

**Complexity University – 22 June, 2020 | Session 1**

**an introduction to complex challenges**

- 1. Understand what makes systems “complex” and the characteristics of complexity**
- 2. Understand what makes challenges characterised by complexity different from other situations (for example technical problems)**
- 3. Understand the differences between responses to complexity that are “fit for purpose” and those that are not.**

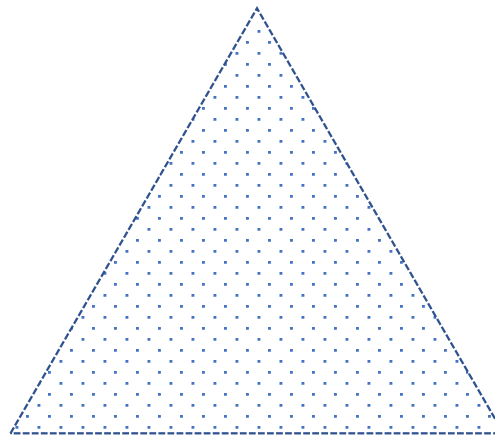
**what is complexity?**

**three characteristics of  
complexity**

**emergent**

**adaptation**

**information**



**“pigeon”**

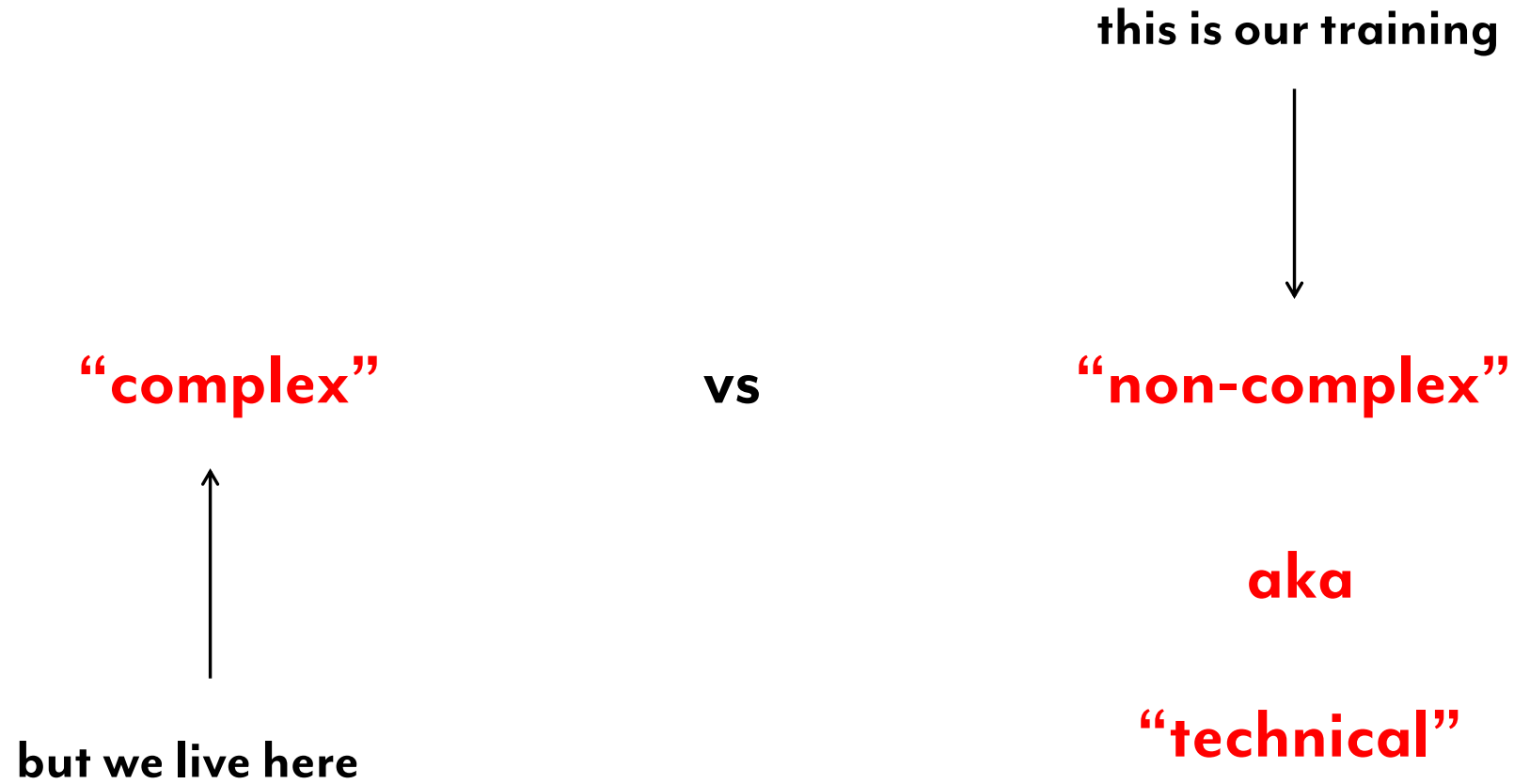
**vs**

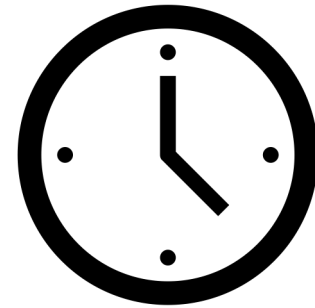
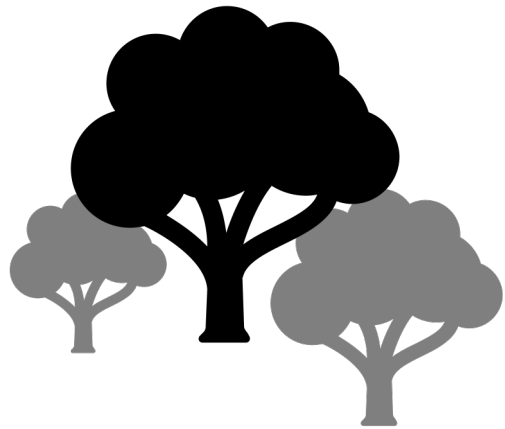
**“rocket”**

**“complex”**

**vs**

**“non-complex”**







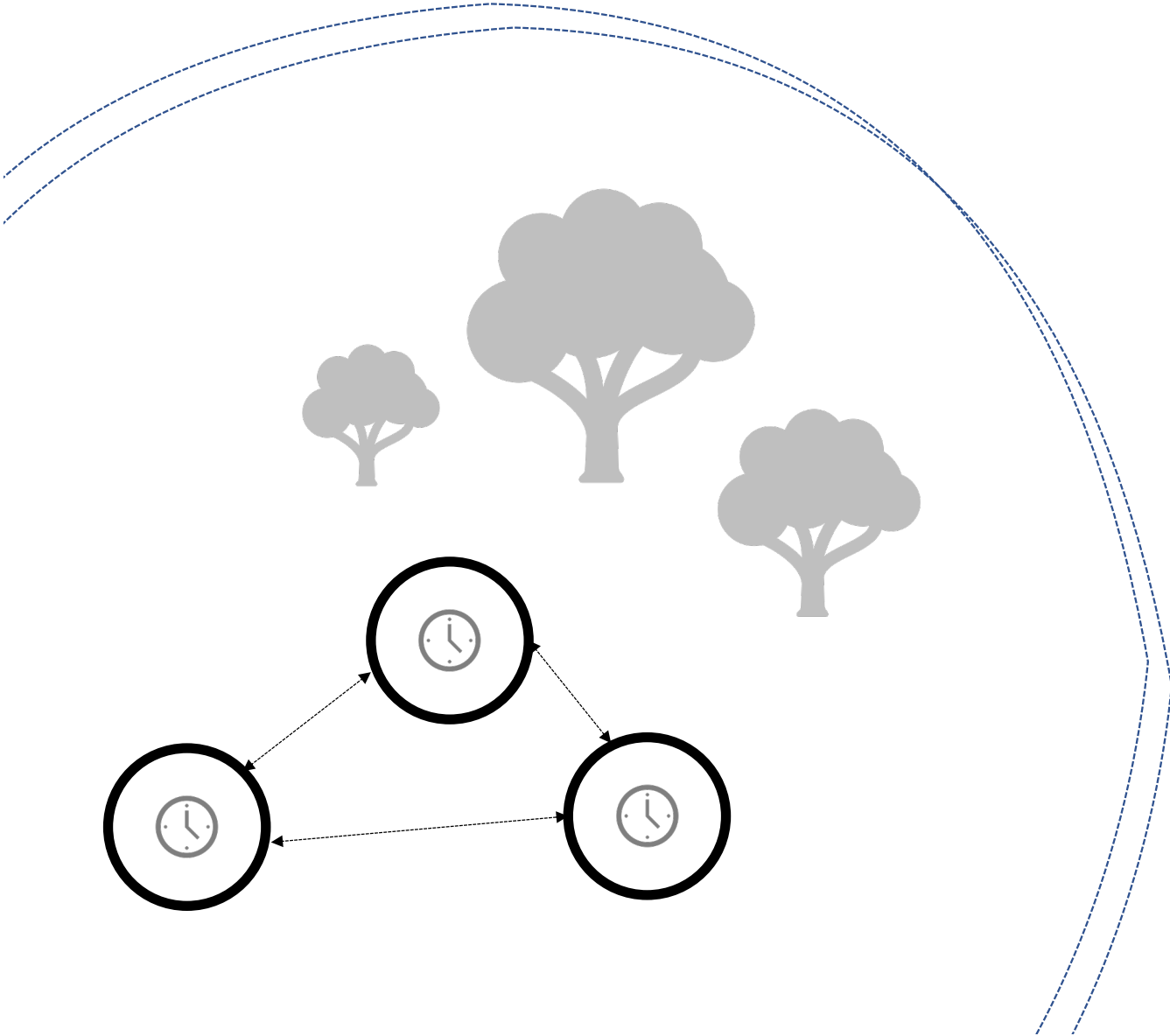
## **Axiom 1**

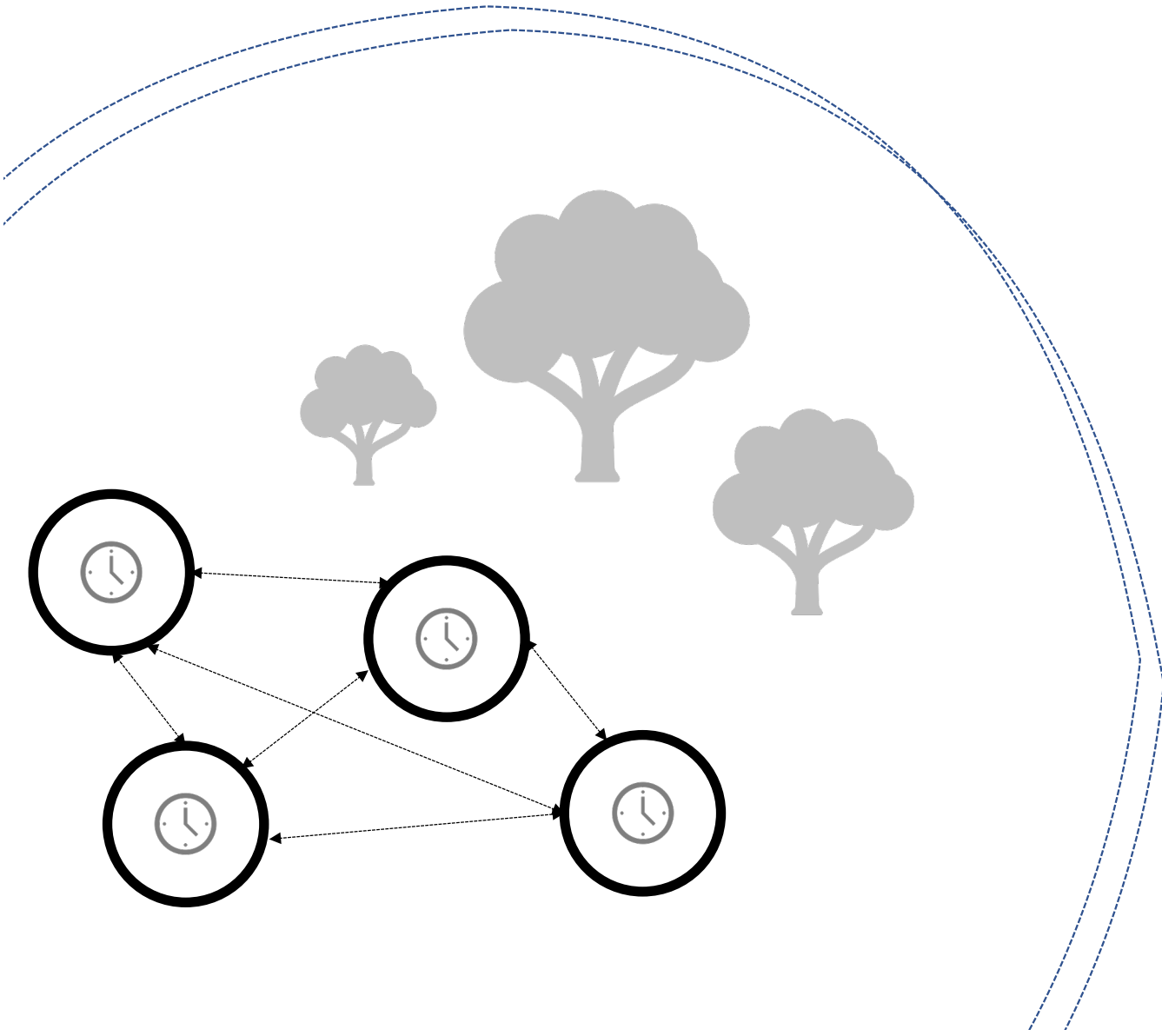
**non-complex systems are** always part of complex systems

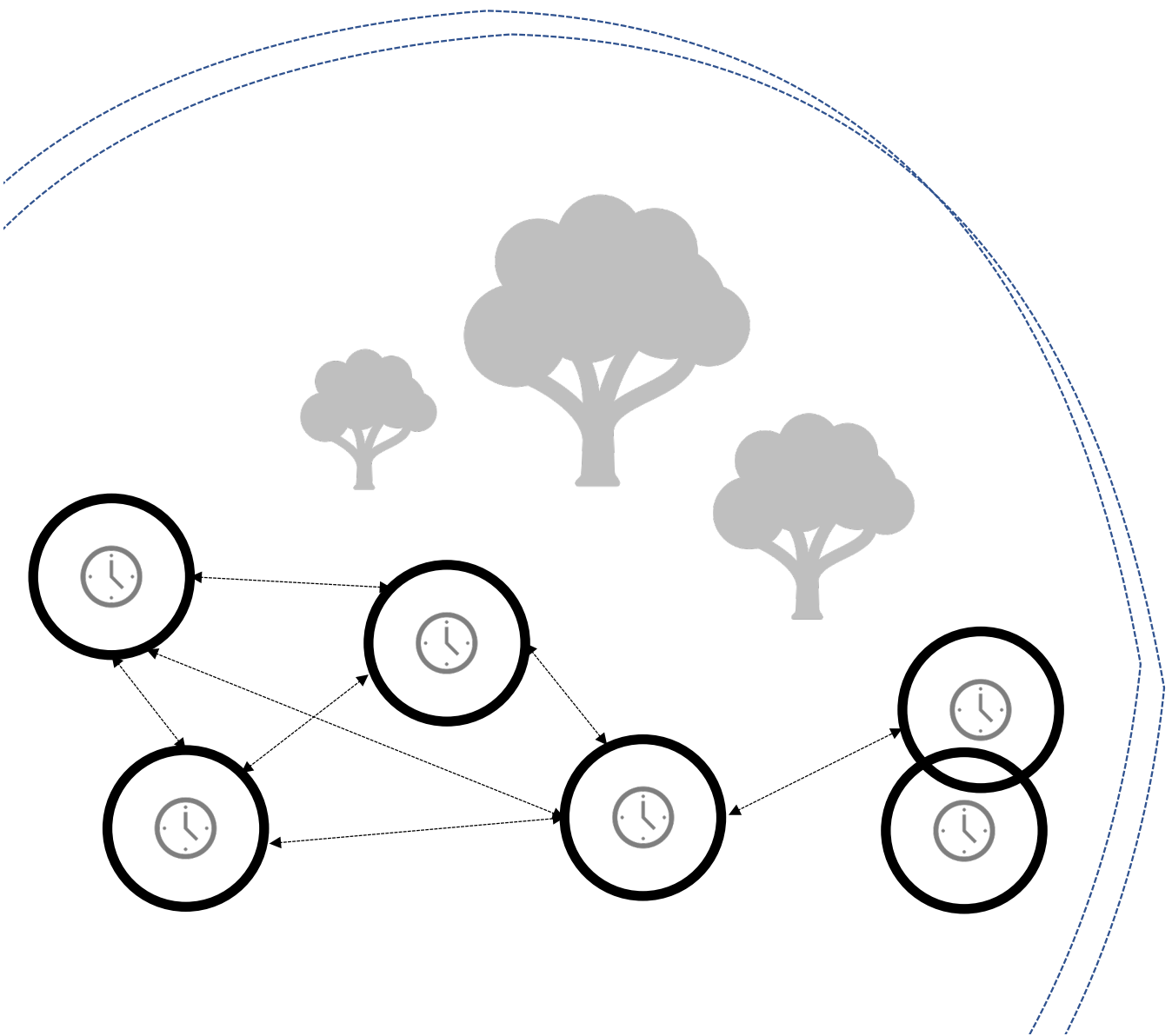


**but complexity is increasing**

**but complexity is increasing** as non-complex systems grow







**what is does it mean? why should we care?**



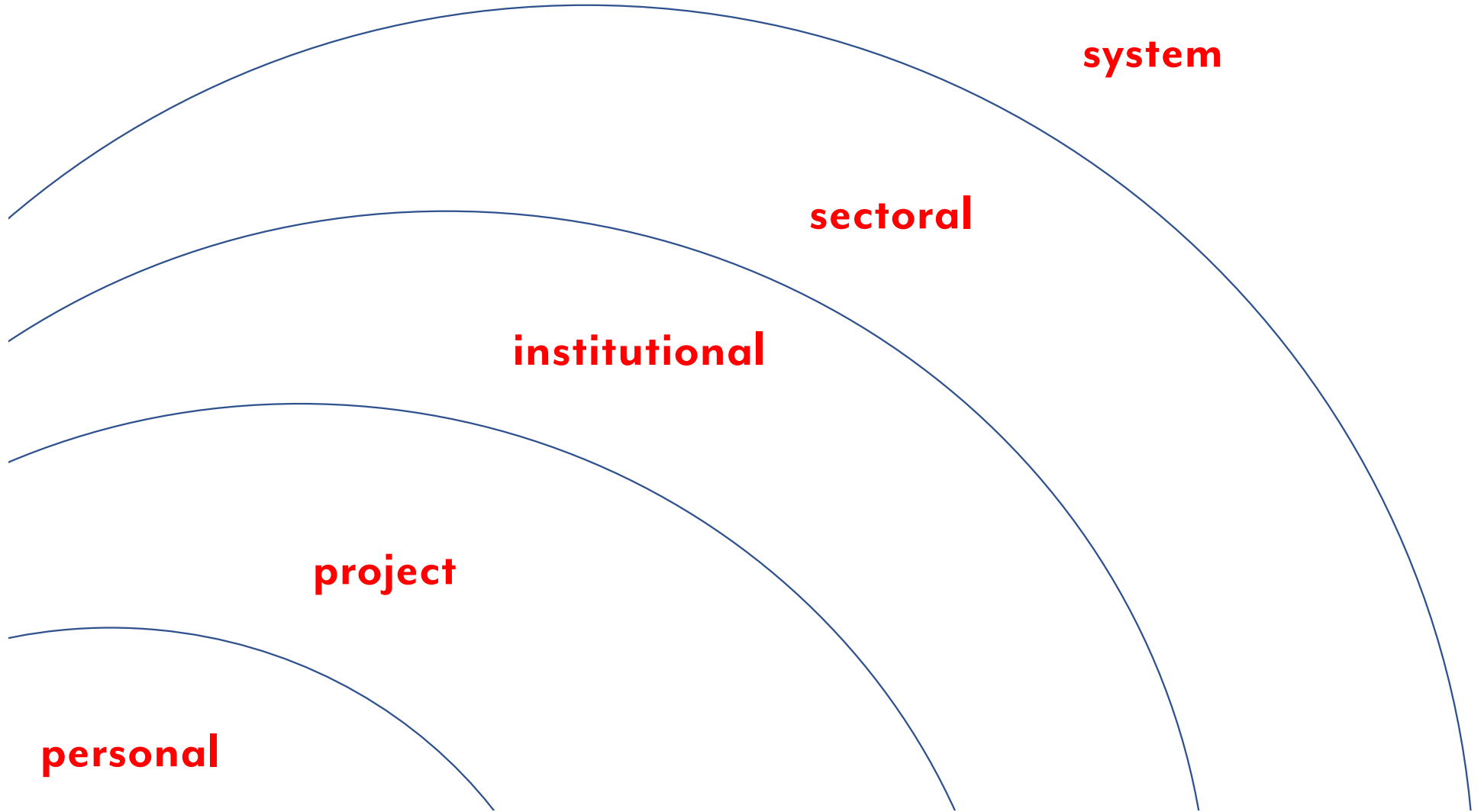
**what happens when we ignore Axiom 1?**

**the probability of catastrophic failure grows**

**the probability of catastrophic failure grows**  
**how? why?**

**“[In a crisis] We don't rise to the level of our expectations,  
we fall to the level of our training.”**

**- Archilochus**



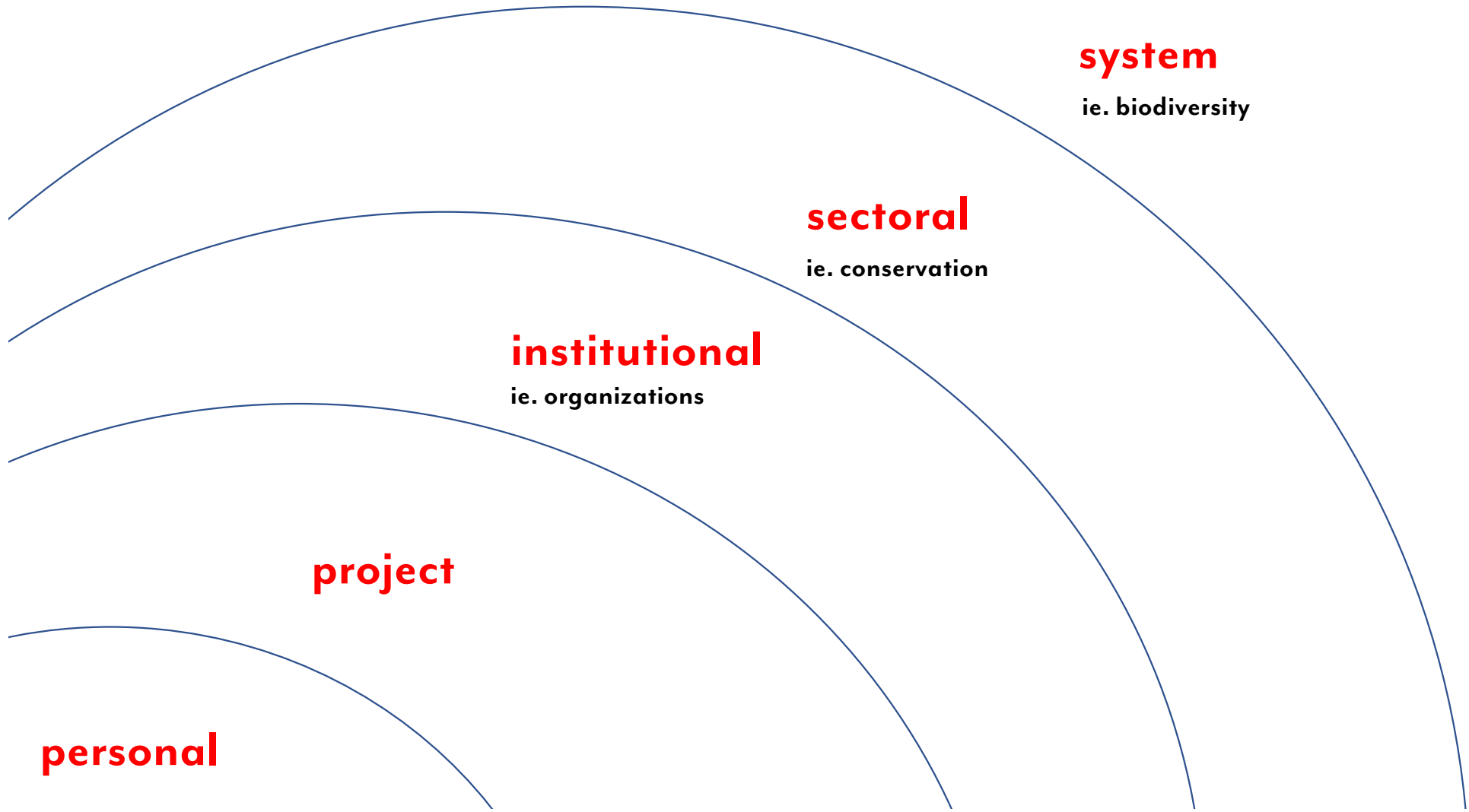
**personal**

**project**

**institutional**

**sectoral**

**system**



## **Axiom 2**

**we adapt and learn our way into catastrophic failure**

## **Axiom 2**

**we adapt and learn our way into catastrophic failure  
one day at a time**



**how?**

**demand for multiple forms of capital **increases****

(natural resources, infrastructure, services)

**our ability to supply demand **decreases****

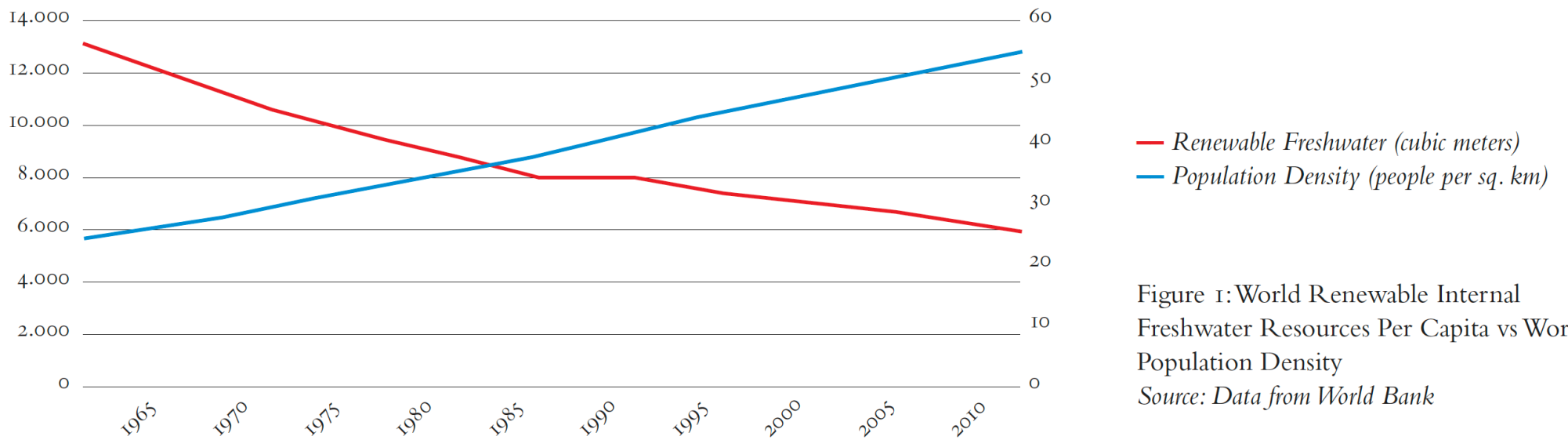
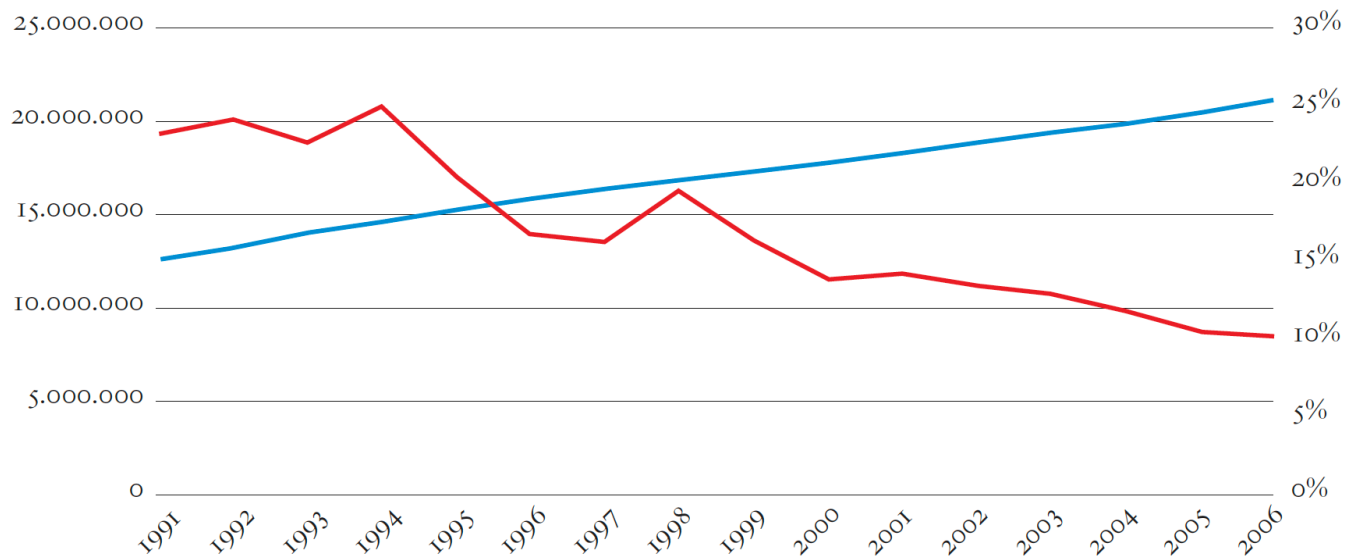


Figure 1: World Renewable Internal Freshwater Resources Per Capita vs World Population Density  
 Source: Data from World Bank



— Agriculture, value added (% of GDP)  
 — Yemen Population

Figure 2: Yemen Population vs Agriculture Value Added  
 Source: Data from World Bank

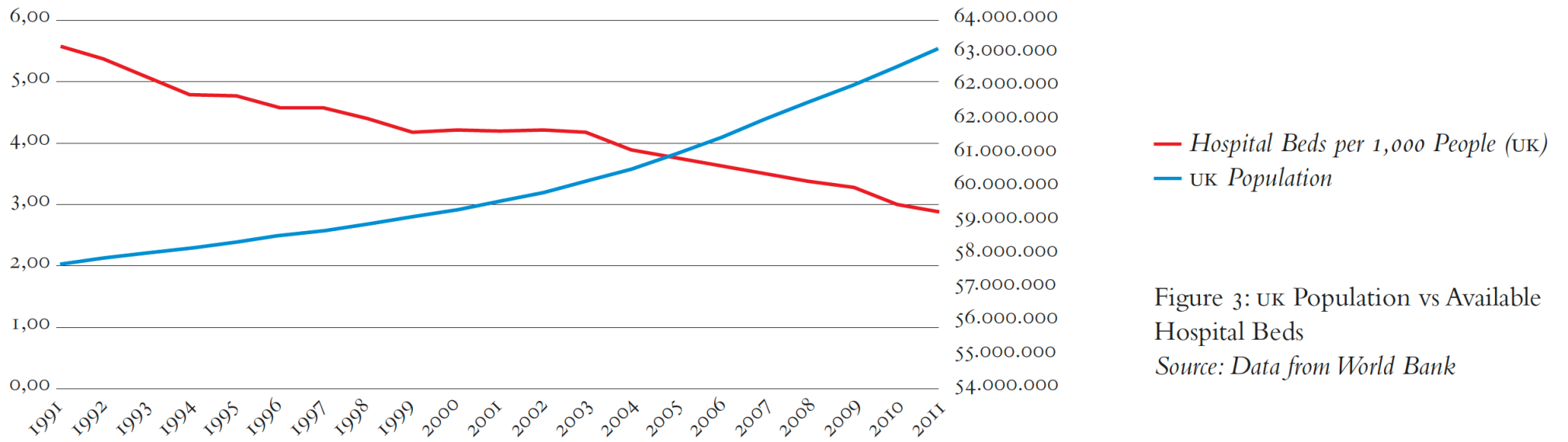


Figure 3: UK Population vs Available Hospital Beds  
 Source: Data from World Bank

**Discuss in small groups, instances, where you see in systems you're a part of, demand increasing while supply is constant or declining...**

**session #2 avoiding catastrophic failure in complex systems**

**Complexity University – 26 June, 2020 | Session 2**

**an introduction to complex challenges**



**session #2 avoiding catastrophic failure in complex systems**

**desired future  
state**

**current realities**

**undesirable  
future state**

**desired future  
state**



how do we  
get there?

how do we  
avoid this?



**undesirable  
future state**

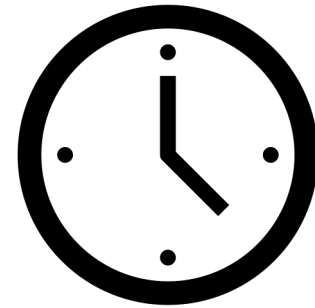
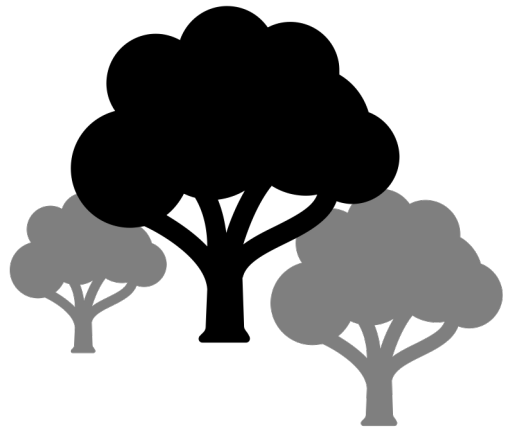
we are here



**current realities**

**how do we get there? how do we avoid the undesirable?**

**two approaches**



**the dominant response = strategic planning** 🕒

**desired future  
state**

**current realities**

**undesirable  
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**current realities**



phase 1



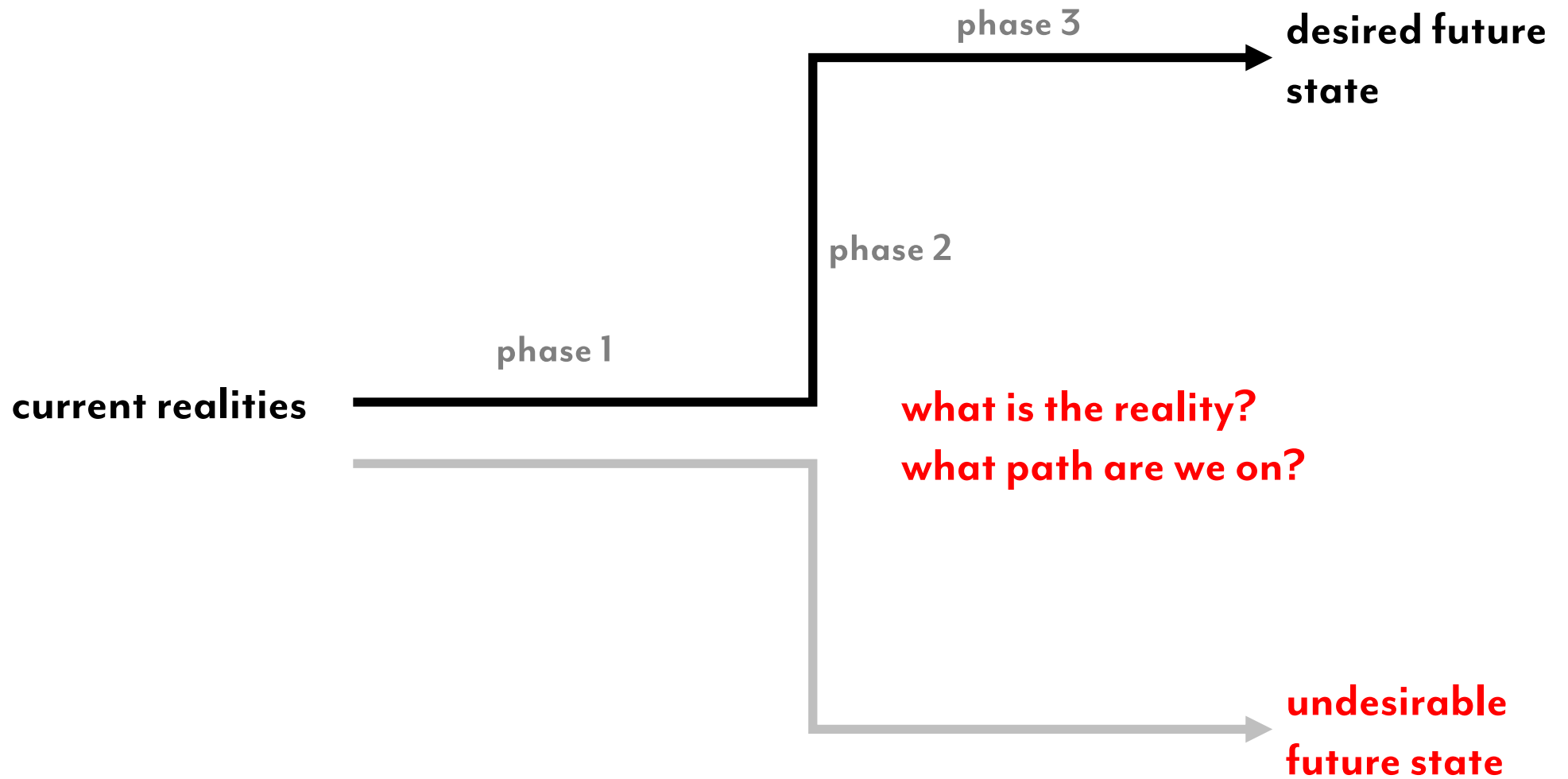
phase 2



phase 3

**desired future state**

**undesirable future state**



**strategic planning aims for optimisation**

**optimisation as a strategy in situations of diverging supply +  
demand curves does not work**



**the culture of strategic planning is not fit for purpose**  
**it violates Axiom 1 + 2 + 3**

## Axiom 1

**non-complex systems are** always part of complex systems

## **Axiom 2**

**we adapt and learn our way into catastrophic failure  
one day at a time**

## **Axiom 3**

**if demand is increasing and supply is constant or declining  
in a system, it is heading for catastrophic failure**



(if we can get gravity wrong for 20 centuries,  
shouldn't we consider possibility that we've gotten  
**strategic planning** wrong?)

**strategic planning in complexity is malpractice**  
**just don't do it**

**what is a better way?**

a better response = **the prototyping paradigm**<sup>1</sup>



(1) Note the “prototyping paradigm” is different from “prototyping processes”

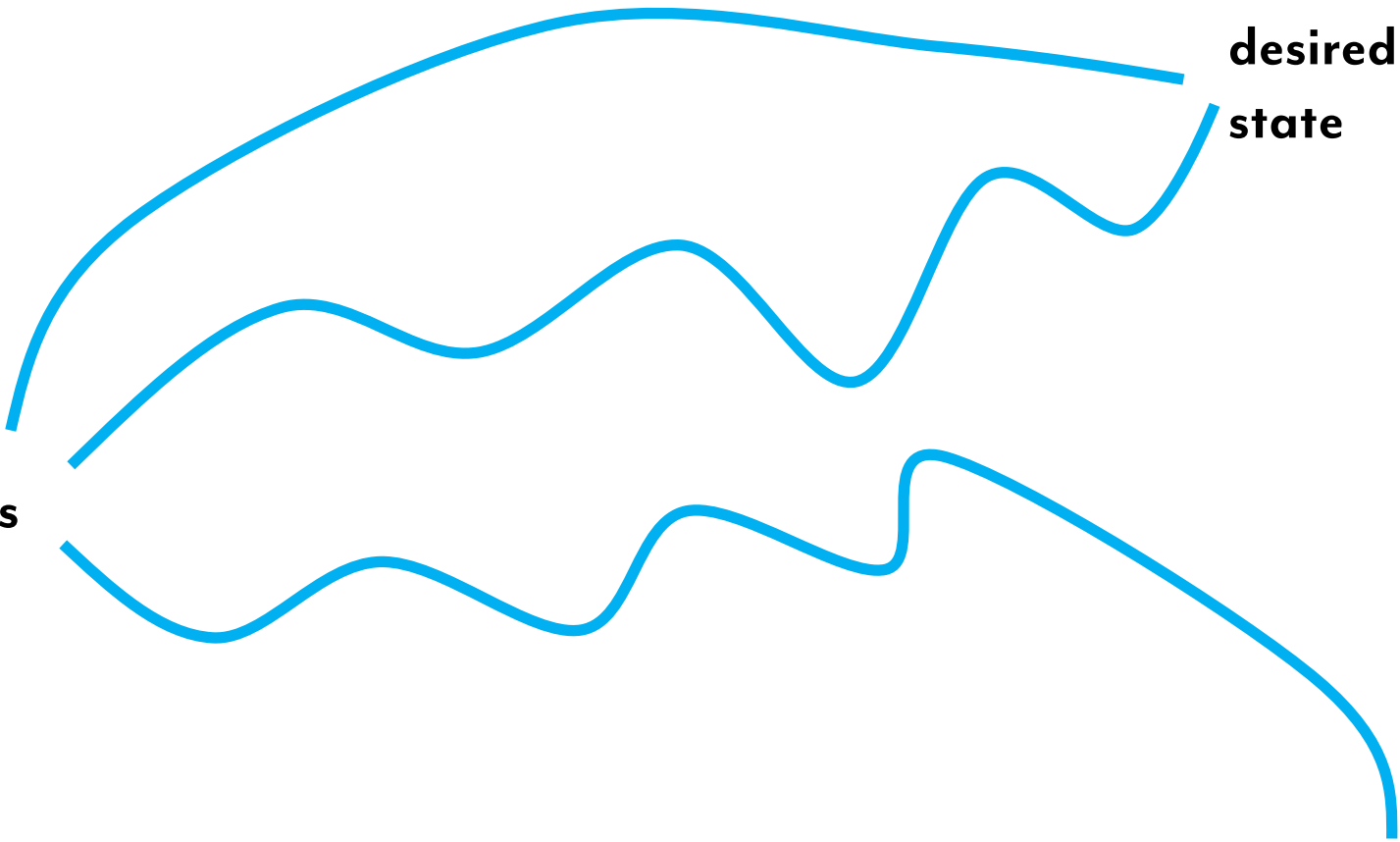
## **Axiom 4**

**there are multiple pathways to desirable future system states but they are all emergent (unpredictable)**

**desired future  
state**

**undesirable  
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**current realities**



## **Axiom 5**

**we cannot see very clearly into the future**

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**we cannot see very clearly into the future**

**we live in an era of the law of regression to the tail**



**desired future  
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**we don't see the pathway as a whole**

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**we have a very partial view**

**we don't see the pathway as a whole**

**we have a very partial view, the journey is unpredictable**

**desired future  
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**think of a good journey you went on, think of a bad journey  
what were the differences?**

**“... the future is a teenage crackhead who makes shit up as he goes along.”** – Chuck Klosterman

**so what do we do then?**



## Axiom 6

**test as many pathways to desirable systems states  
as possible** - the more we test, the more likely we are to  
find a way through

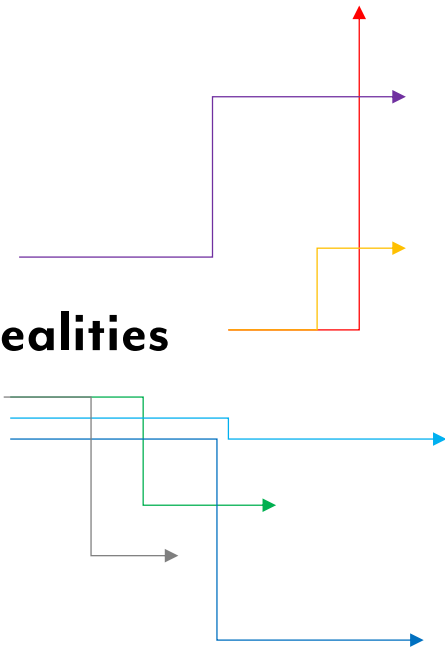
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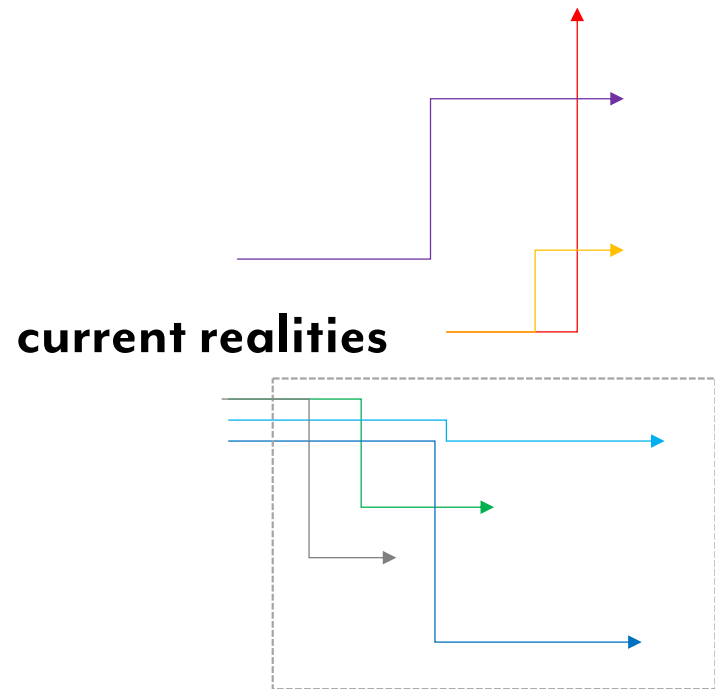


**undesirable  
future state**

## **Axiom 7**

**be disciplined when testing in complex systems,  
draw boundaries (including temporal), be frugal  
in testing (jugaad innovation)**

**desired future  
state**



**undesirable  
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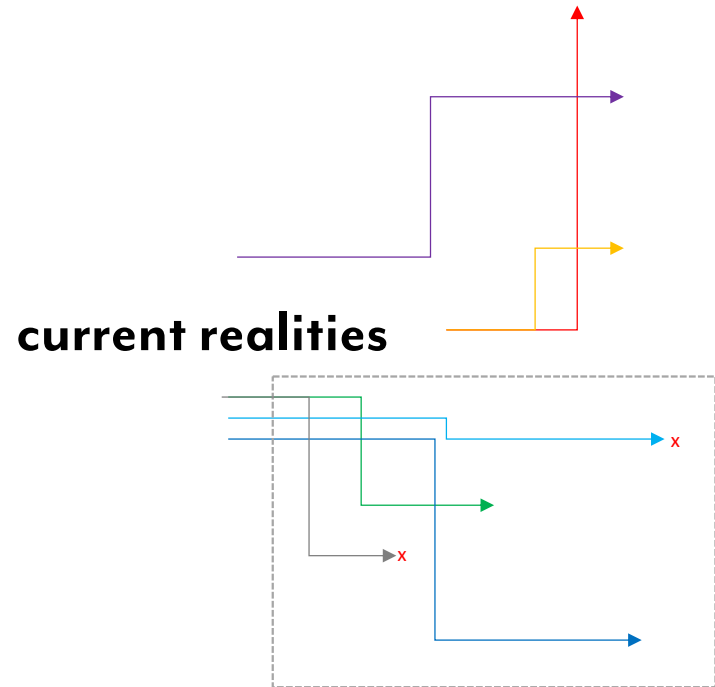
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**“effective” practice in a complex system is reflexive  
+ contextual**

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**“effective” practice in a complex systems is reflexive  
+ contextual - there is no such thing as “best practice”**

**desired future  
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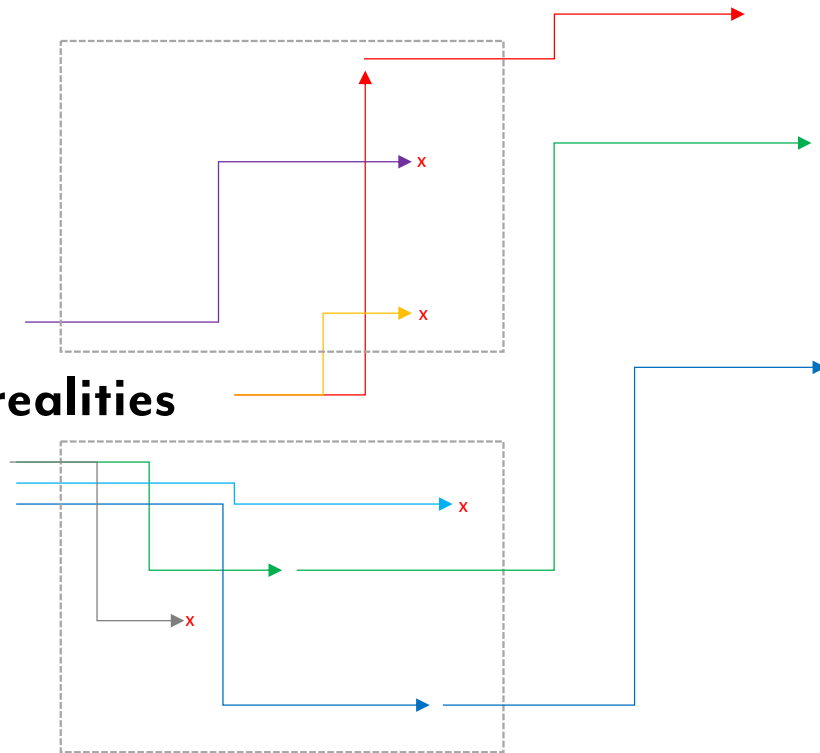


**undesirable  
future state**



**desired future  
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**current realities**



**undesirable  
future state**

## **Axiom 9**

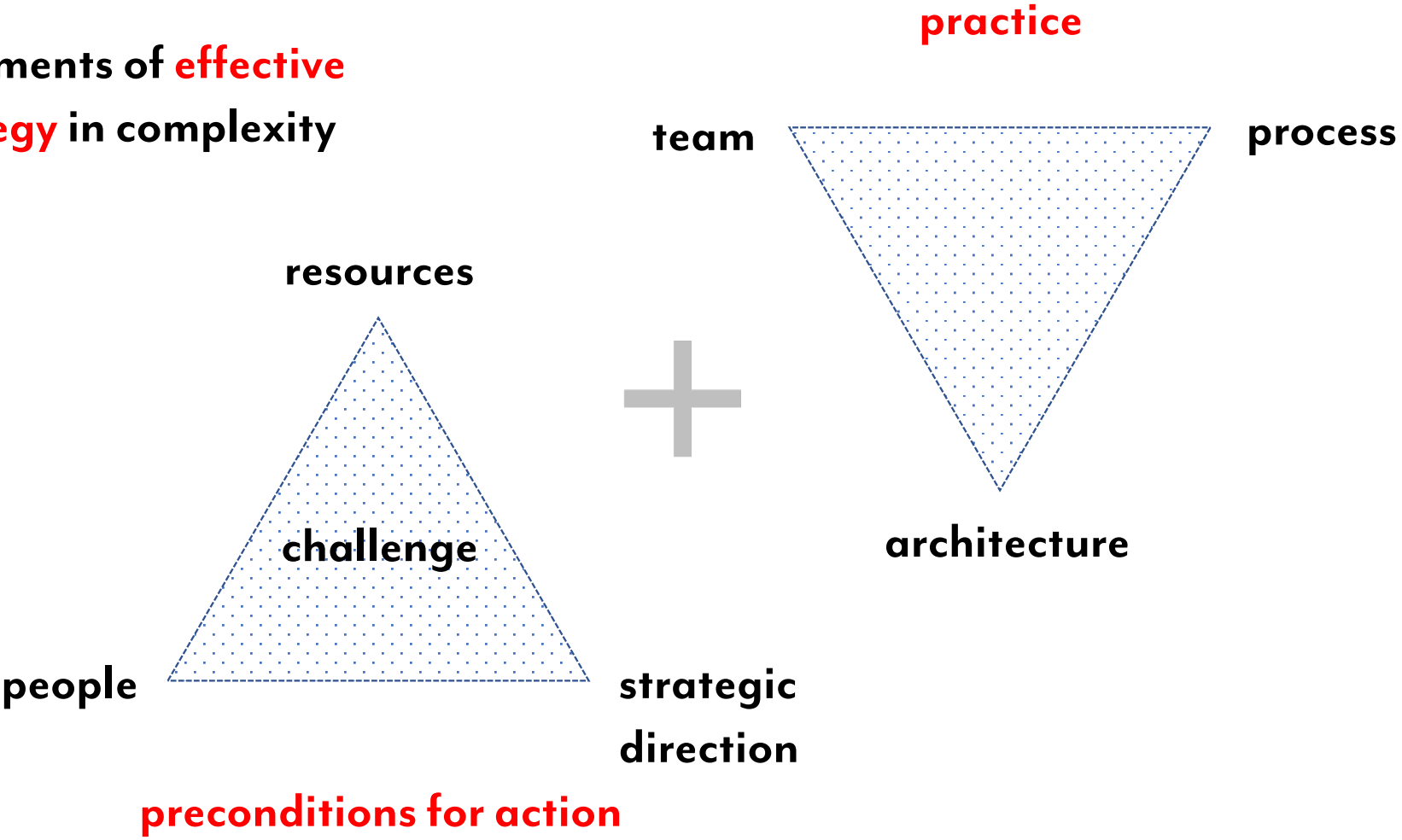
**the real innovation in complex systems are teams (not plans)**

**the best teams are the product of reflexive practice**

## **Axiom 10**

**effective strategy in complex systems is a practice**  
**it is about what you actually do**

the elements of **effective strategy** in complexity



# Ten Axioms

## **Axiom 1**

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(one day at a time)**

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## **Axiom 10**

**effective strategy in complex systems is a practice,  
it is about what you actually do, not what you say you're  
going to do**