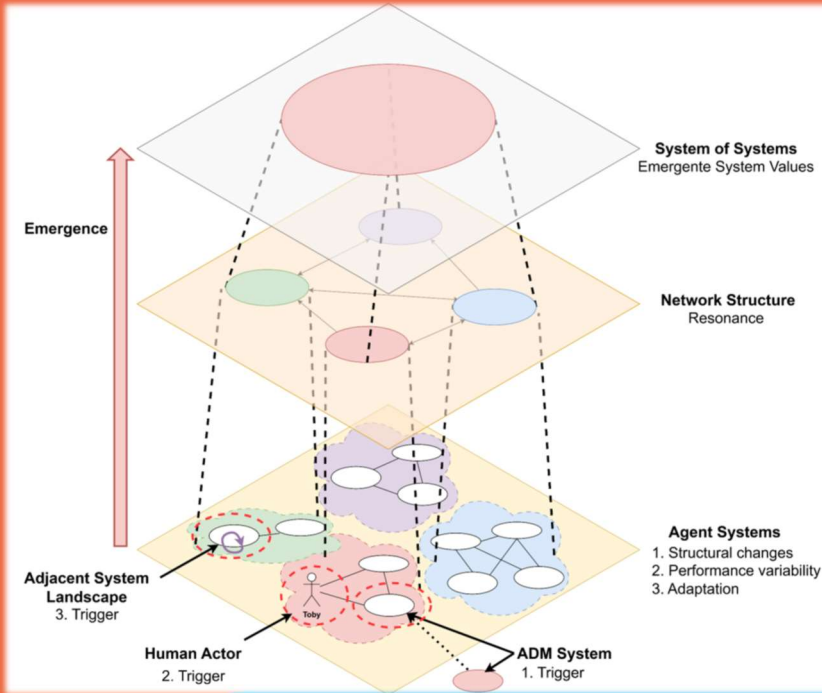


# 2.17 Designing for emergence

Hybrid intelligent systems evoke new forms of emergent phenomena at higher system aggregation levels



Emergence can result in:

- Unsafe system states
- Hazards and harms
- Violation of System Values e.g. Fairness

How can we design for emergent properties? Like:

- Safety
- Fairness
- Resilience
- Innovation



By understanding HI as part of a broader socio-technical system

By utilizing design methodologies that can help enforce important emergent properties such as safety or fairness

**Mental Models alignment**

**STPA**

**Oth. systems Eng. Meth.**

Through identifying robust detection and monitoring mechanisms for emergence (operations)

Assumption based leading Indicators

- Entropy?
- Performance variability?
- Coupling?
- DevOps KPIs?

**System mapping & modelling**