



Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing

ANNUAL MEETING

Del Centro Nazionale di Ricerca in HPC,
BIG DATA AND QUANTUM COMPUTING

ISOLA D'ELBA – LA BIODOLA, 5 - 8 OTTOBRE 2025



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Approccio Responsabile alla Ricerca e all'Innovazione Tecnologica

Antonino Rotolo



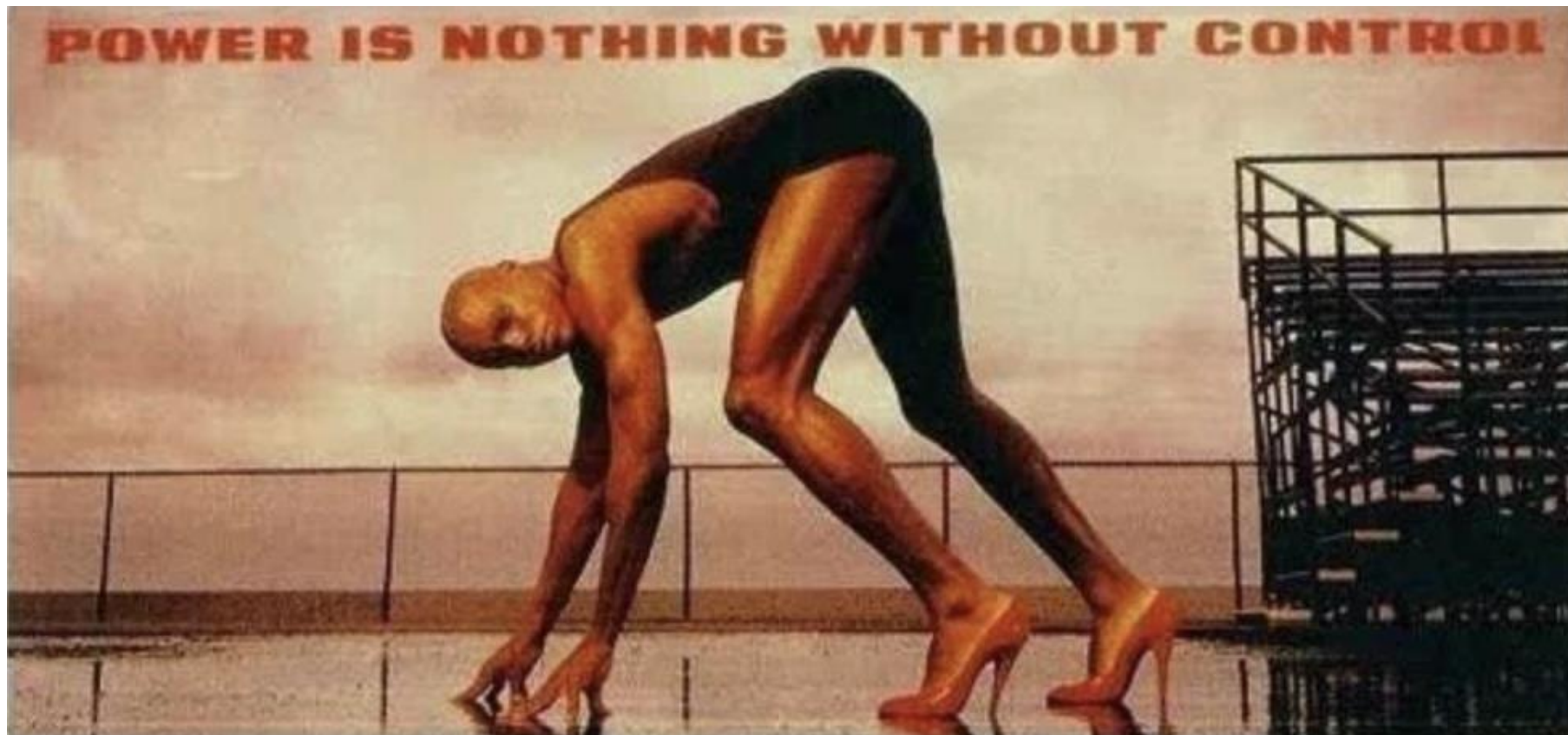
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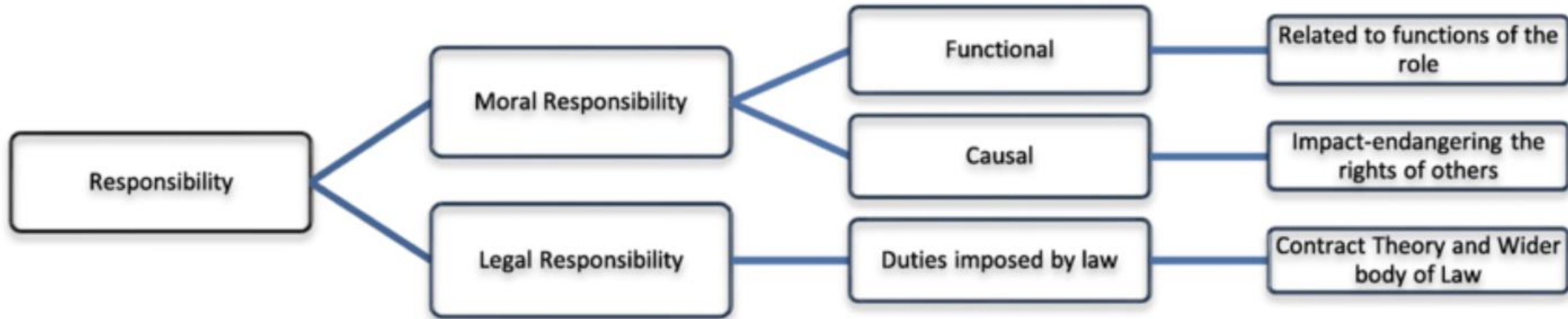
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Responsibility



Moving from Principles

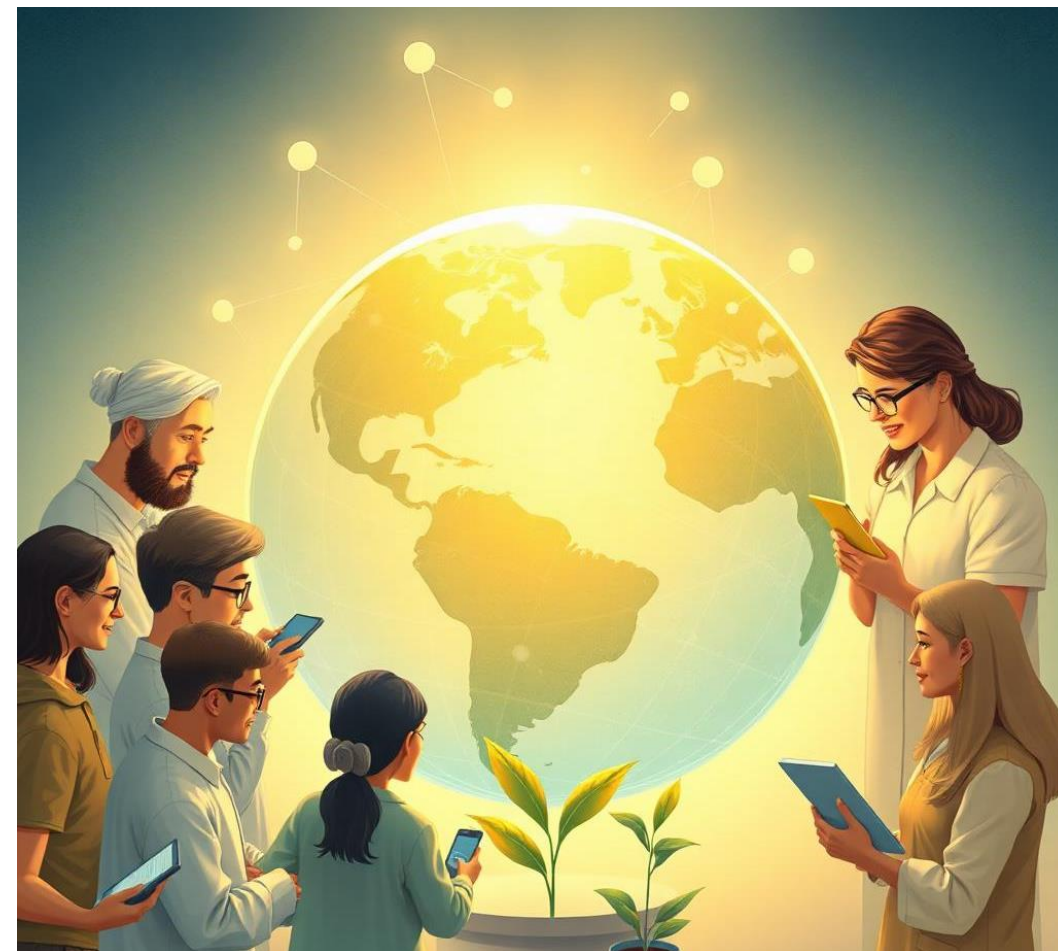
Complexities: Mid-level Principles

The agreement on particulars is incompletely theorized in the sense that the relevant participants are clear on the practice or the result without agreeing on the most general theory that accounts for it. Often people can agree that a rule [...] makes sense without entirely agreeing on the foundations of their belief. They may accept an outcome [...] without [...] converging on an ultimate ground for that acceptance. Often people can agree not merely on the outcome, but also on a rationale offering low-level or mid-level principles on its behalf. But what ultimately accounts for the outcome, in terms of a full-scale theory of the right or the good, is left unexplained. (Sunstein, Incompletely Theorized Agreements in Constitutional Law)

From Theory to Practice

1. **Build capability and capacity to engage as equals** among those who may be affected by research and innovation impact activities
2. **Engage ethically with all relevant parties**
3. **Manage risk and reduce the potential for harm**
4. **Seek to ensure equity, diversity, and inclusion** in engagement and impact
5. **Maintain accountability and evaluate engagement and impact**
6. **Design for lasting impact**

(Jensen et al 2025)



Risk or Impact?





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A Case Study: AI

Challenges of AI: Creativity

“If you steal from one book you are condemned as a plagiarist, but if you steal from ten books you are considered a scholar, and if you steal from thirty or forty books, a distinguished scholar.” (Amos Oz, *A Tale of Love and Darkness*)

What about if I
steal from
trillions of books?



Challenges of AI: IPR

Scenarios	What-if analysis
AI systems are equipped with new creativity capabilities. They invent new things, propose new patents, create new art.	What if an ideal AI inventor had access to the complete set F of all existing and potential novels (like Borges' Library of Babel)? If this inventor wrote a new novel R using data from F, could it produce a genuinely new masterpiece? Consider an AI system X, protected by IP law, that invents another AI system Y, which then generates invention Z. Who would own invention Z?

Challenges of AI: Law-making and enforcement

Scenarios	What-if analysis
Law-making is supported by generative AI, and legal systems are AI-generated, which also regulate themselves. Legal compliance of AI systems must avoid risk mitigation and be based on an effective sanctioning system.	What if we change the compliance paradigm and adopt a vision where special and secure AI systems are designed to detect AI violations? Does this lead to new regulatory paradoxes, such as circular reasoning or infinite regress? In fact, a sanctioning AI provides regulatory grounds for other AIs.

Challenges of AI: Co-evolution

Artificial Intelligence 339 (2025) 104244



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Artificial Intelligence

journal homepage: www.elsevier.com/locate/artint



Human-AI coevolution

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ARTICLE INFO

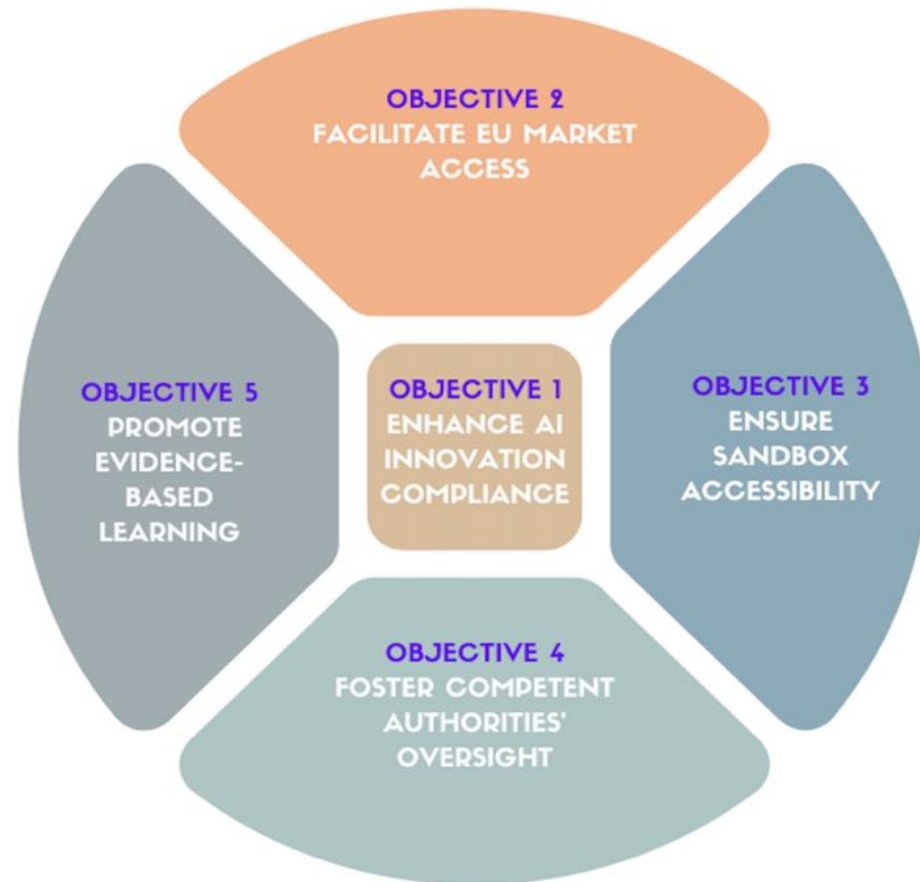
Keywords:

Artificial intelligence
Complex systems
Computational social science
Human-AI coevolution

ABSTRACT

Human-AI coevolution, defined as a process in which humans and AI algorithms continuously influence each other, increasingly characterises our society, but is understudied in artificial intelligence and complexity science literature. Recommender systems and assistants play a prominent role in human-AI coevolution, as they permeate many facets of daily life and influence human choices through online platforms. The interaction between users and AI results in a potentially endless feedback loop, wherein users' choices generate data to train AI models.

Challenges of AI: Experimenting for Innovation





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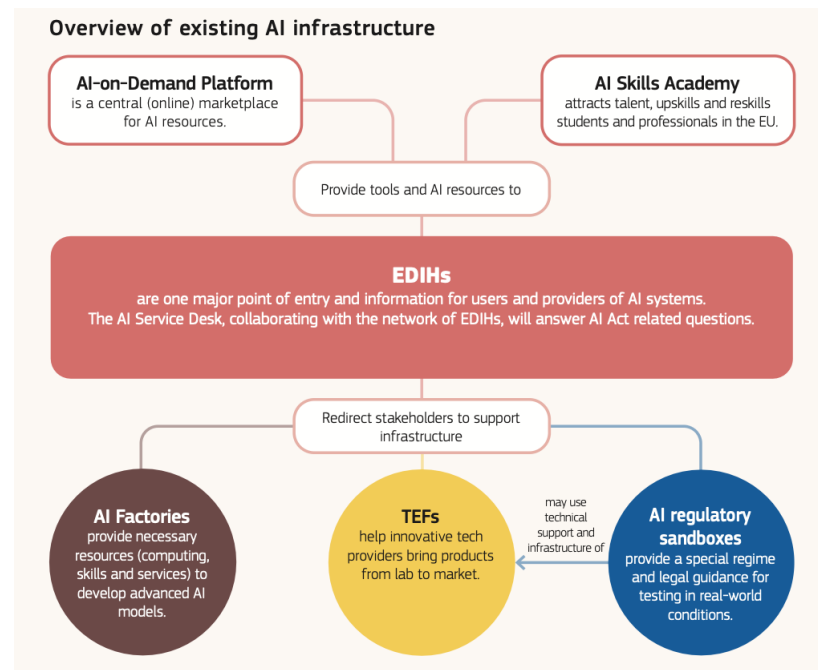


Rethinking Dual Use?



From Individual Responsibility to Collective Engagement

Apply AI Strategy



Giga Factories



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