and beyond. The combination of rapid, data heterogeneity and cooperation for discovery computation based on open-source code will lead to fast implementations of the demonstrators with high flexibility that will permit a rapid transit to the public.

Table 1.4a: Critical risks for the research approach

Description of risk	Objective	WP	Proposed risk- mitigation measures
Evolutionary semantic algorithms insufficiently developed: Medium	2	WP1	Use traditional non-semantic genetic algorithms to infer data connections.
Multilayer metrics accounting for spatiotemporal patterns along many datasets insufficiently developed: Low	2	WP1	Implementation of more standard complex networks metrics to characterize data knowledge discovery.
Low number of training data available: Medium	2,3	WP2	Alternative methods focusing on matrix decomposition methods.
Automated evolutionary-inspired expressions for causal knowledge discovery insufficiently developed: Medium	2,3	WP2	Symbolic regression methods to full automation for causal discovery accounting for evolutionary rules.
Eco-evolutionary dynamics of multiple traits in species-rich ecosystems insufficiently developed: Medium	1-4	WP3	Mean-field approximations using classical ODE systems and novel universal differential equations for scientific machine learning.
Evolutionary neurobiology-inspired federated networks insufficiently developed: Medium	1-4	WP3	Spiking neural network models as alternatives to evolutionary neural biology-inspired algorithms in federated networks.
Cooperative forecasting mixing eco-evolutionary dynamics and neural nets in large scale federated networks insufficiently developed: Medium	1-4	WP3	Mix eco-evolutionary dynamics models with less alternative neural nets models working a smaller spatiotemporal scales.

2 Impact

2.1 Expected impact

- **Scientific and technological contribution to the foundation of a new future technology**: ROBHOOT target discovery of novel evolutionary diversification-inspired algorithms to substantially improve solutions for sustainability in ecosystems. **Discovery of novel evolutionary-inspired algorithms in the context of diversifying traits, interactions, technologies and human groups for biodiversity maintenance have been hardly been investigated in this context so far**. Therefore, several predictors related to biodiversity, technological and social times series analysis will be tested and further developed to enable robust prediction of sustainability. Altogether, this project will lay the foundation for future sustainability studies.
- **Potential for future social or economic impact or market creation**: Our approach accounts for heterogeneous sources of data, the evolving mechanisms driving technological, environmental and social changes required to make ecosystems sustainable. This will allow to use the technology in public and private industry, for example, to generate rapid and robust scenarios when facing complex problems including global sustainability challenges (e.g., global health, food and feed production, ecosystems degradation).
- **Impact on transparency and reproducibility**: Decision making and governance at local, regional and global scales require access to transparent and reproducible information containing