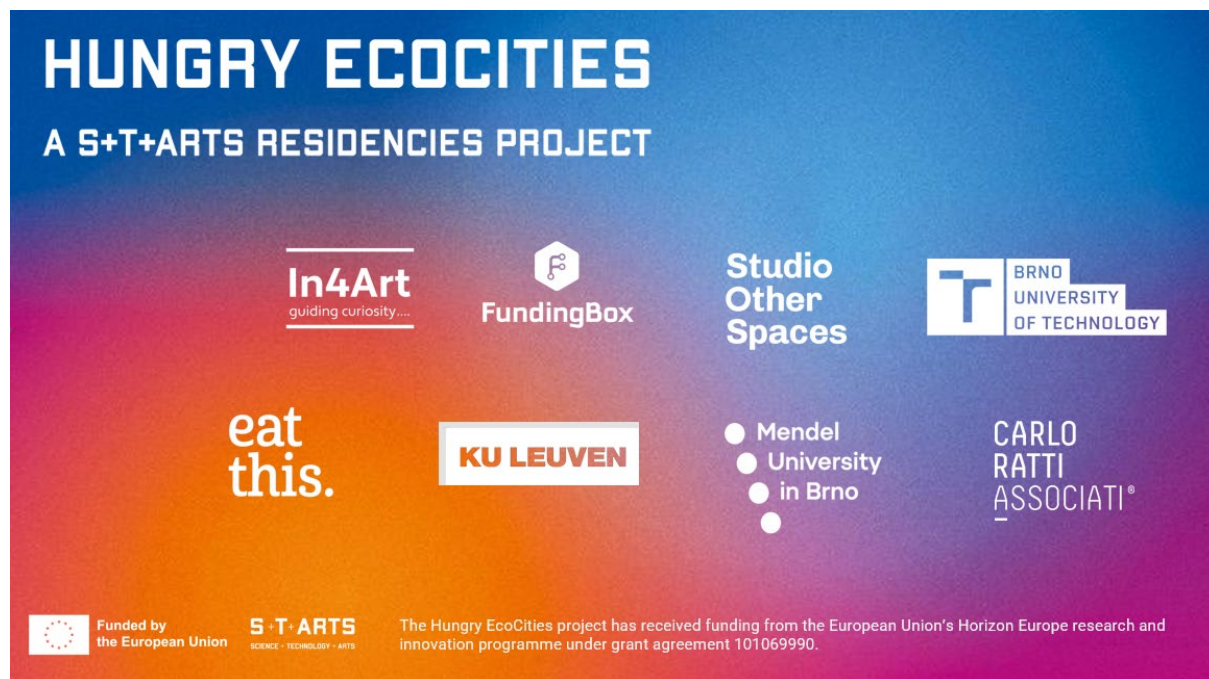




Deliverable 4.7 – Lessons Learned

Version 1.0

Grant Agreement Number	101069990
Project title	Hungry EcoCities
Start date of the project	Sep 1 st 2022
Duration of the project	42 months
Date of submission of the report	22 December 2025
Work package No.	4

Project coordinator: Brno University of Technology

WP leader: Monika Loeve, Carlo Ratti Associati

Lead author: Monika Loeve, Carlo Ratti Associati

Reviewers: Pavel Chaloupsky + Mendel University

Objective of the deliverable

This deliverable aims to provide a comprehensive summary of the activities conducted and key outcomes achieved during the PPE residency, in line with the plans outlined in Deliverable 4.2 (HTE and PPE mentoring plans). It presents an overview of contributors and the program goals defined at the end of the first residency, illustrating each goal through the corresponding activities and their value to participants. The report also captures feedback from the experiments, documents lessons learned, and highlights key takeaways from both residencies, including improvements implemented based on feedback received from HEClab services.

History of changes

Date	Version	Author	Comment
20.06.2024	0.1	Klara Kaluzikova	Setup of deliverable
03.12.2025	0.2	Vincent Leung (CRA) Lija Groenewoud (In4Art)	Deliverable structure
08.12.2025	0.3	Monika Loeve (CRA)	draft
12.12.2025	0.4	Vincent Leung (CRA)	draft
16.12.2025	1.0	Monika Loeve (CRA)	Final draft
19.12.2025		Pavel Chaloupsky (MNDL)	Review
19.12.2025	1.1	Monika Loeve (CRA)	Final

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1. Abstract

This deliverable provides a summary of the activities conducted and the key outcomes achieved during the PPE residency, as initially planned and outlined in **Deliverable 4.2 HTE and PPE mentoring plans**. It presents an overview of the contributors involved in the PPE and the program goals established at the conclusion of the first residency. Each goal is illustrated through the related activities carried out during the residency, highlighting their value to the program and its participants. The report also includes feedback from the experiments, lessons learned, and key takeaways from both residencies.

Some of the findings in this report can be better understood when read in conjunction with **Deliverable 2.4 Feedback on HEClab**.



An overview of all the parties involved in Hungry EcoCities

2. PPE peer-to-peer program

2.1 Background and PPE residency objectives

The Path to Progress Experiments (PPE) represent the second residency of Hungry EcoCities. It took place over a period of 14 months, with the primary objective to identify the business challenges faced by the small and medium enterprises (SMEs) in the agri-food sector. These SMEs were paired with artists with various specialties to come up with creative solutions to address their challenges.

The quantity and diversity of the contributors participating in the PPEs is a testament to their complexity. The 10 experiments were led by 11 artists, 10 SMEs and over 20 experts representing the eight members of the Hungry EcoCities consortium. The experiments also benefitted from dozens of individual collaborators – from those structurally involved in the working process to guest commentators offering insightful perspectives at masterclasses, meetings and other events – across the planning, prototyping and many more facets of the production process.

All the relevant activities were conducted to fulfil the three **PPE peer-to-peer program goals** determined at the end of the first Hungry EcoCities residency:

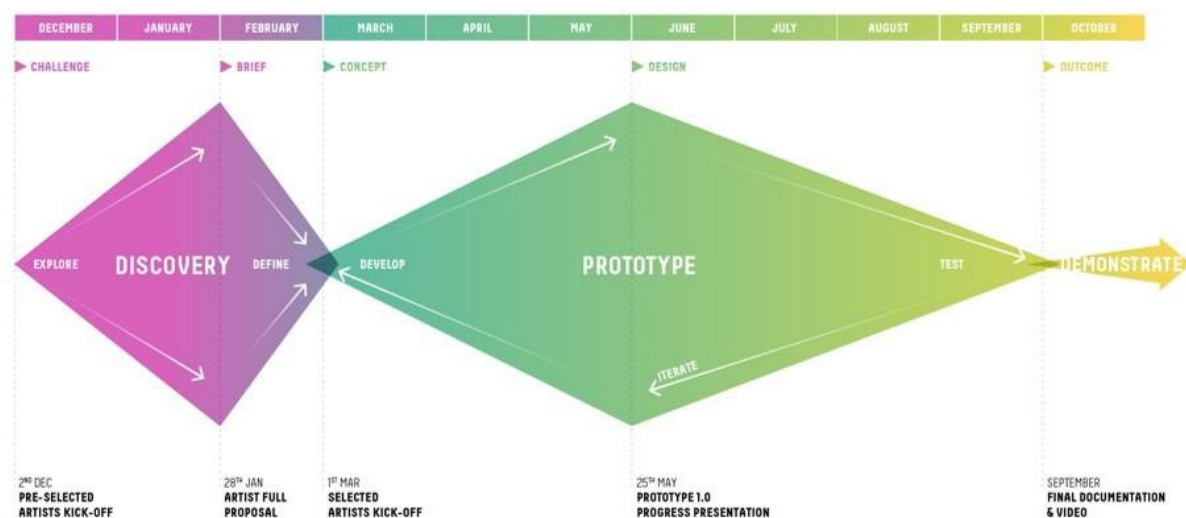
- 1) to allow for cross-pollination between core individuals involved in the projects.
- 2) to support the projects as a group through joint inspiration and information sessions with cross-program relevance.
- 3) to enforce the individual projects through access to external experts.

2.2. PPE residency set-up

Transforming concepts into solutions: Discover – Prototype – Demonstrate

Similarly to the HTE residency, the PPEs followed a cross-cutting approach, moving beyond abstract design-thinking models and instead adopting a “learning by doing” process, in which consistent, practical feedback fueled the experiments’ evolution. The residency consisted of 3 phases:

- In the “Discover” phase, 20 pre-selected artists prepared their applications for the program with the support of the art-driven innovation mentors and webinars disseminating information about the SMEs. They presented their final proposals on the Jury Day, and 10 artist units were ultimately chosen. In parallel, the SMEs were assigned an additional challenge to respond to the HTEs from the first Hungry EcoCities residency.
- The “Prototype” phase began with in-person kick-off events at the SMEs’ premises in March 2025, when artists, SMEs, and mentors refined the experiments’ concepts and laid out the next steps. Over the following months, artists worked closely with the SMEs to create, test and adjust the prototypes. Regular meetings, feedback sessions, and optional Knowledge Sharing workshops ensured the steady progression of the experiments.
- The “Demonstrate” phase took place in September and early October 2025, with the artists and SMEs giving a final presentation of their work and showcasing their experiment prototypes. The demonstration events were held at the SMEs’ premises, industry fairs and other relevant venues, depending on the nature and scope of each PPE.



A flowchart showing the three phases of the PPE residency

2.3. PPE residency goals and completed activities

Building on lessons from the HTE residency and feedback from EU Commission reviewers, the PPE residency implemented three types of meetings, several of which had already been successfully piloted during the HTE programme. These included project-specific biweekly and monthly online progress meetings, in-person meetings and workshops, as well as topical Knowledge Sharing events. The following overview illustrates how these activities supported the different goals of the residency program set out at the end of the HTE residency.

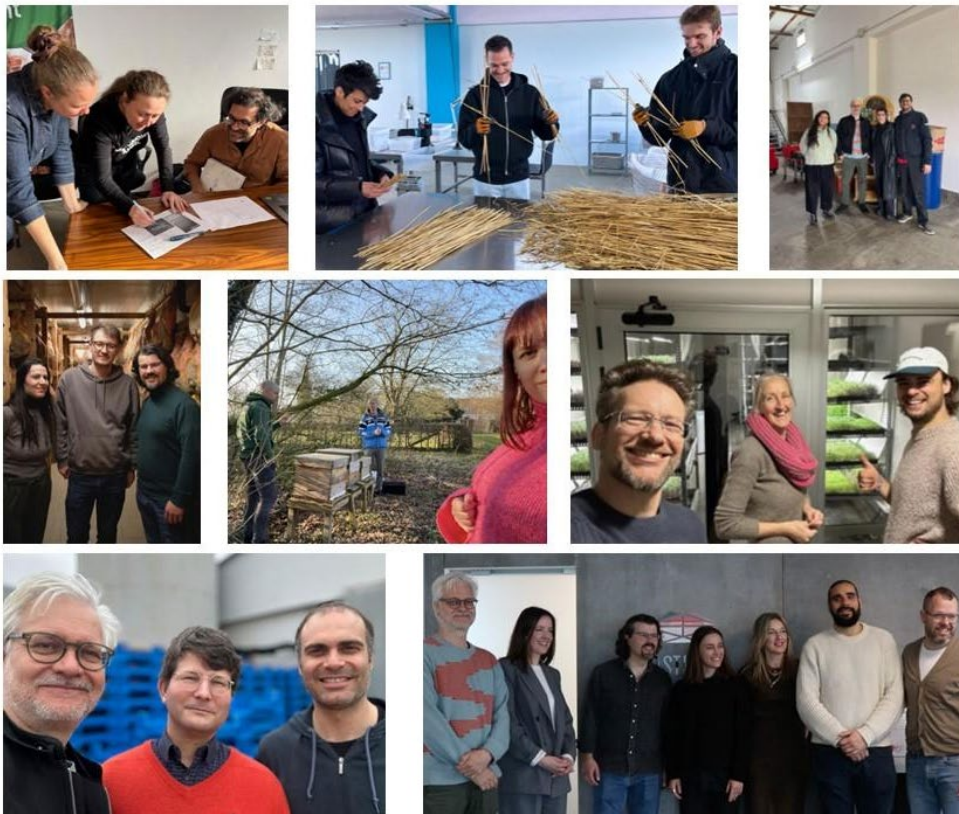
2.3.1 Goal 1: Allow for cross-pollination between core individuals involved in the projects

Working together: Workshops and collaboration events

/ Kick-off session (March 2025)

Following the selection of participating artists, a kick-off event was organized for every PPE, where the SME in question hosted the artist(s) and HEC consortium members at its premises. This set of hands-on workshops provided the artists with an immersive understanding of the SMEs' operational environments, enabling all the parties to learn about the real-world challenges in focus.

This site-specific setup was especially beneficial for the group to refine the initial concept, predict potential obstacles, and determine actionable strategies for the prototyping phase. It also set a positive tone for the upcoming collaboration between the artists and SMEs.



Photos of various kick-off events taking place in the SMEs' premises.

/ Artist Coffee Chats (24 April, 5 June and 25 September 2025)

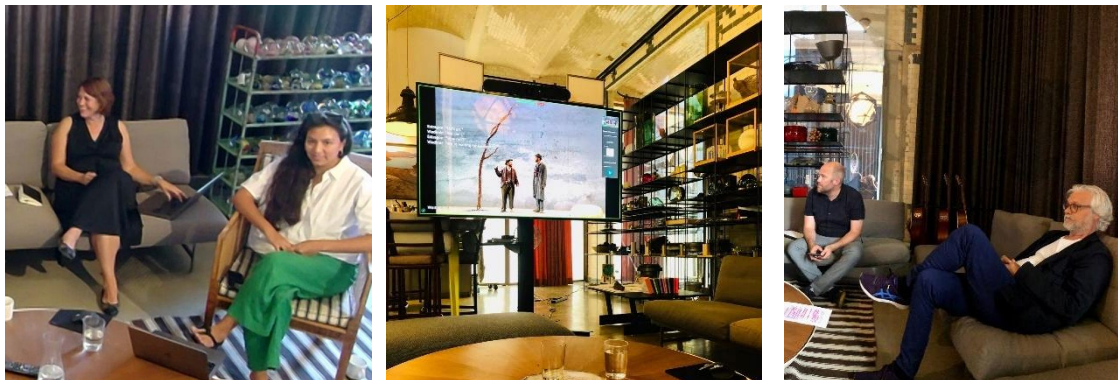
The Artist Coffee Chats served as informal online sessions for the participating artists to share project updates, exchange ideas, and stay connected. As such, these meetings, led by CRA as WP leader, were a vital occasion for peer-to-peer learning, idea cross-pollination and community connection. Each artist unit was required to attend at least two sessions.

Many topics were discussed over the course of the residency. Some of them included reflections on the kick-off events, concept refinement, technical research, early prototyping, real-life testing experiences and post-residency actions. As time went on, the meeting focus shifted from getting artists acquainted with one another's experiments towards the exchange of knowledge, toolkits and feedback. The supportive atmosphere it cultivated could be felt as some artists voiced concerns about their work, upon which they received immediate encouragement and assistance from their colleagues during and after the Coffee Chats.

/ Future Solution Talks (3 July 2025)

The Future Solution Talks was a hybrid event organized and moderated by the three creative studios. The resident artists, SMEs and consortium members were joined by selected industry experts. The latter, having contributed to Hungry EcoCities' development in the early stages of the program, returned to assess how their previous predictions panned out through recorded interviews and live commentaries. In response to the premise of the meeting, "How are you doing?", they examined how recent industry changes and current affairs impacted their work, as well as the drivers of and barriers to innovation.

Such insights unlocked cross-sector dialogs between the guests and SMEs who were tackling similar issues. It thus achieved the intended objectives of sparking inspiration, exploring forward-looking solutions and fostering connection among experiment leads.



Part of the Future Solution Talks took place at the SOS office in Berlin.

/ Joint wrap-up and celebration event (31 October 2025)

An online meeting was held for all the resident artists, SMEs and consortium members to discuss their experiences and the experiment outcomes. The event marked the conclusion of the PPE residency, celebrating the work of the artists and SMEs. It provided an opportunity for all the parties to look back on the 14-month journey and correspondingly, most participants showed a high level of enthusiasm in the conversation.



Artists, SMEs and consortium members gathered at the online wrap-up event.

2.3.2 Goal 2: Support the projects as a group through joint inspiration and information sessions with cross-program relevance

Exploring through masterclasses and inspiration sessions

Masterclasses were optional online sessions open to everyone. Each masterclass lasted 45 minutes, featured a specific subject at the confluence of AI, art, sustainability, and the agri-food sector, and was followed by a discussion segment. The hosting duty was divided among HEC's consortium members, scientific advisors and partners.

These masterclasses enriched the residency experience by offering both academic and practical perspectives. They supported and inspired all the participating artists, SMEs, and consortium members throughout the residency.

/ Intellectual property management session by In4Art (20 June 2025, see Annex 1)

The first session focused on collaborative intellectual property, exploring the related challenges and opportunities. Participants examined what constitutes intellectual property and how collaborative innovation functions in practice through concrete examples. The session was carried out for informational purposes and did not provide legal advice.

/ AI discovery session by Robin De Croon (30 July 2025)

The goal of this masterclass was to demonstrate how to make decisions related to AI models understandable for specific audiences, domain experts and the general public. The successful implementation of the technology requires compliance with the EU AI Act and other relevant institutional frameworks, as well as user acceptance. The session covered design techniques including visualizations and conversational interfaces, as well as practical case studies like visual dashboards and recommender systems to illustrate how AI could be utilized with respect to the circumstances of different professionals and the values of consumers.

/ Business modelling workshop by Aart van den Bos (5 September 2025, see Annex 2)

The objective of this masterclass was to discuss entrepreneurship and other relevant aspects of creating a business. Besides fundamental theories, the class cited a variety of real-life examples, focusing on the interaction among businesses and the struggles they face. It was received positively by the participating artists and SMEs, who deemed the learnings practical to apply to their work.

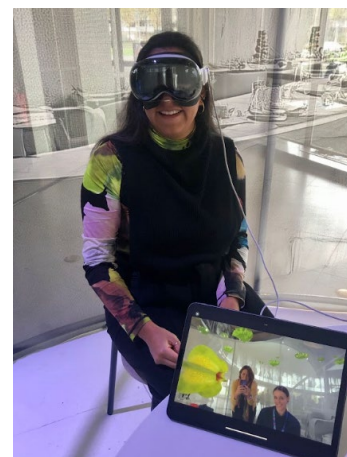
Further to that, we attended various key events in the agricultural and design sectors during the residency period to consolidate HEC's connection with different business and public communities.

/ GreenTECH (10-12 June 2025)

The event taking place in Amsterdam is one of the biggest forums on horticulture technology worldwide. Hungry EcoCities took an active role there in the 2025 edition with talks given by Carlo Ratti Associati (urban farming) and In4Art (data and technology), as well as an interactive workshop featuring The Council of Foods, one of the experiments completed by Nonhuman Nonsense during the first residency.

/ Dutch Design Week (19-27 October 2025)

Hungry EcoCities participated in the latest edition of the Dutch Design Week to present the results of its work over the last three years, which was above all anchored by the 19 experiments completed over the two residencies. Following that, the consortium also unveiled its collaboration with Co/Lab, an initiative of the Dutch Design Foundation, under the title "Hungry for Change" to test the experiment outcomes and learnings. Considering the event attracts an average of 350,000 visitors from across the world, it was a moment for us to promote our vision and in return, gather significant feedback from public stakeholders, the targeted end users of some of the experiments.



In4Art presenting (left) and a test of the PPE Phygital Seasoning (right) at the Dutch Design Week

2.3.3 Goal 3: Enforce the individual projects through access to external experts

Targeted sessions with external specialists on a need basis

Throughout the residency period, we kept tabs on every PPE through regular meetings taking place every two weeks. A core part of these meetings was identifying the needs of the artists and SMEs. Whenever appropriate, we connected them with the experts in the agri-food, design and other sectors from our network to advance their experiments. Depending on the specific objectives of the PPE in question and the timing, the connection could take the form of inspiration, professional advice or practical assistance.

Given the collaborative nature of the PPEs, the focus of the first phase was to get the artists and SMEs involved to know each other, define the scope of their research and draft a timeline of tasks for the months to follow. In this way, external specialists played a minimal role, which distinguishes the second residency from its HTE predecessor.

The second phase focused on prototyping. Some artists and SMEs were introduced to professionals specializing in the PPEs' focus areas. Beyond commentaries, some of them played an integral role in the experiments' progress. This was the case of Olaya Miel. The ecological beekeeping initiative not only spoke about the needs and challenges faced by local apicultural businesses, but also let non-invasive sensors be installed in its hives, which yielded crucial data to Be(e)together. The artists of the experiment also received an online masterclass from Natasja Roodbergen to understand the behavior of wild bees.

In the final phase, the artists and SMEs worked to put together assets and events that demonstrated their experiment results. The outcomes of all 10 PPEs were shown to industry leaders with diverse expertise, who offered critical feedback on their innovation and relevance to the agri-food business, as well as suggestions to scale up the prototypes. For instance, the compostable bar tools and interior panels from Straw Return were presented to the managers at the Greek boutiques of an international coffee chain, as they commented on the prototypes' compatibility with the retail venues. Meanwhile, a dedicated demonstration event was held for Re.Source-Society, in which aquaponics and greenhouse experts lauded the climatic moderation solution to alter either the indoor temperature or humidity while keeping the other unchanged.

3. Lessons learned

We strived to maintain an open and collaborative environment throughout the project. While the residency structure was predefined, we, whenever possible, sought the artists' and SMEs' input on how the activities should be rolled out (an example being the topics of the masterclasses). All the parties involved had ample opportunity to provide feedback on the residency throughout the production period, whether after every peer-to-peer meeting or through the final deliverable to summarize the overall program experiences. (See Deliverable D4.8).

Below are factors that, upon final reflection, contributed to the success of the residency.

- **Innovation through interdisciplinary collaboration:** The collaboration between SMEs and artists proved highly successful, with diverse backgrounds fostering fresh approaches and mutual learning.

- **Building momentum from day one:** Breaking down the overall residency timeline into task-specific milestones helped design exploration and ensured all the required materials were delivered in a timely manner. The “Discover” phase was especially important. Whilst its overall length could be reduced to make room for prototyping, the duration of the introductory in-person meetings and workshops could be extended to improve mutual understanding.
- **Staying aligned and fostering team spirit:** Regular meetings played a crucial role. Many artists and SMEs appreciated the chances to catch up with their industry and academic mentors. They noted these occasions helped them keep the experiments on track conceptually, keep pace with the production schedule, and foster a strong sense of team cohesion.
- **Maintaining a fluid flow of insights:** Dedicated internal knowledge-sharing moments, such as Artist Coffee Chats, masterclasses and Future Solution Talks, proved highly valuable. On these occasions, the 10 pairs of artists and SMEs channeled their collective intelligence to assess the individuals experiments. Most importantly, by openly sharing and documenting the expectations and failures of the production process, the artists drew constructive suggestions and new perspectives from one another, some of which were significant to the projects’ progress.
- **Mentorship extends beyond the project:** In several experiments, the creative studios assumed a bigger role than mentors advancing research and prototyping. With extensive experience in negotiating the technical and non-technical issues arising around design projects, they offered crucial moral support to the artists, some of whom felt stress and frustration when they encountered unforeseen circumstances that hindered their work.
- **Nothing replaces physical presence:** The most fruitful meetings throughout the residency were those when the artists and SMEs met on-site, with the caveat that it was harder to let everyone be heard when the number of participants increased. In addition to mandatory events where all PPEs were represented, the artists and SMEs were actively encouraged to form smaller groups among themselves and set up separate in-person working sessions, so that all the parties involved could receive sufficient attention and benefit from them.

4. Consortium takeaways from the work packages

Considering the substantial scope of HEC and the number of stakeholders involved, six work packages were devised to ensure we had oversight of all the program’s elements. A consortium member was assigned to each work package to lead the tasks associated with it.

The following segment surveys the initial goals of different work packages and a summary of our experiences at the end of the program.

WP1 - Thematic expert group program | Lead: NTWK

The objectives of this work package were setting the stage that would eventually lead us to the expected outcomes. We established the Hungry EcoCities knowledge hubs, bringing together experts with industry and academic expertise who could help develop HEC’s intellectual framework and support art-driven projects. The hubs identified pressing challenges within the agri-food system to guide the experiments and encourage connection among all the participants during and beyond the residencies.

While early vision development was essential, we found out that it was equally important to schedule regular evaluation sessions to ensure all the working elements were aligned and discuss new ideas that emerged during the project period.

WP2 - Hungry EcoCities virtual fab lab (HEClab) | Lead: MNDLU

This work package aimed to build a virtual fab lab for conceiving, exploring, and prototyping AI-enabled agri-food use scenarios that could be scaled up to support sustainable and ethical food production and consumption practices.

We defined the requirements from artistic and technological perspectives, developed a digital environment linked to existing platforms, and established a framework for art- and AI-driven experimentation. Tools such as HEClab proved useful, but to maximize the possibility of uptake, they should not function as a stand-alone mechanism. Compatibility with systems already familiar to the industry, achievable with sufficient time allocated to development and testing, is crucial.

WP3 - Open calls and matchmaking | Lead: FBA

The focus of WP3 was identifying, mobilizing, and matchmaking at least 50 potential art-driven experiments, split between 20 HTEs and 30 PPEs. An impartial and competitive process was implemented to select the 40 strongest proposals to be presented on an interactive Jury Day. Eventually, the 20 most promising ideas became part of WP4 of Hungry EcoCities: 10 from the first call (HTEs) on art-driven usability experiments, and 10 from the second call (PPEs) on art-driven use-case prototyping.

The selection process drew inspiration from other S+T+ARTS residencies and the Better Factory art-industry KTE program. A sequential approach was used to progressively match artists, studios, experts, and, for the second call, end-users. We discovered that the limited residency timeframe left little time for pathfinding. Rather than early-stage ideas, the SMEs entering the residency with existing and clearly defined business challenges were the most productive in the experiments.

WP4 - Hungry EcoCities studios fellowship program | Lead: CRA

This work package focused on executing and scaling up the art-driven experiments within the HTE and PPE fellowship programs selected through WP3. The HTEs supported the development of the HEClab virtual fab lab, while PPEs delivered use-case prototypes to accelerate agri-food innovation. Each residency spanned nine months (14 including matchmaking and proposal preparation).

Key objectives included allocating mentors and integrating experiments into the HEC network, executing the experiments to achieve the KPIs, ensuring smooth execution and KPI achievement, scaling up through investors and partners, and collecting feedback to improve HEClab and to guide future S+T+ARTS collaborations.

The program successfully cultivated valuable prototypes: digital ones in the HTEs and ones focusing on concrete business challenges in the case of the PPEs. We believe reallocating part of the initial concept phase to development and prototyping would give the artists and SMEs more time to polish their experiment and improve the outcomes.

In addition, the residencies benefited greatly from various forms of contact. Kick-off meetings established momentum from day one; monthly meetings kept the experiments on track; knowledge sharing activities allowed participants to follow each other's progress and foster a sense of group cohesion.

WP5 - Business development and sustainability | Lead: In4Art

The objective of this work package was to expand the reach and impact of Hungry EcoCities and HEClab. Various actions were taken to increase awareness and recognition among new SMEs, technology providers, artists, and other DIH representatives. These include the dissemination of project outcomes through targeted media and information systems, the extensive promotion of the open calls for art-driven experiments, integrating members into HEClab, linking HEClab with RAMP, STARTS, and SAH networks, and support for consortium companies in developing their business models and plans.

Based on our experience, future outreach efforts could be strengthened by actively leveraging the consortium partners' networks, including universities. Creating opportunities for participants to present their work to broader audiences, both during the residency and after its completion, would further amplify visibility, exchange, and impact.

WP6 - Project management and coordination | Lead: BUOT, Involved: IN4ART

WP6 concerned the efficient management of the overall project. This encompasses the coordination of Hungry EcoCities, effective communication with the EC, the consortium, and external stakeholders, as well as quality assurance, risk management, financial, legal, and administrative oversight, data management in line with Open Research Data requirements, and IPR management.

Such work was carried out as planned, with regular consortium meetings guaranteeing continuity and progress. We also found in-person meetings, even the ones outside the scope of residency, beneficial to team building.

Annexes

Annex 1

Selected slides of the intellectual property management session

S+T+ARTS

Agenda

HUNGARY ECOCITIES
A S+T+ARTS RESIDENCIES PROJECT

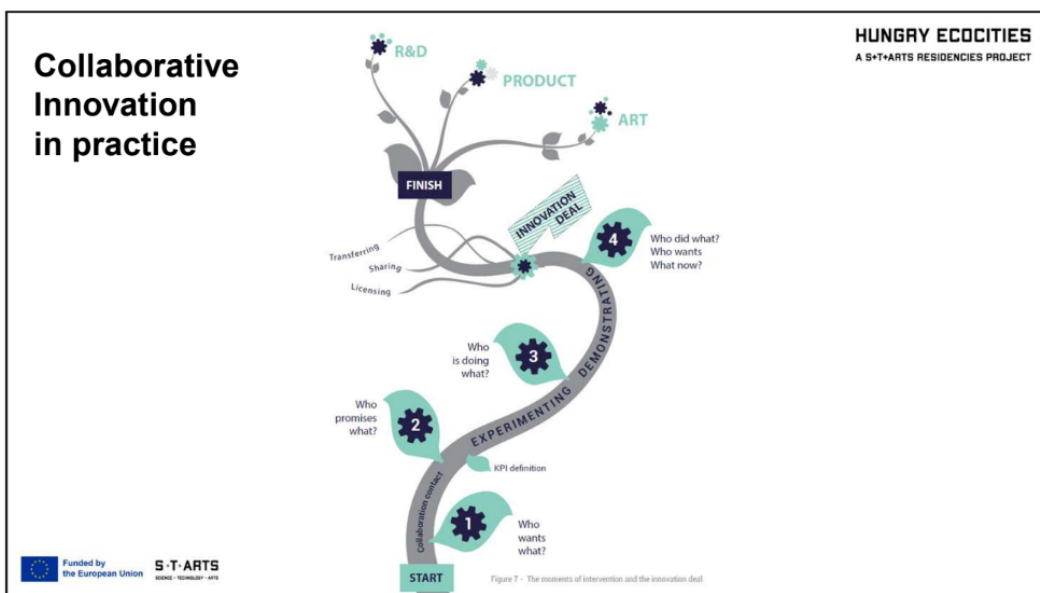
What is Intellectual Property
When does something become IP?

What is Collaborative Innovation
Code of Conduct & when is an invention collaborative?

Challenges & Opportunities
Examples from similar projects

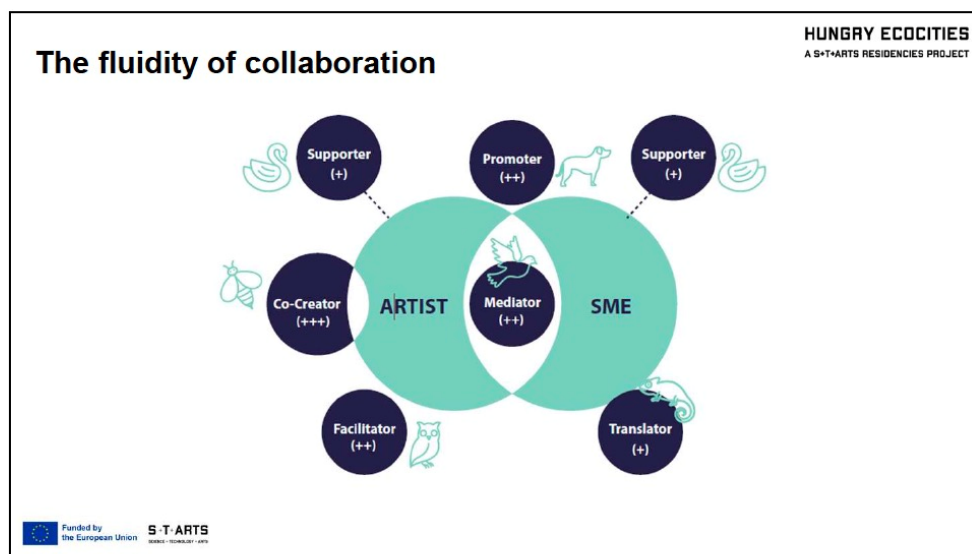
EU AI Act
When does the AI Act become relevant to consider?

Time for reflection and discussion
How is your own project evolving?



Code of Conduct		HUNGARY ECOCITIES A S+T+ARTS RESIDENCIES PROJECT
Values	Experiments conducted with public funding should aspire to benefit the general public. We are committed to do so through two principles: 1] open-source sharing unless 2] knowledge sharing	
Return	Experiments should aspire to achieve a positive return on investment through pushing for either/or: scientific return, artistic return, societal return, business return, ecological return.	
Collaboration	Experiments should be based on a healthy, respectful, safe collaboration environment by ensuring: transparency on requirements and expectations, equality in communication and treatment, inclusivity and honesty.	
Information	Experiments shall comply with the GA and SGA contractual agreements at all times	
IP	Experiments shall make explicit the produced IP and protect IP owners from misuse, as long as this does not affect the values principle.	
Crediting	Experiments shall acknowledge all those parties and programs involved in the development through fair and just crediting principles	

11



12

Annex 2

Selected slides of the business modelling workshop

Agenda:

11.00 -11.15 Welcome & Introduction

11.15 -11.45 Theoretic Framework & Examples

11.45 -12.00 Ppt per company & Discussion

12.45 -13.00 Buffer & Finalise

DIFFERENT APPROACHES TO FOOD AND FARMING



India



Deteriorating tea gardens in Darjeeling, India. 40% yield drops due to water stress and soil fertility loss as a result of decreasing soil organic matter and structure as above ground pruning material hardly decomposes because of a lack of microbial activity.

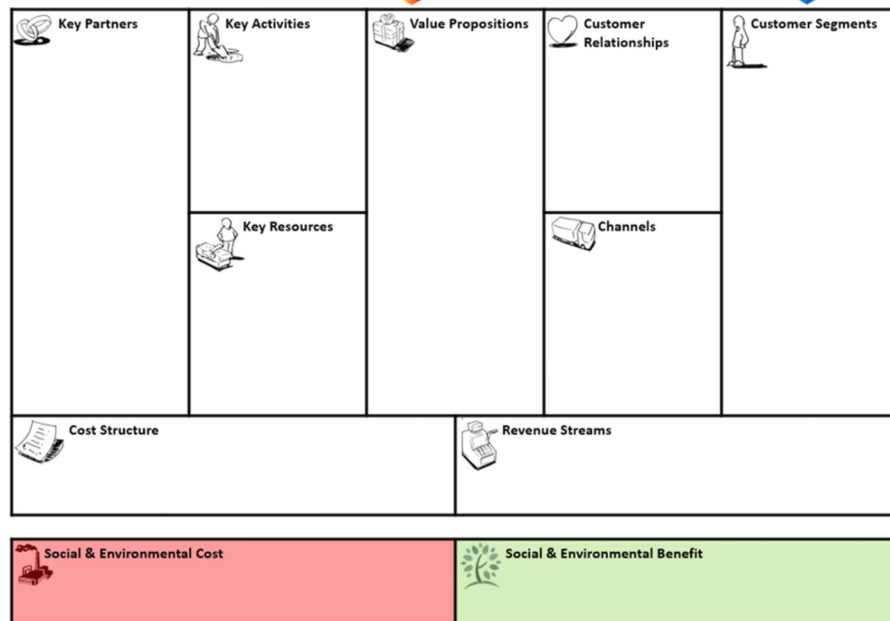


Training for small-scale growers to use biomass for composting, to be ready in 8 weeks.

Example - Customers

- **Governments & municipalities** (need sustainable waste management and emission reductions).
- **Industries & agribusinesses** (food processors, supermarkets, beverage companies) with organic waste streams and sustainability targets.
- **Farmers** (smallholders and large farms) needing affordable soil improvers.
- **Carbon credit buyers** (companies, investors, funds) needing credible offsets.
➔ Market type: **Multi-sided market** (interdependent groups: waste providers, compost users, carbon credit buyers).

Business Model Canvas



About Hungry EcoCities



**Funded by
the European Union**

S + T + ARTS
SCIENCE + TECHNOLOGY + ARTS

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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