



# EuroFAANG

## From Infrastructure to Impact: Enabling Equitable Public-Private Collaboration in Genotype-to- Phenotype Research for Farmed Animals

### Context

EuroFAANG, a European Research Infrastructure (RI) project, has demonstrated the central role that coordinated infrastructures can play in advancing genotype-to-phenotype (G2P) research for farmed animals, particularly in genomics, phenomics, and in vitro model systems.

Research infrastructures provide coordinated access to physical resources, such as experimental facilities for phenotyping and biobanks of cellular models, as well as access to data resources, including archives, analytical tools, and associated technical expertise. By centralising access through research infrastructures, fragmentation across projects and actors is reduced, duplication of effort is minimised, costs are lowered, and the overall value of publicly funded research is maximised across stakeholders.

However, the translation of genotype-to-phenotype (G2P) research into innovation, sustainable breeding, and societal benefit remains suboptimal and insufficiently structured. Industry engagement is often constrained by unclear access procedures, intellectual property (IP) uncertainties, fragmented biobanking systems, and the absence of clearly defined pathways for pre-competitive public-private collaboration.

At the same time, European research and innovation policy places increasing emphasis on responsible research and innovation, including the **3Rs principle (Replacement, Reduction, Refinement)**, improved **FAIR data** practices, reduced fragmentation of infrastructures, and stronger uptake of publicly funded research results. In vitro research for farmed animals is highly relevant to these objectives but remains underutilised outside academia. This policy paper draws on EuroFAANG Deliverable D4.6 to outline how equitable, transparent public-private collaboration frameworks can strengthen the long-term impact of European research infrastructures for farmed animal research, drawing explicitly on the EuroFAANG experience and with a forward-looking perspective towards the development of GenoPHEnix and other future RI initiatives.



## Why Equitable Public–Private Collaboration Matters

Effective innovation in animal breeding and health requires early and structured collaboration between public research infrastructures and industry actors, including breeding organisations, biotechnology companies, and animal health stakeholders. Pre-competitive collaboration allows partners to jointly develop tools, models, and knowledge while avoiding conflicts linked to downstream commercialisation.

Evidence from EuroFAANG stakeholder engagement shows strong industry willingness to collaborate when:

- access conditions are transparent and predictable;
- benefit-sharing and recognition are clearly defined;
- ethical and data governance standards are robust.

Without such frameworks, valuable research outputs risk remaining underexploited, significantly limiting Europe’s overall return on public research investment, across the research and innovation system — not only within RIs themselves.

## Core Policy-Relevant Elements

European research and innovation policies increasingly emphasise responsible research and innovation, open science, sustainability, and improved uptake of publicly funded research. Building on these policy objectives, the EuroFAANG framework identifies **five elements** that can be implemented through Research Infrastructure governance models.

1

### Reciprocal partnership models

Equitable collaboration depends on reciprocity. Industry contributes biological materials, phenotypic data, and applied expertise, while academic researchers provide access to research data, protocols, and expertise. Research infrastructures further build on the foundation provided by academia to provide capacity in the form of physical labs and experimental facilities and virtual data infrastructure and expertise. Policy frameworks should support research infrastructure and normalise two-way engagement.





2

## Transparent access and open sample principles

Clear, standardised access rules for pre-competitive research provide clarity, reduce uncertainty and lower barriers for participation. Open sample and metadata sharing policies, aligned with the FAIR principles, are particularly important for sharing biological resources relevant to in vitro G2P research.

3

## Integration of ethical and sustainability objectives

Embedding the 3Rs principle and responsible breeding commitments into access conditions ensures that collaboration aligns with societal expectations and strengthens public trust in animal research.

4

## Proportionate IP and benefit-sharing mechanisms

Pre-defined IP and recognition rules—supported where necessary by data protection and encryption measures—help balance openness with legitimate commercial interests, enabling collaboration without undermining innovation incentives.

5

## Interoperable biobanking ecosystems

Harmonised biobanking practices and shared metadata standards improve discoverability, reuse, and long-term conservation of genetic resources. Policy support is needed to align research infrastructures with genetic diversity initiatives and biobank networks to reduce fragmentation.

### From Knowledge to Impact: The Role of GenoPHENix

Building on the EuroFAANG RI project, the future **GenoPHENix RI** will offer the opportunity to operationalise these principles at scale. Beyond providing access to data and models, GenoPHENix could function as a connector across the research and innovation landscape, supporting early interaction between:

- Research Infrastructures (RIs),
- Technology Infrastructures (TIs),
- academic and public-sector researchers,
- innovative companies,

and, where appropriate, investors. Such early-stage networking aligns with current European policy discussions on accelerating innovation uptake and can help promising G2P applications move beyond the research phase while maintaining ethical standards and public value.



## Policy Recommendations

To maximise impact and ensure alignment with European research and innovation priorities, the following actions are recommended:

1

### Embed equitable partnership frameworks in RI governance

Encourage RIs to formalise reciprocal, pre-competitive collaboration models as part of their access policies.

2

### Support structured engagement-to-access pathways

Promote clear, stepwise mechanisms guiding industry from initial engagement to formal access decisions.

3

### Align RI access with sustainability and ethics goals

Link access conditions to the 3Rs principle, responsible breeding frameworks, and genetic diversity objectives.

4

### Strengthen RI-TI and innovation linkages

Support early interaction between RIs, TIs, and innovators to improve scaling and uptake of research results.

5

### Invest in data governance and biobanking interoperability

Ensure long-term policy and funding support for secure, FAIR, and interoperable data and sample infrastructures.

## Conclusion

The EuroFAANG experience demonstrates that equitable, transparent public-private collaboration is both achievable and necessary to translate animal genomics research into societal, environmental, and economic value. By embedding these principles into future infrastructures such as GenoPHEnix, Europe can strengthen its leadership in sustainable animal research and move more effectively from **knowledge generation to real-world impact**.

