

# HUNGRY ECOCITIES

A S+T+ARTS RESIDENCIES PROJECT

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## Deliverable 2.3 – Enhanced and integrated usability-based framework

### Version1

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### Objective of the deliverable

The objective of this deliverable is to present the achieved results concerning integrating and validating the outcomes of the Humanizing Technology Experiments on the newly created virtual HEClab.

The virtual HEClab has been created as part of the Hungry EcoCities project and is currently operational as a beta version. The HEClab can be accessed here: [www.heclab.eu](http://www.heclab.eu)

The first activities on the HEClab are to integrate the outcomes of the Humanizing Technology Experiments and to further develop several of these experiments through matching with the SMEs selected for the Path to Progress Experiments.

This deliverable explains where we currently are in this journey and what our next steps will be.

## History of changes

Date	Version	Author	Comment
07.06.24	0.1	Rodolfo Groenewoud – van Vliet	Setup of deliverable, first draft
14.06.24	0.8	Chiara Borghi - CRA	Final version + Review, integrations
26.06.24	1	Lija Groenewoud van Vliet	Final Review version

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## 1. Abstract

This deliverable is the third deliverable of five deliverables in Workpackage 2. In WP2, we set out to develop an online virtual innovation lab, called HEClab, from start to finish, over the course of the Hungry EcoCities project (2022 – 2026).

The HEClab is a flexible "*virtual fab lab*" platform designed to "*conceive, explore, and prototype AI-enabled agri-food industrial use scenarios*." Its primary goal is to facilitate the matchmaking process between prototypes and their creators with SMEs within the Hungry EcoCities (HEC) initiative.

While its initial development is rooted in the HEC project, its broader ambition is to support and enhance various projects and initiatives both within the S+T+ARTS network and beyond. The platform's goal is to facilitate connections and collaborations among artists, SMEs, researchers, technical suppliers, and other stakeholders, ultimately accelerating innovation and increasing the visibility of art-driven innovation.

This deliverable is the first deliverable where we present the beta version of the HEClab which has come online in May 2024 and will be used for a first full cycle between May – November 2024.

The deliverable showcases: (1) what is part of the HEClab today (June 2024), (2) how the outcomes of the Humanizing technology Experiments are being integrated into the lab (also see D4.3), (3) what the process architecture currently is, (4) how we work on building bridges with other initiatives, including S+T+ARTS initiatives, and (5) how we look towards the future of HEClab, both the full test run during the second open call in the coming months, as well as the topics of further development for 2025.

We conclude that the HEClab beta version is a good first step towards the lab we envisioned in D2.1 which will have immediate value in the matchmaking of the Path to Progress Experiments, thereby reaching the main goal of this WP. However, we are more ambitious and see opportunities to expand the HEClab in different directions, aiming for sustainable deployment after Hungry EcoCities ends in 2026.

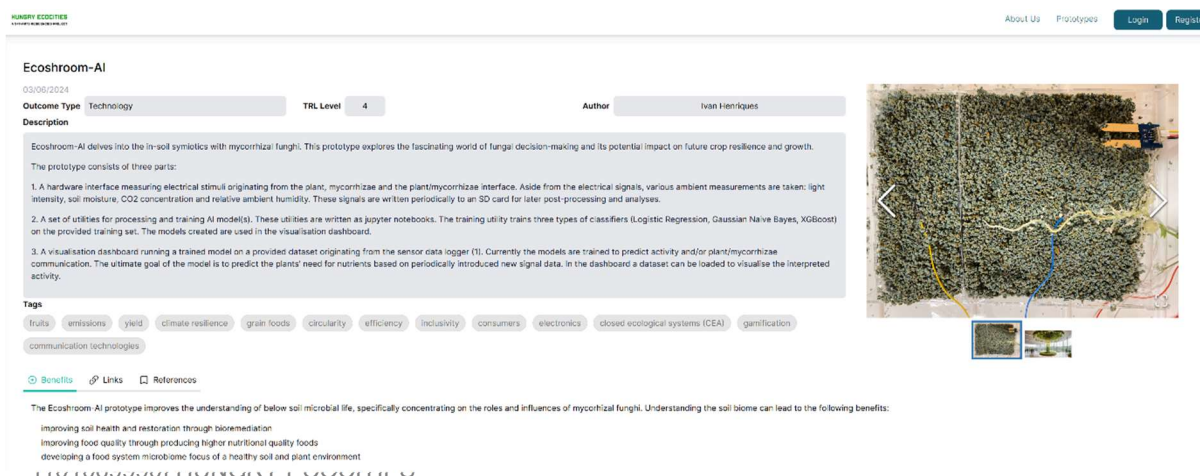
## 2. HEClab: integrating and validating the Humanizing Technology outcomes

The beta version of the Hungry EcoCities virtual lab, the HEClab, is ready and has started integrating the prototype outcomes of the Humanizing Technology Experiments. All 9 completed HTEs have produced an art-driven, AI-enabled food systems prototype which has been integrated on the HEClab in the form of a prototype card. Link to see the prototypes on the HEClab: <https://heclab.eu/prototypes>

Prototype cards contain the required information needed to match with opportunities (more on that later). Each prototype card contains the following information:

Title	the title of the prototype
Outcome type	the type of outcome, following the 8 possible art-driven experimentation outcome types of the PESETABS diffusion model
TRL level	the technical maturity of the prototype, identified through the logic of the technology readiness level model, with 9 levels of technical maturity.
Author	the creator of the prototype (the artist)
IP/Tech insight	the license(s) attached to the IP embedded in the prototype
Description	a text based written description of the prototype, its purpose and its current state of development
Images	visual images of the prototype
Tags	up to 15 relevant words (tags) that correspond to the prototype, either chosen from pre-set food related tags or self-created if necessary
Benefits	a written description of the main benefits, usage possibilities of the prototype, according to the author.
Links	relevant links to learn more about the prototype: website links, publications, repositories, demo video's, explanatory video's, etc.
References	a list of relevant knowledge sources which informed the development of the prototype.

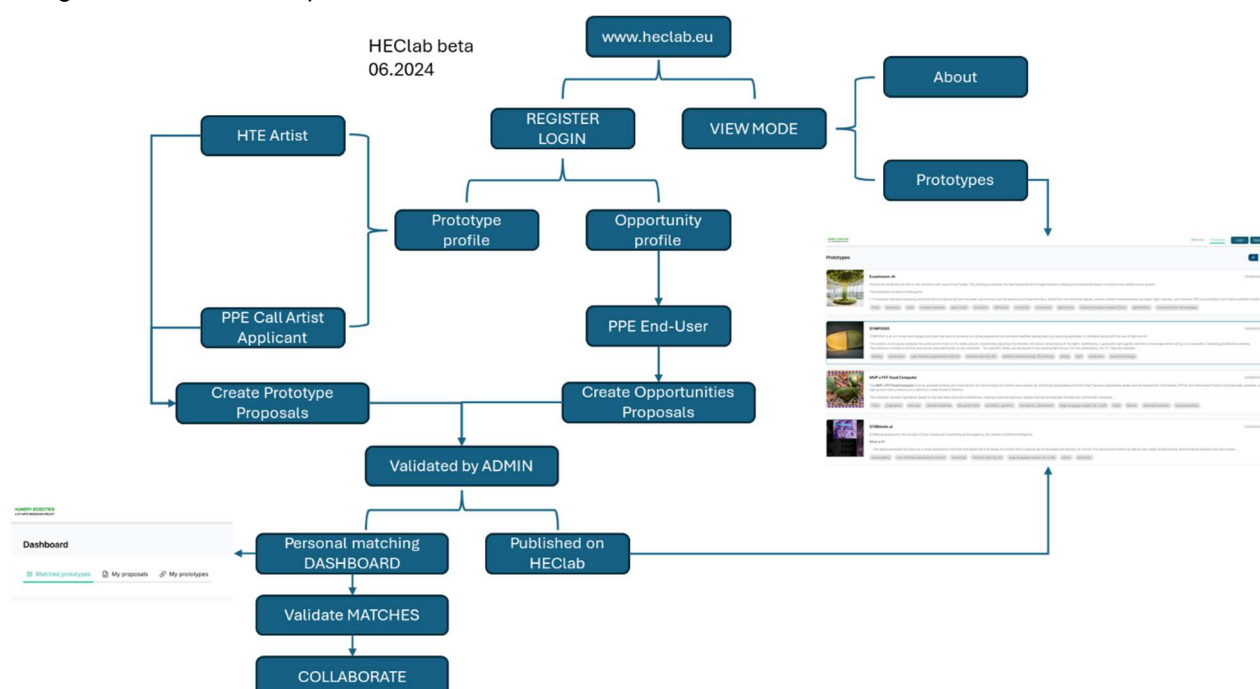
Figure 1: Example Humanizing Technology outcome prototype card on heclab.eu



The integration process of the Humanizing Technology outcomes was part of the final deliverables of the artists. They were requested to register on the HEClab and prepare a prototype card. After completing their proposed card, the cards become visible for the administrators of the platform with the request to validate and publish the prototype cards on the platform. The validation process is conducted manually at the moment and includes validating the existence of the proposed prototype, the existence of the creator(s), checking the working of the links, checking the fit of the tags with the description offered, and checking the completeness of the card. After these checks, the prototype card is published on the platform. Anyone visiting the HEClab can view the prototypes, regardless of whether a visitor is logged in.

The current platform process architecture is visualized in below figure.

Figure 2: HEClab beta process architecture status June 2024



In 'view mode', visitors to the website can access the about page with background information on the HEClab and the Hungry EcoCities project, and scroll the database of art-driven prototypes, currently consisting of the 9 prototypes resulting from the HTEs.

Through registering, users can create either a prototype profile (for artists) or an opportunity profile (for SMEs). Each profile creates a custom and personalized version of the lab for that specific individual. With a prototype profile the artists have the option to create a prototype proposal, resulting in the process explained on the previous page. With an opportunity profile, the SMEs have the option to create an opportunity proposal. This will be done for the first time in September with the 10 selected SMEs for the Paths to Progress Experiments. Each created proposal card requires admin

validation (see explanation above) before being added to the HEClab repository. Each user has a personalized Dashboard with the following content:

- |                                      |  |
|--------------------------------------|--|
| + My proposals                       | proposals prepared and pending validation      |
| + My prototypes / opportunities      | cards validated and part of the HEClab         |
| + Matched prototypes / opportunities | matches proposed by the HEClab for validation. |

For all proposed matches, both the artist and the end user have the option to either validate or discard the proposed match. When both parties validate the match, they will receive all information required to establish contact and explore a collaboration.

In addition, the administrators can also see the non-matched prototypes and opportunities to keep track of the effectiveness of the HEClab.



### 3. HEClab: building bridges with other (S+T+ARTS) initiatives

One of the core ideas behind the HEClab is that, although it is developed and prototyped within Hungry EcoCities, it can serve as a valuable component in other projects and initiatives, both from S+T+ARTS and outside. To achieve this, a number of initiatives have been taken or will be taken shortly now that the HEClab is operational. The most important lines of exploration in this regard are explained in this chapter.

*A - how the HEClab can interact with the goals, ambitions and projects within the S+T+ARTS Family.*

Since the inception of the idea to build a virtual lab platform as part of HEC, the idea was to build it within the project, but with the intent to serve interests beyond. Maybe most importantly, those of 'sister' S+T+ARTS projects and initiatives. We will pursue this along three lines:

A1 – by preparing for acceptance of other S+T+ARTS project outcomes, starting with the outcomes of Better Factory (finalizing in 2024), Repairing the Present (finalized in 2022) and AIR (finalizing in 2024).

A2 – by exploring the potential of using the HEClab to support matchmaking for other S+T+ARTS projects, those where cascade funding calls for teams of artists and SMEs or artists and tech suppliers or artists and researchers are included.

A3 – by exploring the potential of using the HEClab to increase the visibility of art-driven innovation prototypes for other EU calls and opportunities, by matching S+T+ARTS prototype outcomes to partners and call opportunities from other EU sources.

*B – how the HEClab can interact with the goals, ambitions and other projects related to food system transformation in Europe*

The HEClab, being a product of HEC, focuses for the moment on art-driven innovation collaborations within the food domain. Therefore we prioritize the connection with other projects in Europe with whom we share a mutual interest. Many of these projects have been brought together under the Food2030 network, also HEC is part of that network. Through this network, we are interacting with other food system transformation projects with the aim to explore if the HEClab can be an additional asset for the goals of other projects, or if the HEClab can be integrated into existing projects or platforms with overlapping goals. We do this in two ways:

B1 – we are connected to [food2030.eu](https://food2030.eu) online platform, in particular the Sustainable Food Systems Network, where over 75% of currently active food system



transformation projects are united. Their community seeks to exchange, interact and merge interests on a continuous basis, possibly HEClab can add a feature to this exchange.

B2 – we are connected to the [Sustainable Food System Innovation Platform](#), a smaller, more focused platform / network where they have an inventory of project related results and outcomes which could benefit from some of the functionalities of HEClab. In the same way, some of the innovations in the innovation inventory could be incorporated into the HEClab.

*C – how the HEClab can interact with other opportunities*

We are eager to find other opportunities for the HEClab, both during the HEC project and beyond. That is why we plan to actively communicate about the HEClab after we have run the open call matchmaking through the lab. This will be in the period after November 2024 and continue until the project ends in March 2026.

## 4. HEClab: roadmap

The HEClab is a completely new developed platform which is the main objective of WP2. The aim is to *'built a virtual fab lab to conceive, explore and prototype AI enabled agri-food industrial use scenarios'*. In the first year of the project we specified the requirements for the HEClab (D2.1). These requirements were defined extensively, merging must have's with like to have's, and taking into account multiple types of users and domains of focus. After this, which is still the base for our development journey, we decided to design and build a first version of the HEClab, concentrating on a few core features which could be built, tested and used already within the second call of the project (D2.2). This version was built over the last few months, resulting in the beta HEClab which can be used today.

The first objective of the HEClab is to guide the matchmaking process between prototypes and their authors with SMEs in the second round of projects. The first step in this process was the creation of the first batch of prototype cards from the outcomes of the Humanizing Technology Experiments (achieved in June 2024). The second step will be the creation of prototype cards by artists applying to the second open call for artists, the PPE experiments (planned for Jul-Sep). The third step will be the creation of the first batch of opportunity cards by the SMEs selected for the PPE experiments (planned for October). The fourth step will be the matchmaking between HTE outcomes and SMEs as well as between OC2 artists and SMEs through the personal matching dashboards (planned for November).

As of December 2024, the HEClab has been fully tested and applied for the purpose of the PPE experiments. After this, and as of the start of 2025, we will focus on improving the HEClab based on the experiences from the usage by artists and SMEs, in combination with the requirements we specified in D2.1. This development roadmap consists of 9 main topics we will continuously address and improve upon during Hungry EcoCities.

### 1 – improving the login experience

- Security
- Automatic mailing
- User interface

### 2 – expanding view mode features

- Prototype database visualization
- Adding manuals + FAQ
- Adding UI / UE features from D2.1

### 3 – expanding prototype offerings

- With artists applying to OC2
- With artists from other S+T+ARTS projects
- With artists from outside of S+T+ARTS

### 4 – expanding opportunities offerings

- With public funding opportunities
- With private funded opportunities



## 5. Reflection and Lessons learned

The development and deployment of the HEClab have provided valuable insights into its functionality. The platform has proven to be an effective tool for collecting and clearly communicating key data on the different HTE prototypes developed within HEC. It ensures that the information is systematically open and accessible to interested parties, including SMEs, artists, stakeholders, and the wider public. This dual role transforms the platform into not only a tool for developing the matchmaking for the next phase of HEC, but also a medium for disseminating information about art-driven innovation to a wider audience.

Key aspects of HEClab have been refined through reflections and lessons learned during its iterative process:

- ***User Interaction and Design for Multiple Users:***  
The platform has been optimized to provide an easy and seamless experience for all users, whether they are artists, SMEs, or visitors. This includes improving user interfaces and interactions to maximize usability and accessibility.
- ***Flexibility and Scalability:***  
HEClab was designed with two main goals in mind: providing a smooth and efficient platform for matchmaking during HEC and being flexible and scalable enough to adapt to other S+T+ARTS projects and initiatives beyond HEC in the future.
- ***Streamlined Communication of Projects:***  
One of the challenges was distilling essential information for each project. Project cards were developed to summarize complex and experimental processes, proving to be a useful tool for simplifying project communication. Each artist was tasked with synthesizing their project's essence, categorizing it, and envisioning the benefits of its potential future implementations. This task prompted reflection on the challenges they could solve, advancing towards the next phase involving SMEs.
- ***Effective Categorization:***  
Tags related to each project are not only useful for facilitating matchmaking but also for mapping a network of connections between the themes addressed by the different projects. They enable multi-level comparisons and highlight intersections and overlaps among the different HTEs developed so far, fostering potential collaborations and synergies among the artists and among the solutions developed through the prototypes.

By continually improving based on user feedback and experiences, HEClab can effectively support and enhance various projects and initiatives within the S+T+ARTS ecosystem and beyond.



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The project is part of the S+T+ARTS programme. S+T+ARTS is an initiative of the European Commission to bring out new forms of innovation at the nexus of arts, science and technology.

Hungry EcoCities aims to explore one of the most pressing challenges of our times: the need for a more healthy, sustainable, responsible, and affordable agri-food system for all enabled by AI. More info: [starts.eu/hungryecocities.nl](https://starts.eu/hungryecocities.nl)