D2.5 – Visualisation Platform of Digital Agriculture & Forestry Uptake – Version 1

Work Package 2 - Uptake of Digital Agriculture & Forestry Technologies

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Introduction

As part of Task 2.3, **a website application** of the 4Growth*Visualisation Platform of Digital Agriculture & Forestry Uptake* was created.

The website is currently password-protected. It is a temporary measure until the consortium decides to go public with the platform. For the moment only a restricted group of people can access the data since we are still in testing phase. The credentials to access the website are as follows:

- URL: https://staging.4-growth.dev-vizzuality.com/explore
- Username: 4growth
- Password: ndq!zdv9xga7TED@dhv

This document describes an initial version of the platform, Version 1, delivered in M12. The tool allows users to visualise the uptake of digital technologies within the agriculture and forestry sectors in European countries. The platform intends to make the project insights accessible to a broader community, including decision-makers and actors within the value chains of agriculture and forestry. The 4Growth Visualisation Platform will serve as a source for information and insights derived from the project's activities.

In a future iteration, version 2 (D2.6) of this model will be released, including data projections from the MMFT that are currently not shown in Version 1.

Outline of the Data Visualization platform

The visualisation tool is composed of several screens that contain a series of tools and features to allow the user to visualise the data using different filters and configurations. The high-level structure of the functionality is as follows:

- Explore Screen
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- Account details
- Edit password

Explore screen

The Explore Screen is the initial screen for the data visualisation platform. It allows the user to browse the values of data for different results and filter the data with different criteria to narrow down the results.

Figure 1 - Explore screen

Filters

The visualisation tool gives the user the possibility of filtering the displayed data by different criteria.

The general filters allow the user to filter by area of operation or by country:

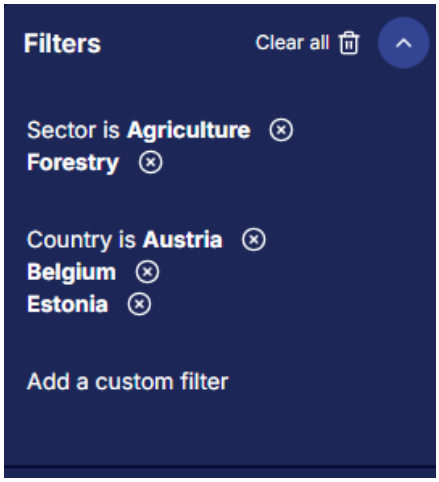

Figure 2 - General filters

There is also the possibility of adding custom filters where you specify values for the different parameters. For example, we can choose to show only the values where the *technology type of agriculture* is *precision farming.*

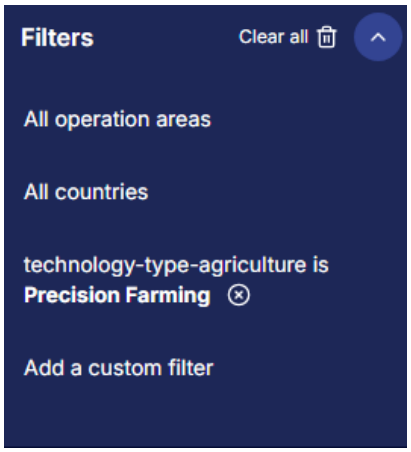

Figure 3 - custom filter

Sections navigator

The results of the data survey are displayed in several sections. We have two ways to navigate directly to these sections: a sections menu on the sidebar and a shortcut list of buttons.

Figure 4 - Sections menu on the sidebar

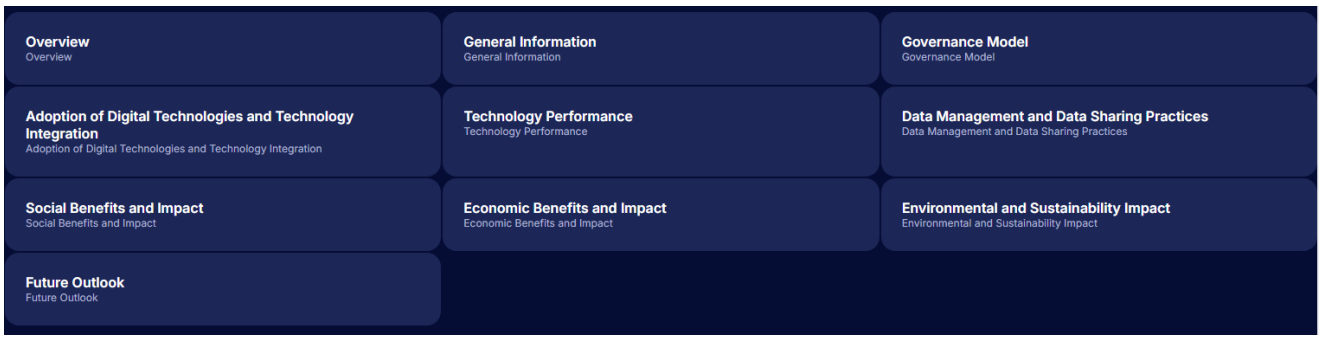

Figure 5 - Sections: shortcut set of buttons

Data visualisation sections

The data visualisation sections display the data using a set of different widgets appropriate for each kind of data.

Each widget has a graph/diagram displaying the information, an indicator of the response rate, and a menu where you can change the type of graph in which the data will be shown.

Overview section

Shows a summary of the data obtained in the surveys, together with a map of Europe showing the adoption of technology by country. This overview adjusts when the user activates the filters. For example, if only one country is selected, the number of total surveys will be shown for the country selected.

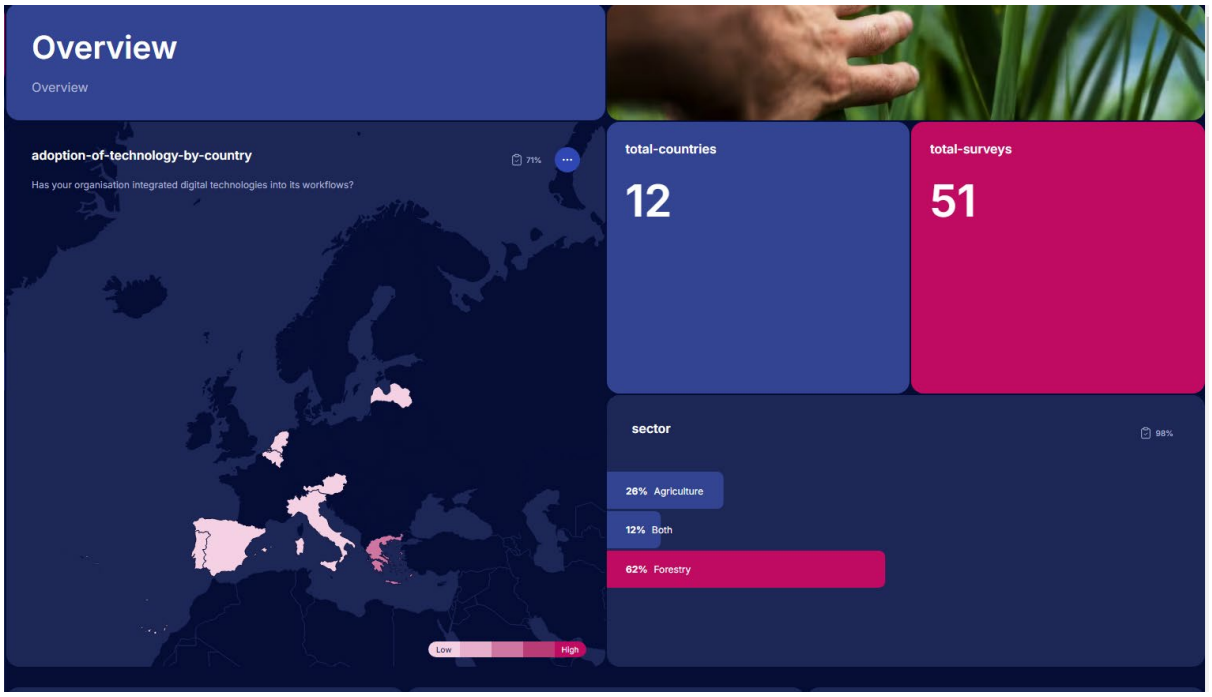

Figure 6 - Overview section

General Information

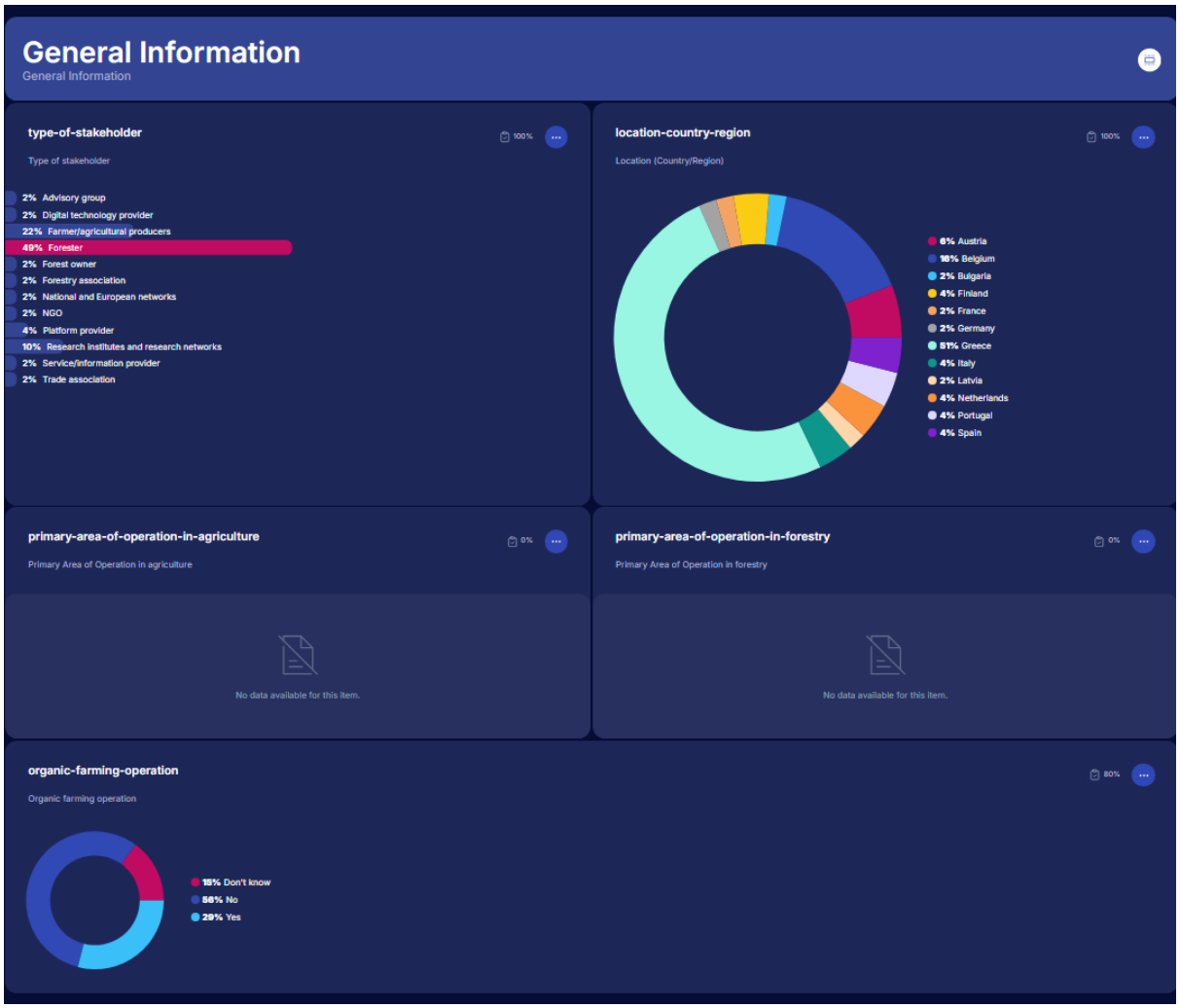

Figure 7 - General information

Governance Model

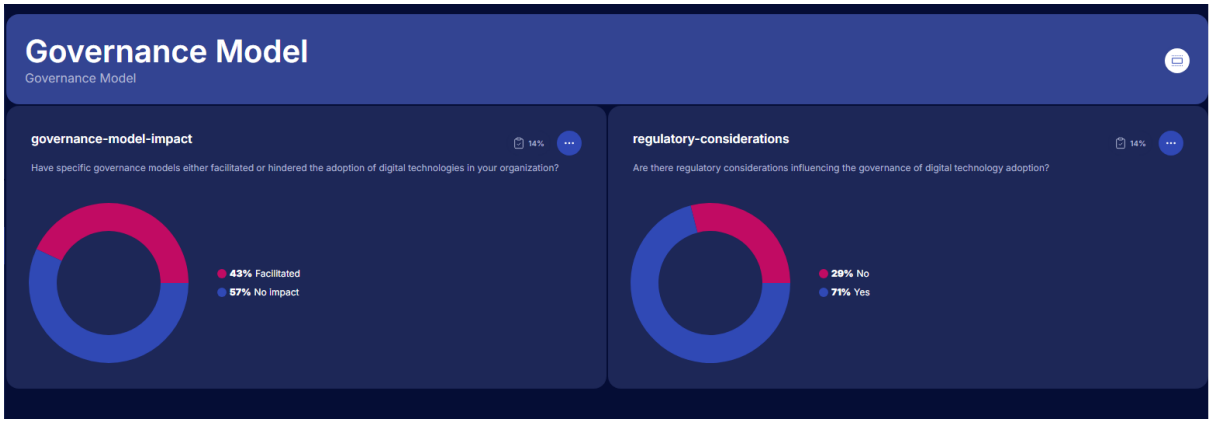

Figure 8 - Governance model

Adoption of digital Technologies and Technology integration

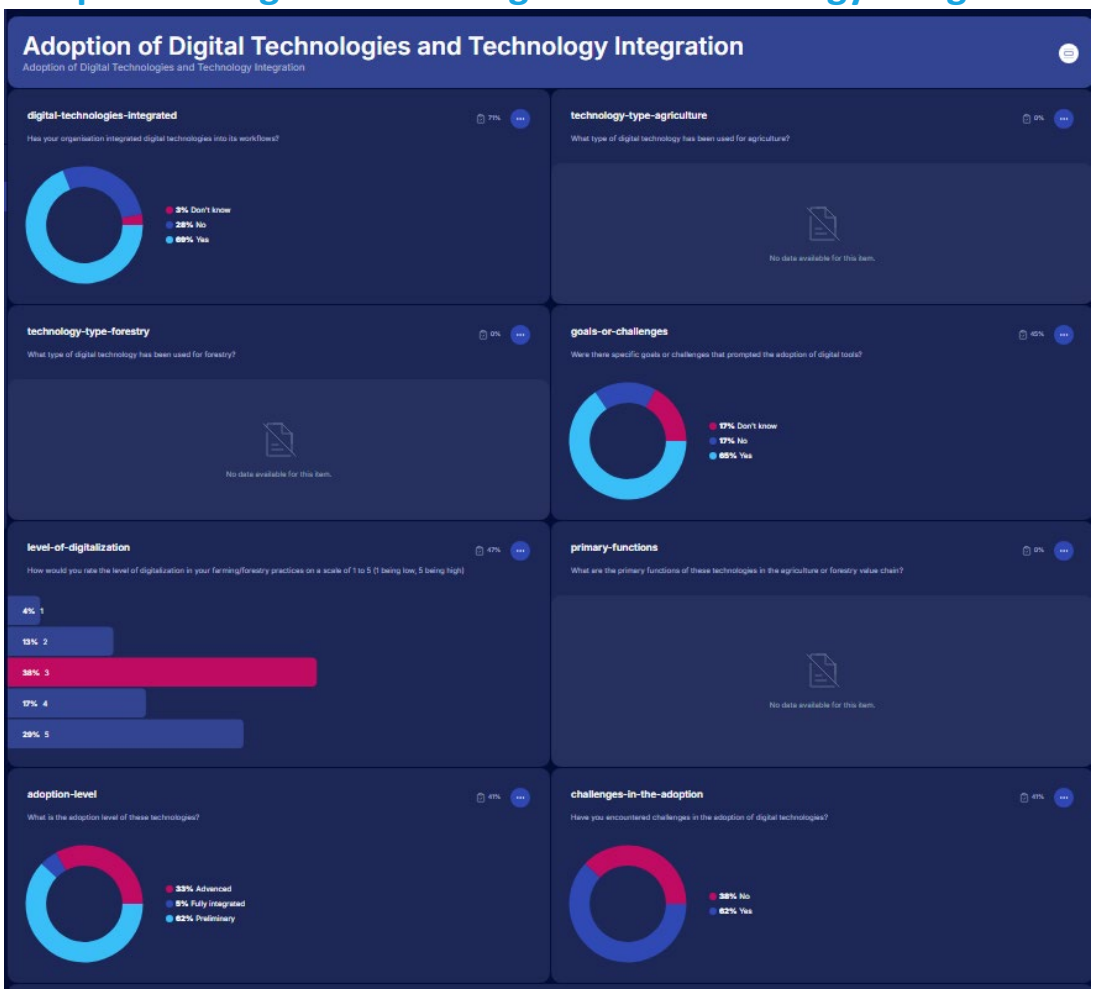

Figure 9 - Adoption of digital technologies

Technology performance

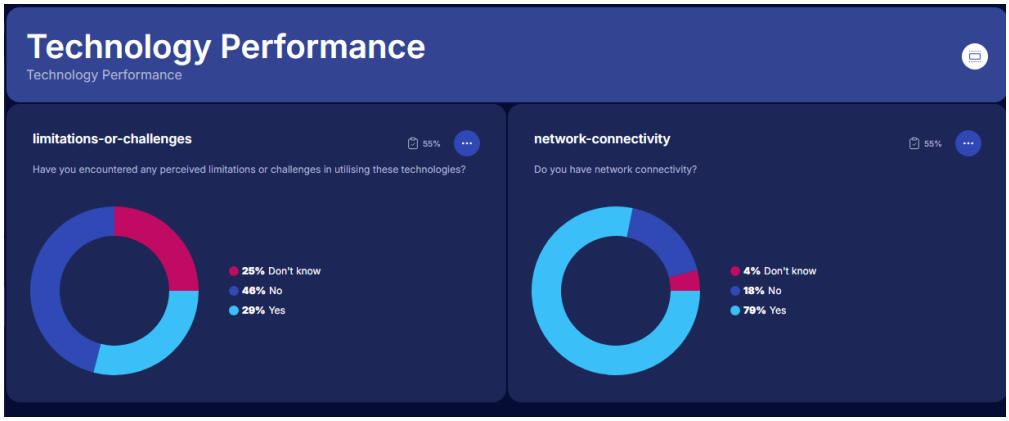

Figure 10 - Technology performance

Data management and data sharing practices

Figure 11 - Data management and data sharing practices

Social benefits and impact

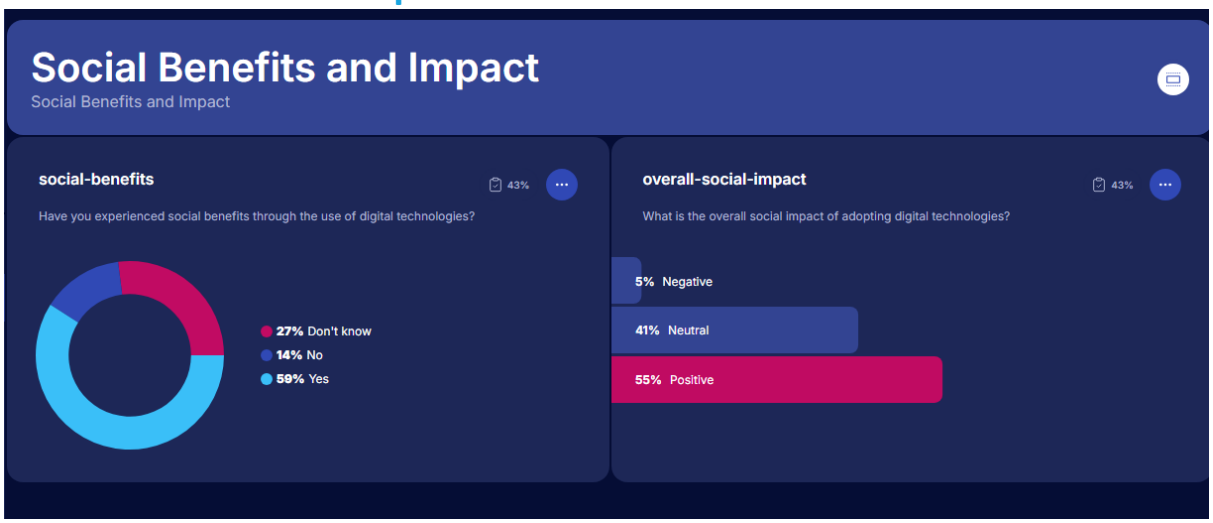

Figure 12 - Social benefits and impact

Economic benefits and impact

Figure 13 - Economic benefits and impact

Environmental and sustainability impact

Figure 14 - Environmental and sustainability impact

Future outlook

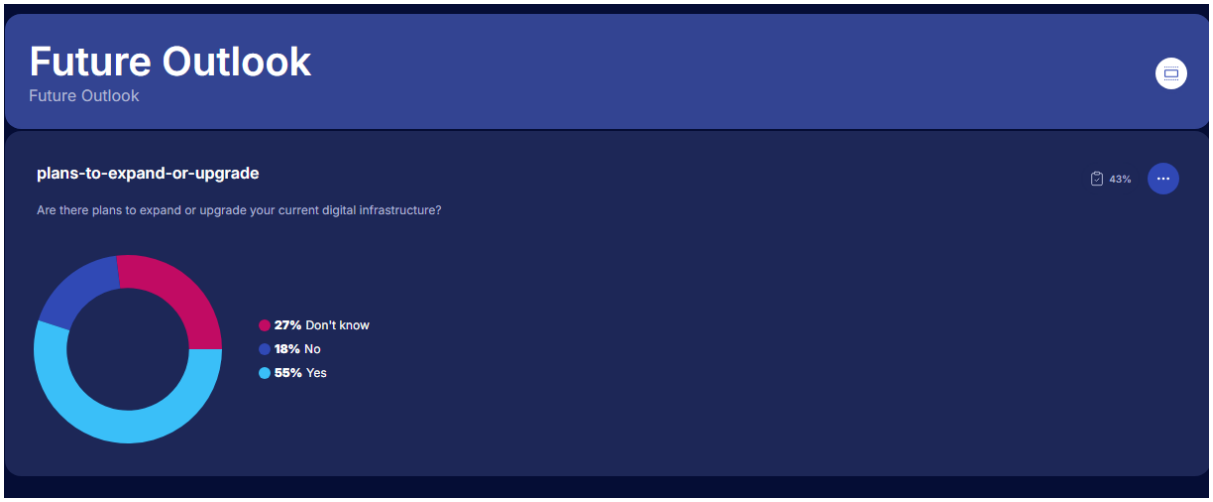

Figure 15 - Future Outlook

Sandbox

The sandbox is a feature that allows the user to choose their own custom visualizations, more configurable than the filters in the explore screen. It also allows the user to save these visualisations in their profile so they can revisit them at a later point in time.

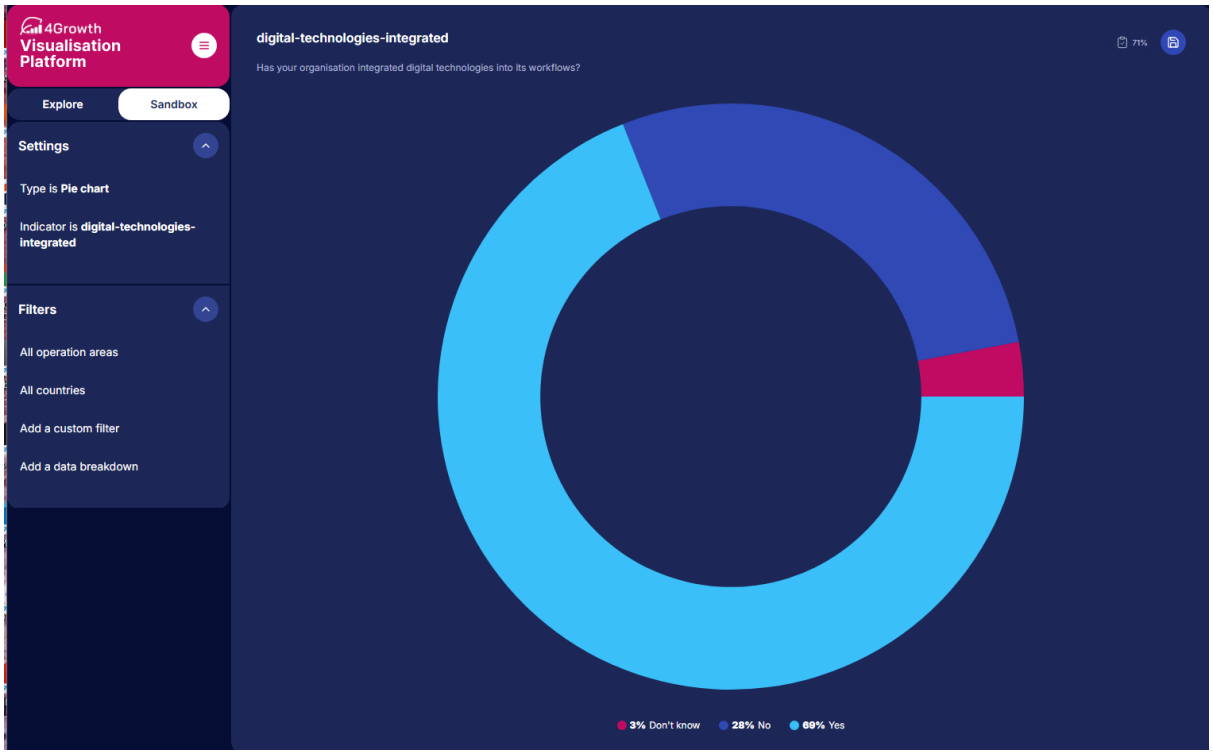

Figure 16 - Sandbox screen

Settings

In the settings screen of the sandbox, you can configure the type of chart that you want to use for the visualisation, and the indicator that you want to visualise.

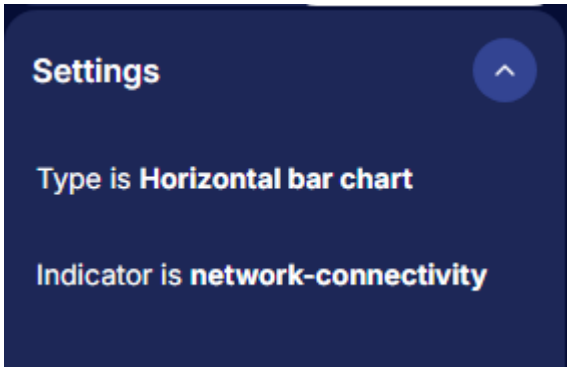

Figure 17 - Sandbox settings

Filters

The users can filter by sector or country, and they can also add custom filters or a data breakdown to combine two indicators.

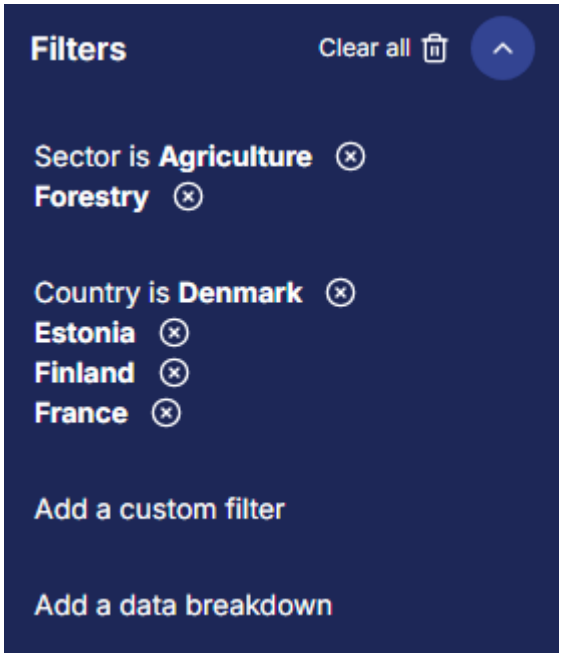

Figure 18 - Sandbox filters

Figure 19 - Data breakdown

Saving visualisation

When users configure a custom view of the data, they can save this visualisation to reuse it later on. this information will be available from the user profile screen.

Figure 20 - Sandbox: save visualisation

User screens

Users have the possibility of creating a profile account in the platform so that they can store and recover their custom visualisations. This is optional and the tool can be used without registration.

User registration

The user can create an account to save their custom visualisations. The application will request an email address to identify the user, and also the definition of a password.

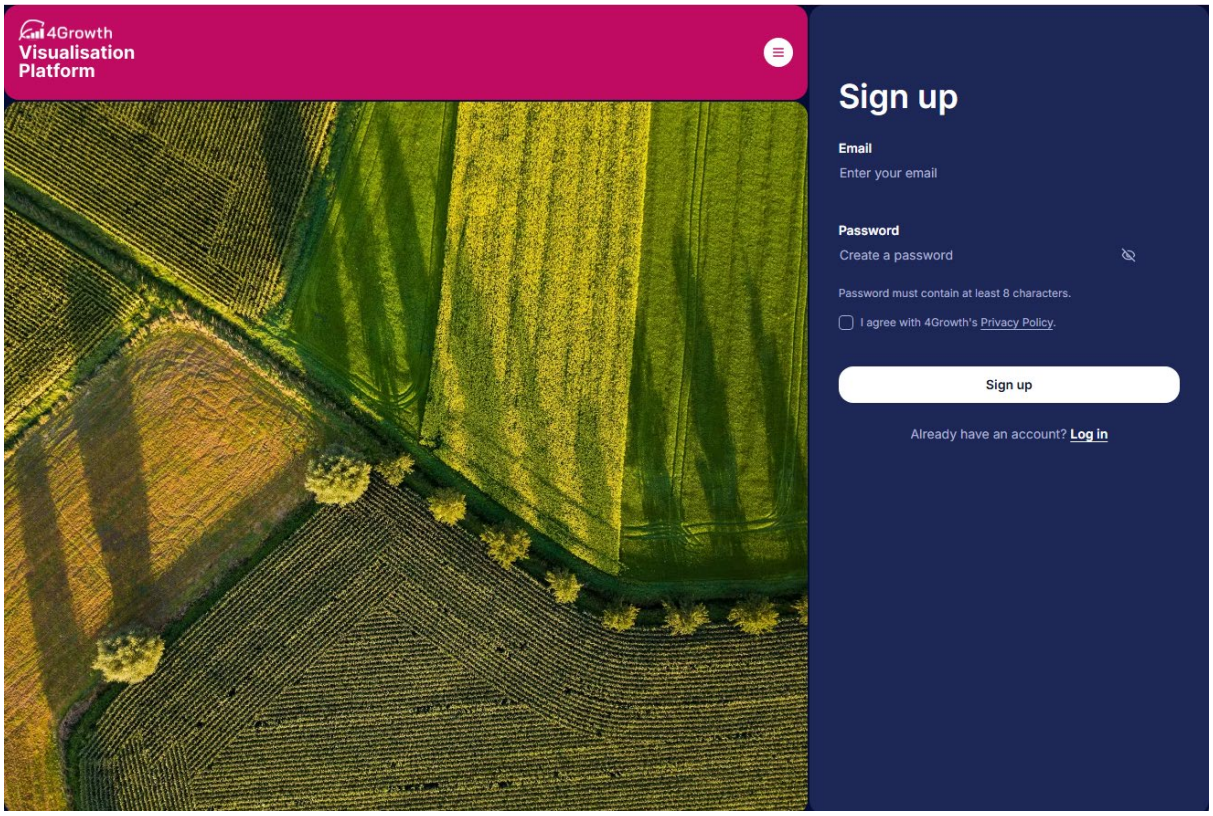

Figure 21 - User registration screen

Figure 20 - User registration screen

User login

The users can log into their user account using the login screen. They can also recover their password if it is forgotten.

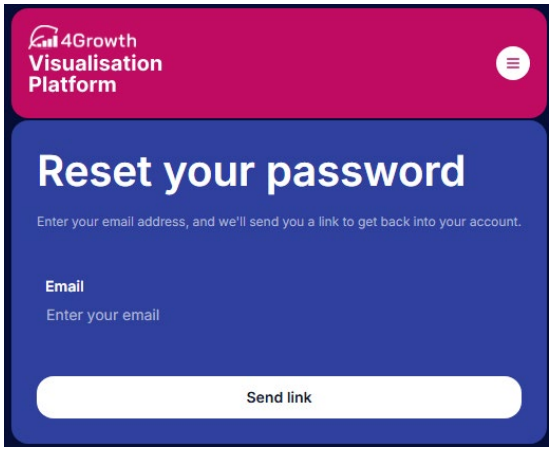

Figure 22 - Password reset

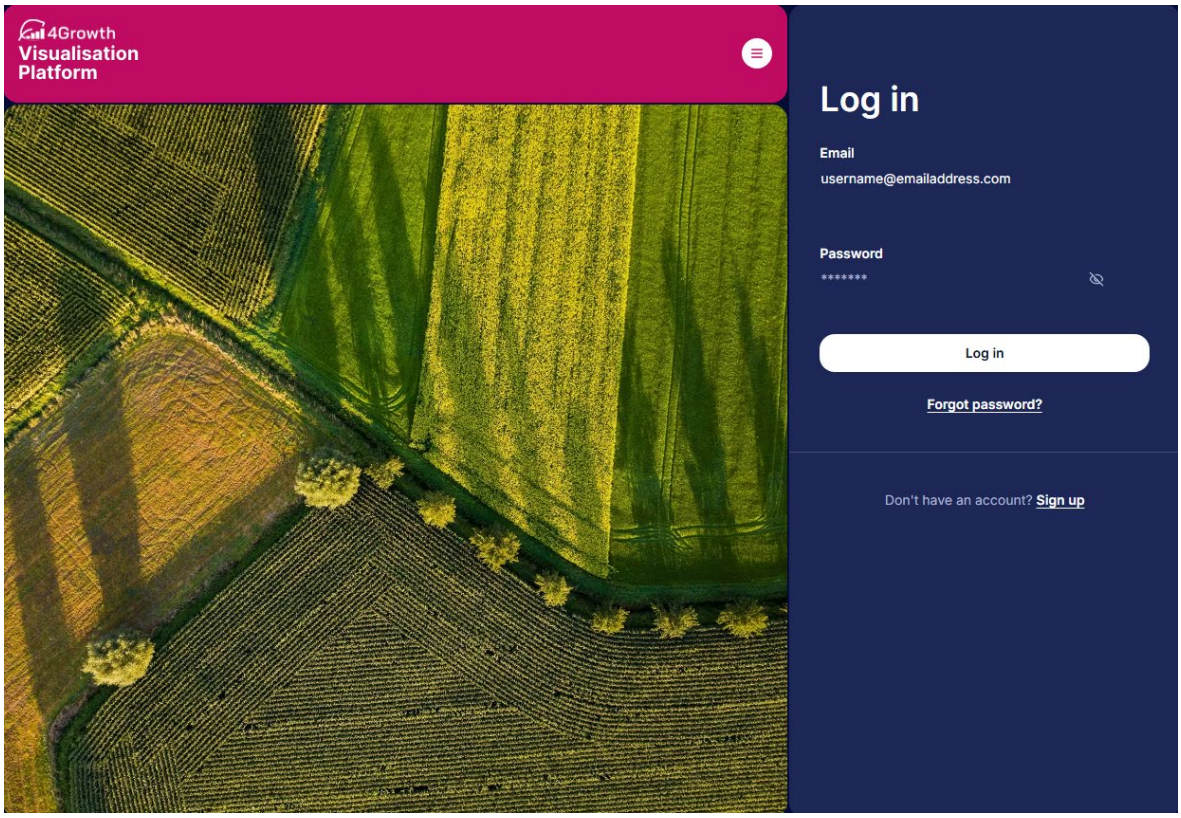

Figure 23 - User login

User profile screen

A list of the visualisations that the user saved can be seen on the profile screen.

It is also possible to change the email address or the password of the user.

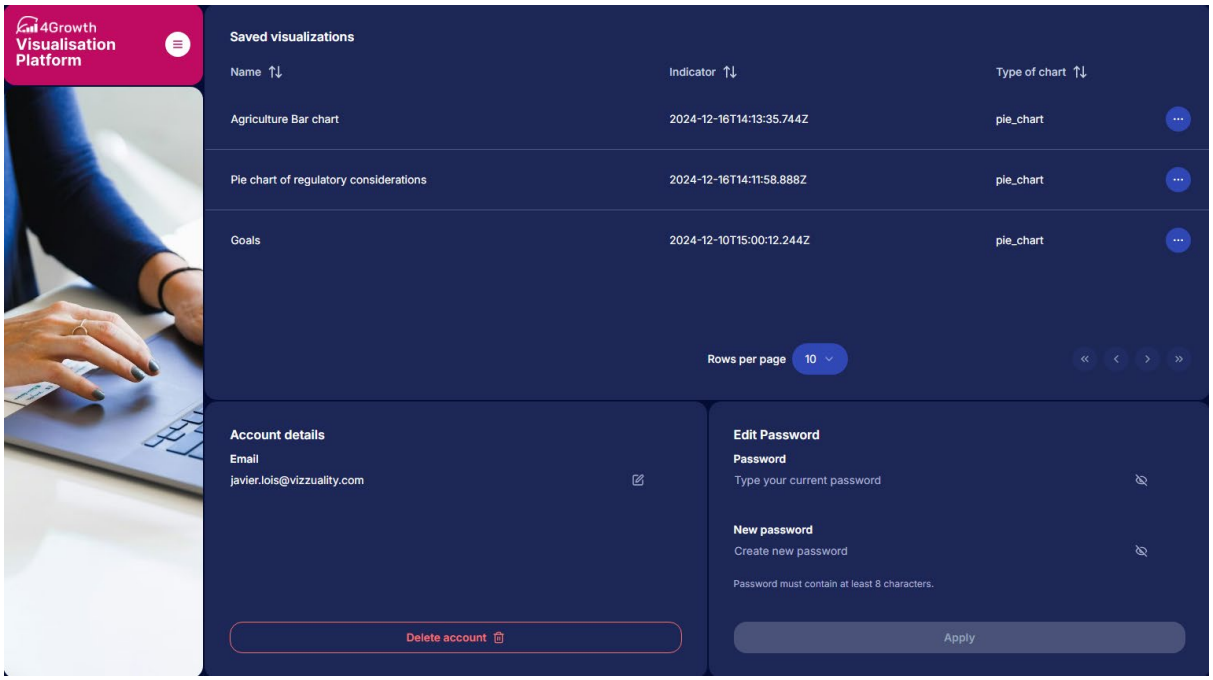

Figure 24 - User profile screen

Architecture and other technical considerations

High-level Architecture Overview

The tool is designed as a modular, open-source platform that centralizes survey data and provides interactive visualization capabilities. Its architecture balances performance, scalability, and usability, ensuring accessibility for diverse stakeholders.

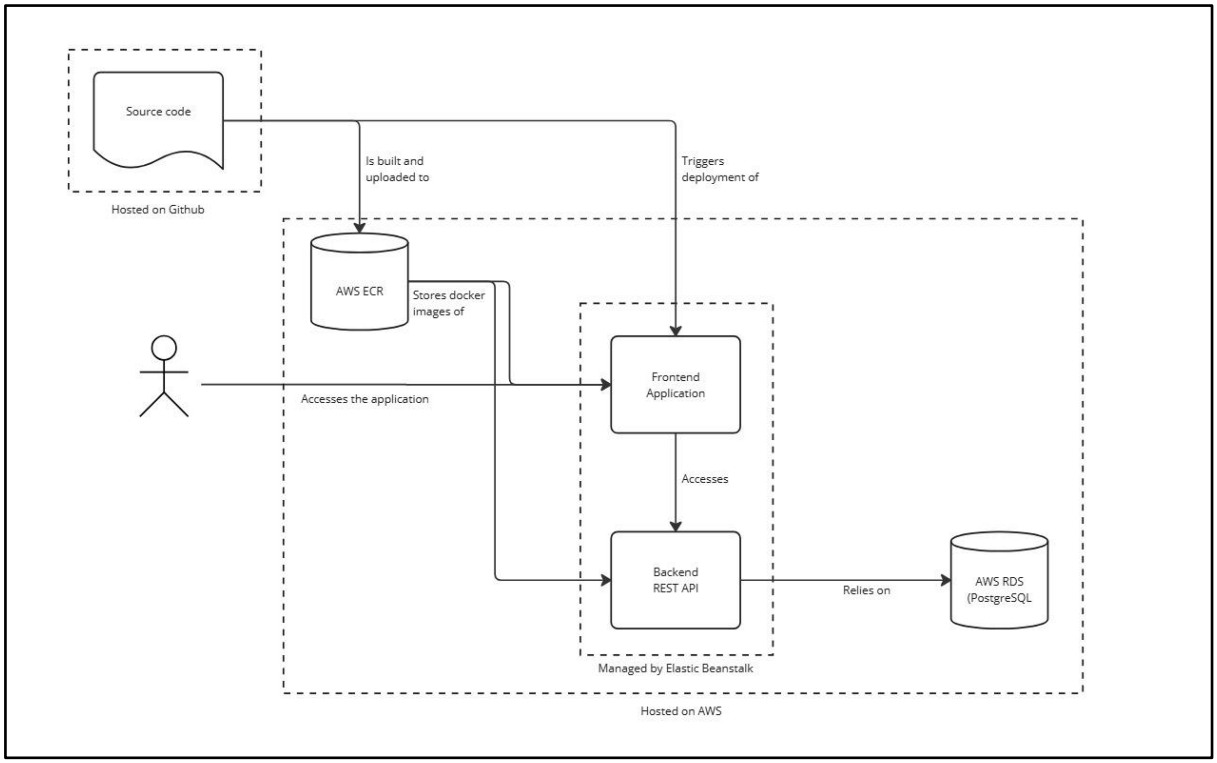

Figure 25 - High-level architecture

Core Components and Services

1. **Frontend application**: A user-friendly web interface built with Next.js and TypeScript, providing data visualizations and exploration features.
2. **Data management API**: A REST API manages and stores data, configuration and metadata for the survey results, enabling dynamic updates without code modifications.
3. **Amazon ECR:** Container registry of the docker images of the Frontend and Backend applications built and deployed during the CI/CD flow.
4. **Data processing and integration**: ETL script triggered manually that imports the survey data and integrates it into our database.

Hosting and Infrastructure

The project's infrastructure is kept using Terraform, found in the /infrastructure folder in the Github repository. The repository can be found in https://github.com/Vizzuality/4-growth

The Terraform project manages:

- Basic AWS ElasticBeanstalk configuration (including EC2 and database).
- Github Actions secrets and environment variables.
- AWS user for GH Actions.
- ECR repositories.

The application consists of a monorepo with the frontend and the backend modules dockerized in separate containers.
It also deploys a vanilla nginx docker image (from dockerhub directly) to act as a reverse proxy.

The source code of the FE and BE server apps is kept on Github and, on merge to key branches, respective docker images are built and pushed to AWS ECR.

Currently the application is hosted in a Vizzuality internal subdomain that can be used for dev and staging environments. When the time comes for the application to be made available to the public, it will be transferred to the main domain of the 4Growth project. At that moment it will be required to add the relevant DNS records.

Next Steps

Following this deliverable (D2.5), two more major updates to the 4Growth Visualisation Platform will follow; D2.6 in M22 and D2.7 in M33. These iterations will build upon what has already been developed by integrating the outputs of the Market Monitoring and Forecasting Tool (MMFT), which will produce various projections on the current and future states of the agriculture and forestry technology markets. D2.6 and D2.7 will also ingest and display more of the "ground truth" data gathered via the Grid and Observatories as it is collected.