FAIRshare

DIGITAL TOOLS FOR FARM ADVISORS

D1.1: Report on methodology and standards

FAIRshare
DIGITAL TOOLS FOR FARM ADVISORS

Document Summary

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Abbreviations

DATS – Digital Advisory Tools and Services
DBDL – Database Design Language
ERM – Entities & Relationships Model
ICT – Information Communication Technology
IoT – Internet of Things
PNF – Permanent Networking Facility
WP – Work Package

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1. Summary

The main purpose of the *Report on methodology and standards* is to describe in detail how the FAIRshare platform should be designed with emphasis on the content and its structure.

The ultimate purpose of this document is to make sure that the requirements and needs of the different stakeholders are met and are depicted at the design schemes, which will be followed during the development phase.

This report is organized in five chapters, each addressing a specific aspect of the methodology that will be followed during the project. Chapter 3 describes the detailed methodology divided in 4 phases: identification of DATS, identification of users, data acquisition and data base design and presents the relevant mock-ups.

Chapter 4 presents the mock-ups of the DATS final pages after the population of the inventory. Chapter 5 describes the next actions the consortium partners have to perform and risks to be considered, in order to convince advisory services to participate in the creation of the platform, as well as industrial partners developing DATS solutions.

This will be a living document and the design schemes will be updated after the development phase during the beta testing of the database and the platform. The Agricultural University of Athens (AUA) is the partner responsible for documenting this report, as well as keeping it up to date with possible future alterations/modifications.

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2. Introduction

FAIRshare's ultimate objective is to enable and help advisors to bridge the digital divide that exists amongst them in different domains, levels of digitization, adaptation and different geographical regions. This will be achieved by enabling sharing of tools, knowledge and experience that already exists within the farm advisory community.

FAIRshare is based on the beliefs that:

- Many existing digital tools could be used in other contexts (cropping/animal systems) with little modification.
- Advisors and their organizations that develop tools are willing to share these tools with their peers on their own bilateral agreements.
- The principles of good practice in the development and use of Digital Advisory Tools and Services (DATS) provide valuable learning tips and insights, which are transferable.
- Peer to peer exchange of advisory tools, experiences and motivations can enable advisors and farmers to adapt to the digital transformation in agriculture and will stimulate the farming community to be more involved in the digital age
- A multi-actor approach will achieve the level of ownership and motivation needed to create a culture change among advisors and farmers

A digital platform to be used by the farming community, and specifically advisors, will be developed in WP1 with the standpoint to create a portal/inventory for the acquisition, exchange and dissemination of DATS.

During the first six months of the project, since its launch, all WP1 partners have been communicating and discussing the following issues:

- the scope and variety of DATS
- the definition of providers of the DATS and potential users of the platform
- the definition of the users' needs and benefits from the platform
- the amount and type of information required and how to acquire it
- the communication and dissemination strategies for engaging as many users as possible from the beginning

Since there are already some successfully developed, and relevant, digital tool platforms (i.e. SmartAKIS, 4D4F, IoF2020 IoT catalogue) it is of major importance for the consortium of FAIRshare to:

- identify, extract and adopt best practices from them
- facilitate the advisors to participate actively in accessing the digital tools, which will be stored in the FAIRshare database and making sure that their time will not be duplicated by accessing multiple database for their needs
- focus mainly on advisors' needs and not necessarily include every aspect under the umbrella of digital farming targeting farmers, , which is already covered by other projects. The attention should be on digital tools that provide advice on farming practices.

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- maintain a multi-actor approach all along the Work Package activities, and in particular, keep the community of advisors engaged and participating by including them in every step of the design, development, testing and populating of the database with DATS

3. Methodology

The developed methodology is focused on selecting the best way to approach both users and providers of the Permanent Networking Facility (PNF) of FAIRshare as well as to define the scope of the DATS, which will populate the database of the inventory.

The methodology to be followed is partially based on the guidelines proposed by Connolly and Begg for the design of databases and has been adapted to fit the needs of FAIRshare. Connolly and Begg (2005) have introduced three main phases of database design methodology, namely: **Conceptual, Logical and Physical**.

- **Conceptual** design phase aims to produce a conceptual representation of the required database. The core activity in this phase involves the use of ER (Entities-Relationships) modelling in which the entities, relationship and attributes are defined.
- For the **logical** design phase, the aim is to map the conceptual model, which is represented by the ER model to the logical structure of the database. Among the activities involved in this phase is the use of normalization process to derive and validate relations.
- In the **physical** design phase, the emphasis is to translate the logical structure to the physical implementation of the database using the defined database management system.

Connolly and Begg (2005) have outlined factors critical to the success of database design as follows:

- Work interactively with users as much as possible.
- Follow a structured methodology throughout the data modeling process.
- Employ a data-driven approach.
- Incorporate structural and integrity considerations into the data models.
- Combine conceptualization, normalization, and transaction validation techniques into the data modeling methodology.
- Use diagrams to represent as many of the data models as possible.
- Use a Database Design Language (DBDL) to represent additional data semantics.
- Build a data dictionary to supplement the data model diagrams.
- Be willing to repeat steps.

Some of these guidelines and disciplines, inspired by the database design methodology, are used in the project's adapted methodology, which is outlined below:

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⇒ Phase 1: Initial identification of DATS
⇒ Phase 2: Initial identification of providers and users
⇒ Phase 3: Data acquisition and aggregation
⇒ Phase 4: Design of DATS page with the most important information
⇒ Phase 5: Strategies to involve advisory services & other DATS providers

The main focus of this WP is the engagement of advisory services both within the EUFRAS membership and outside, and from other commercial companies, to facilitate their ease of use of the platform, participation in the collection, supply and use the DATS in the FAIRshare platform.

To achieve this, a systematic review was performed focusing on the needs of the end-user, namely advisory services, serving the farmers and how to persuade them become users of the platform. As is typical when using the multi-actor approach, the selection and classification framework started off with a huge number of possible variables and criteria. This was narrowed down by clustering and refining into a structured format suitable for the collection of the information needed to inform the advisor user.

From the launch of the project and until the end of Task 1.1, AUA partner has organized tele-conference sessions among partners mentioned in *Table 1*. All partners mentioned in the table below, effectively participated in every session and at the same time provided valuable feedback in between sessions. The dates of the sessions, the main topics which were discussed and the most important outputs are briefly described in *Table 2* and presented with details in the following sections of the document.

***Table 1:* Basic information of the telecommunication sessions among WP1 partners**

Participants	***Organization***	***Area of expertise***
Spyros Fountas	AUA	Research & education
Sofia Mouseti		
Juan José Magán Cañadas	CAJAMAR	Applied research
Vanja Bisevac	CEMA	Industry network
Sara R. Djelveh		
Rafael Ferrer	HISPATEC	Applied research
Kristine Piccart	ILVO	Applied research
Marta Goñi Labat	INTIA	Applied research, extension & education
Kevin Connolly	TEAGASC	Applied research, extension &education
Peter Paree	ZLTO	Farmers organisation, extension
Janine Roemen		

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Table 2: **Brief description and outputs from each session**

Date of session	*Main topics*	*Actual outputs*
17/12/2018	Initial discussion on the methodology. Identification of DATS' providers. Identification of DATS and their attributes.	Document including first attempt to list and define - providers/users - DATS attributes
08/01/2019	First evaluation of the identified attributes of DATS Discussion based on real examples of DATS, provided by the partners.	1st version of the questionnaire
25/01/2019	Enrichment of the questionnaire, discussion on predefined options and distinction between mandatory and optional questions.	Revision and final version of questionnaire
20/02/2019	Discussion on first mock-ups created for the design of DATS page, comments on the structure and visualization.	Validation and final version of mock-ups for the DATS pages
13/03/2019	Discussion on the form-page mockups.	Validation and final version of mock-ups for the online form pages
08/04/2019	Discussion about dissemination strategy and ways to convince providers of DATS to participate in the PNF. Focus on potential risks and challenges.	General outline of actions to be performed by the partners of WP1 for the next phases.

3.1 Phase 1: Initial identification of DATS and their attributes

Defining and describing the scope of DATS is a difficult task, given the very broad range and the rather abstract typology.

In order to have a unique and comprehensive method for scaling the innovations, FAIRshare consortium has adopted an innovation model (Rogers) for evaluation of the DATS. Everett Rogers was a sociologist and a writer and he is best known for originating the *Diffusion of innovations* theory and for introducing the term *early adopter*. According to Rogers, the key elements in diffusion research are: **innovation, adopters, communication channels, time and social system.**

As shown in *Figure 1*, diffusion occurs through a five-step decision-making process. The first stage is the stage of **knowledge**, where an individual is first exposed to an innovation, but lacks information about it and is not motivated to search for further information. **Persuasion** is the second stage, where the individual is interested in proposed innovation and actively seeks for related information. **Decision** is the third

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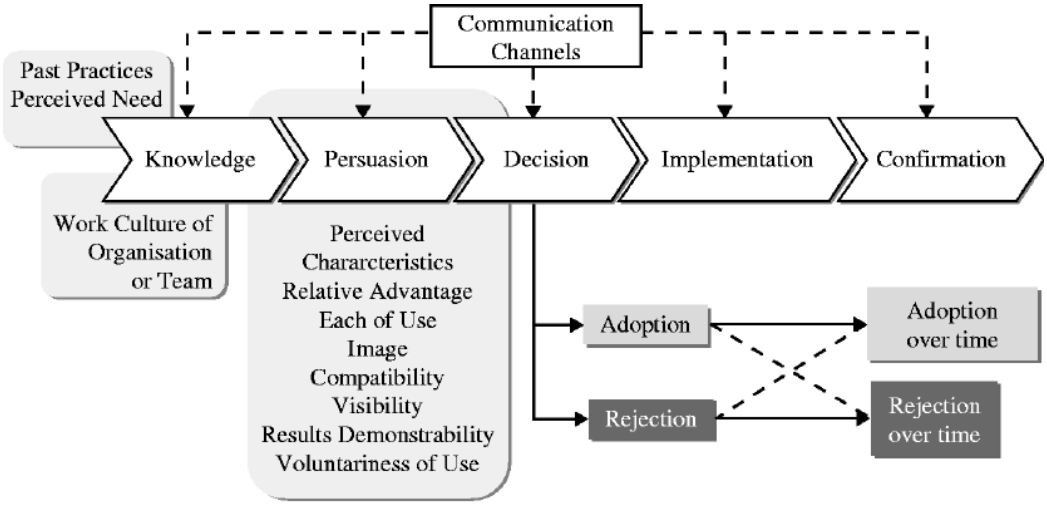
stage where the individual takes the concept of the change and weighs the advantages/disadvantages of the usage of innovation and makes a decision whether to adopt or to reject it. The next step is the **implementation** phase, where the individual employs the innovation to a varying degree depending on situation. During this stage, if the individual is interested in further usage, they may search for further information about the innovation. The last stage is **confirmation** – the phase when the individual finalizes his/her decision to continue using the innovation.



Source: Rogers (2003)

Figure 1: **A model of Five Stages in the Innovation Decision Process**

Since this process relies on human capital, all dimensions of each innovation must be carefully considered. Since the innovation must be widely adopted in order to be self-sustainable, Rogers introduces five main categories of adoption rate. Namely, these are: innovators, early adopters, early majority, late majority, and laggards.

According to Rogers, potential adopters evaluate an innovation on:

- its relative advantage (the perceived efficiencies gained by the innovation relative to current tools or procedures),
- its compatibility with the pre-existing system,
- its complexity or difficulty to learn,
- its testability,
- its potential for reinvention (using the tool for initially unintended purposes), and its observed effects

Based on Roger's theory and the adapted multi-actor approach, which involves knowledge and experience from the consortium, a more concise definition was given for DATS:

Digital Advisory Tools and Services (DATS) are technologies which include computer and mobile phone applications and services. They may stand alone, on individual devices, or be connected via the web. Their primary function is to assist advisors to deliver a farmer-focused, decision support service or to assist in administrative or communication tasks. DATS enable data/information to be collected, analyzed and

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shared between farmers and their advisors, and/or between farmers and other farmers. The term DATS includes the associated backend databases and data transmission technologies, which enable advisor and farmer-facing technologies to work effectively. Also included are off-the-shelf, as well as customized tools, which facilitate decision support through data recording, monitoring, analysis, presentation/visualization and communication between and among advisors and their client farms.

Partners of WP1, who are themselves members of several European advisory organizations, and have developed or used DATS, have concluded in the following categories and types of DATS:

1. **Communication/dissemination:**
    - ⇓ Text
    - ⇓ Mobile phones
    - ⇓ Email
    - ⇓ Social media
    - ⇓ Radio
    - ⇓ TV
    - ⇓ Infographics
2. **E-services:**
    - ⇓ Analysis & Benchmarking
    - ⇓ Real time monitoring & Decision support
    - ⇓ E-mapping, Drawing
    - ⇓ Training, learning
    - ⇓ E-applications & Regulations
3. **Organization:**
    - ⇓ Client billing management (CBM)
    - ⇓ Customer relationship management (CRM)

3.2 Phase 2: Initial identification of users

Based on the coverage of participants within the FAIRshare consortium and its relation to EUFRAS members, it is estimated that more than 80% of Europe's 40,000 advisors may benefit from the platform, providing more digitization benefits to Europe's 12.5 million farmers.

During the kick-off meeting of FAIRshare in Dublin organized by Teagasc, the project coordinator, a multi-actor participatory approach was followed which produced valuable outcomes for the continuation of WP1, especially Task 1.1 "Methodology and standards". The most important was the identification and categorization of the platform's end-users as follows:

- **Production Advisor:** The Production Advisor will want to use the PNF and DATS inventory to learn and improve within their role. Specific knowledge they will acquire includes criteria about farmers' needs, to learn about the latest tools,

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and to engage in knowledge sharing and generation. Ultimately they will be able to offer an improved service.

- **Strategic Advisor:** The Strategic Advisor will want to use the PNF and DATS inventory, as it will enable them to have more frequent and affordable interactions with farmers and with other advisors for support and interaction without the expense of travel. More specific user needs include to provide faster and better advice on continuation, and to provide more direct calculations. Ultimately they will be able to offer an improved service.
- **Farmers & Employees:** Farmers and employees will have several reasons to use the PNF and DATS inventory, first of which is needs articulation and to tell their advisors of their requirements. They will also be useful for cost-saving, work planning, market news, benchmarking, and to fulfil legislative requirements.
- **Educators & Applied Research:** Those working in education can use the PNF and DATS inventory to build content for lectures, develop practical exercises and to create and improve courses. Those working in applied research can use the PNF and DATS inventory to test applications in trials.
- **IT Developers & Services:** IT developers and Services will mainly want to use the PNF and DATS inventory for their own business development and innovation. They can serve as inspiration for new products, to further innovate, and develop new apps and services and they will allow for gaps to be identified. They will also be useful for providing client support.
- **Risk & Finance:** Those working in risk and finance will want to use the PNF and DATS inventory for risk management, to offer new products and as a source of Artificial Intelligence / Big Data.
- **Rural Policy:** Those involved in rural policy will want to use the PNF and DATS inventory to support CAP, to improve sustainability, to ensure the competitiveness of the farming sector and to target funding at those tools which can support scheme objectives.
- **Media:** The Media will want to use the PNF and DATS inventory, as it will allow them to disseminate information, to promote agriculture as a high-tech industry, and to address societal pressure.

The above categories acted as a potential “users pool”, which were merged into two main categories identified as end-users of the platform: **visitors** and the **providers of DATS**.

Visitors can come from any of the aforementioned categories. They will be able to browse in the Permanent Networking Facility (PNF) and search through the available DATS, in an optimized search engine yet to be designed. A visitor guest will have free and full access to the platform content (DATS information) and will be able to become a premium user by creating an account and building a simple profile in the platform, so that she/he can be notified for new entries that might interest him, or be provided with some suggestions that fit her/his needs, as well as being able to communicate with her/his peers for specific DATS.

The **providers** of DATS can also potentially fall into more than one of the above categories. They will be able to create an account in order to provide their available

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DATS. A potential provider can be a single person or a whole organization or company providing multiple DATS they have developed and can be used by the advisory services or an independent advisor. An administrator, either from Teagasc or AUA will review the uploaded information, accept, and make them available on the platform.

3.3 Phase 3: Data acquisition

This section is about the questionnaire and the online form that have been created, following discussion with members of the consortium who shared their knowledge, experience and needs since most of them will be the end users of the platform and/or DATS providers.

Organizations and advisors providing DATS will be invited to submit their tools to the FAIRshare platform, by filling in the questionnaire detailing the most important assessment criteria. The threshold for submitting DATS is kept to a limited number of required questions to ensure a high level of participation from external DATS providers. Therefore, a conscious effort was made to keep the questionnaire concise and straightforward. Some of the information requested, will be presented to the end users, and others will provide valuable metadata for the optimization of the search engine.

For the final selection of these questions and their options, a number of members/advisory services of WP1 were asked to participate and provide real examples of existing DATS, in order to validate how they would fit the needs of the questionnaire. Based on their valuable input, the questionnaire was modified and adapted multiple times to match the needs of the users.

3.3.1 The Questionnaire

The questions are grouped thematically into categories to help the user navigate in the most efficient way:

A. Description of the DATS

A1. Basic information
A2. Who/what is it for
A3. Technical specifications
A4. Resources

B. Challenges addressed

C. Benefits/Impacts

In the following sections the questionnaire is presented in detail, with all the available options a DATS provider can choose from.

A. Description of the DATS

- * Fields with asterisk are required in order to complete the registration of the DATS, the rest is optional.
- The options inside the fields, if any, will be given as drop-down menu lists.

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A.1 BASIC INFORMATION

1. * Tool/Service name
2. * Tool/Service title (very short description in a sentence)
3. * Country of origin
4. * Language (s) (drop down list, multiple selection)
5. Tool's website
6. * Owner/Creator (possible to insert multiple entries)
    a. *Name of person/company/agency
    b. *Email
    c. *Website
    d. Collaborating Agencies
7. * Description (limit of words)
8. * How it works (limit of words)
9. * What category does your DATS fall under?
    - ⇓ Communication/dissemination
        - ⇓ Text, mobile phones, email
        - ⇓ Social media
        - ⇓ Radio, TV, Infographics
    - ⇓ E-services
        - ⇓ Analysis & Benchmarking
        - ⇓ Real time monitoring & Decision support
        - ⇓ E-mapping, Drawing
        - ⇓ Training, learning
        - ⇓ E-applications & Regulations
    - ⇓ Organisation
        - ⇓ Client billing management (CBM)
        - ⇓ Customer relationship management (CRM)
    - ⇓ Add other
10. * Cost (select one)
    a. Free
    b. With cost (text box appears if someone wants to provide details)
        - ⇓ Setup cost
        - ⇓ Annual service cost
        - ⇓ Free Trial Period available
        - ⇓ Free basic version and premium fee-based version
    c. Available to clients of supplying agency only
11. *Year of launch
12. Year of last update
13. Number of users since the year of launch
14. Number of downloads (if the tool or service available online) since the year of launch

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A.2 WHO/WHAT IS IT FOR

15. * Main target groups (multiple selection)

- ⇓ Farmers/Cooperatives
- ⇓ Agronomists/Advisory services
- ⇓ Policy makers
- ⇓ Suppliers
- ⇓ Industry/manufacturing
- ⇓ Add other

16. * Agricultural sector (multiple selection)

- ⇓ All agricultural sectors
- ⇓ Plant production in general
- ⇓ Arable farming
- ⇓ Fruits and vines
- ⇓ Vegetables
- ⇓ Flowers
- ⇓ Herbs
- ⇓ Forestry
- ⇓ Arboriculture
- ⇓ Animal production in general
- ⇓ Dairy (cattle, sheep, goats)
- ⇓ Meat (cattle, pigs, sheep, goats, poultry, rabbits, snails)
- ⇓ Poultry egg production
- ⇓ Fishing/Aquaculture
- ⇓ Insects/Apiculture
- ⇓ Post-harvest
- ⇓ Farm-based added-value processes
- ⇓ Agritourism
- ⇓ Communication/dissemination
- ⇓ Add other

17. * Is the tool/service developed for a specific type/species of crop or animal?

    a. Yes (text box to insert, i.e. olive trees, tulips, bees)
    b. No

18. * Is tool/Service developed to be applied in (select one)

    a. Open air
    b. Greenhouses/Indoor installation
    c. Both

A.3 TECHNICAL SPECIFICATIONS

19. * Mode of delivery / Interface (multiple selection)

- ⇓ Stand-alone software
- ⇓ Web app

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- ⇓ Mobile app
- ⇓ Spreadsheet
- ⇓ Paper
- ⇓ Add other

20. Can it be used offline
    a. Yes
    b. No
21. * Data sources (multiple selection)
    - ⇓ Manual input
    - ⇓ IoT (Internet of Things) installed devices (i.e. sensors, probes, GPS, cameras)
    - ⇓ Technical third party services (i.e. satellite services, weather services)
    - ⇓ Administrative third-party services (i.e. CAP data, fiscal data, transaction data)
    - ⇓ Add other
22. Does the tool allow multi user access to individual farmer dataset (with the farmer's permission)?
    a. Yes (text box to insert limitations/restrictions, if any)
    b. No
23. Level of computer knowledge required to operate
    a. Low
    b. Moderate
    c. High
24. Is training required to use this tool or service?
    a. Yes
    b. No

A.4 RESOURCES

25. * Keywords (4-10)
26. * Images/Screenshots (upload 2-5)
27. Documentation (multiple selection)
    - ⇓ PDF
    - ⇓ Videos
    - ⇓ Excels
28. Testimonials of users
    - ⇓ Text box
    - ⇓ Images

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B. Challenges addressed

* What are the challenges or needs addressed by this Digital Tool/Service (drop-down list, multiple selection)

- ⇓ Plant protection management
- ⇓ Water management
- ⇓ Nutrition/Fertilisation management
- ⇓ Improving animal care
- ⇓ Livestock stock management (movements/health/fertility/production)
- ⇓ Livestock feed and resource management
- ⇓ Livestock Green House Gas (GHG) measurement and management
- ⇓ Compliance with legislation and standards
- ⇓ CAP management
- ⇓ Strategic planning
- ⇓ Finance and budgeting
- ⇓ Operational management focus
- ⇓ Post-harvest management
- ⇓ Harvest prediction
- ⇓ Logistics
- ⇓ Markets and sales
- ⇓ Sustainable food production and healthy diets
- ⇓ Work safety
- ⇓ Add other(s)

C. Benefits/Impacts

* What are the benefits/positive impacts associated with the DATS (drop-down list, multiple selection)

- ⇓ Increase of productivity
- ⇓ Improvement of yield quality
- ⇓ Optimization of resources use
- ⇓ Environmental protection
- ⇓ Biodiversity preservation
- ⇓ Increase of profit/farm income
- ⇓ Minimization of input costs
- ⇓ Efficient strategy planning
- ⇓ Effective operational management
- ⇓ Financial assessment / Reporting
- ⇓ Task scheduling / Time management
- ⇓ Labour saving / Limit stress / Increase farmer's leisure time
- ⇓ Limit human exposure to chemicals
- ⇓ Limit number or severity of property damage and related accidents
- ⇓ Limit number or severity of human injuries

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⇓ Compliance records management
⇓ Better interaction between farmer and advisor
⇓ Control of animal health problems
⇓ Enhanced adaptation & resilience to climate change
⇓ Add other(s)

D. Additional information

* Would you like to provide some important additional information?

a. Yes
b. No

3.3.2 The Online Form

A functional and easy to fill-out online form will be created based on the questions above in order to populate the platform's database. Potential DATS providers will be able to login into their account and fill in a multi-page form, in order to add necessary information.

After the refinement and filtering aided by members of WP1 who participate in advisory organizations, the information which must be provided is the minimum amount needed. The online form is designed to be user-friendly and structured thematically for better navigation. Once the provider has logged in the platform, the estimated time required to fill in the form and submit it is less than 30 minutes. This is providing the person submitting has a very good knowledge of the specific DATS and also has immediate access to all the required information and files to upload.

The form will follow the same structure as the questionnaire and will be thematically divided in four pages. In the first page, shown in *Figure 2,* basic information is required from the provider concerning the DATS, in the second page (*Figure 3*) the provider gives information about the function and target groups. In the third page (*Figure 4*), the provider has to select the five most important challenges and benefits from the use of the DATS and in the final fourth page (*Figure 5*) the provider chooses keywords, uploads the required images and any additional resources. This is the final page after which the provider can submit the DATS to the database of the inventory, and be informed about the successful submission or if some corrections are needed.

Throughout the online form the DATS provider is also presented with suggested and predefined options and practical tips, in order to give the correct and most important pieces of information and make sure she/he completes the form in the shortest time and with the least effort. After the submission, the provider will be able to update, add or delete any of the given information, as many times as she/he wishes.

In the following mockups, an example is presented with some real and some made up information, based on a real DATS already developed and in use by ZLTO, a farmers' organization and advisory service from the Netherlands.

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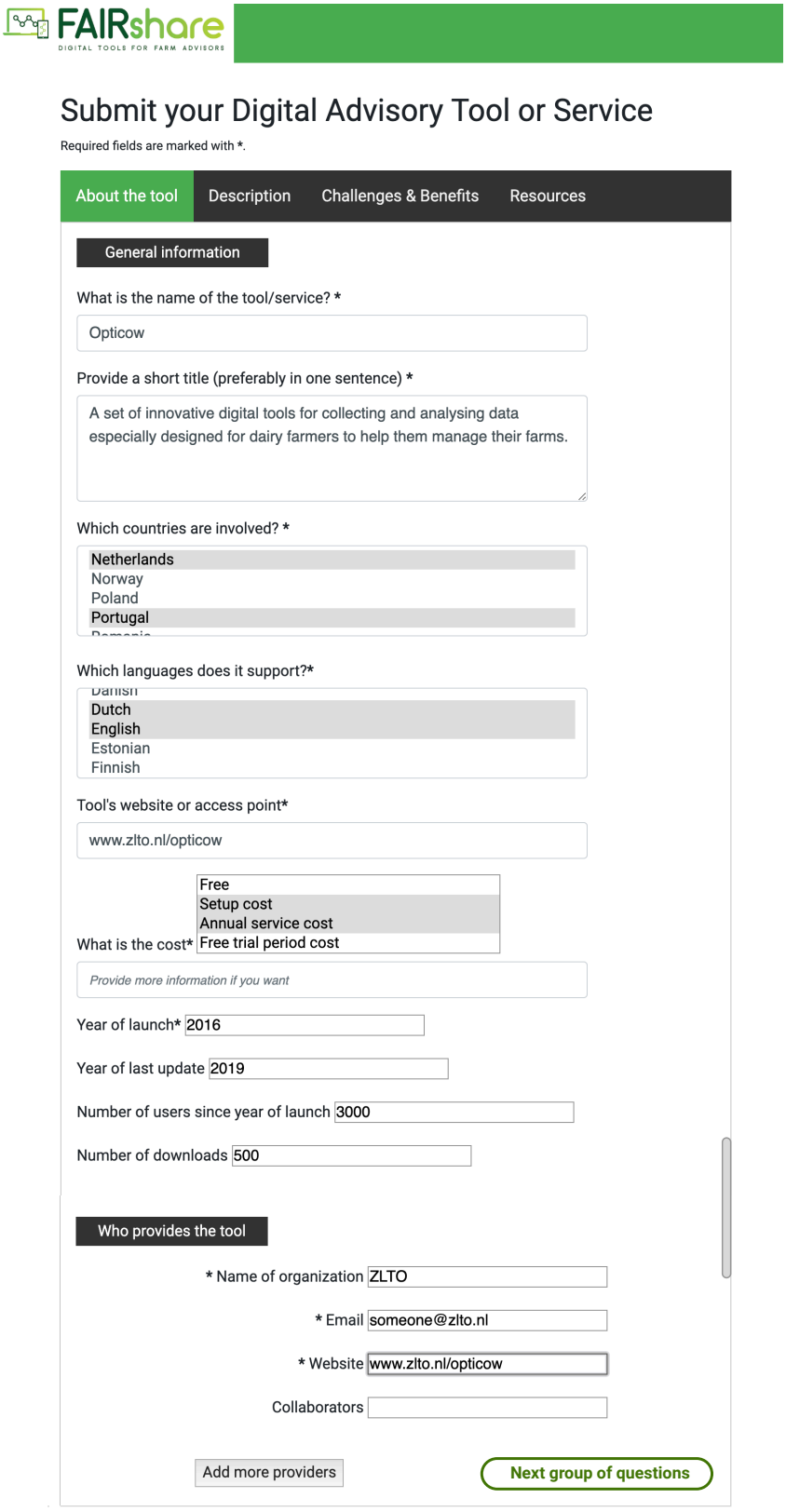

Figure 2: **1st page of the Online Form**

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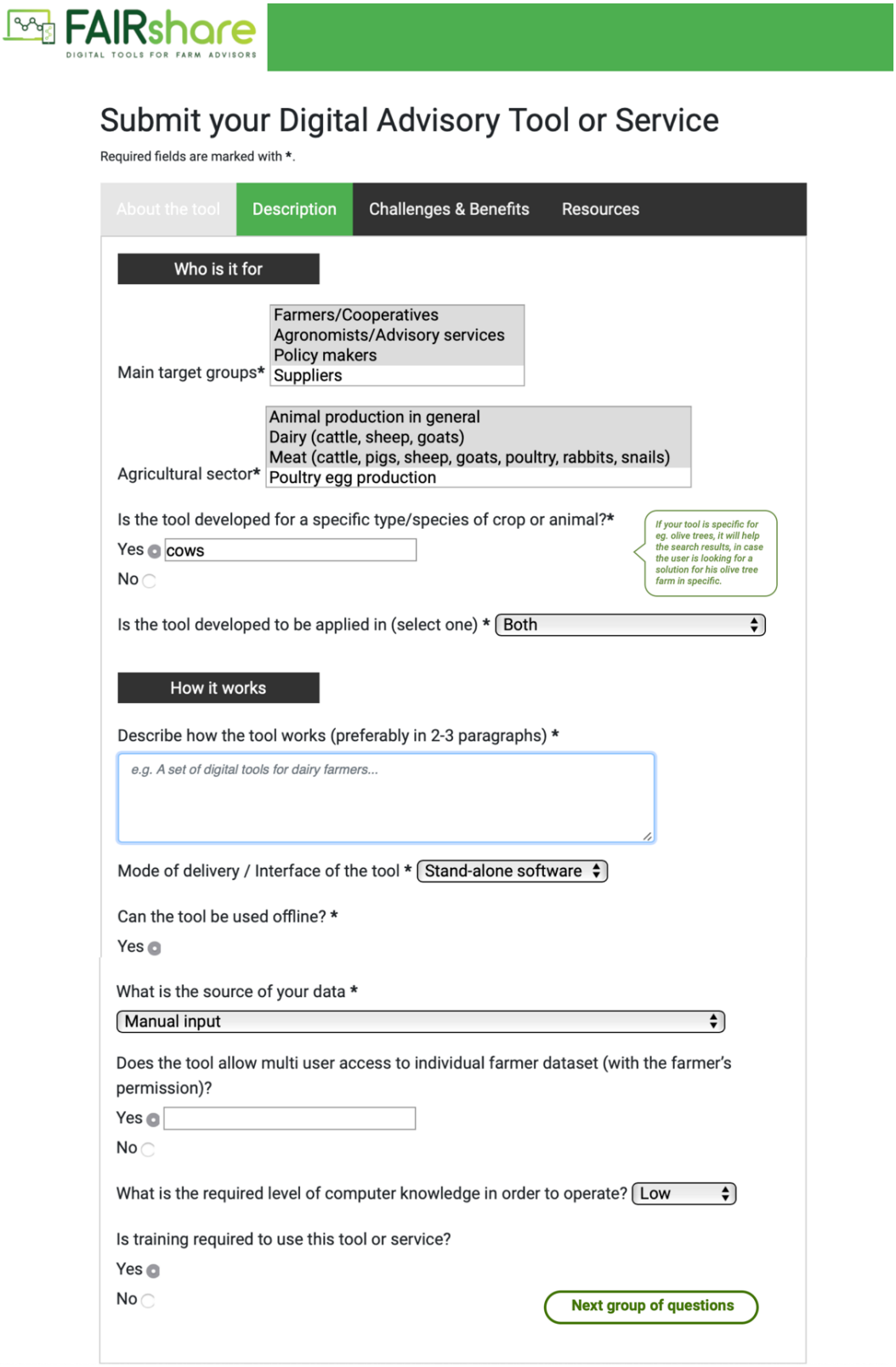

Figure 3: **2nd page of the Online Form**

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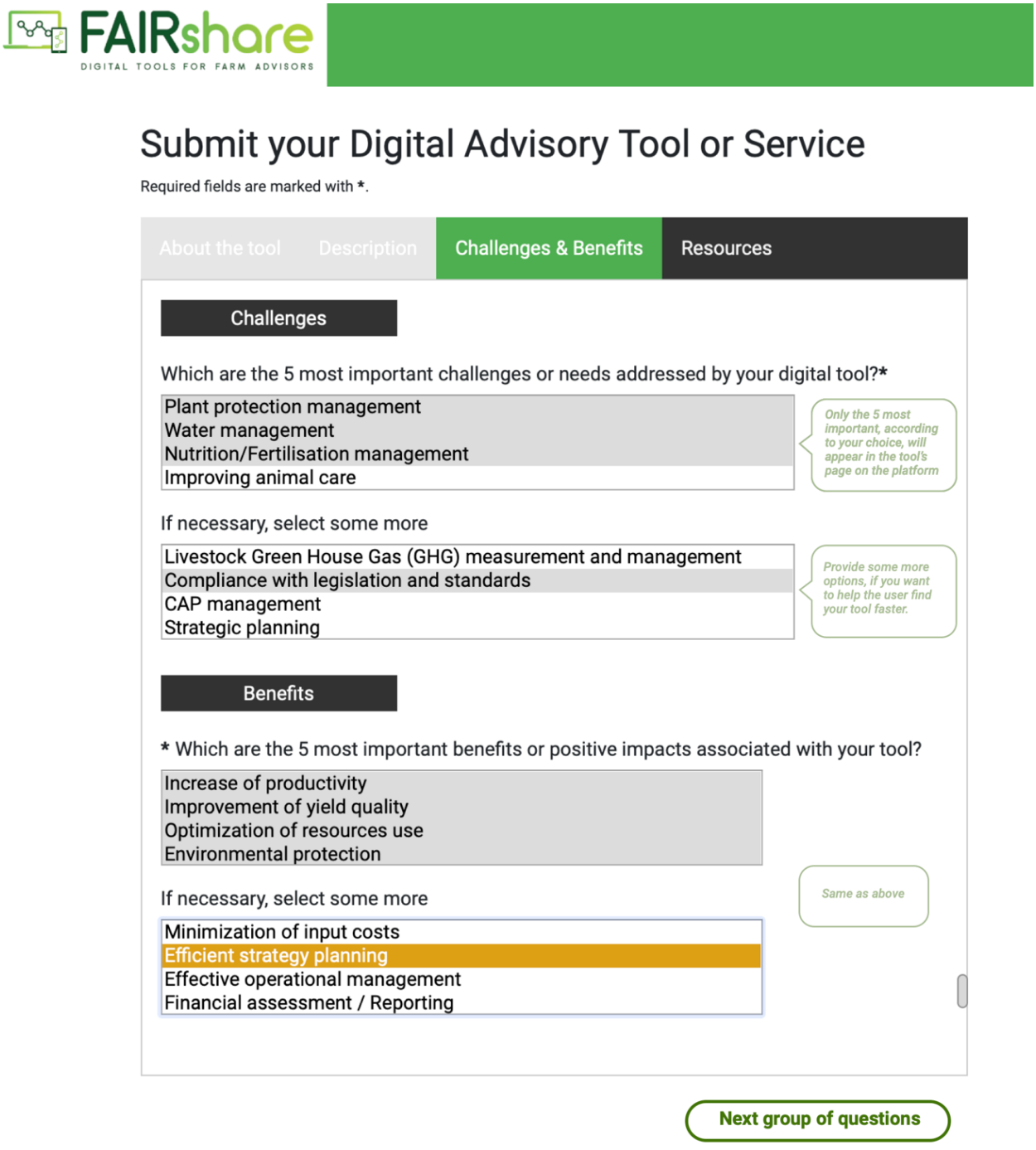

Figure 4: 3rd page of the Online Form

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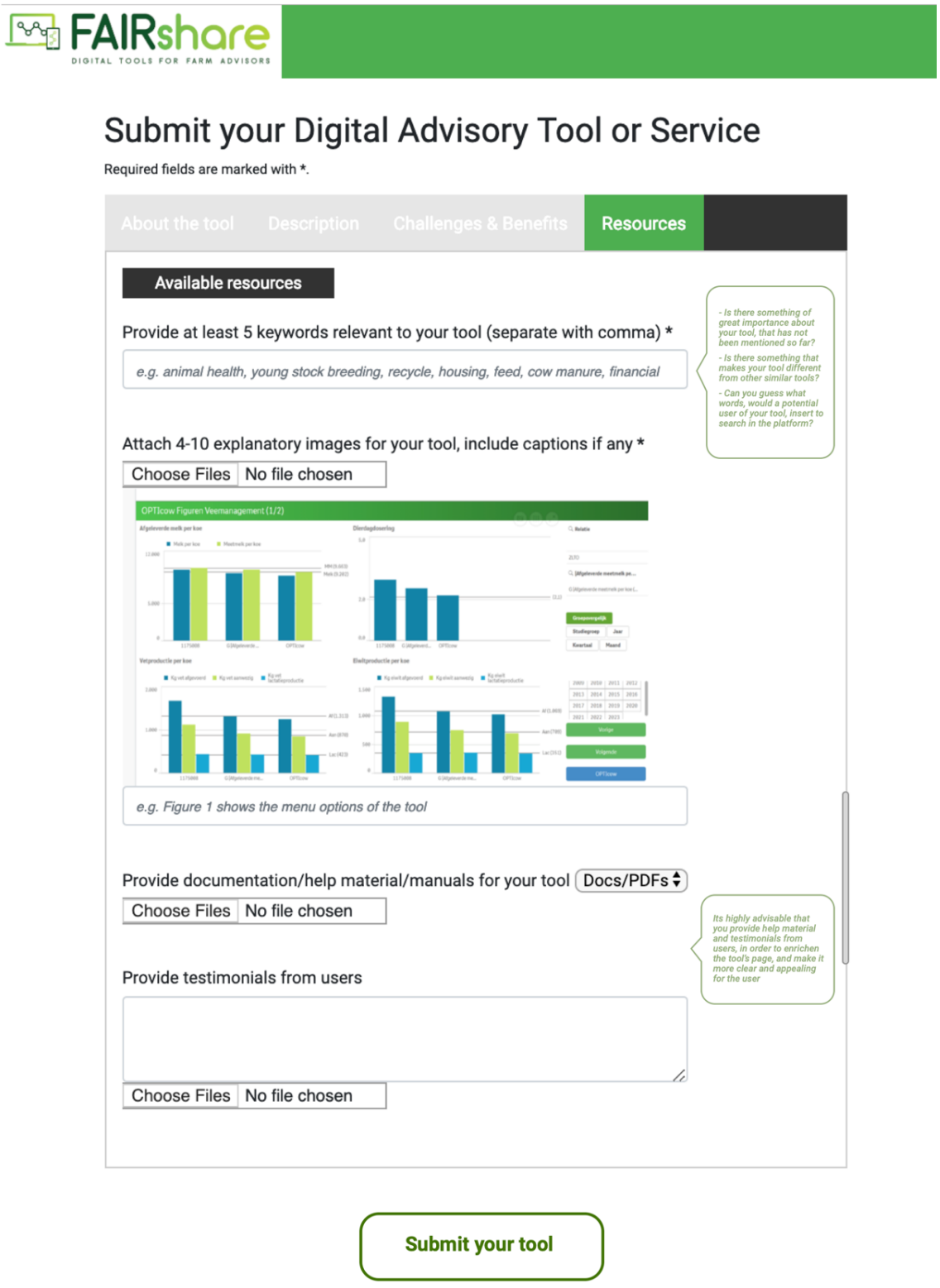

Figure 5: **4th page of the Online Form**

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3.4 Phase 4: Database design

Both users and providers of this PNF will be able to provide their DATS and search through all the available DATS with a powerful and easy to use search engine. All the important information for each DATS will be presented in a well-structured and user-friendly landing page, so that every user can have access to all the information she/he needs.

The next goal is to interact with Task 1.2 and create a semantic search tool, which stores digital solutions and tools for farmers and advisors. The semantic tool will assist users in identifying best-matching digital tools and alternatives to address specific, user-defined farmer's challenges expressed in 'common search language' built on components established in the VALERIE project[1] (2017) and will tailor these to match the specific domains of the FAIRshare project. *Figure 6* shows the relationship between the two projects. The two distinct systems with different interfaces will share the same disciplines on the development of the search engine, as developed for VALERIE, and the FAIRshare in turn will potentially provide new sets of metadata to VALERIE's database.

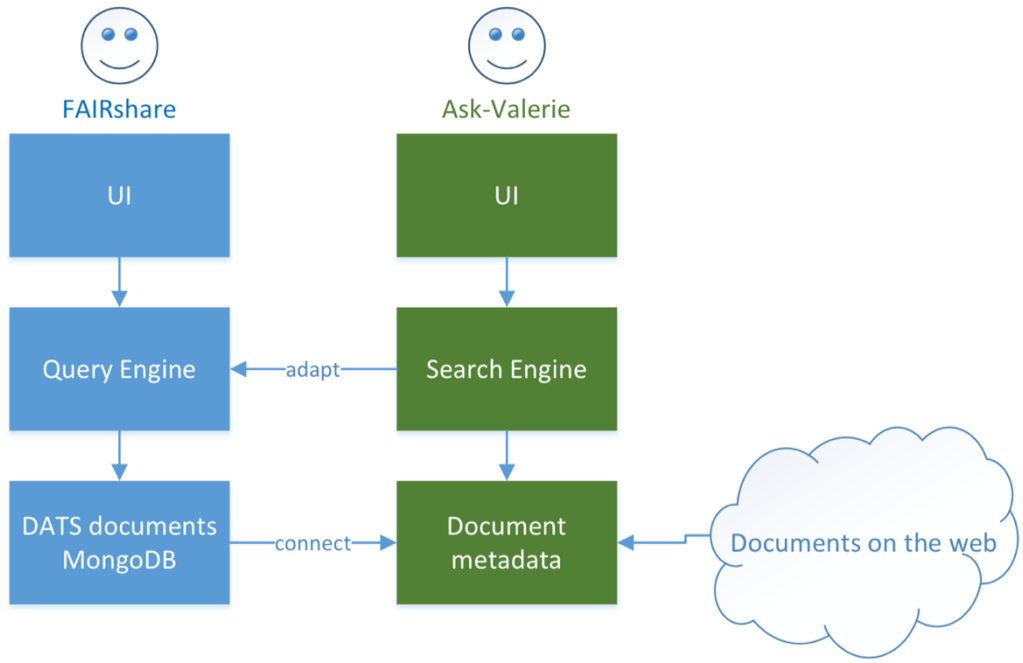

Figure 6: **Interaction between VALERIE and FAIRshare projects**

[1] https://cordis.europa.eu/project/rcn/111331/factsheet/en

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Valuable knowledge and experience from the VALERIE project will be transferred in order to create the right ontologies and their relations and attributes to serve the goals of the FAIRshare project. As shown in *Figure 7*, the process will start with the collection of information, through the online form presented in Section 3.3.2. The result will be a set of documents, which will be annotated and metadata will be added manually if needed. The FAIRshare ontology clearly defined after sessions among responsible partners (AUA, WR etc) will be then applied in these documents, in order to populate the database of the inventory.

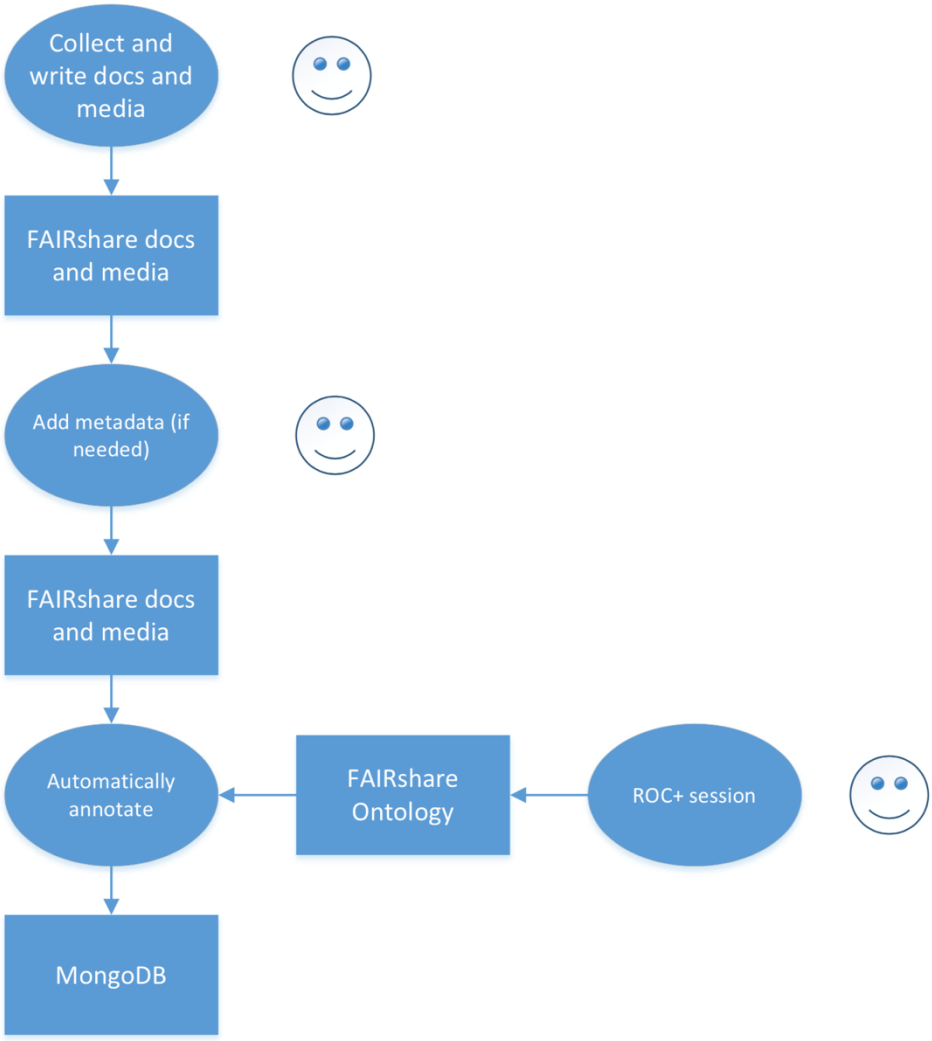

Figure 7: **Architecture of FAIRshare's database design process**

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The selected database technology to be used is MongoDB, an open source, cross platform database management system, which is classified as NoSQL and is document-oriented. Some benefits from using of MongoDB are described below

- There is **no need to declare the structure of documents** to the system – documents are **self-describing**.
- **Related information** is **stored together** for fast query access through the MongoDB query language.
- It is fast and can handle **highly diverse data types**, and manage applications more efficiently at scale. It's high-performing for simple queries.
- The data schema can be changed **without modifying** any of the **existing data**. A **new field** can be created and added without affecting all other documents in the collection, without updating a central system catalogue, and without taking the system offline.
- It is **easy** to **reduce the workload** and **scale** the application**,** with **no downtime.** It can be scaled **within and across multiple distributed data centers**.

4. Presentation of DATS

The main purpose of the FAIRshare platform is to help advisors be aware and knowledgable about all the available DATS they could potentially use. By searching through the database the user will be presented with a list of results based on her/his specific needs. Browsing through the results must be accomplished with the minimum number of steps and require the least effort, with the ability to easily move to the next, if a given DATS doesn't meet their exact needs.

Each result will correspond to a DATS record and its page will be presented in one summary screen. The page of each DATS will be structured and presented in the simplest, most functional and attractive way so that the user will be able:

- to establish in a few seconds if the tool or service is useful for her/him
- to understand how it actually works, read testimonials, watch explanatory videos
- to decide if it meets her/his needs and resources (cost, technical skills, devices etc)
- to have direct access to the DATS (download it or test it)
- to contact immediately the person/organization who has developed or provided the DATS

Each DATS landing page is composed of three views (Figures 8,9 and 10). In all three views the user can clearly see:

- the **name** of the DATS
- a short **title**
- a number of **images** or **screenshots**
- a list of basic information about: the **country of origin**, **languages** it supports, **year of launch, year of last update, number of downloads**

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- details about the **cost**
- detailed information about the **provider**: **name, website, email**
- technical details: **mode of delivery**, **ICT skills** and **training** required from the user, **sources of data** it uses
- available **resources** offered by the provider: documents, trial versions, manuals etc.

The first view, as shown in *Figure 8*, will be the default page loaded when the user clicks on a specific DATS to find out more about it. Additionally to the mentioned information, the "Who is it for" tab will be open in this view, so the user will be immediately informed about the target group this DATS is addressed at and if it is suitable for her/him.

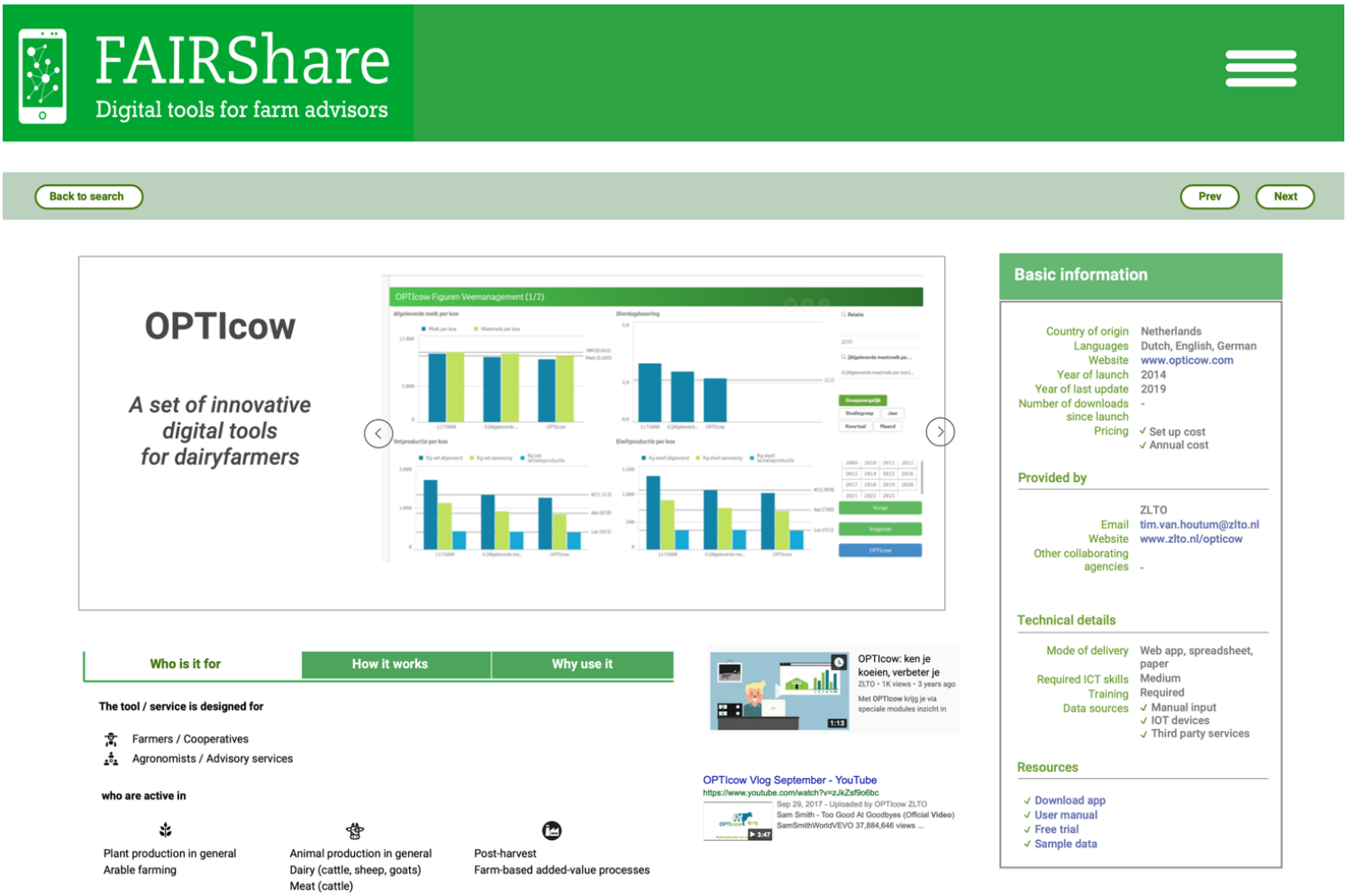

***Figure 8*: DATS page view 1**

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The second view, as shown in *Figure 9*, will load when the user clicks on the "How it works" tab. This tab will show a detailed description about the function of the specific DATS, which can be as detailed as the provider wishes, given some limitation decided in the design process of the online form. The simpler and more explanatory the description is, the more valuable it will be for the user in order to understand how she/he can use it.

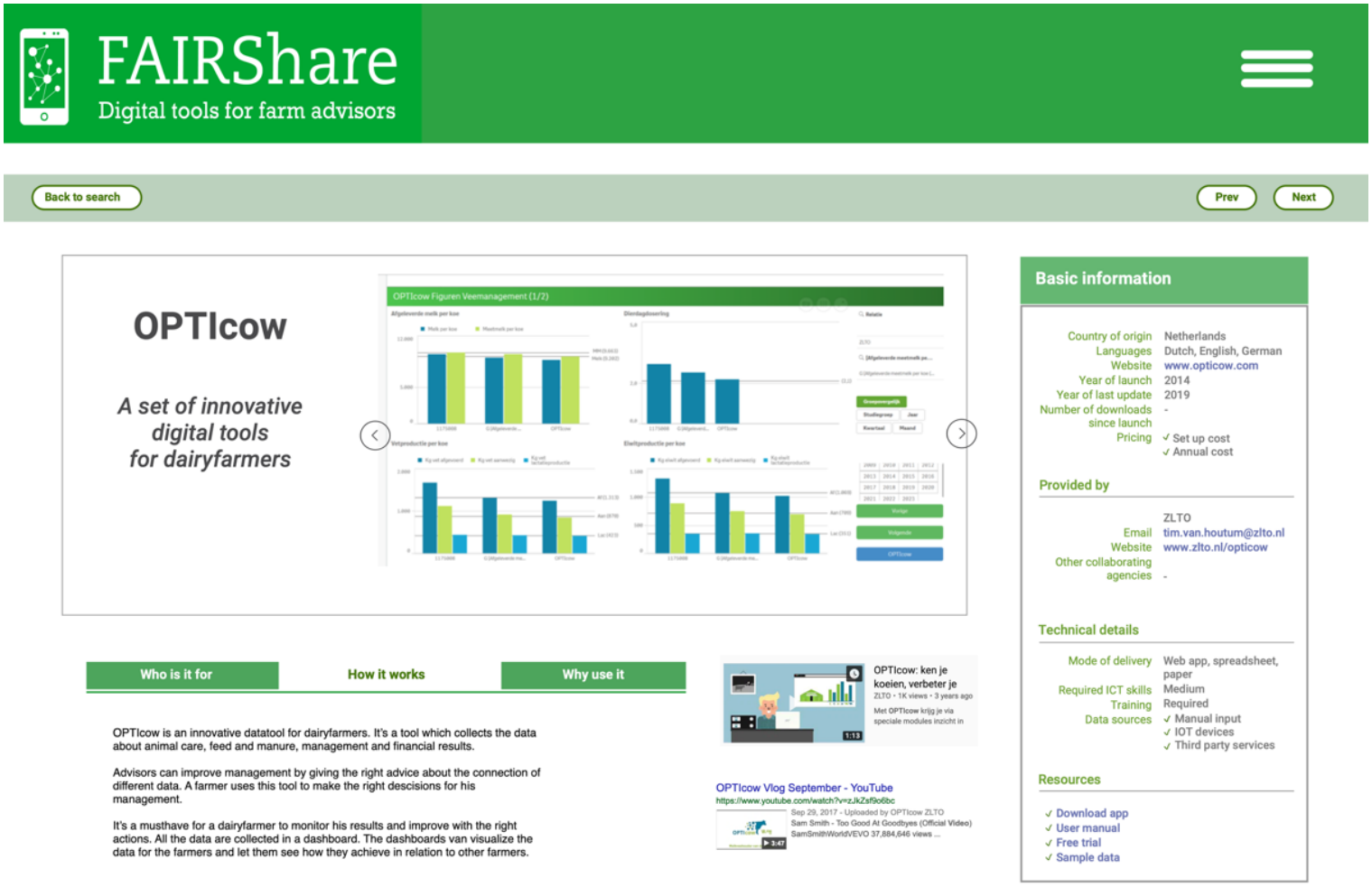

Figure 9: **DATS page view 2**

The third view, as shown in *Figure10*, will load when the user clicks on the "Why use it" tab. This tab will contain two lists: the challenges addressed by the DATS and the potential users' benefits. These lists will be produced from the selection the provider of the DATS will have made in the online form, where she/he will be asked to select the five most important challenges and benefits in the corresponding sections of the form. This information can act as an overall reassurance for the user, who is looking through the PNF for specific DATS to satisfy her/his needs.

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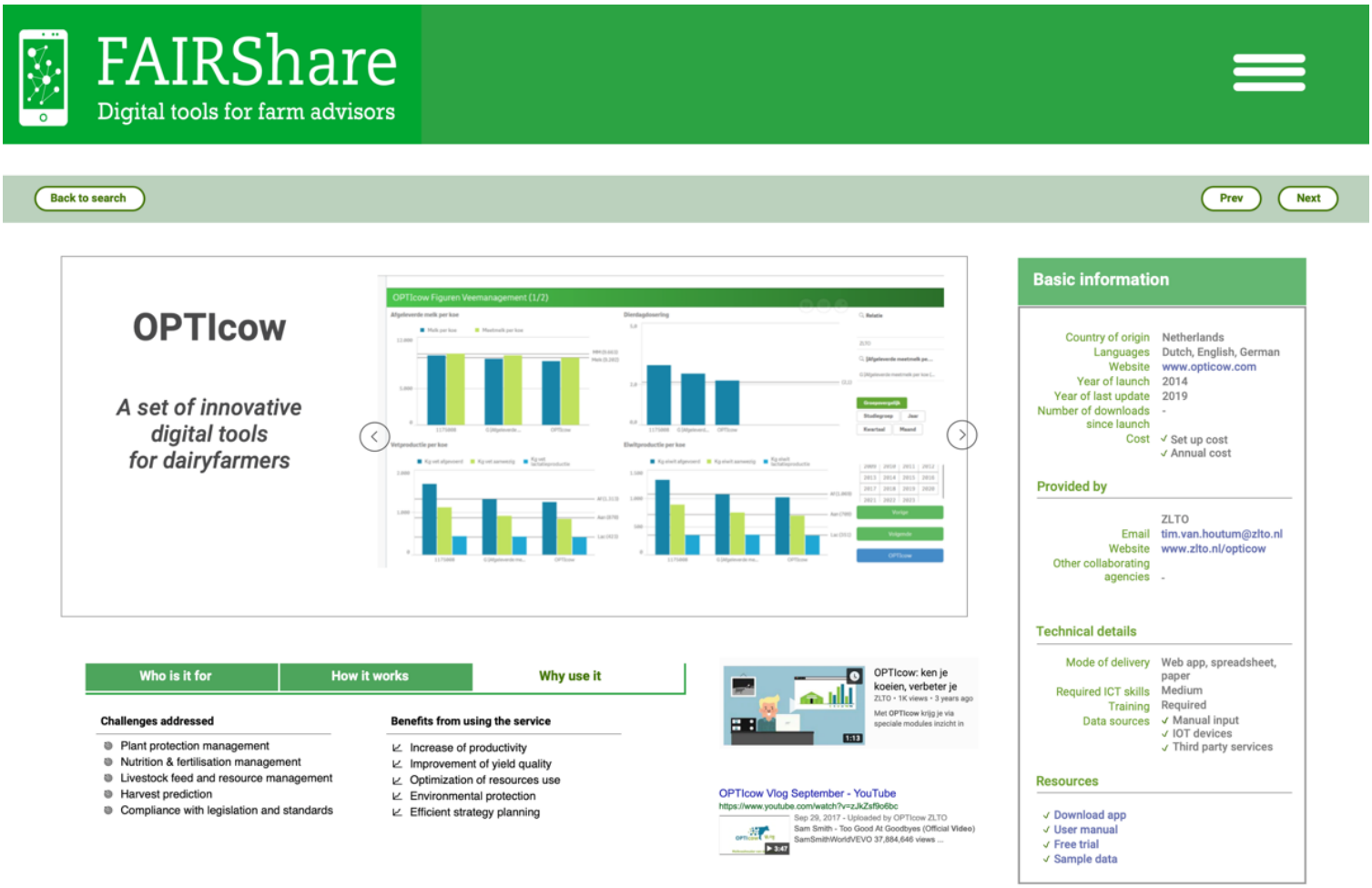

Figure 10: DATS page view 3

Additional content will appear in each DATS page, depending on the optional content the provider has submitted. In the above examples, in *Figures 8*, *9* and *10*, there is some free space devoted to videos concerning the specific DATS. Another example of DATS page could show testimonials from users etc.

5. Dissemination strategy for populating the inventory

For the next steps of the project, which is the design and population of the database to support the inventory, WP1 partners will work closely and in parallel. It is important that the vast community of advisors who will be the end users and/or the DATS providers and this participatory approach will be continued throughout the database and platform design phase, providing real examples for feedback and testing.

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Following the same philosophy and practices, the database of the inventory will be gradually populated and validated through the feedback. The first goal is to supply the database with a critical number of DATS during a test period. This critical number is to be decided in the following Tasks of WP1. Some of the major advisory services and some of the big digital provider companies will be contacted to add their products during the initial phase. This way the rest of the advisory community will understand the importance of participating.

FAIRShare partners will also be responsible to list and organize their contacts towards the goal of populating the platform with most of the available DATS that are related to advisors in Europe. This will also be facilitated by the partners own extensive networks within their organization and øutside them within their countries and in countries that they have business relations with. Target groups will be outlined, with no duplicate contacts and they will be informed by all possible means. Following the consortium, the EUFRAS members and the commercial companies will be asked to participate and provide their tools in the fully developed platform.

The actions of the consortium partners responsible for the dissemination of the platform and the need to populate it with DATS can be performed in 3 levels:

a) Personal level: use personal professional relationships each member has in order to attract and persuade them to be part of the project
b) Professional level: use wider social networks created in each partner's professional and marketing area
c) Project level: use dissemination tools and practices provided by WP7 of the FAIRshare project

Existing networking facilities or platforms, like SmartAKIS can be sources of DATS. However, it is important to carefully select from this source, only those DATS that are focused specifically on the needs of advisors. This way it will be easier to persuade the providers to participate and make their tools available in the FAIRshare inventory, as well, making sure that their efforts to provide information to multiple platforms will be eliminated.

6. Conclusions

Partners' dedication and active participation from the beginning of Task 1.1 of FAIRshare, justify a very optimistic perspective for the next phase of the project. The proposed methodology, partners' needs, potential risks and further actions are clearly defined. The mock-ups created in this phase also provide a very clear overview of the desired outcomes concerning the population of the inventory in the first place, but also helpful insights on the final version of the PNF, upon its completion.

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