



HERIFORGE D4.2

Common organisational and governance
models of the HERIFORGE Hubs Network

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Executive summary



This document represents Deliverable 4.2 of Work Package 4 of the HERIFORGE project. According to the project proposal, this deliverable shall provide Common organisational and governance models of the HERIFORGE Hubs Network. The purpose of these models is to ensure appropriate communication and collaboration after the project ends to sustain and foster cross-border strategic collaboration.

The document looks at the potentials and specialization of the three hubs constituting the HERIFORGE Hubs Network. It defined this network as a cross-border excellence hub. It analyses it based on the assumptions made by the project at the proposal stage, deepened by the findings provided by tasks 2.1, 2.2 and 4.2, especially in deliverables D2.1 and D.4.1. It further draws on the insights of the internal strategic workshop used as a platform to discuss possible solutions and requirements for governing and organizing the HERIFORGE cross-border excellence hub after the completion of the current project. Relevant literature input is used to elaborate the proposed governance and organizational models.

The proposed models recommend incremental building of the network governance through three levels: the first based on the existing project structure starting at month 18 of the project duration, second established during the second half of the project and based on establishing a governance separate from the project bodies, and the 3rd for post project operation. For this level three options ranging from continuation of the model of voluntary participation similar to the project consortium, through a federated association of entities up to the establishment of a formal entity for the representation of the HERIFORGE excellence hub.

These recommendation shall be subject of further discussion, modification and adaptation by the HERIFORGE consortium and its bodies. The final governance models, shall be established as deliverable D4.5. *Updated COGM*.

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List of acronyms

Acronym	Description
3D	Three-dimensional
CCI	Cultural and Creative Industries
CH	Cultural Heritage
CHI	Cultural Heritage Institutions
COGM	Common Organisational and Governance Models
CTL	Catalink
Cyl	The Cyprus Institute
DARIAH	The Digital Research Infrastructure for the Arts and Humanities
Dm.n	HERIFORGE deliverable m.n
ENoLL	European Network of Living Labs
EU	European Union
FCC	Fundacja Centrum Cyfrowe
HHN	HERIFORGE Hubs Network
IBL PAN	Instytut Badań Literackich Polskiej Akademii Nauk (<i>The Institute of Literary Research</i>)
ICH	Intangible Cultural Heritage
IP	Intellectual Property
JPRP	Joint Pilot Research Projects
JPRP-CY	The Cyprus hub Joint Pilot Research Project
JPRP-TR	The Türkiye hub Joint Pilot Research Project
KER	Key Exploitable Results
KPI	Key Performance Indicator
KT	Knowledge Transfer



KU	Koç University
Mn	n -th month of the project
NAO	Network Administrative Organisations
NIM	Narodowy Instytut Muzeów (<i>National Institute for Museums</i>)
On	Objective n
PSNC	Poznan Supercomputing and Networking Center
R&I	Research and Innovation
S3	Smart Specialisation Strategies
SME	Small and Medium Enterprises
ST	Steering Committee
TTO	Technology Transfer Office
WP n	Work Package n
XR	eXtended Reality



1.2. Definitions

1.2.1. Hubs

Hubs are place-based innovation ecosystems established in Poland, Cyprus and Turkey, providing a research and innovation (R&I) environment for the responsible reuse of cultural heritage through XR technologies. They bring together stakeholders from research, industry, public administration and society, enabling knowledge exchange and collaboration within a cross-border context. The three hubs operate under a common framework aligned with the R&I strategy defined in WP2 (Task 2.2).

1.2.2. Excellence hubs

Excellence hubs are strategic platforms built on specialised expertise and the strengths of local ecosystems. They ensure complementarity between hubs and support the coordinated implementation of cross-border R&I activities. For strategic purposes, the HERIFORGE Hubs Network is treated as a single excellence hub integrating all three national hubs. The common governance model will define the framework of Integration of three specialized local hubs into one excellence hub.

1.2.3. Network of hubs and its operationality

According to Gül, M. et al., 2025, HERIFORGE aims to develop a network of three interconnected place-based ecosystems. The project seeks to establish an excellent research and innovation (R&I) environment that fosters innovation in the cultural and creative industries (CCIs) through the responsible use of extended reality (XR) technologies and cultural heritage.

According to PSNC (2023), task 4.1 establishes HERIFORGE Hubs Network by means of consolidation of existing ecosystems into a fully operational network of hubs.

Fully operational is defined here as possessing structure and procedures for certain observed circumstances such as e.g. new initiatives or new members.

The HERIFORGE Hubs Network is a cross-border structure integrating three national hubs into a shared R&I ecosystem, as defined in the project proposal (KER3). It facilitates collaboration, supports knowledge exchange and enables the implementation of joint innovation activities across regions. In this context, operationality refers to the capacity of the network to function effectively based on defined structures, governance mechanisms and procedures. A fully operational network is able to coordinate activities, onboard new members and initiate collaboration in a structured and consistent manner. The network ensures structured information exchange, defines common approaches to advocacy activities and supports coordinated external representation. Its level of operationality is described through three stages:

- **Level 1:** operating within the project framework

The network is currently operational at Level 1. It exists as a collaborative group of partners sharing information and aligning strategies informally. This level is supported by the stakeholder mapping conducted in D4.1, which identified over 460 stakeholders across Poland, Cyprus, and Türkiye.

- **Level 2:** formalised and operational based on established governance and procedures

Desired state at the end of the project - by the end of the HERIFORGE project, the network should transition to a formalized model. This includes defined rules for information exchange, external representation, and potentially a "General Assembly" or "Steering Committee" to govern cross-hub activities.

- **Level 3:** sustainable beyond the project lifecycle



Sustaining operations after the project end, the ultimate goal is a self-sustaining network that exists independently of the initial EU funding. This requires a dedicated financial structure (e.g., membership fees or new project-based funding) and potentially a legal entity to advocate for policies at the EU level.

The development of the Hubs Network is deeply integrated with several foundational project documents that provide the baseline for its governance and strategic direction:

- **D2.1** - Policy Landscape Analysis used to identify critical policy gaps and regulatory barriers in Cyprus, Poland, and Türkiye, such as the lack of XR-specific mentions in cultural heritage policies,
- **D4.1** - Hubs' Profiles and Inclusivity Strategies provides the core understanding of regional ecosystem needs and establishes the initial objectives for stakeholder engagement and inclusive innovation,
- **D2.2** - Strategy for Innovative and Responsible Reuse (Draft) defines the overarching strategic framework that the hubs must translate and communicate to their respective stakeholders

1.2.4. Common governance models

Common governance models define the shared organisational framework of the HERIFORGE Hubs Network, ensuring coordination across hubs in line with the project proposal. They establish rules for decision-making, communication and stakeholder engagement, including defined roles, procedures for onboarding new members and workflows for coordinating joint activities. The framework also supports knowledge exchange through structures operating within and across hubs. The governance models support both effective operation during the project and the long-term sustainability of the network beyond the project life.

1.3. Assessment of hubs and hubs network statuses in HERIFORGE

The performance of the HERIFORGE Hubs Network will be measured against specific strategic and operational benchmarks. These are aligned with the project's Key Performance Indicators (KPIs) to ensure that the transition from a project-based initiative to a sustainable network is measurable.

- **KPI 6** (Knowledge Exchange Events) - focus on the frequency and diversity of cross-border events that facilitate the transfer of XR expertise into the cultural heritage (CH) sector,
- **KPI 7** (Researchers Trained) - about tracking the number of researchers within the regional innovation ecosystems who have gained specific competencies in responsible XR reuse,
- **KPI 8** (Workshops and Trainings) - about delivering structured capacity-building sessions. This is a critical operational KPI identified in the Hubs Strategy Framework to ensure knowledge transfer actually occurs,
- **KPI 9** (External Entity Participation) - refers to measuring the engagement of organizations outside the original consortium, particularly in the co-development of guidelines for responsible XR reuse.

Timeline for KPIs:

- **M18** (Milestone) - initial establishment of the network and reaching Level 1 operationality,
- **End of project** - achieving Level 2, characterized by formalized cooperation and a stable governance structure,
- **Post project** - moving toward Level 3, where operations are sustained through independent financial structures or investment plans
-

1.4. Methodology

The team tasked with elaborating this deliverable used the following measures to propose the first version of COGM:

- Analysis of the potentials and specializations of the three hubs constituting the Heriforge Network: that work included using the input from the aforementioned project tasks and relevant deliverables produced by those tasks.



- Interactive work over a strategic workshop organized by the deliverable authoring team. This workshop was an internal interactive session that allowed for deep discussion of the needs, requirements and possible governance solutions for the cross-border excellence hub.
- Drawing from relevant literature to propose solutions working for the type of structures similar to HHN.

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workflow that connects scientific CH documentation with creative XR interpretation serving the needs expressed by the Turkish ecosystem: XR for CH for educating the public, strengthening cultural tourism, ensuring long-term preservation, while enhancing inclusivity in heritage representation.

According to D4.1, the Türkiye Hub ecosystem is dominated by public-sector institutions, municipalities, development agencies, archaeological sites and museums, exhibiting strong cross-disciplinary capacity and pronounced interest in XR for education, tourism, and long-term preservation. These insights inform the JPRP-TR's emphasis on participatory validation, cultural sensitivity, and cross-institutional collaboration, as well as the attention given to IP, access rights, and ownership in the creative aspects of narrative —issues that repeatedly emerged as structural weaknesses across the TR stakeholder network.

Insights generated through Task 2.1 (Policy Landscape Analysis) pointed to a fragmented policy environment surrounding digital and XR-related heritage work in Türkiye, including gaps in Law No. 2863 on Conservation of Cultural and Natural Property and persistent uncertainties around digital rights management. These findings challenge the structural baseline for defining project requirements, identifying institutional constraints, and determining the governance needs for - both tangible and intangible - cultural heritage digitization projects in XR. Complementing this analysis, Task 2.2 (Cross-Border Research and Innovation Strategy) aims to offer strategic alignment with the broader HERIFORGE vision to become a Network of Hubs enabling cross border innovation. Proposing a case study pilot project to elaborate the policy gaps in Türkiye and tackle obstacles with engaged research methodologies is the roadmap proposed to ensure that outcomes from JPRP-TR feed into a shared European approach to cultural heritage innovation. The goal of the TR Hub with its JPRP focusing on multimodal ICH workflows is to forge the local strengths with the identified local gaps in order to use the momentum of the Heriforge Hubs Network to push through the TR Hub's bottlenecks and create an innovative learning environment.

2.3. Poland

The Polish Hub brings together advanced technological infrastructure with strong expertise in digital humanities, user research, and open culture practices, creating a balanced and complementary ecosystem for cultural heritage innovation.

At its core, Poznań Supercomputing and Networking Center (PSNC) provides robust technological capacity, including high-performance computing, data storage, and advanced digital services supporting the digitisation, management, and dissemination of cultural heritage resources.

This technological backbone is complemented by the Digital Humanities Centre at the Institute of Literary Research of the Polish Academy of Sciences (IBL PAN), which introduces a strong research and user-centred perspective into the hub. With expertise in UX, audience studies, and the reuse of cultural data, the Centre focuses on how users engage with digital heritage and how XR-based experiences can be designed to be meaningful, usable, and accessible. This perspective is essential in ensuring that technological innovation is grounded in real user needs and supported by empirical research.

At the same time, the Centre is embedded in European research infrastructures and networks, including OPERAS, and actively contributes to the development of open science and open data practices. Its connections with initiatives such as DARIAH and the European Open Science Cloud (EOSC) position the Polish Hub within a broader European ecosystem, enabling knowledge exchange, interoperability, and access to international expertise.

Insights from the ecosystem analysis (Tasks 2.1 and 4.1) point to a landscape shaped by a strong presence of public institutions—particularly museums—alongside a still fragmented innovation environment, where collaboration across sectors remains limited and intermediary roles are underdeveloped. Within this context, the Polish Hub naturally



assumes the role of a connector, linking technological infrastructure, cultural institutions, and user-oriented research perspectives.

In addition, Fundacja Centrum Cyfrowe contributes to the hub's capacity in the areas of civil society engagement, digital rights, and policy-oriented activities.

Overall, the Polish Hub is characterised by the integration of infrastructure, research, and societal perspectives. Through this combination, it contributes to the development of inclusive and impactful XR solutions for cultural heritage, in line with the strategic pillars of Research, Development, and Inclusivity defined in D2.2.

3. Hub roles designation within the network of hubs

The HERIFORGE hubs operate as specialized nodes within a cross-border network, bridging the gap between Cultural Heritage (CH) and Extended Reality (XR) technologies. Their strategic focus is divided into three core pillars: Research, Development, and Inclusivity.

According to Visions Objectives and Actions in Gül, M. et al., 2025: “(...) *Cyprus and Poland envision futures centered on smart cities where XR is widely adopted and embedded into daily life. In contrast, participants from Türkiye did not perceive the future positive, reflecting deeper concerns about national conditions and structural limitations. Each country (also) presents distinct characteristics (...) For example, Cyprus, as an island nation with a smaller population and domestic market, must integrate more quickly into international markets to ensure sustainable growth. Poland is a rapidly developing economy, though its growth is tempered by the regional impact of war. As a stable country hosting many Ukrainian citizens, Poland has unique opportunities to tap into both local and incoming talent, enhancing its XR and cultural heritage innovation ecosystem. **For the positive scenario to materialise in Cyprus and Poland, stronger collaboration with municipalities and local governments will be critical, especially to embed XR into urban planning and city-wide policy frameworks. In Türkiye, while the country remains a dynamic and growing economy, it also faces challenges from regional instability and domestic political and economic pressures. These challenges contribute to a talent outflow, particularly in fields like XR and cultural heritage.** However, this also presents a **strategic opportunity: the emerging diaspora of Turkish professionals can become a vital asset for building international collaborations** and re-engaging with the national ecosystem. For this reason, connecting with the diaspora should be a strategic priority for Türkiye.*

Recognising both the shared characteristics and unique contexts of the three hubs, an overarching vision has been defined to harness their core strengths and provide a common direction. As **a unifying aspiration, it aims to position the HERIFORGE Hubs Network as a leader shaping the current and future practices. The vision is Trendsetter in XR and Cultural Heritage”.**

The vision presented here shows a future shaped by creativity, innovation, and collaboration. The hubs are positioned not only as sites of **experimentation and excellence** but also as **models for emerging practices, ethical standards, and inclusive approaches**. By aiming to **lead rather than follow**, the vision aspires to create a dynamic space where diverse perspectives converge, and new possibilities for XR and cultural heritage are continuously explored and defined.

Answers on how to do it: by advocacy (there are obstacles in the fields), by enabling cross-border innovation, collaboration, inclusivity. According to Gül, M. et al. 2025, table 13-17; HHN should pursue the 5 objectives listed below to realise the vision.

- **O1:** Grow a dynamic community and foster productive collaborations.
- **O2:** Enhance the access to funding and commercial and economic viability for XR in cultural heritage,
- **O3:** Foster continuous and inclusive learning opportunities in XR and cultural heritage,
- **O4:** Facilitate international exchange and global recognition for XR in cultural heritage,



- **O5:** Advocate for policy and institutional awareness on XR in cultural heritage.

3.1. Analysis of hubs roles within strategies

Research Strategy

Bridging Policy and Practice, the research strategy focuses on identifying and addressing regulatory and knowledge gaps that hinder the responsible reuse of cultural heritage.

- **Policy Landscape Integration** - hubs leverage findings from the D2.1 Policy Landscape Analysis to advocate for the inclusion of XR in national and regional Smart Specialisation Strategies (S3),
- **Addressing Regulatory Gaps** - research efforts are directed toward clarifying legal ambiguities, such as Intellectual Property (IP) rights, copyright, and the licensing of "digital twins" of cultural assets,
- **Evidence-Based Advocacy** - the hubs generate white papers, policy briefs, and cost-benefit analyses to demonstrate XR's value to ministries and funding agencies,
- **Finally, knowledge transfer** as "Knowledge and Exchange Transfer Offices," hubs consolidate R&I insights into practical guidelines for the sector.

Development Strategy

Innovation Brokerage, the development strategy aims to lower barriers to entry for Small and Medium Enterprises (SMEs) and Cultural Heritage Institutions (CHIs) through resource pooling and incubation.

- **Innovation Brokerage** - hubs act as facilitators that connect technology providers with museums and researchers to co-produce innovation,
- **Resource Provision** - a key planned action is the mapping and sharing of XR tools, 3D scanners, datasets, and software licenses to create economies of scale,
- **Project Incubation** - through Open Calls (offering up to €50,000), the hubs financially and technically support pilot projects that solve specific CH-XR challenges,
- **International Connectivity** - hubs serve as gateways to global networks, connecting local initiatives with EU infrastructures like Europeana3D, DARIAH, and Time Machine.

3.3. Inclusivity Strategy

Responsible and Participatory Reuse, aligned with the D4.1 Hubs' Profiles and Inclusivity Strategies, this pillar ensures that technological advancements do not exclude marginalized groups.

- **Quadruple Helix Engagement** - hubs cultivate ecosystems where academia, the public sector, the private sector, and civil society engage as equals,
- **Accessibility by Design** - a core responsibility is co-developing practical accessibility toolkits and guidelines for XR experiences to meet physical, cognitive, and sensory needs,
- **Regional Contextualization**
 - i. Cyprus: Acts as a neutral space for bicomunal collaboration across the divide.
 - ii. Türkiye: Mediates between fragmented cultural and tech communities.
 - iii. Poland: Connects isolated museums with XR technologists to overcome legal and technical silos.
- **Ethical Standards** - hubs organize workshops focused on co-design with diverse user groups, including people with disabilities, to ensure "Responsible Reuse".



4. Hub network full operationality plan

This chapter develops a full governance framework across four dimensions: 1) the theoretical foundations informing governance design choices, 2) multilevel architecture moving from informal confederacy through federal association to legal entity, 3) the hub level micro governance covering roles, communication flow, maintenance, monitoring, new initiatives, and risk and 4) implementation timeline.

The chapter explicitly connects governance design to the HERIFORGE vision and mission as developed in T2.1 and to the stakeholder ecosystem and quadruple helix actors profiles established in T4.1

4.1. The Gap and the mission

The HERIFORGE networks will be designed to respond to three critical innovation gaps that characterize the current landscape of digital cultural heritage:

1. Fragmented non interoperable 3D CH datasets, lack of XR ready standards,
2. Weak structural links along with unvalidated workflows between CHIs, XR developers, researchers and policy makers,
3. Institutional reluctance to share assets due to IP uncertainty and fear of misuse.

The **HERIFORGE** mission is to transform fragmented cultural heritage data and siloed workflows into standardised, collaborative and socially driven XR innovation ecosystems, enabling scalable reuse, cross sector collaboration and meaningful public engagement across Europe.

4.2. Theory and Application of the Governance Framework

The HERIFORGE project faces classic multi-level governance problems with three geographically and institutionally distinct hubs (Poland, Cyprus, Türkiye), each embedded in different national policy environments, that need to operate under a shared cross border logic while remaining responsive to local ecosystems. From the workshop it emerges that the structure needs to be credible and durable without risking becoming too rigid or inaccessible to new members, over burdening existing partners and collapsing after the project ends.

This is not isolated or only related to HERIFORGE, such risks are inherent in projects and it closely mirrors challenges that have been documented in research on transnational creative networks, distributed innovation hubs and post project sustainability in EU funded R&I initiatives.

The HERIFORGE governance design will draw on four complementary bodies of theory, each applied at a specific level of the network.

4.2.1. Federated network model

This model, described extensively in *“Modes of Network Governance: Structure, Management, and Effectiveness”* (Provan & Kenis, 2008) is directly applicable as it distinguishes between three modes: 1) participant governed networks, 2) lead organisation networks, and 3) network administrative organisations (NAO). For HERIFORGE a hybrid of participants governed (at level 1-2) evolving toward a lightweight NAO (at level 3) can be the most appropriate one.

Provan & Kenis finds that participant-governed networks work well when trust is high, member numbers are small, and goals are defined to some degree. NAOs become necessary when external legitimacy and resource mobilization are needed, which is what level 3 requires.



4.2.2 Polycentric governance

Elinor Ostrom's polycentric governance theory, developed in "Governing the Commons" (Ostrom, 1990) that presents the work on multi-scale institutional design is directly applicable here. Polycentric systems allow multiple centres of decision making at different scales, operating under a common set of rules without a single hierarchical authority. This maps well onto HERIFORGE's three-hub model: each hub governs itself locally, while the network level handles cross border coordination and external presentation. Ostrom's design principles with clearly defined boundaries, congruence between rules and local conditions, collective choice arrangements, monitoring, graduated sanctions, conflict resolution mechanisms, and recognition rights, provide a practical checklist for building durable governance.

4.2.3. Quadruple helix governance

The quadruple helix model, introduced by Carayannis and Campbell (2009), formalizes the inclusion of civil society alongside academia, government and industry. For HERIFORGE, this framework provides the normative basis for stakeholder inclusion across governance bodies at both the hub network level, and connects directly to the actor profiles established in T4.1.

The T4.1 deliverable mapped over 460 stakeholders across three national ecosystems, identifying ten personas mindset that characterise the diverse actor HERIFORGE must engage. These personas map onto the four helix roles as follows, informing both governance composition requirements and co-creation activity design.

Table 1, Helix actors and their roles in governance

Helix Actor	Role in Hub Governance	Role in Network Governance
Academia /Research T4.1 Persona Cluster (Explorer, Cultural Steward, Digital Genius)	• Co-creates knowledge outputs • Leads pilot research • Provides technical expertise for XR standards development	• Hub leader institutions (Cyl, PCSS/IBL PAN, KU) • General Assembly academic representation • Working Group leadership
Industry / Creative Sector T4.1 Persona Cluster (Tech Hunter, Creative, Connector)	• Utilizes hub infrastructure • Co-develops XR applications • Brings commercial innovation logic to pilots	• Steering Committee (business development function) • Associate and full membership • Service provision • partnerships
Government and Policy Actors T4.1 Persona Cluster (Bureaucracy Translator, Mobilizer)	• Enables regulatory clarity • provides policy context • Opens institutional access for CHIs	• General Assembly public sector representation • Policy advocacy working group • Ministerial liaison
Civil Society T4.1 Persona Cluster (Celebrator, Connector, Cultural Steward)	• Co-creates culturally meaningful XR experiences • Represents community interests and heritage narratives	• CHIs participation in hub activities • Community forums structures • User evaluation panels for pilots



The challenge in quadruple helix governance is avoiding academic or institutional capture, something that was also addressed during the workshop discussions, by ensuring that governance bodies are structurally designed to include community and civil society voices rather than just being mere participants.

4.2.4. Social Innovation Governance

The literature on social innovation governance frames the model as a process of inclusive co-creative and transformational decision making. Galego and Brans (2023) define governance of social innovation as “multi actor structure processes that are inclusive and promote social and political transformations through collective actions, co-production, and participation in policy making”. This framing is relevant to HERIFORGE because the network’s mission - making cultural heritage accessible, reusable, and co-created - is fundamentally a social innovation mission, not merely a technical or organisational one.

It is important to make a distinction between the application of the model at the different governance levels. Application of community led co-governance models at transborder national level would introduce a combination of complexity and decision making inefficiency that will undermine the network’s operational effectiveness. The appropriate application of social innovation principles to HERIFORGE should therefore be selective and level specific.

A critical finding from the literature (Dobbin and Lubell, 2021) is that inclusive processes alone do not guarantee equitable representation unless explicitly designed for it. HERIFORGE governance mechanisms must therefore include structured protection against tokenism, defined representation rules and clear accountability for how stakeholders input informs decisions.

4.2.5. Platform Governance for Creative Networks

For creative and cultural networks specifically, Throsby’s work on cultural networks (*“Economics and Culture”*, Throsby 2001) and Flew’s analysis on creative industry clusters (Flew, 2012) identify that successful creative networks tend to use lightweight convening mechanisms, not bureaucratic governance, with strong identity and shared mission compensating for weak formal authority. Another example that was mentioned, which also fits in this discussion, is the New European Media initiative that has a steering board, annual assembly and a light administrative layer.

Most EU funded projects often face challenges regarding future viability in the post project era. These challenges have been well documented in the work of Edler & Fagerberg (2017) on innovation policy and sustainability, as well as practical frameworks from the European Commission’s own guidance on exploitation and sustainability planning for Horizon projects. The key finding among the different sources is that networks that tend to survive because they have developed a value proposition that transcends the original project, not only that but they establish a lightweight legal form early enough to develop institutional memory, and they designate specific individuals (not just institutions) as stewards.

4.3. Living Lab and Co-Creation as Operating Model for Each Hub

Each HERIFORGE hub operates as a living lab, a real world, open innovation ecosystem in which co-creation, exploration, experimentation, and evaluation are the core operational modes. This framing gives the governance structure a philosophical coherence, where the governance bodies exist to enable the living lab’s work.

The co-creation cycle (Discover, Define, Develop, Deliver), is the operational loop through which each hub works with its ecosystem. Each phase corresponds to existing HERIFORGE deliverables and work packages, and each cycle feeds back into governance decisions with the general assembly reviewing cycles annually. At level 2 the general



assembly itself functions as a deliver-and-discover event, where representatives present the network outputs to the community and generate the cycle's strategic priorities.

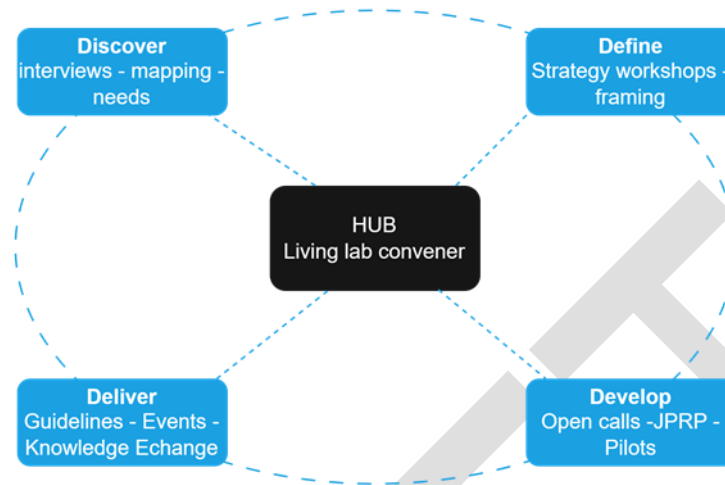


Figure 1, The co-creation cycle - hub as living lab and convener (each cycle feeds into governance decisions, General Assembly reviews annually)

A living lab is formally defined by the European network of Living Labs, (ENoLL) as a user-centred, open innovation ecosystem operating in a real life environment, integrating concurrent research and innovation processes. The four core activities are co-creation, exploration, experimentation and evaluation, and are conducted with real users, in real contexts, producing outputs that are grounded in genuine community need rather than institutional supply.

This definition maps almost precisely onto what each HERIFORGE hub is designed to be. The Cyprus hub operates as a testbed for XR in tourism and bicomunal heritage, integrating real CHIs, communities, and XR developers in structured pilot projects. The Polish hub connects isolated museums with the XR technology sector through PoC demonstrators developed with real institutional partners. The Turkish hub facilitates cross-disciplinary collaborations in a fragmented ecosystem characterized by institutional reluctance and trust deficits that only a neutral convener can bridge. All three scenarios from D4.1 and particularly Scenario 4 on XR embedded smart Cities as living labs highlight this logic more closely.

The theoretical grounding for the living lab model within HERIFORGE draws on Følstad (2008) and Leminen, and Westerlund and Nyström (2012), who describe how living labs govern themselves as multi stakeholder platforms with distinct actor roles. The roles of host, utilizer, enabler and user, provide the living lab framework with concrete operational form that complements and extends the quadruple helix model, translating the abstract four actor logic into a set of functional relationships within each hub.

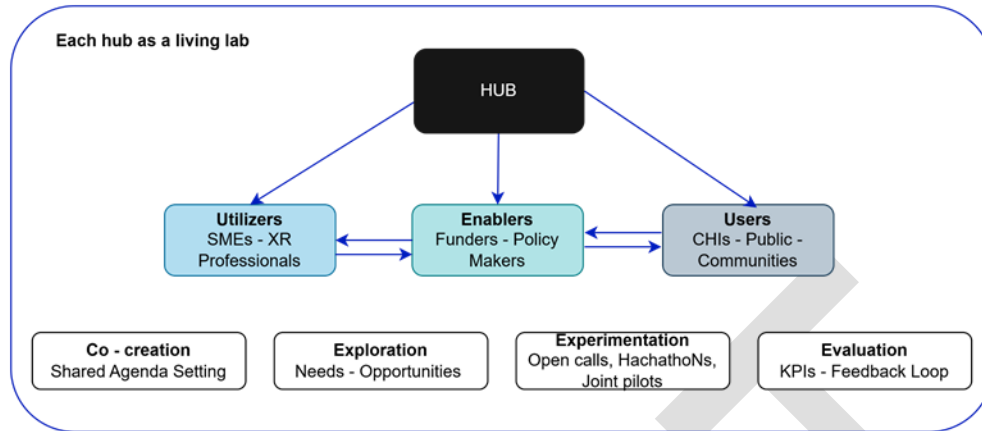


Figure 2. Each hub as a living lab - Actor roles and activities (Based on ENoLL framework, Følstad, 2008; Leminen et al., 2012

4.4. Model Options

The theoretical frameworks presented above serve a distinct purpose from the structural options that follow. They provide an analytical perspective and do not serve as organisational blueprints. Provan and Kenis describe the conditions under which different governance forms succeed, while Ostrom provides design criteria that any durable governance arrangement must meet. Then we have the quadruple helix that defines who must be represented and social innovation governance shaping participation structures at the hub level. As a whole, these theoretical frameworks establish the criteria against which structural choices can be evaluated and not the choices themselves.

Option A - Participant Governed (Informal Confederacy)

The network remains a voluntary association of the three hubs leading institutions, coordinated through regular meetings and shared platforms. Decision making is consensus but not governed by a legal entity or formal membership structure. In essence this is Level 1 extended.

Such a model works well because as low overheads, it is fast to set up with no legal complexity and it is flexible. On the flip side, such models have no external credibility, thus unable to apply for funding as a network, no mechanism to integrate new members and it is prone to collapse in case one of the hub leaders decides to disengage.

Option B - Federated Association with Steering Committee (Hybrid Model)

With this model the network is formalized into a voluntary association (or informal but with a constituted body) with a general assembly composed of representatives from all three hubs along with invited external stakeholders, and a smaller steering committee of 3 to 5 people, with minimum one per hub that handles operational decisions between annual assemblies. This model is not required to become a legal entity initially but it might need to develop a roadmap leading towards registration. This is the recommended Level 2 model.

This inclusive model has a credible structure with distributed decision making that can be also scalable. The downside is that it requires the drafting of light governance documents, such as having a charter, defined processes and procedures).

Option C - Formal Legal Entity

The network registers as a legal entity, in the form of an international non-profit association, that is capable of holding funds, applying for grants, entering contracts, and employing staff. This is the level 3 aspiration.



This model has a full institutional capacity that is also fundable and sustainable. However, it requires significant administrative overheads, registration justification that needs to be agreed upon, and it may not seem realistic prior to the project ending.

The three options above translate that theoretical grounding into concrete organisational forms, ranked by degree of formalization. Option A corresponds to the participant governed network type that Provan and Kenis suggest, low overhead, trust dependant and fragile at scale. Option C represents the network administrative organisation (NAO) type, that is institutionally capable but requires significant investment to establish. Option B is the hybrid path between them, designed to satisfy Ostrom's durability criteria and embed quadruple helix representation, without the overhead of full legal registration during the project lifetime. The living lab operating model applies across all three options, describing how each hub works, not which governance structure the network adopts.

4.5. Recommendation

The recommendations presented in this section are made by the D4.2 authoring team to the HERIFORGE Executive Board as the project's existing governance body with authority over strategic and operational decisions. Where a recommendation involves a commitment that extends beyond the project lifecycle, requires institutional resources, or binds a partner organisation to obligations after the project ends, adoption will additionally require approval from the leadership of the relevant partner institution and, once constituted, endorsement by the future General Assembly. The recommendations in this document do not themselves constitute governance decisions. They are analytical and strategic proposals that must be formally adopted through the appropriate governance channel before they take effect. The Executive Board is the first body to which this document is addressed, and it is the Executive Board's responsibility to determine which recommendations to adopt, which to refer to institutional leadership for approval, and which to defer to the General Assembly once that body is constituted.

The recommendation is aligned with the operationality levels already defined in the deliverable, moving through a clearly defined sequence aligned with project milestones.

4.5.1. Level 1 (M18) - Operational

The network functions as it currently does with a coordinated group of three hub leaders and their consortia. The governance instrument at this level is a shared charter demonstrating a statement of intent and operating principles. This should define:

- The shared vision, that is "Trendsetter in XR and Cultural Heritage",
- The roles of the hub leaders,
- The basic communication and coordination norms,
- The criteria for admitting new members.

This document gives the network the tangible organisational structure the proposal requires as evidence for KER3, without premature formalization.

At level 1 the hub leaders carry the full responsibility of the network governance. Each hub leader institution is responsible for maintaining its national stakeholder registry, organising hub level co creation activities, acting as the primary contact for local stakeholders, participating in cross hub coordination calls, and contributing to the shared knowledge platform.

At this level the communication process operates through the project existing consortium communication infrastructure, supplemented by cross hub coordination calls and a shared knowledge platform accessible to all consortium members. The Level 1 Charter should specify which channels are used for which types of communication, the expected response



time for cross hub enquiries (for example up to 5 working days), as well as the process for escalating unresolved issues.

4.5.2. Level 2 (M36) - Federated Association with General Assembly and Steering Committee

By the end of the project, the networks should operate under a constituted governance structure with two tiers:

General Assembly

The general assembly meets once per year (online or hybrid). All registered members from the hub leading institutions and affiliated stakeholders have representation. Each hub sends a minimum 1 representative. The assembly approves strategic priorities, admits new member categories and elects the steering committee. The quadruple helix principle should be embedded here with the requirement that the assembly's composition representation should have all helix actors (academia, business, civil society, public sector) across the three national hubs.

Steering Committee

The Steering Committee (ST) is the operational governance body between annual Assembly meetings. The ST of five to seven members with at least 1 representative from each hub and ideally with a cross sector composition, should meet every two months to discuss how it handles operational decisions, coordinates cross hub initiatives, approves new individual members or partners between assembly meetings as well as how it manages the network's communication infrastructure. The critical design requirement, which is constitutional at Level 2, is that the committee has to have named individuals and not institutional bodies.

It is essential that this body should include at least one person whose informal role maps to what the workshop describes as a business development function, meaning someone who can grow the community, identify funding opportunities and act as the network's external liaison.

At this level the communication operates on two layer architecture. At the network level, the ST maintains a shared knowledge platform, a type of monthly newsletter and a formal record of ST decisions shared with members within a specified amount of time after the meeting (for example within a week's time). At the hub level, each hub maintains its own stakeholder registry and community channels. Within a similar timeframe (7 to 10 days) all incoming cooperation requests should be acknowledged.

The Steering Committee described in this section is a recommended future governance body. It does not currently exist as a project structure. Until it is constituted by the inaugural General Assembly, which this document recommends convening at M24, all network-level coordination responsibilities referred to in this chapter sit with the HERIFORGE Executive Board. References in this document to actions that should be taken "by the Steering Committee" before M24 should therefore be read as responsibilities of the Executive Board in the interim. From M24 onwards, the Steering Committee assumes these responsibilities as it is constituted and elected

4.5.3. Level 3 (post Project, from Month 36 - Legal entity)

Level 3 describes the post-project state of the network, in which it operates as an independent registered legal entity. During the final year of the project, from Month 30, the steering committee should begin preparing for registration as a legal entity. The Executive Board carries this responsibility until the Steering Committee is constituted at M24. The groundwork, feasibility study, jurisdiction decision, and initiation of registration — must be completed before the project ends at M36.

The appropriate form depends on the jurisdiction and governance preference of the partners. This could be in the form of a non-profit association, which could also be the most practical one, given the consortium's geography and EU funding context. The legal entity enables the network to apply for Horizon Europe or other EU-level funding as an applicant institution rather than requiring one of the existing partners to always serve as a formal applicant.



The network level governance structure is presented below showing the relationship between the General Assembly, Steering Committee, individual hubs, and their constituent actors.

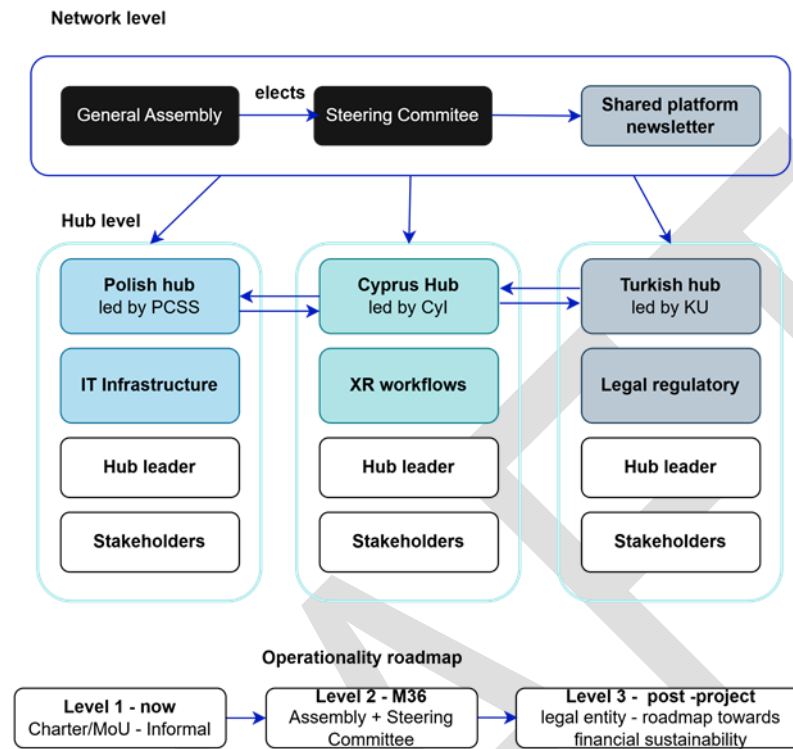


Figure 3, Heriforge Hubs Network - Multilevel Governance Structure, Hub Specializations, and Operability Roadmap note: cross hub knowledge exchange

The financial model required to support a registered legal entity beyond the project lifecycle is not fully defined at the time of this deliverable. This is intentional because the appropriate financial structure cannot be responsibly specified before the network has demonstrated its value proposition through Level 2 operation, before a jurisdiction for registration has been agreed, and before the membership fee structure has been tested in practice. A premature application of a specific model, that has no proven application or traction, might risk not only being unrealistic but also lock the network into an unsustainable model before its community is mature enough to support it.

Through the literature review and workshop discussion these mechanisms are EU program funding through the Creative Europe Networks stream, for which a registered network with demonstrated cross-border membership is eligible, annual membership fees from full members, structured proportionally by organisation type and size, fee-based services including training, consulting, and XR advisory, offered to no-consortium members on a cost recovery basis, licensing and revenue from IP generated and in kind contributions from hub leader institutions in the form of staff time, hosting and infrastructure.

It is advised that the Executive Board is tasked with commissioning a financial feasibility study ideally by M30, that can sit as the foundation for Level 3 feasibility workshop. This study should model at least two scenarios:

1. A minimalist model that relies mainly on membership fees and in-kind contributions
2. And a growth model incorporating service revenue and EU program funding (hybrid)

The insights from the workshop and study will be presented as a recommendation to the General Assembly at M33 alongside the legal entity transition decision.



4.6. Micro Level Governance (Within Each Hub)

At the national hub level, the governance model should follow a simplified version of the same logic. Each hub maintains its own stakeholder registry (building on stakeholders mapped in D4.1), organizes its own community engagement activities (events, workshops, open calls) and acts as the first contact point for national level stakeholders. The hub leader institution is accountable to the network steering committee for reporting on hub level activities.

The key micro level governance instrument is the hub's own community charter or engagement protocol, defining who can participate, how new members are onboarded, what obligations members take on and how the hub communicates. This should be developed by each hub in consultation with local stakeholders, reflecting the distinct national context identified in D4.1:

- Cyprus' need for bicommunal and international bridge building,
- Turkey emphasis on talent retention and diaspora engagement, and
- Poland's need to connect isolated museums with the XR ecosystem.

One of the most important governance decisions at hub level is who may join the hub community and what are the terms and conditions. Admission criteria must be clear, accessible, and proportionate, they must lower the barriers that have previously existed and streamline the process.

These eligibility criteria for hub membership, borrowing from previous activities (open calls, workshops and project meetings) can be the following:

- The applicant organisation is active in at least one of the following fields: XR technology, cultural heritage, digital humanities, creative industries, relevant public policy or innovation ecosystem,
- The organisation is prepared to contribute to at least one hub activity per year (event participation, co -creation session, knowledge exchange, pilot partnership or similar),
- The organisation commits to adhering to the network charter, including IP norms, communication standards, and the quadruple helix representation principle,
- The organisation sector or actor type adds to or maintains the hub's quadruple helix balance with preference towards applications that balance the helix representation,
- The organisation is not in direct conflict of interest with existing hub members in a manner that undermines the hub neutrality as a convener.

4.7. Technology and Knowledge Transfer Function

The question of whether HERIFORGE requires a Technology Transfer Office (TTO) is answered affirmatively, but with an important qualification, that the network requires TTO functionality, not a traditional centralized TTO structure. The cultural heritage and XR context differs from deep tech research in that the majority of exploitable assets are not patent eligible but consist of data, know-how, digital content, datasets, methodologies, workflows and services. A classical patent focused TTO model is therefore not proportionate nor fit for purpose for HERIFORGE at this stage.

The workshop discussed that technology transfer (TT) or knowledge transfer (KT) or knowledge exchange (KE) activities should be embedded in hub level operations rather than constituted as separate formal bodies. Each hub leader institution already performs these functions through events, stakeholder engagement, and knowledge dissemination.

The recommendation is to make these explicit in each hub's operational mandate and assign named individuals as responsible, without creating bureaucratic hurdles. Each hub leader already performs these functions; the task will be to formalize the mandate rather than create new structures.



This approach is consistent with each hub's specialization as identified in D4.1, and with the actor role framework of the living lab model, which presents the hub as a host and enabler with a natural mandate to facilitate knowledge flows between utilizer organisations (CHIs, developers) and the broader ecosystem.

4.8. Maintenance of hubs network and monitoring its operationality

The long-term maintenance of the HERIFORGE Hubs Network relies not on overly rigid institutionalisation, but on a balanced combination of structured governance and community-driven engagement. The network is envisioned as a “living tissue” of collaborating entities whose continued interest in developing projects at the intersection of cultural heritage and immersive technologies ensures its durability beyond the project lifecycle.

The sustainability of the network is closely aligned with the strategic pillars defined in D2.2—Research, Development, and Inclusivity—ensuring that maintenance mechanisms directly support the core functions of the hubs.

A key mechanism supporting this sustainability is the identification and empowerment of local leaders within each hub. These are institutions and organisations already actively engaged in innovation practices, capable of acting as knowledge brokers and community anchors. Their role contributes directly to:

- **Research activities**, by translating policy-oriented insights into practice and supporting evidence-based advocacy,
- **Development activities**, by facilitating collaboration between cultural heritage institutions and technology providers,
- **Inclusivity goals**, by ensuring diverse stakeholder representation and engagement within local ecosystems.

The network's continuity is further supported through regular and structured communication. This includes maintaining open communication channels (e.g. mailing lists, collaborative platforms) as well as organising cyclical meetings—both formal (e.g. annual assemblies, thematic workshops) and informal (e.g. peer exchange sessions). These interactions are essential for:

- sustaining **knowledge exchange and transfer mechanisms** (e.g. guidelines, policy briefs, best practices),
- supporting **innovation brokerage activities** through ongoing matchmaking between stakeholders,
- reinforcing **quadruple helix engagement**, ensuring continuous dialogue between academia, industry, public sector and civil society.

An important dimension of network maintenance is the promotion of “mutual support” mechanisms. Rather than relying solely on centralised training structures, the network encourages peer-to-peer learning and capacity building among its members. For instance, cultural institutions such as museums may share experiences, tools and lessons learned directly with one another. This approach strengthens:

- the **uptake of XR technologies** by lowering knowledge barriers,
- the **reuse of shared resources** (e.g. tools, datasets, infrastructure),
- and the **co-development of inclusive and accessible solutions** through shared practices.

The HERIFORGE Hubs Network adopts a flexible and non-centralised governance approach, avoiding unnecessary hierarchy while maintaining clear roles and coordination mechanisms. This approach supports long-term engagement by lowering barriers to participation and enabling organic growth, while still ensuring coherence with the common governance model and the strategic objectives of the hubs.

Crucially, the sustainability of the network is grounded in a shared sense of value and mutual benefit among its participants. Different types of stakeholders derive distinct but complementary advantages from participation:



- leading institutions strengthen their visibility, expand their networks and reinforce their role as innovators and knowledge leaders,
- emerging actors gain access to an active ecosystem, opportunities for learning, and connections with relevant partners, including technology providers,
- commercial entities benefit from access to new markets, potential clients and collaborative partnerships within the cultural sector.

Over time, this model supports a transition from passive participation to active contribution, where new entrants evolve into experienced members who co-create the network's activities and outputs, including research outputs, innovation projects and inclusive practices.

These activities are supported by lightweight procedures ensuring continuity of onboarding, information exchange and coordination, as defined in the common governance model. In this perspective, the maintenance of the HERIFORGE Hubs Network is not ensured by formal obligations, but by cultivating a community of practice that actively contributes to the implementation of the hubs' research, development and inclusivity strategies, and in which participation is continuously incentivised through relevance, reciprocity and shared purpose.

The maintenance of the hubs network is the ongoing work of keeping the HERIFORGE community functional, informed and growing between major governance events. It includes regular updates of the stakeholder registry, annual or biannual engagement reviews, continues community events, annual surveys, repository upkeep, governance document review and periodic IP registry audits and updates. This should not be regarded as an administrative overhead but the main mechanism that builds the community investment needed for long term sustainability.

The monitoring of the hub's network is defined by accountability and continuous learning and improvement, ensuring that the network remains effective and that governance can be adjusted when needed. The monitoring framework tracks KPIs across community, capacity, and network dimensions, using standardised reporting on events, external participation, researcher training, open calls, and network growth at different operational stages. It also supports early identification of risks such as low engagement or weak coordination, so corrective action can be taken before problems begin to affect the wider network.

The maintenance and monitoring of the hub's operability are key elements of effective governance and overview. This ensures that risks are identified early, handled systematically and followed by both proactive and corrective measures. It sets clear roles, monitoring routines, and escalation routes in order for the network organisation to respond quickly, implement feedback loops and learn quickly to keep activities aligned with objectives.

4.9. Information flow and communication rules

Effective information flow is the connection thread that binds the HERIFORGE Hubs Network. Without clear rules about how information moves within and between hubs and the hubs's external actors, the recommended model risks becoming a collection of parallel activities rather than a genuinely integrated network. It requires the establishment of communication architecture, the use case workflows through which the network handles incoming needs and requests as well as the planned structured programs (events, workshops) that support governance transitions.

Communication should be designed for sustainability from the onset. The workshop discussion identified that communication methods have not yet been standardised across hubs; this is an open question that the steering committee should address and resolve before M18.



5. Deliverable updates

This document will be updated throughout the project. According to PSNC (2025), this deliverable shall be updated in the form of D4.5. It is assumed that main regional hub fields of specialization will not change during the project.

The document evolves throughout the project based on activities and experience gained during its implementation. Monitoring of hubs and network of hubs operationality and governance shall take place between D4.2 and D4.5, which is between M18 and M36 of the project.

Various elements of the governance model may be subject to change. The following shall be monitored and updated during the project: hubs maintenance and monitoring, information flow and rules of communication. These elements shall be monitored and updated accordingly. It is necessary to indicate in D4.5 (that is version 2 of COGM) which specific parts of this current document have been updated.



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