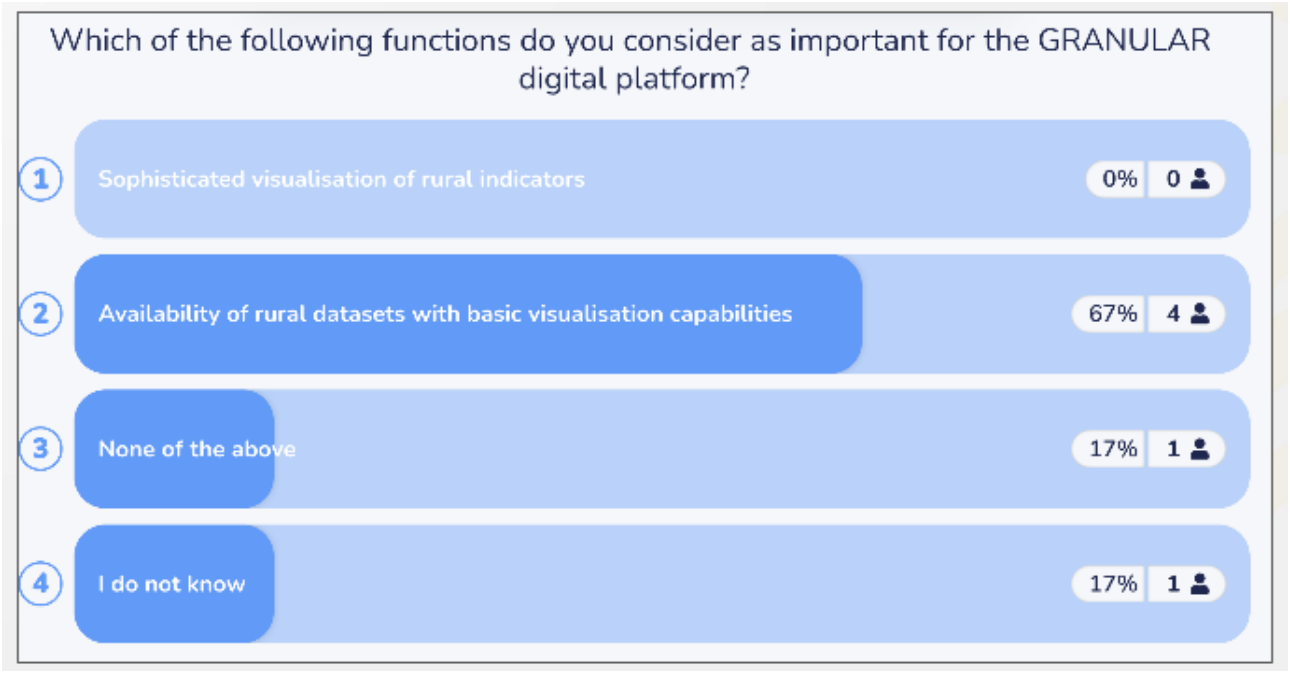


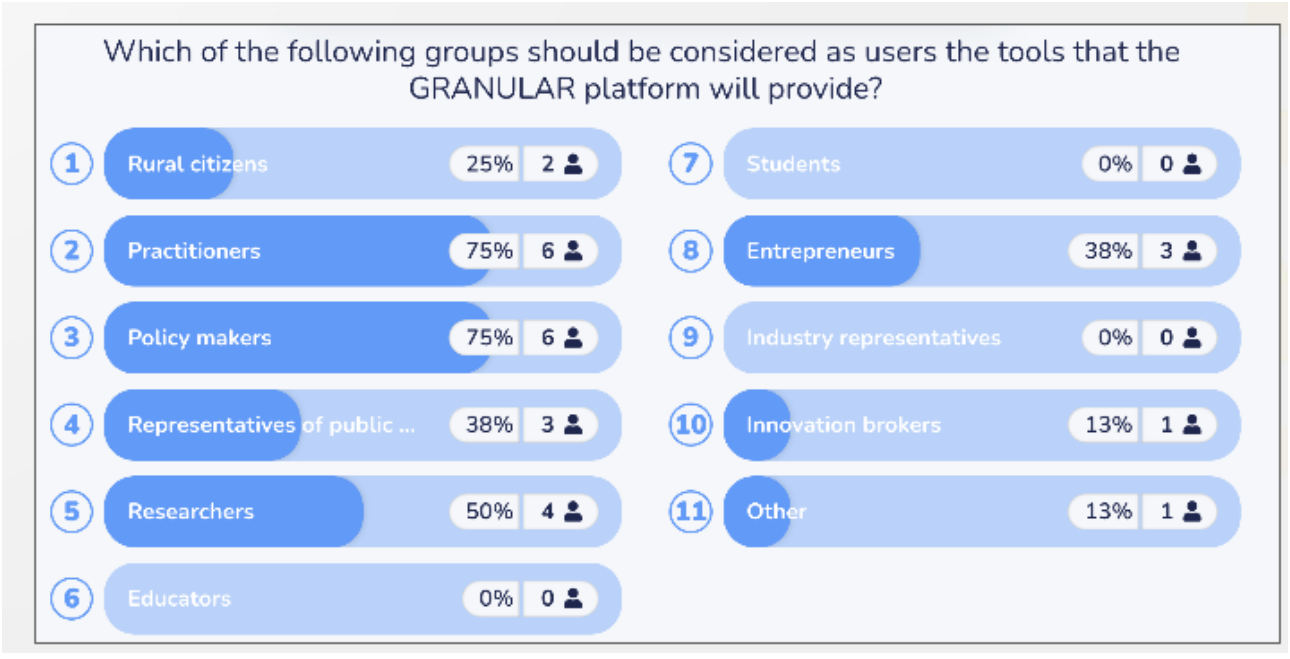

Have you ever used a tool visualising rural indicators?
1
Yes
83%
5
2
No
17%
1

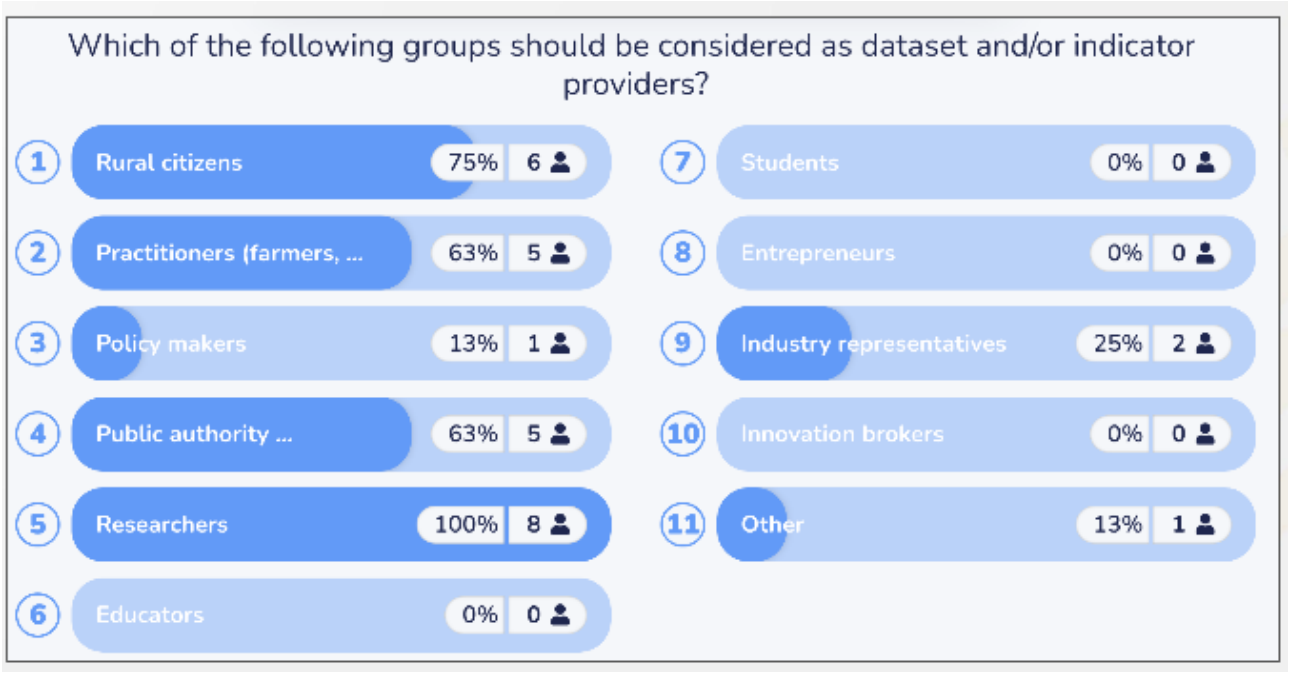

If yes, can you name any difficulties you faced?
Too much info
Not compatible with all browsers
No analyses possible
Never used a tool with clear definition of rural area (geo scope definition) nor with a
Unclear how to download data in some cases
Does it require knowledge in GIS?
Hard for first Time users
the difficulty to download (export) the whole dataset
Delay/lagging
No clear instruction how to use it.

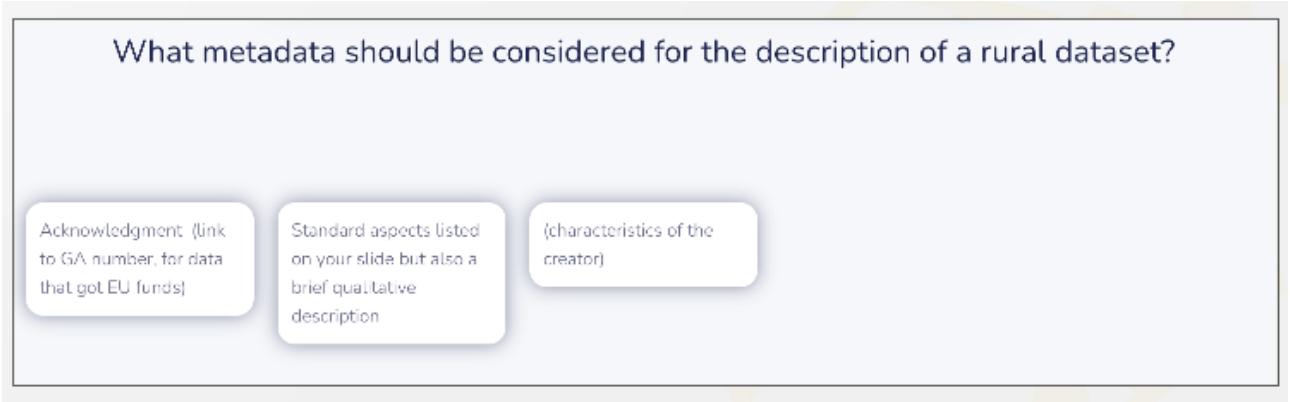

Have you ever used any database/inventory to obtain rural datasets?
1
Yes
60%
3
2
No
40%
2


If yes, can you name any difficulties you have faced?
Choice options not clearly defined.
Too many format options to download
the necessity to sign up to a website
Related to the format that the data can be downloaded in
Unfriendly metadata which prevents you to find where to download
complexity of extracting information


Which of the following functions do you consider as important for the GRANULAR digital platform?
1 Sophisticated visualisation of rural indicators 0% 0
2 Availability of rural datasets with basic visualisation capabilities 67% 4
3 None of the above 17% 1
4 I do not know 17% 1


Which of the following groups should be considered as users the tools that the GRANULAR platform will provide?
1 Rural citizens 25% 2
2 Practitioners 75% 6
3 Policy makers 75% 6
4 Representatives of public ... 38% 3
5 Researchers 50% 4
6 Educators 0% 0
7 Students 0% 0
8 Entrepreneurs 38% 3
9 Industry representatives 0% 0
10 Innovation brokers 13% 1
11 Other 13% 1


Which of the following groups should be considered as dataset and/or indicator providers?
1 Rural citizens 75% 6
2 Practitioners (farmers, ... 63% 5
3 Policy makers 13% 1
4 Public authority ... 63% 5
5 Researchers 100% 8
6 Educators 0% 0
7 Students 0% 0
8 Entrepreneurs 0% 0
9 Industry representatives 25% 2
10 Innovation brokers 0% 0
11 Other 13% 1


What metadata should be considered for the description of a rural dataset?
Acknowledgment (link to GA number, for data that got EU funds)
Standard aspects listed on your slide but also a brief qualitative description
(characteristics of the creator)

Annex 2. Visualization toolkit survey

This Annex contains the questions and answers provided in the User needs collection and insight acquisition survey.

For each of the following **statements** related to **functionalities** and **features** of the **Rural Observatory platform**, **provide your opinion** using the 5-point rating scale.

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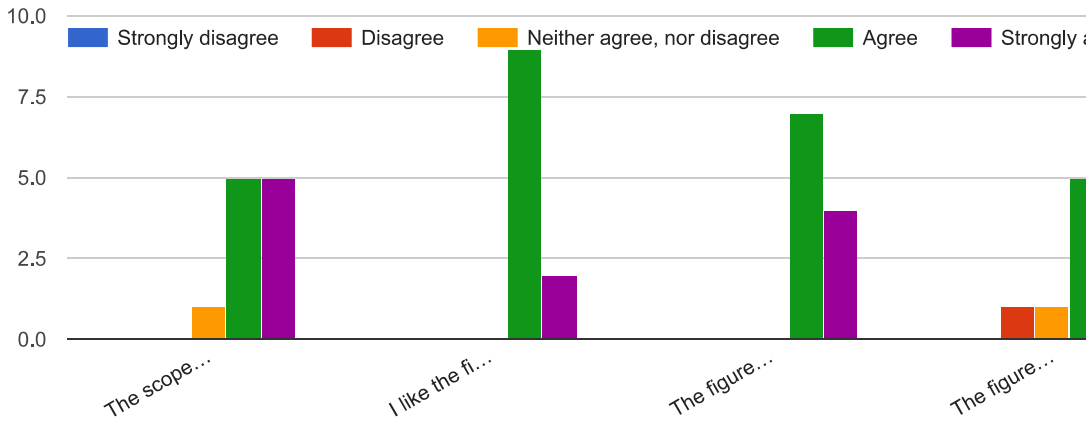

Provide any **comments** or **remarks** about **characteristics** and **features** of the **Rural Observatory platform** that you have found **interesting** and **useful**.

6 responses

Possibility to download specific data in CVS
Dashboard with overall view of datasets
Possibility to look trends (data over time)
Data source

i like very much much the information provided by selecting your country

I find visualizing numbers a very good idea that makes data more readable and useful.

Overall, the Rural Observatory is quite easy to navigate and useful. The interactive map is particularly nice especially when checking NUTS2-NUTS3 as it shows the urban/rural classification.

Providing background information on the indicators is important but this should not interfere with visual appeal and agility.

I like the list view of the data viz, i think it is much clearer. It also shows other/more charts. The comparison is also great. For me this should be the default view.

The search for other regions works well for the most part, but maybe an advanced search in addition would help, where one can filter by proximity or admin level or country, etc.

For cases where I want to compare with other regions, but I don't know them by name. potentially also a feature selecting interesting comparisons automatically.
Maybe regions with a quite different value in the selected indicator, but similar values otherwise? This is a bit vague, sorry.

For each of the following **statements** related to the scope of the GRANULAR platform's visualisation toolkit, as well as **features** it could potentially incorporate, **provide your opinion** using the 5-point rating scale.

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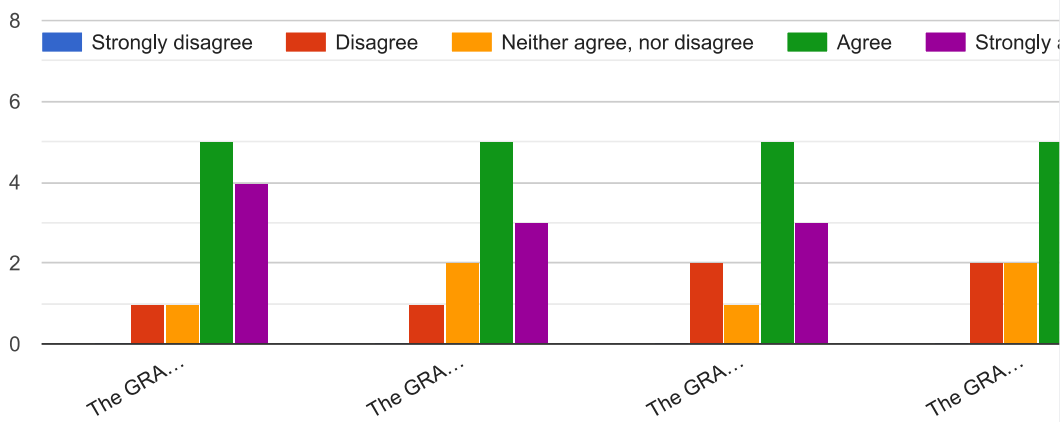

Provide **any additional comments** and **remarks** about the **scope** of the **GRANULAR platform's visualisation toolkit** and the **features** it should have.

4 responses

To provide a section that gives a narrative explanation of the methodology (how data are been collected, reviewed/quality assessment etc.), as well as a practical explanation of how data can be used (e.g. give an example) and what is the added value of this data visualisation for the users compared to others that they can find (e.g. in the Rural Observatory or through their own national/regional visualisation tools).

Maybe more "flexible" search and not so strict, because it wasn't easy to find my area of interest. I had to type the name in multiple ways .

One thing that is missing from the Rural Observatory and that the GRANULAR platform's visualisation toolkit could provide is detailed spatial data, with indicators that can help to adress the issue at stake. For example, if there is an environmental indicator showing the risk of flood, one indicator "lever of action" for the local LL/RL could be the current status of number of hedges and the potential of increasing hedges to prevent flash flood. Similar for energy: current autonomy status and potential for wind/solar energy, etc. etc.

For some of the questions in this section I would need a "it depends" button.

I think that showing visualizations of the Living and Replication labs are fine, but by asking the question in this survey, it sounds like they would be treated differently in the tool to other regions. And I disagree and think they shouldn't be. Where possible the information for LL or not LL should be the same.
However maybe the LL are good candidates for default regions for comparisons. So I select Ebreichsdorf and by default it gets compared to the closest/most similar (in meter distance, size, population??)

Being able to adjust the charts could be interesting, it depends a little bit on what the tool should be doing.
There are so many ways to customize charts, and I doubt we can integrate all of them. So maybe it is easier to keep this light, but make it easy to download the data and viz yourself (I might be heavily biased as I am ABLE to do these visualizations myself).

The graphic overview of the locations for which indicators visuals are provided: This depends on how one shows it.
If it is one region, the current version works already.
But if I compare northern Sweden with a Greek Island, I won't be able to see them on the map and the viz becomes useless, unless you find a clever way to show both of them (automatically).

Section 3: **Feedback on different types of graphs and charts**

How frequently do you use pie charts?

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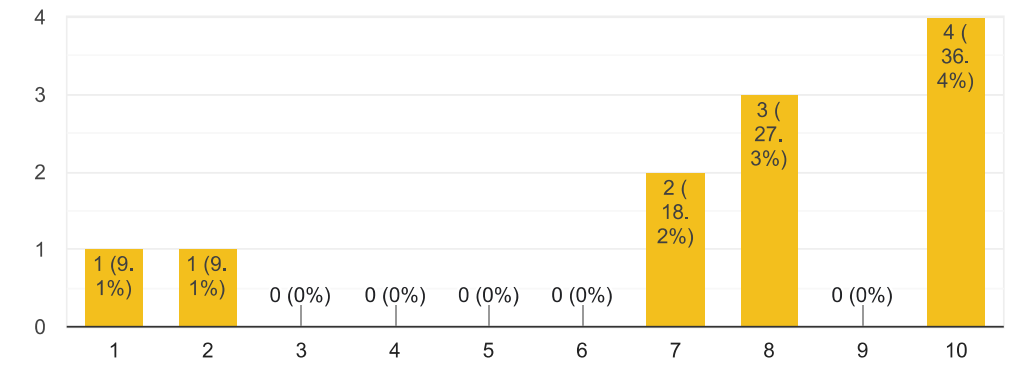
11 responses



How familiar are you with pie charts?

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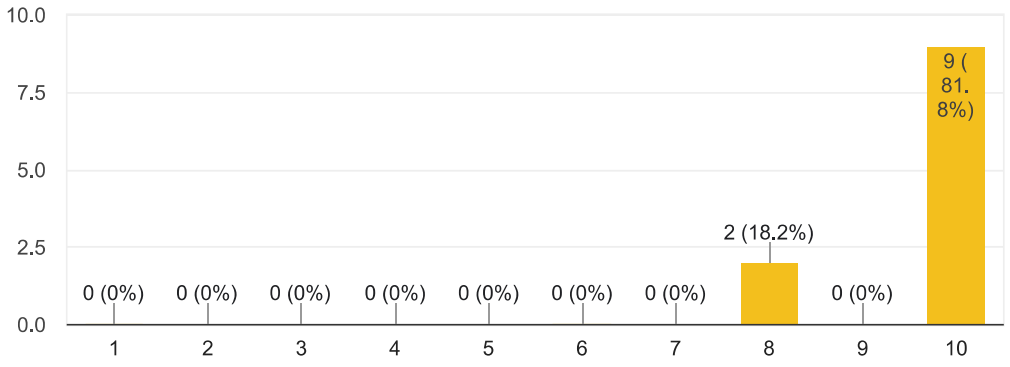
11 responses



How frequently do you use bar charts?

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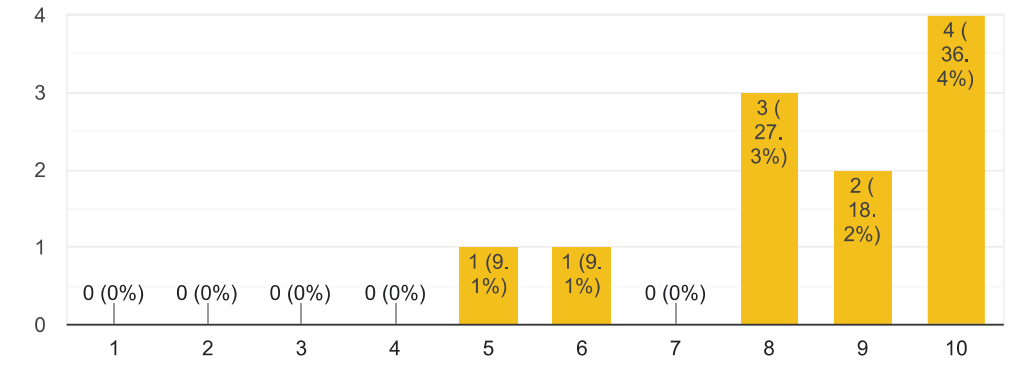
11 responses



How familiar are you with bar charts?

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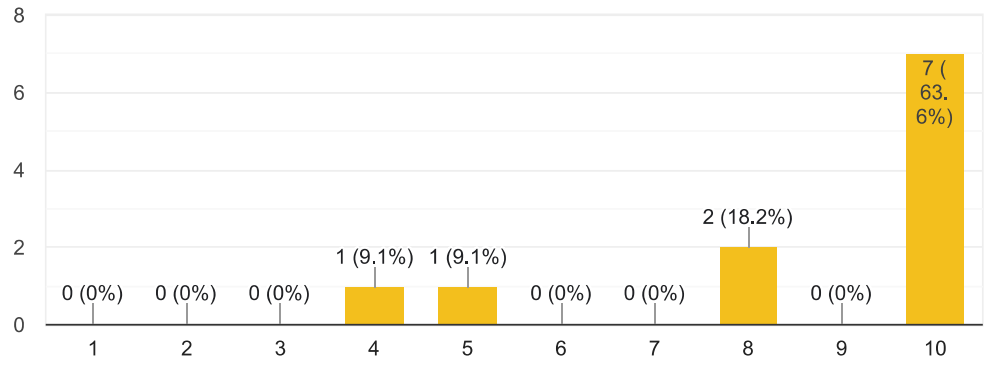
11 responses



How frequently do you use line charts?

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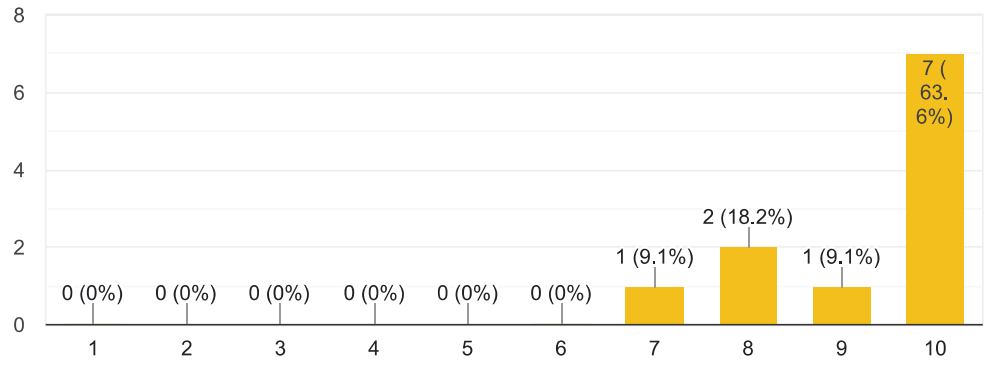
11 responses



How familiar are you with line charts?

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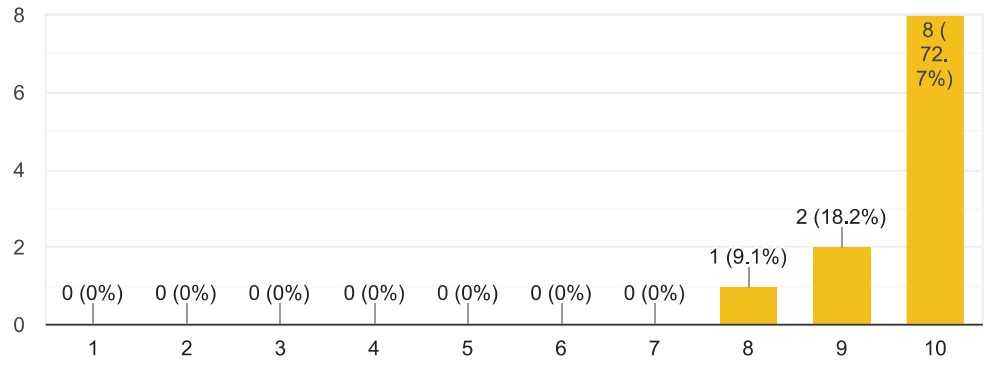
11 responses



How frequently do you use histograms?

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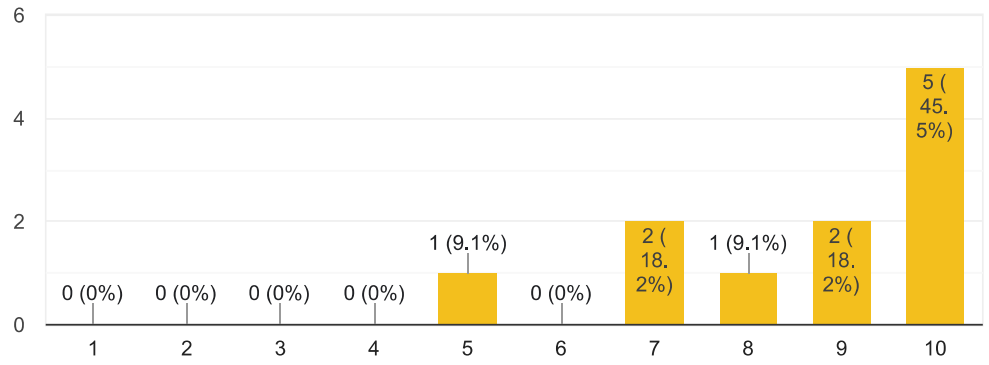
11 responses



How familiar are you with histograms?

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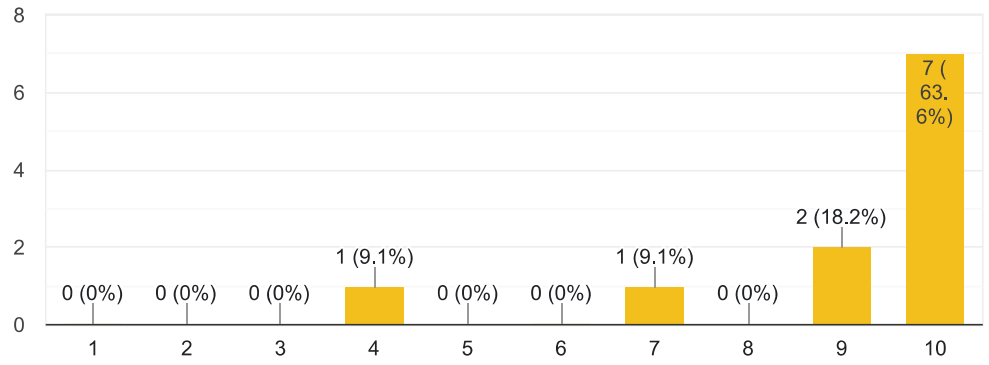
11 responses



How frequently do you use bullet graphs?

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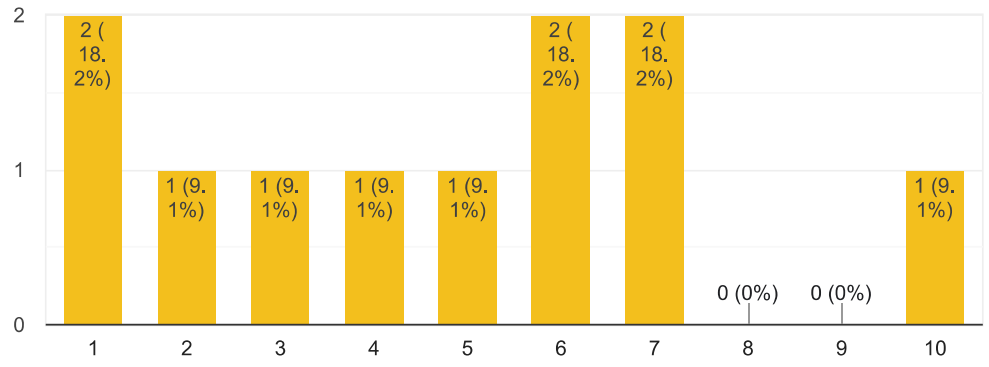
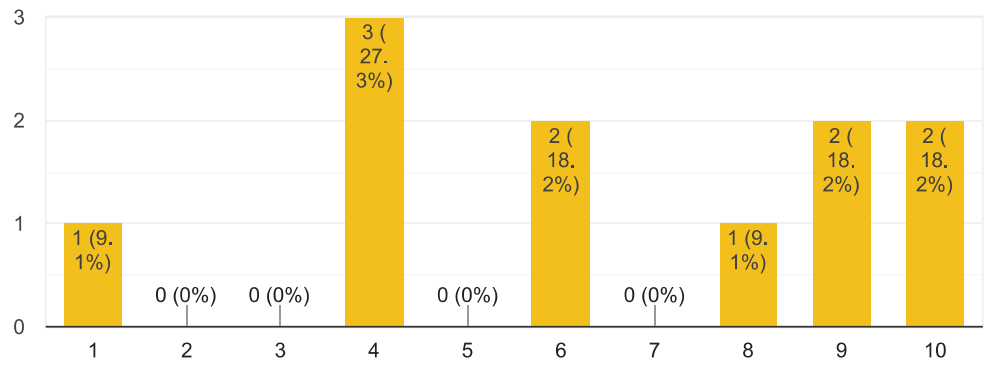
11 responses



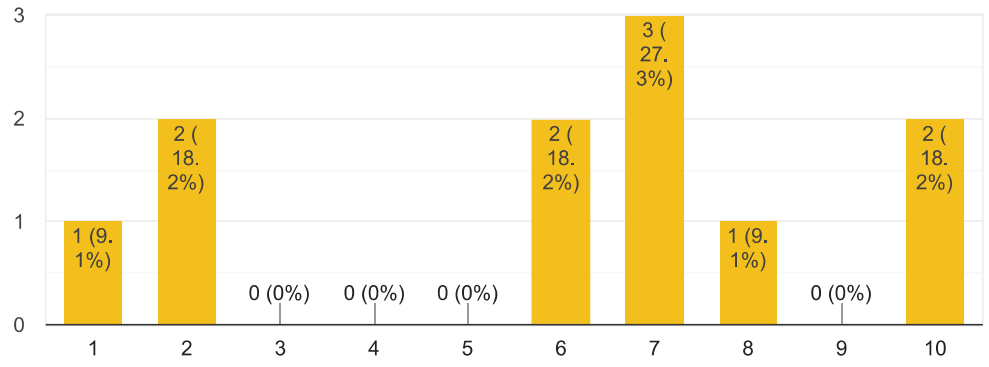
How familiar are you with bullet graphs? Copy

11 responses



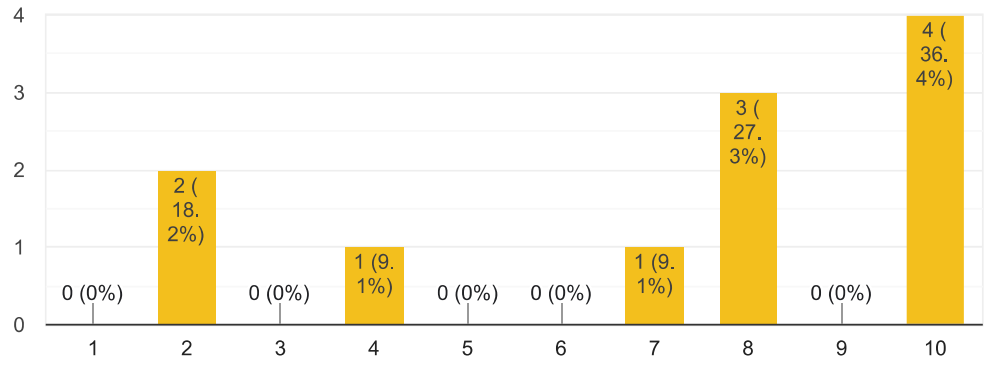
How frequently do you use box and whisker plots? Copy

11 responses



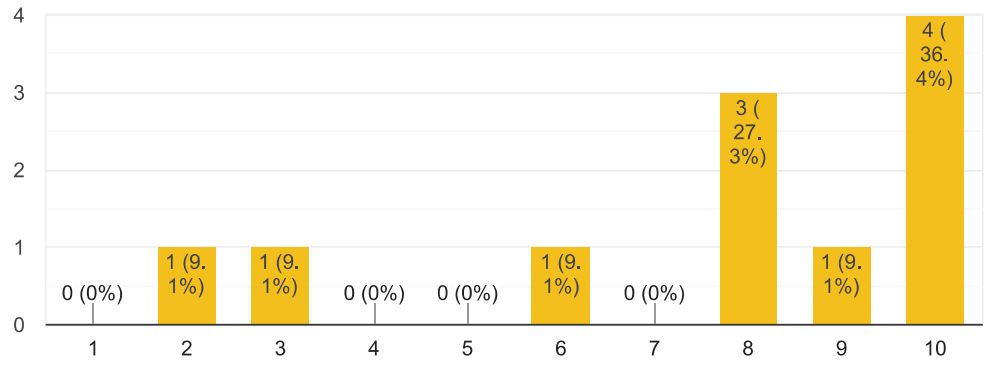
How familiar are you with box and whisker plots? Copy

11 responses



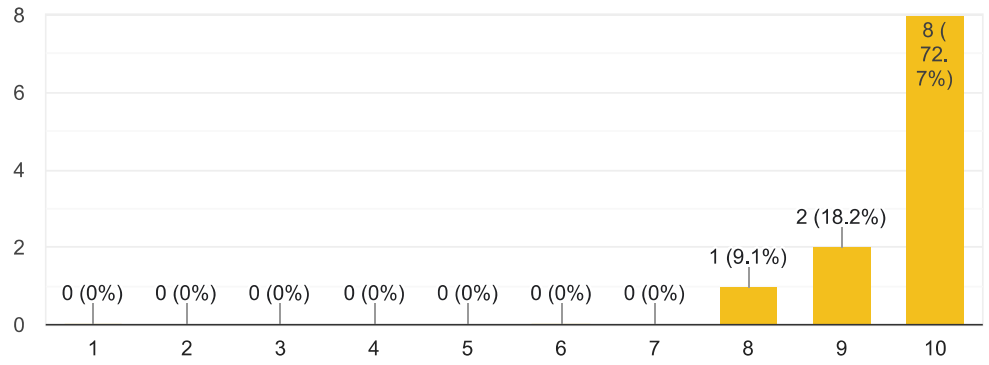
How frequently do you use area maps? Copy

11 responses



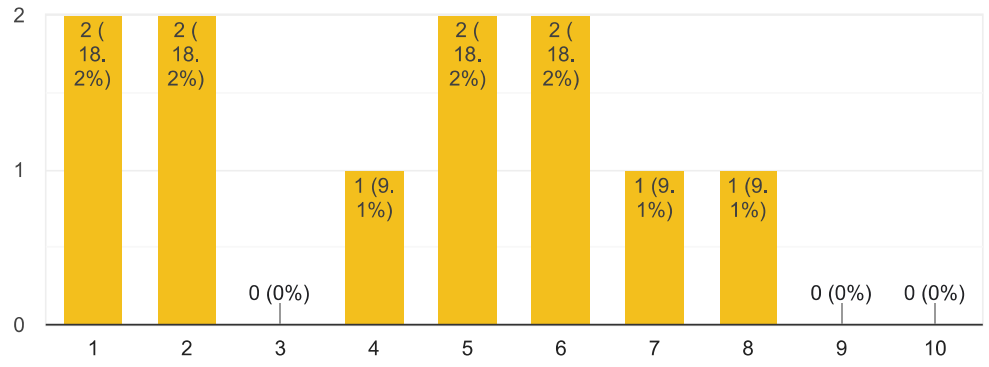
How familiar are you with area maps? Copy

11 responses



How frequently do you use heatmaps? Copy

11 responses



How familiar are you with heatmaps?

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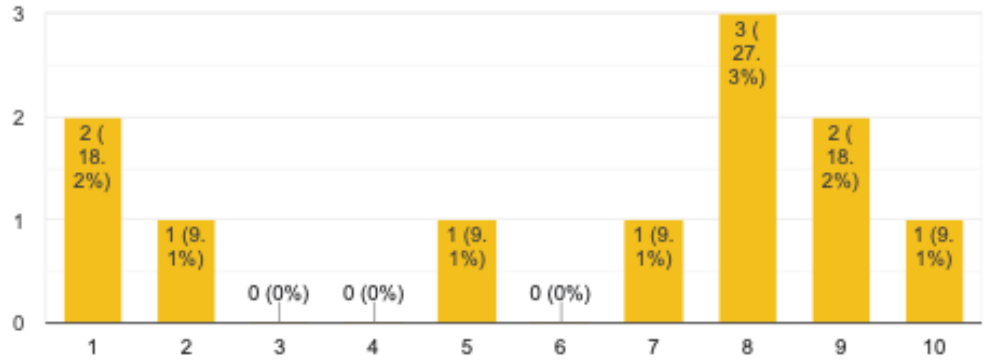
11 responses



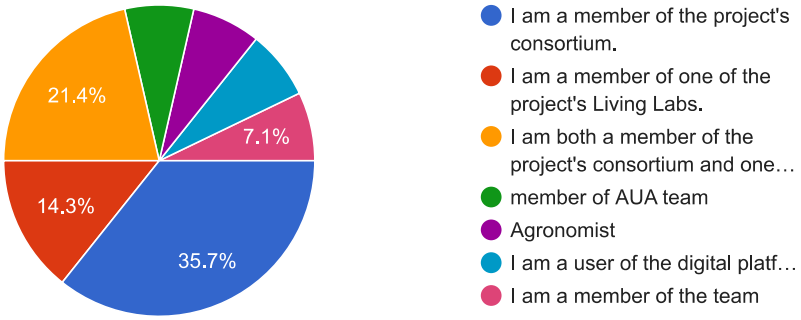
Annex 3. Prototype platform evaluation

This Annex contains the questions and answers provided in the User needs collection and insight acquisition survey.

Which of the following options describes your involvement in the GRANULAR project?

Copy

14 responses



Which of the following options describes better your background and expertise?

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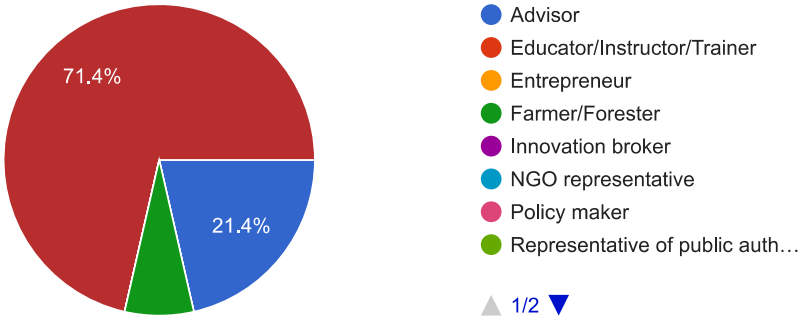
14 responses



Which of the following statements describes best your familiarity with digital technologies?

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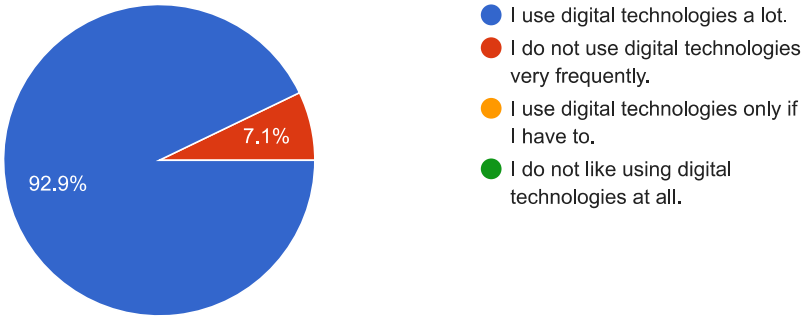
14 responses



Which type of digital device do you mostly use? (You may choose more than one options)

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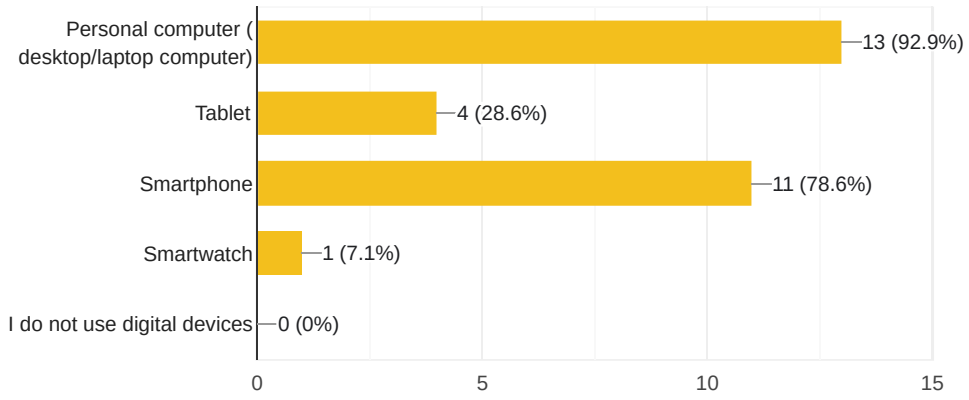
14 responses



Which of the following statements describes best the reason(s) for which you use digital devices? (You may choose more than one options)

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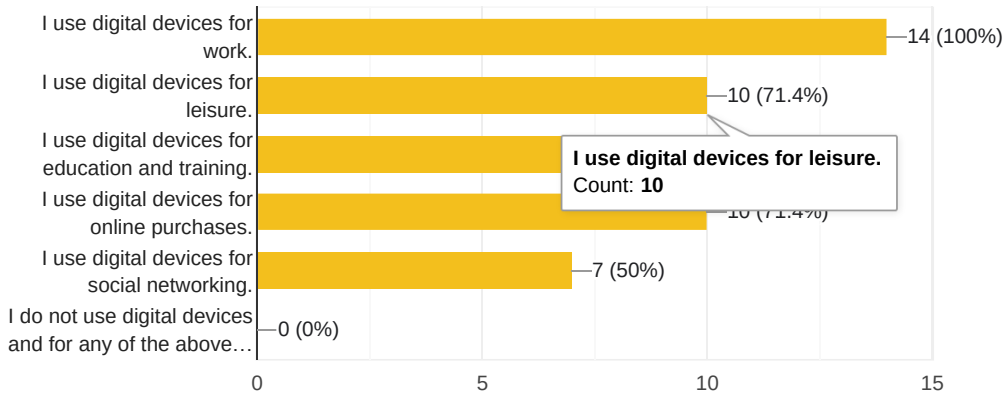
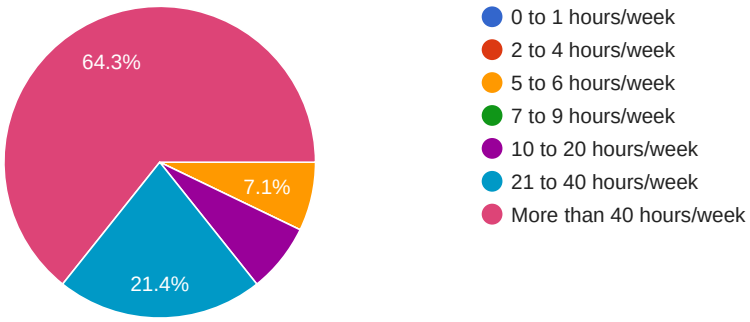
14 responses



Approximately, how many hours per week do you use digital devices?

Copy

14 responses



For each of the statements listed below, select the point of the rating scale that best denotes the extent of your agreement or disagreement.

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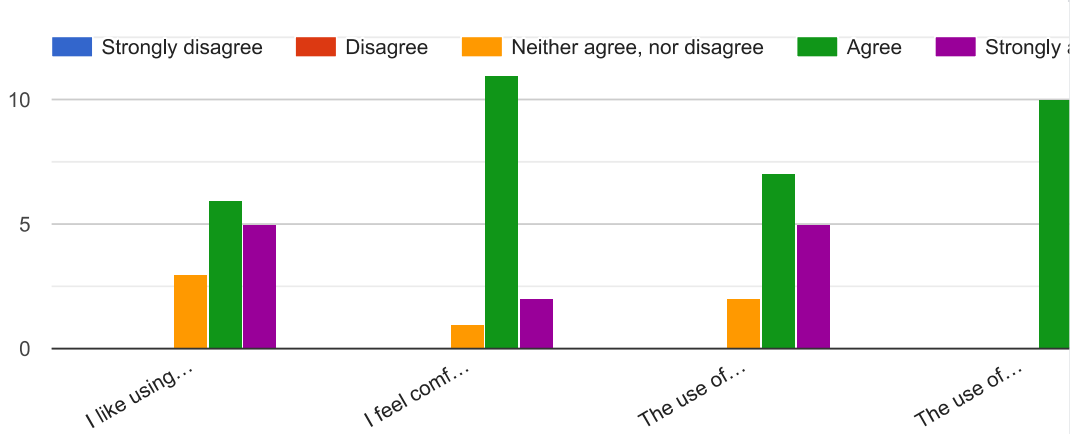

Section 2: **Familiarity and previous experience with digital platforms**

Have you ever used a digital platform as part of your involvement/participation in other projects?

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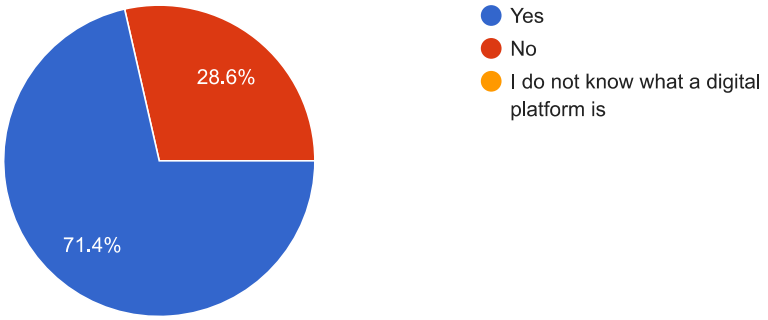
14 responses



Proceed to the following questions **only in the case** that your **response** to the **previous question** was "**Yes**".

Could you name any of the digital platforms you have previously used? Provide up to three examples.

14 responses

1. Digital platform of EU courses, with different video capsules integrated (RUR'UP)
2. Digital repository of EU projects related to rural areas (SHERPA)

Faostat, World Bank, Eurostat

Global Forest Watch, Sentinel Hub

EU Projects ROBUST, TRANSMANGO, ETUDE

www.data.gouv.fr/fr/datasets/
data.laregion.fr/pages/accueil/
arec-occitanie.terristory.fr/

ESPON Database

Google Drive, and other can't remember name

agroclica

www.ucanr.edu
Facebook
Youtube
LinkedIn

smart-akis

111111

EUFarmbook, FAIRShare, Scopus

Agroclica

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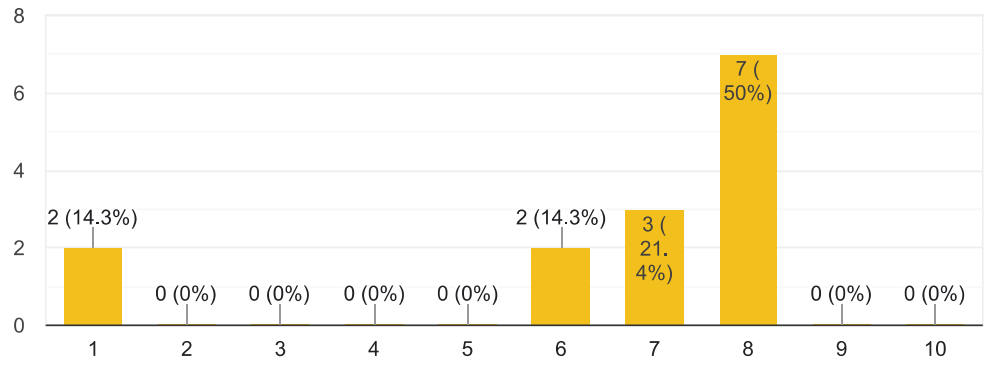
From 1 to 10, how would you rate your overall experience with the digital platforms you have previously used?

Copy

14 responses



Which digital platform features have you found the most useful ones? Provide up to five (5) examples.

14 responses

1. Simple layout, with small representatives icons/emojis that capture well the topic.
2. Easy tags, filtering and sorting options.
3. Embedded pop-ups to have an overview, to avoid having to go to a new page.

See https://ec.europa.eu/eurostat/web/main/data/data-visualisations (clear visualisation of topics) and ESPON https://www.espon.eu/ (https://gis-portal.espon.eu/arcgis/apps/sites/#/espon-hub)

Global Forest Watch

Accessibility of data sharing of data, comparability of data

- filters by themes, dates, granularity, key-words...
- pre-visualization of the first lines of the database (and when adapted, on a map)
- direct link to the web page to download the dataset when public
- exemples of re-use of the datasets
- profile files generation for selected areas, quick comparison between two areas

Ability to access and download data in different formats; ability to visualise data in different ways (tables, maps, charts, etc.)

document sharing and document editing sharing

search, filters, question boxes, videos and infographics

Content management
Personalization features
Social features
Bi directional feedback

product catalogs, digital libraries

111111

Advanced Search, Picture Search, Filters

Agroclica

.

Could you name any digital platform features that you did not like at all? Provide up to five (5) examples.

14 responses

1. Large images that take most of the screen space. Moreover, such images usually don't help in understanding at all and are sometimes disconnected from the actual topic.
2. Unclear filtering options, we don't know how the filtering operates. This is also linked to a lack of clarity on who the users are.
3. Use of scientific jargon, partially translated, too conceptual

Often they are not very functional (too heavy in loading)

https://urban-tep.eu/#!

Lack of updating of platforms, too many overlapping platforms

- metadata overly technical
- increasing numbre of platforms
- out-of-date data

The tedious metadata compilation forms when uploading data

no

unclickable feutures, general notifications, pop-up announcements, pop-up messages, big amount of lebels on the top of the homepage (less is better)

Pop ups
Irrelevant advertisements

maybe make it more minimal. 1 section of the proejects necessary info and 1 section of the actual product

11111

Advertisements

lots of text, lack of links to other sources

.

Section 3: **Feedback on the GRANULAR digital platform**

For each of the statements listed below, select the point of the rating scale that best denotes the extent of your agreement or disagreement.

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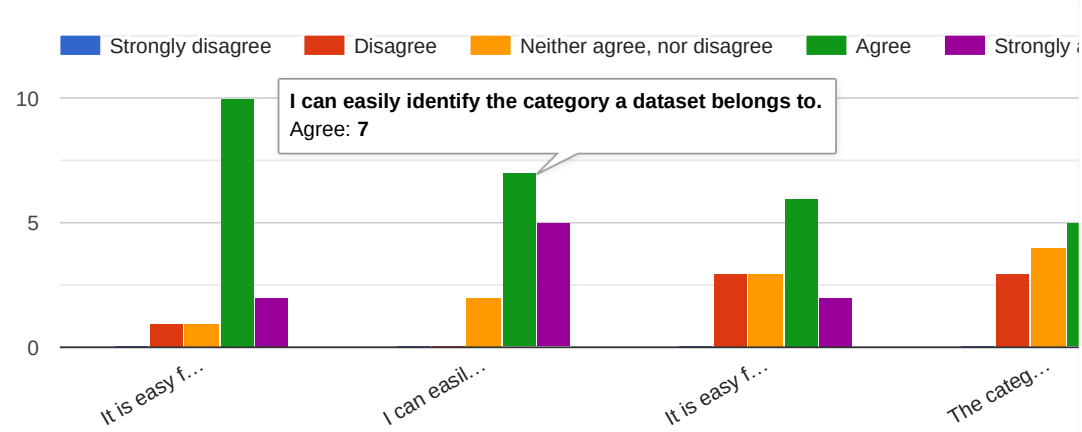

Provide any additional piece of feedback you consider important for the improvement of the GRANULAR digital platform.

8 responses

- The tags/categories are really useful! Would it be possible to have different types of tags (some referring to theme, some referring to granularity level for example)?
- It would be good that the thematic categories are based on the Rural Compass for consistency within the project.
- Images are taking a lot of space, especially on a small laptop. Do we really need these images? They don't necessarily add info. Three options: removing them, or screenshot of the dataset itself, or screenshot of the part of the compass it refers to.
- The overview of datasets is great (with the little boxes). But could the date on the bottom-left of each box refer to the date of the data instead of the upload date? This would be much more useful. There should be some info on whether this data is regularly updated or not (temporality).
- Once you click on a data, the page layout is not the easy to navigate. In my opinion, I would prefer to have all the metadata summarised at the top (remove the picture and put a summary box instead). At the moment, it is a bit lost on the right side. I also suggest to include all the different variables collected as part of WP3 (D3.1), and to coordinate with T3.2 for the cost.
- Would it be possible to add a link to the download page of a specific dataset? (DOI if possible)
- Home page: info on the compass maybe, with WP2 compass at the centre that has clickable components taking you to the relevant available datasets

Certainly an interesting tool, although I guess that for potential users it might be of particular interest to explore the cross-referencing opportunities between the various data-sets. It still remains somewhat unclear to me to what extend that indeed will be possible with actual sets of data sources and the way how these are made accessible

What is the digital plateform objective ? Who is the target ?

If the target is the GRANULAR projet's partners, then opening discussion attached to each dataset would facilitate the exchanges between partners to improve datasets

If the target is also the living labs members, some features are still too technicals I think, such as the metadata descriptions. Actually, some of the LL members are not used to digital platforms. The english language would also to a barrier for some of them.

>> Maybe (utopia !) some specific versions of the digital plateform would allow each LL community to interact and exchange data at its level also ?
As a LL facilitator, I can testify of the local needs to centralise acces to a large number of open data digital platforms, and needs for advice, opinions and digital exchanges about datasets.

I found a bit confusing that the platform has a landing page where the datasets are scrolled laterally, and then a repository with all the information. I found this a bit confusing and also redundant. The visual links to the datasets are a bit distracting. Actually, I did not understand some of the questions in the survey because I overlooked the links at the top, in particular the one to the repository. This might happen to other users too.

1) The amount of datasets would be better to placed next to "Available datasets", 2)Dataset categories at homepage could be better if they have smaller images as it "keeps" a lot of space, 3)There is no reason for 2 different "about us" (the 3 first comment are suggestions because I think that you have to condense the homepage, I only need the basic information of the platform). P.S. kind suggestion: give more color to the "available datasets"

Dataset's descriptions should be given in a simpler way for the user to understand
A tutorial section should be added for the platforms capabilities to be put to better use

The aim and content of GRANULAR project is not 100% clear to me. Maybe, a more extended description would be helpful. However, the platform is very clear and easy to use.

The informations regarding the Granular project and the digital platform (what it is, what is its purpose) should be higher in the front page, easy accessible, and maybe with more information. The categories need clearer descriptions, and maybe a page, before their respective repository, with their description, keywords, number of datasets etc.

Provide any question you consider that is important to be available in the digital platform's Frequently Asked Questions (FAQ) list.

5 responses

- How did you identify the datasets listed in the platform?
- How can I suggest new data to be listed?
- What data is produced by GRANULAR (we will need to find a way to make them stand out)

See above

I would keep it as simple as possible. A simple, static, descriptive landing site and a link to the repository. But this is just a matter of personal choice.

When can a dataset be considered as robust and useful
Which is the methodology that a user should follow to upload a dataset and what parameters should one take into consideration beforehand

Section 4: **Importance of the GRANULAR digital platform to Living Lab members**

For each of the statements listed below, select the point of the rating scale that best denotes the extent of your agreement or disagreement.

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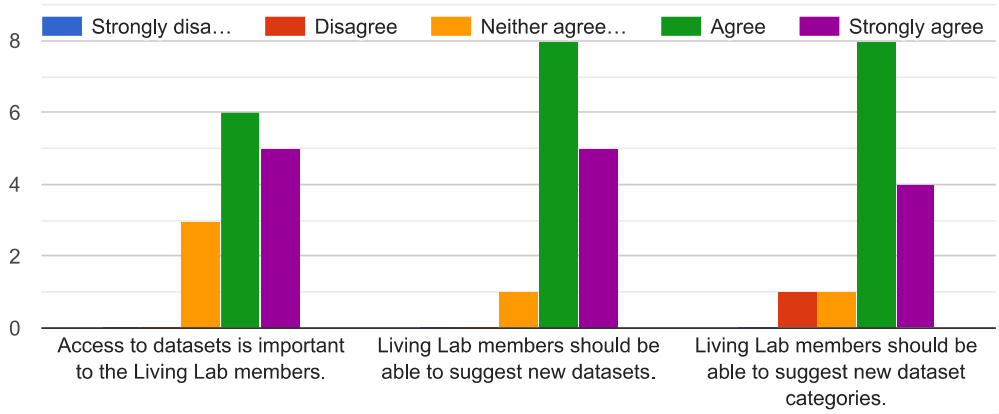
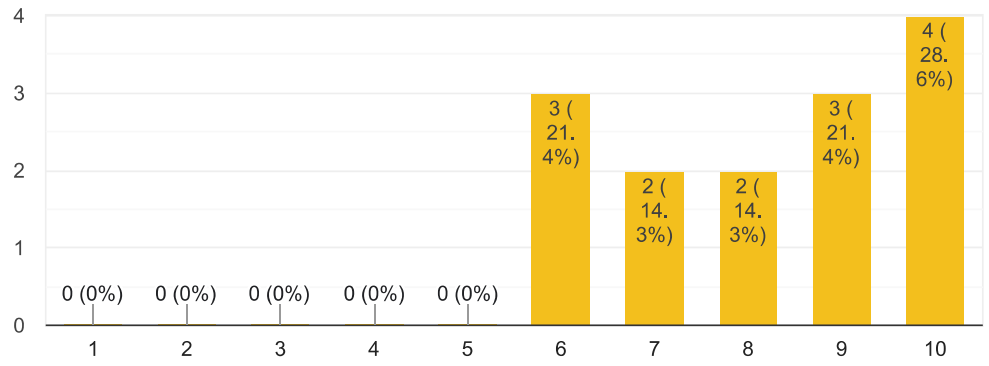


From 1 to 10, how likely do you think it is for the GRANULAR digital platform to be useful for Living Lab members?

Copy

14 responses



In your opinion, which of the following stakeholder groups is most likely to have an interest in using the GRANULAR digital platform? (You may choose more than one options)

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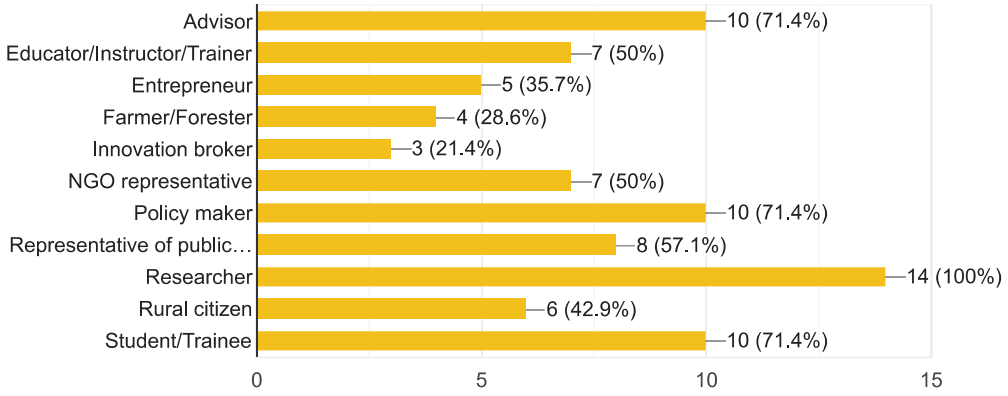
14 responses



In your opinion, in what way(s) could the GRANULAR digital platform prove to be useful for the members of the Living Labs?

14 responses

I am not a LL member, but I would say that the repository as current is not really targeted for them. However, based on the LL thematic priority there should be some visualisation/tools that cover the priority for a specific LL with GRANULAR data. For example: a browser app to visualise the data on mobility flows produced by Uni of Southampton would be of very strong interest to the French LL who mentioned that they are lacking such data.

To provide datasets they have no knowledge of

I think it could at least give them ideas of possible datasets to consider for their own situations. Perhaps bey seeing needs of others, this could help.

See earlier remark. In my opinion rural data-sets become especially meaningful in case of cross-referencing opportunities that allow for and succeed to stimulate comparison, learning and reflection

If adapted, the digital platform could :
- contribute to show and access to existing datasets;
- support the evaluation, feedbacks and exchanges about new datasets between research labs and living labs members;
- facilitate interactions about datasets between living labs;
- support interactions and exchanges of data between the living lab members;
- empower living lab members, letting them contribute to the platform.

To understand what type of data are being produce by whom

Giving them samples of possible use

they could be able to find easier which better practises they could apply and why. It is important to write and upload articles answering to such questions.

There is more than one way that GRANULAR can be useful to the Living Labs members due to its huge dynamic and capabilities. The most important of them in my opinion are, better allocation of investments in rural areas, improving the quality of life in rural areas, recognition of existing problems in rural areas and better utilisation of resources to cover their needs

knowledge transfers, educational purposes

They can find fast and easily some useful data that otherwise it would be a struggle for them to search online.

By having accessible informations and datasets important for the rural areas.

should be a section with q&a or a live chat

access to the data

Section 5: **Attitudes towards the evaluation of datasets from users**

For each of the statements listed below, select the point of the rating scale that best denotes the extent of your agreement or disagreement.

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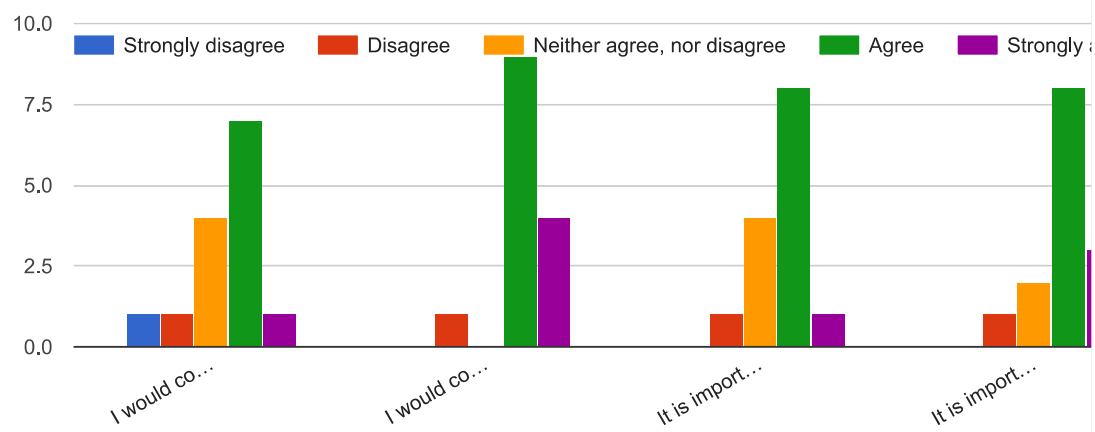

Could you indicate specific aspects (e.g., quality of the dataset, applicability of the dataset in various domains/sectors, size of the dataset) to be considered as concrete dimensions for rating datasets?

10 responses

Maybe one helpful feedback for GRANULAR would be to find a way for users to tell us: "this dataset is really interesting but it is not at the right granularity (spatial resolution)/temporality (temporal resolution) or is not covering my area (spatial extent).

Quality of dataset

See my earlier remarks around cross-referencing opportunities, expectations and hopes

- novelty of the data (not already existing)
- reliability of the data (checked crossing with other data or checked in the fiels)
- granularity (space and time)
- data format (easy to exploit)
- facility to access / cost
- recent and regular updates

Data quality and reliability, that's all that matters. The rest is context-specific

An important comment: the user must have the opportunity to make a comment but not free. So you need some admines to accept them. Regarding to specific aspects, I am sorry but I am not familiar with anithing of them.

The quality and quantity of information it provides is the most important parameter I take into consideration when I am rating a dataset.

Dataset quality, Fit in my case of interest

quality, length, subject (if it fits the category that it is in)

quality of the dataset, size of the dataset