Reflections on Computer Science, Society and Ethics 2
Society I:
Self-organisation

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IMC Krems, 13 April 2021

Contents

1 Self-organisation of, and in, natural and social systems (1/3)

Everything in the universe is
– either a **self-organising system**
– or **part** of its architecture
– or **moment** of its agency.

Any such system has an **overshoot of features over any of its elements**, which makes it **emergent**. By emergence the new comes into being. Emergence is the driver of evolution. The future is open.

Hence the names: ***emergentist Systemism****, ***Evolutionary Systems Theory******, ***General System Theory********, ***complex systems thinking***

* Mario A. Bunge; ** Rupert Riedl, *** Ludwig von Bertalanffy

1 Self-organisation of, and in, natural and social systems (2/3)

Systems, as a rule,
– are made up of **less-complex systems as elements**
– and are, in turn, **elements of suprasystems**.
Thus they are **holons*** building **holarchies***: systems are nested.
A holarchy is the **scaffold of complexity**.

Holarchies are the **product of evolution** towards higher complexity.
Growing together in a holon continues evolution. To build up another level is common moment of evolution. This process is called ***metasystem transition****.

* Arthur Koestler; ** Francis Heylighen et al.

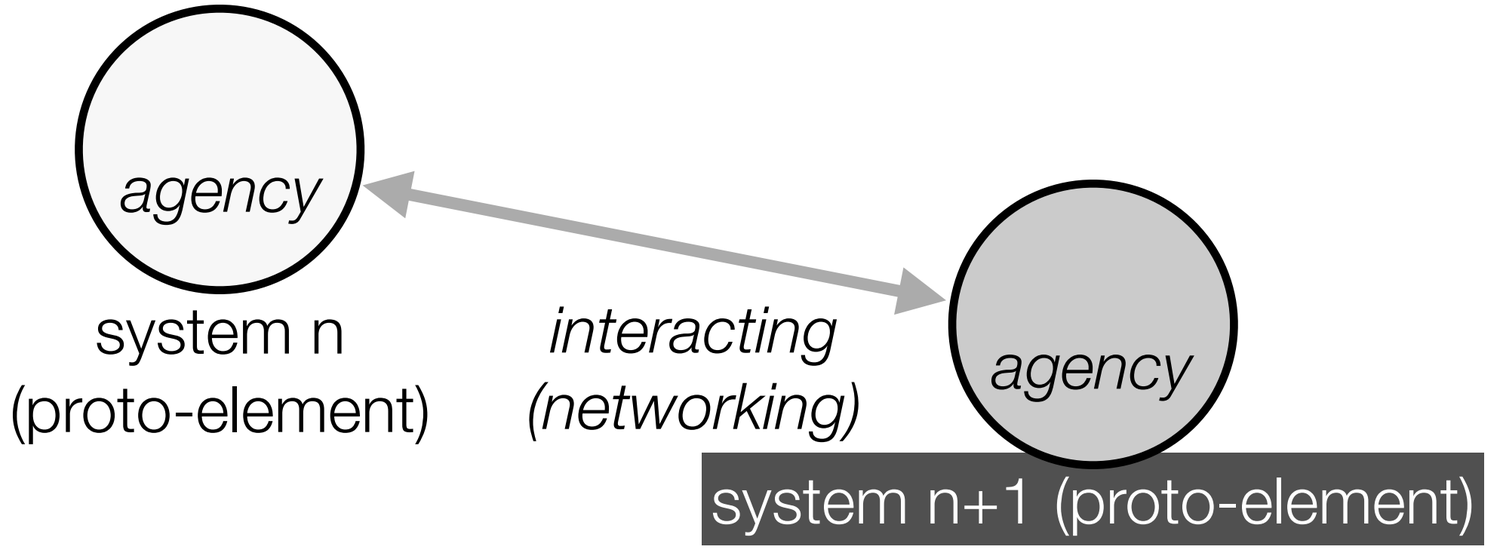
1 Self-organisation of, and in, natural and social systems (3/3)

Any system is an organisation that provides **synergy** to its elements.
In synergy, the elements can reach goals they would not be able to reach without the system. (Systems we observe today have been stabilising themselves as long as they could provide synergy.*)

Organisational relations mediate the synergy effects.
They are set to realise **unity through diversity****: in order to achieve synergy **the system induces its diverse elements to unite** through downward causation in a never-ending process.
Any system needs to balance unity and diversity to stabilise itself: **unity as little as necessary**, **diversity as much as possible**. This process is called ***suprasystem dynamics***.

* Peter Corning; ** Ludwig von Bertalanffy

1.1 Metasystem transition: growing together driving evolution



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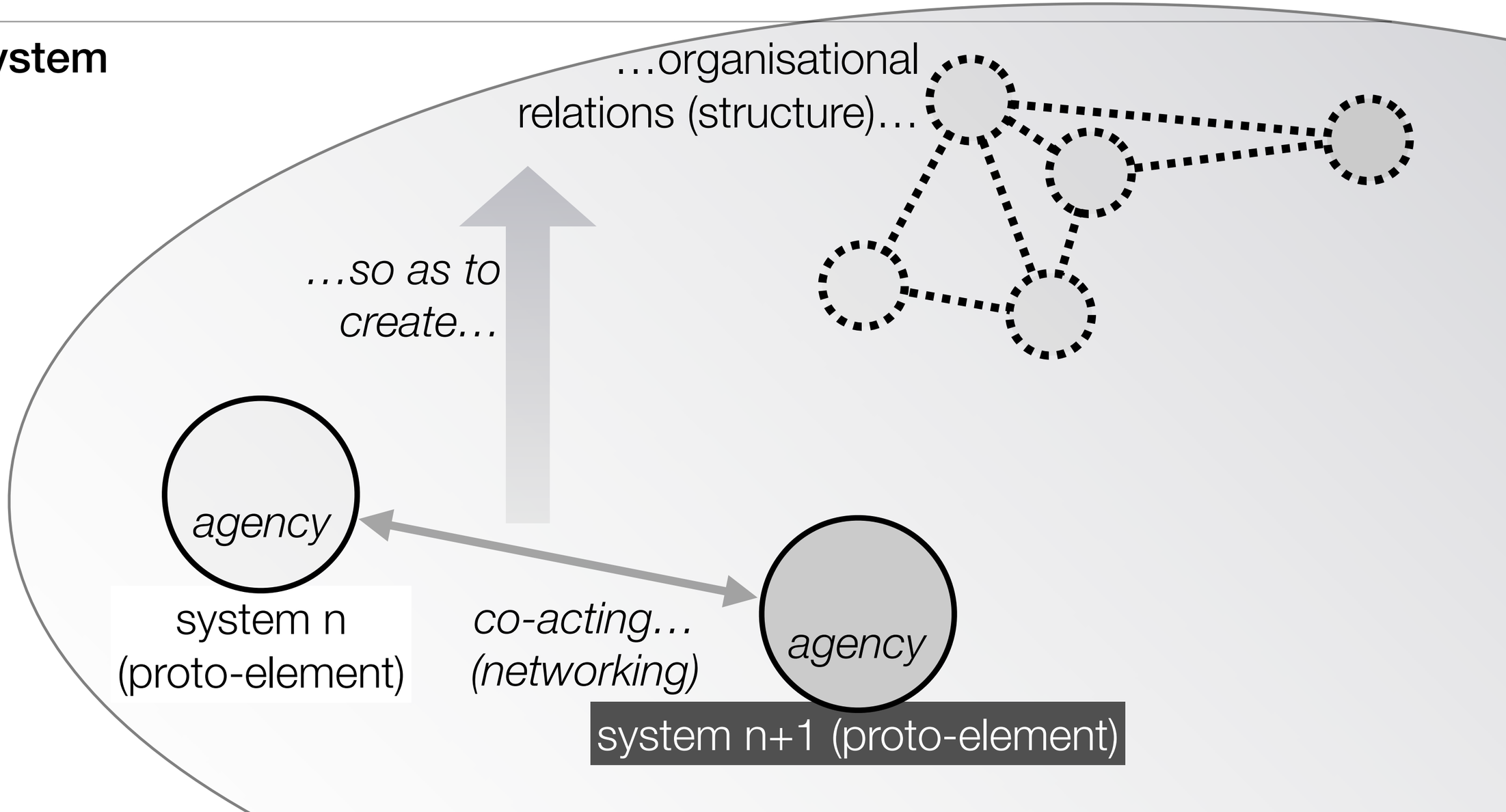
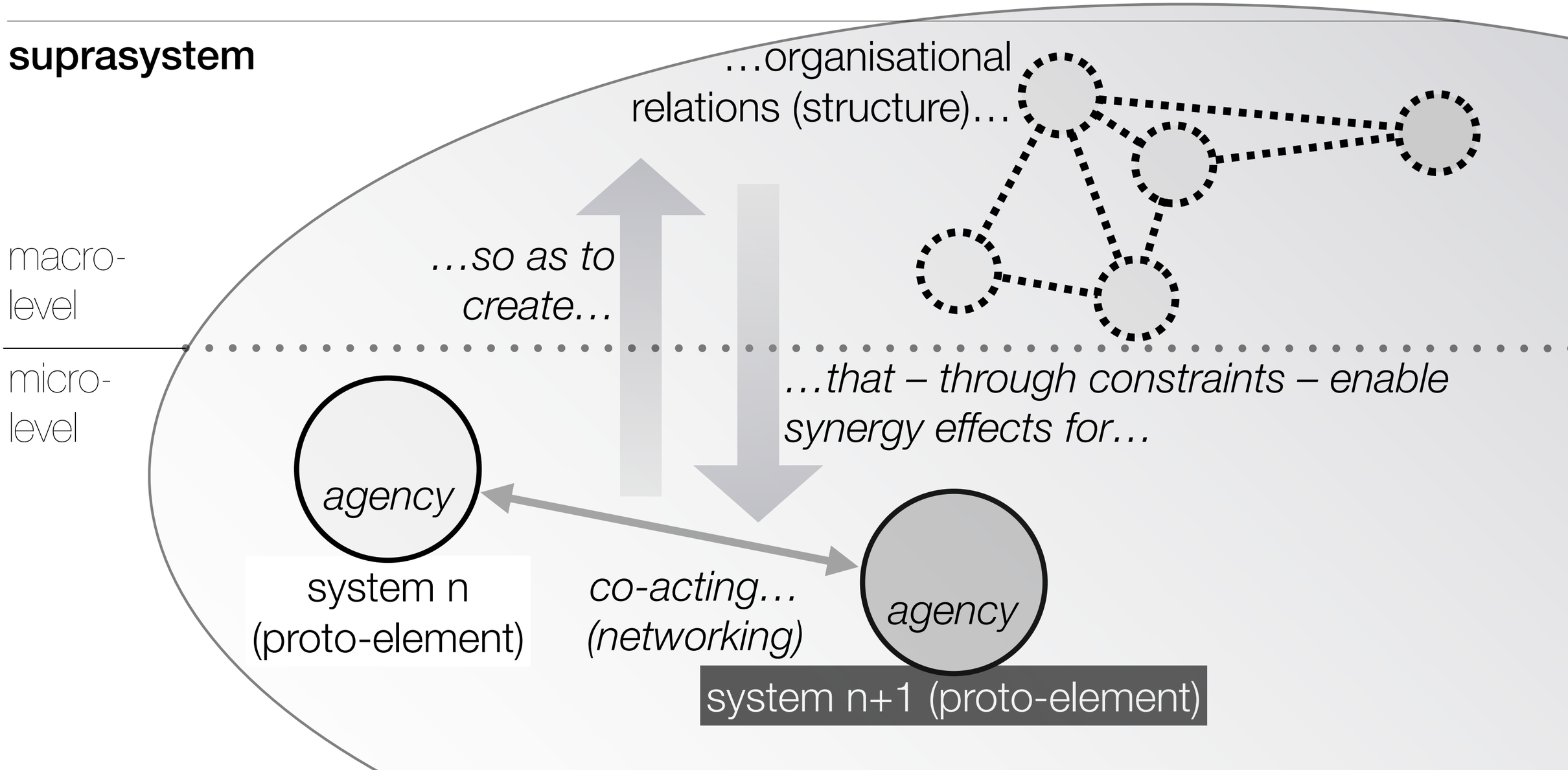


1.2 Suprasystem dynamics: shaping unity through diversity



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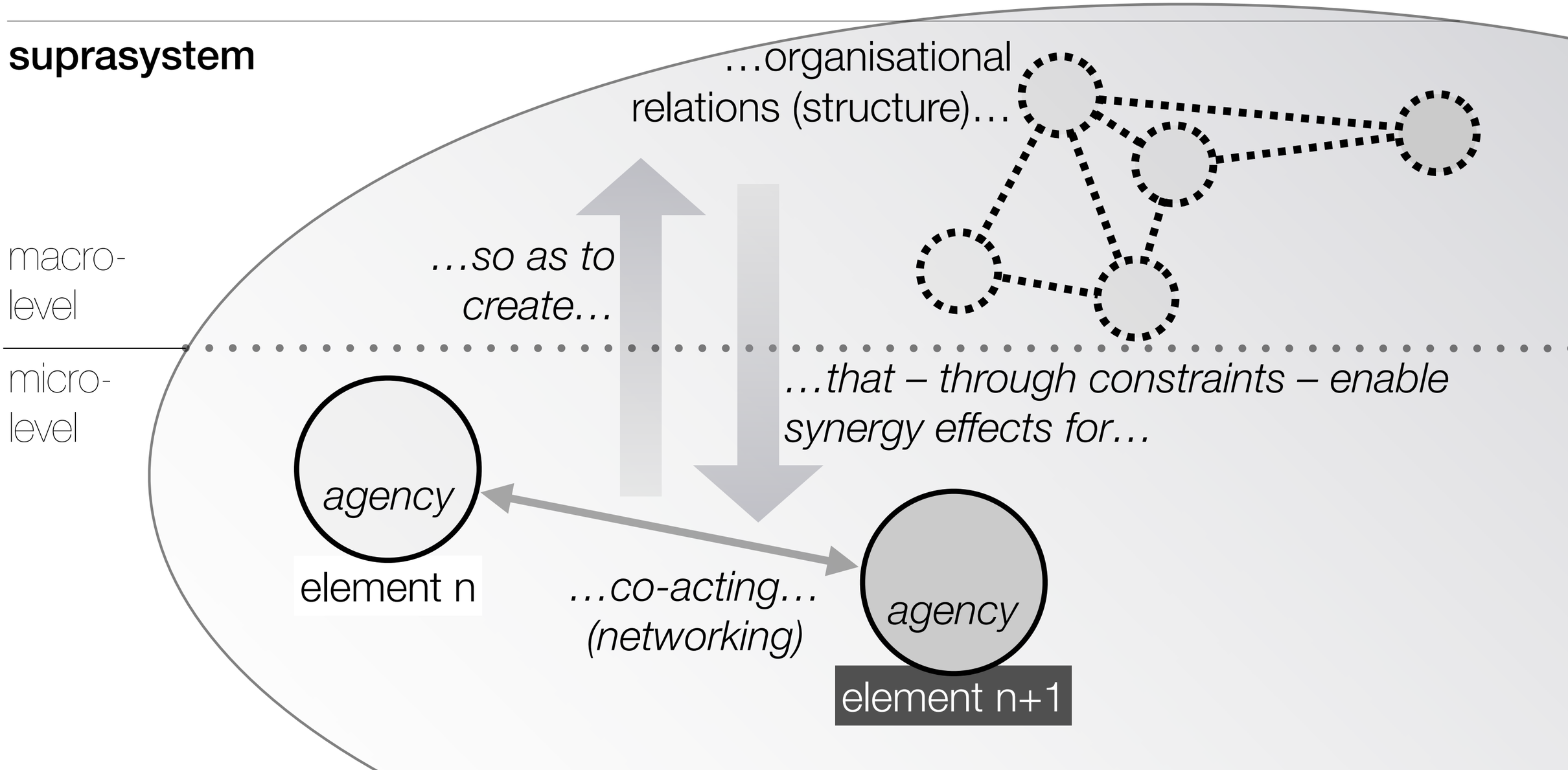
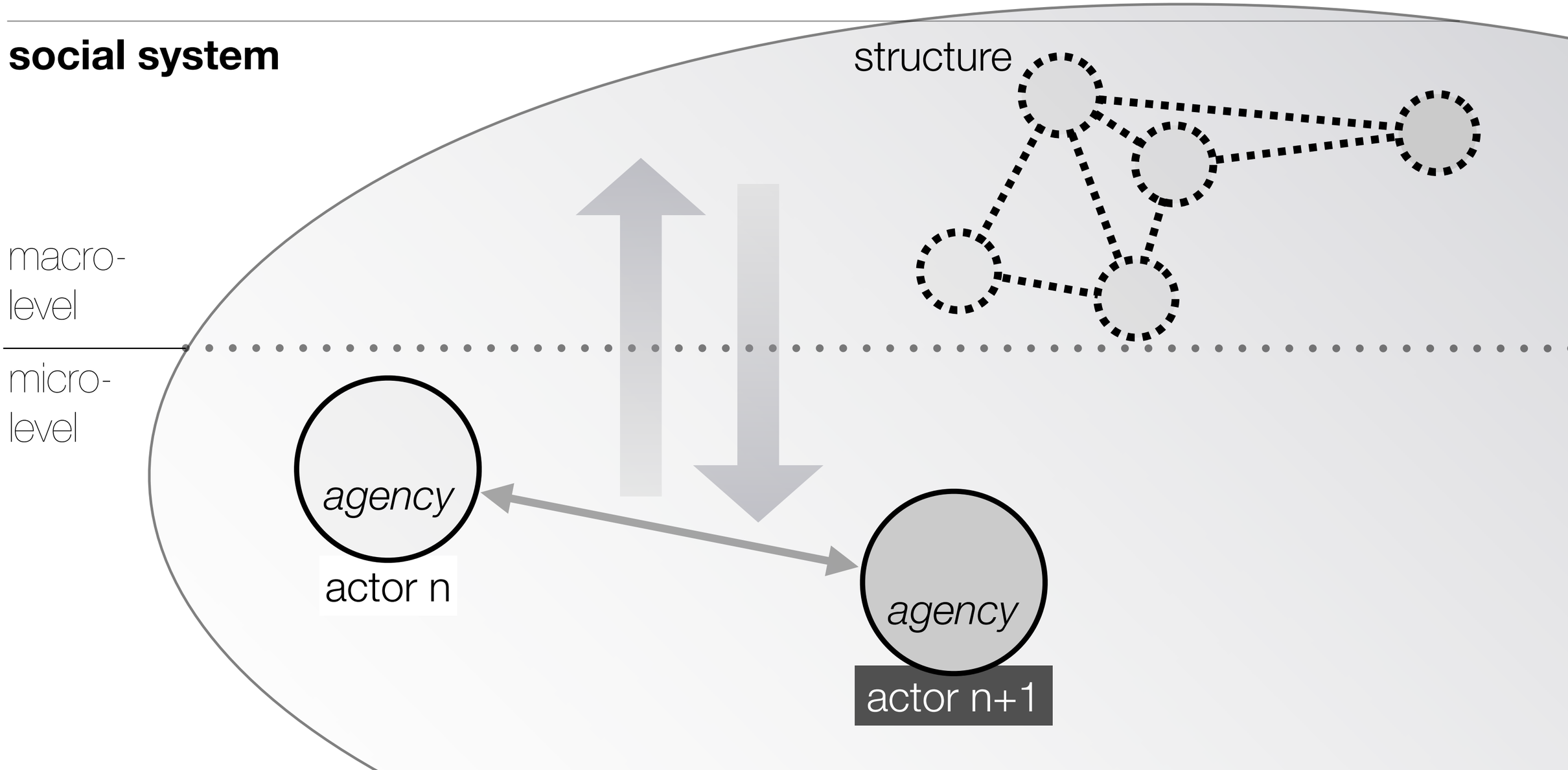


2 Social self-organisation: building a good society for all

A **social system** is made up of **actors** (as elements) that
– produced anew a structure (since they formed a metasystem) and
– reproduce or
– transform a given structure (since they inhabit a suprasystem)
of commons that, as synergy effects, shall provide a good life for any actor.

A **commons** is any **common good** the actors can share in producing (working) and using (living).

2 Social self-organisation: building a good society for all



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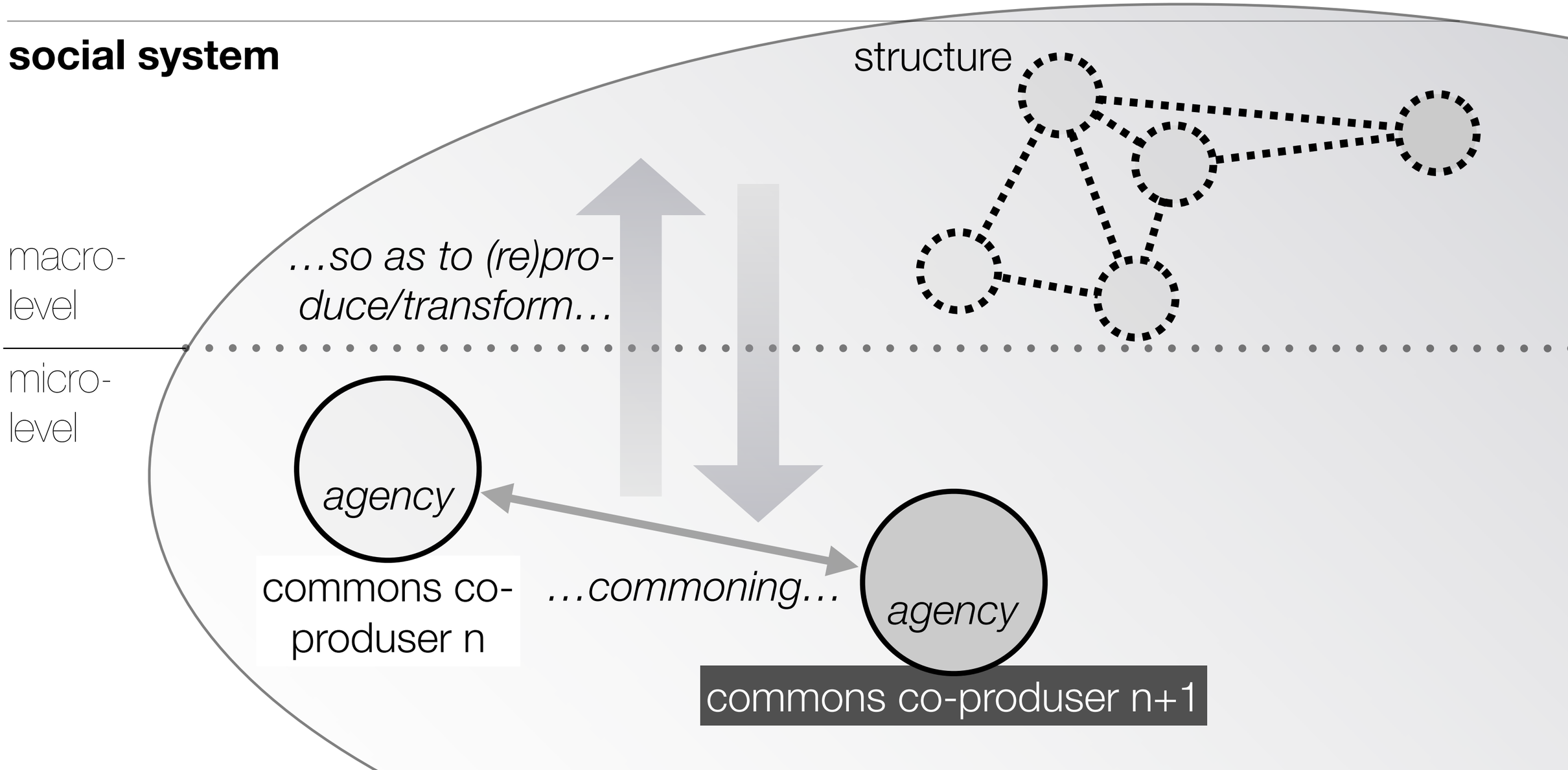

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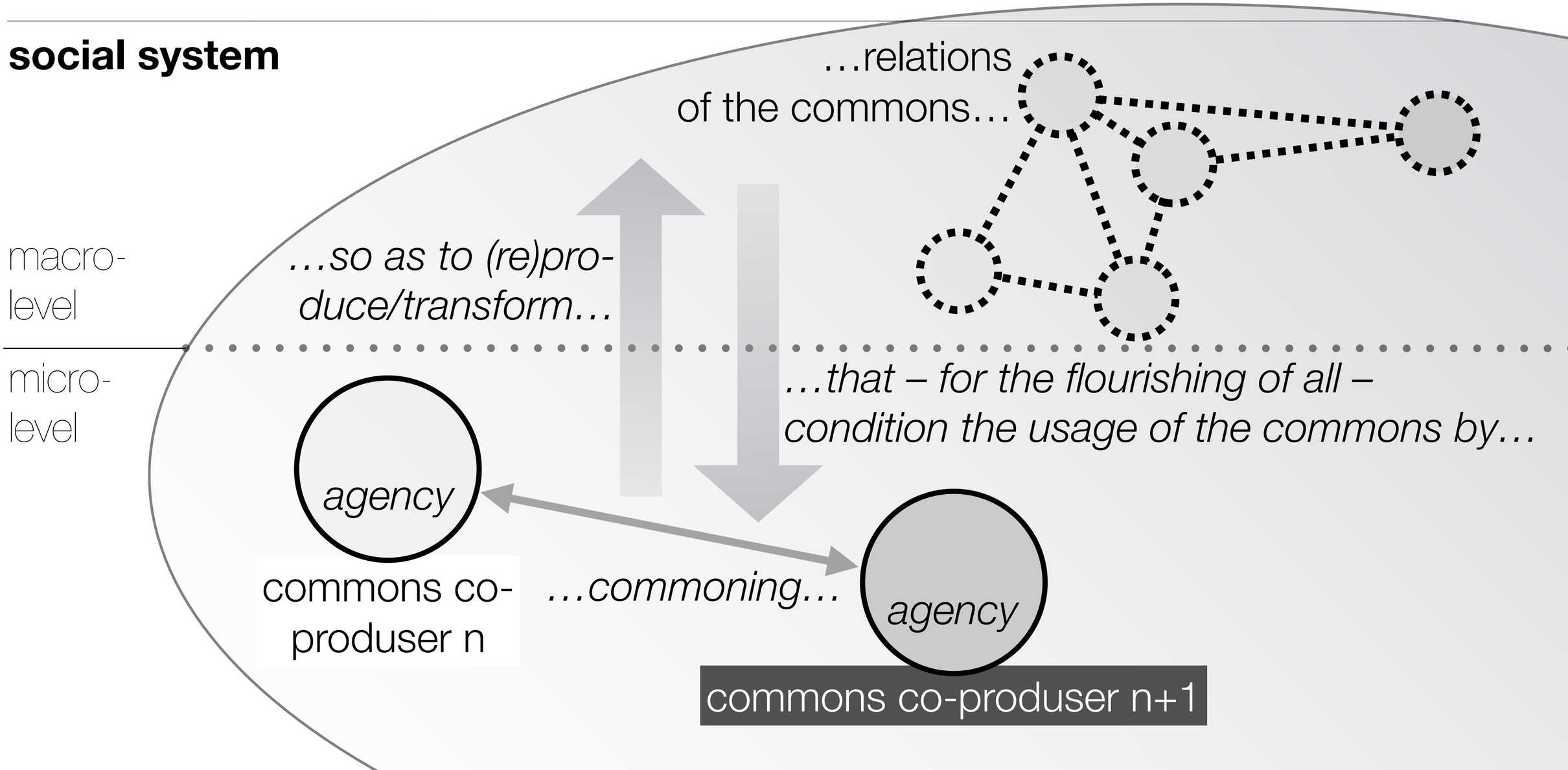

3 Conclusion

- **Social evolution** – the becoming of humankind (anthroposociogenesis) – is a continuation of **natural evolution** with **social systems**.

- So far as we know, **self-organisation** has become differentiated from the **physical** domain of the universe into the **living** domain at least on Earth and from the living into the **social** domain.

- In the **social** domain, **synergy** – as reason of existence of systems – assumes the form of **commons**.

References Society I

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Reflections on Computer Science, Society and Ethics 2
Society II:
Self-organisation in technosocial systems

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IMC Krems, 13 April 2021

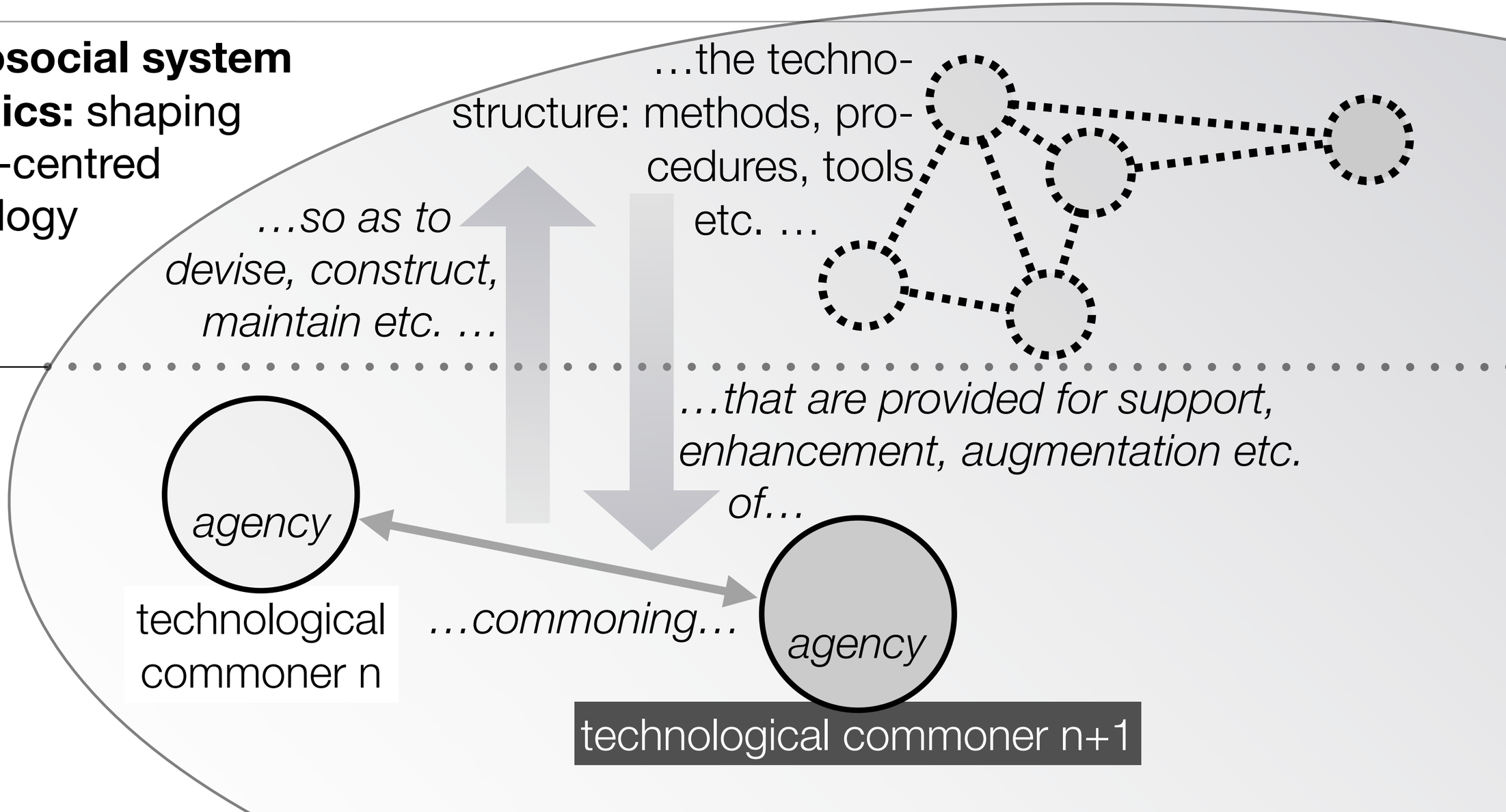
Contents

1 Technosocial self-organisation

Whenever **humans** produce or use technology, **machines** – artificial parts – are inserted into the social system in order to yield a more effective and more efficient overall fulfilment of social functions.

– Any social system is self-organised.
– Machines, however, restrict the space of possibilities of social, or socially controlled natural, self-organisation processes such that the desired result is yielded. Without restrictions, you can't make sure that a determinate result can be expected.

1 Technosocial self-organisation



2 The human and the machine: a complex systems comparison

What do the human and the machine have in common and where do they differ
– in physical respect,
– in biotic respect, and
– in social respect?

2.1 The physical respect (1/2)

	the human	**the machine**
in physical respect	as an **agent***: • is able to **organise itself**, that is, to build up its own order by using free energy and dissipating used-up energy; • is made up of elements that produce **organisational relations** that constrain and enable **synergy** effects and thus induce a **system**; and, as subordinate system, it is able to take part in inducing **superordinate** system entities;	as a **patient***: • has **no self** to organise; • is made up of modules that are connected in a **mechanical** way, thus not able to induce a system nor a suprasystem;

* Rafael Capurro

2.1 The physical respect (2/2)

	the human	**the machine**
in physical respect (con-tinued)	• works on the basis of **less-than-strict-determinacy**, thus yielding emergence and contingency; …	• functions **strictly deterministic**, devoid of emergence and contingency; …

2.2 The biotic respect (1/2)

	the human	**the machine**
in biotic respect	as an **autonomous agent*** (a living system): • is able to **maintain** its organisational relations by the active provision of free energy; • is able to make **choices** according to its embodiment, its embedding in its natural environment and the network of conspecifics;	as a **heteronomous mechanism** (that may dispose of living systems parts): • is **dependent on being provided with free energy** from the outside; • has **no capacity to break free from the programme built-in**;

* John Collier

2.2 The biotic respect (2/2)

	the human	**the machine**
in biotic respect (con-tinued)	• is able to **control** other systems by catching up with the complexity of the challenges it is faced with by the other systems; …	• has no capacity to catch up with complexity, is **under control** by organisms; …

2.3 The social respect (1/2)

	the human	**the machine**
in social respect	as an **actor** (a social agent): • is, in essence, the **ensemble of the social relations*** that emerged from a change in co-operation of its animal ancestors; • is element of social systems that provide the **commons** as social synergy effects; • constitutes social **agency** (action, inter-action and co-action with other actors) that **reproduces and transforms** the social **structure** (social relations) that, in turn, **enables and constrains** social agency;	as **artefact**: • is **constructed by humans**; • is a **commons** itself; • does not act itself but **supports action, inter- and co-action**, is not directly causative;

* Karl Marx

2.3 The social respect (2/2)

	the human	**the machine**
in social respect (con-tinued)	• is the **driving force** of social evolution, including the evolution of culture, polity, economy, ecology, technology; • is able to **set off the transition into actuality of an option of choice** out of the field of possibilities; • is able to **reflect upon the social relations**; …	• is **driven by social evolution**; • does not **directly trigger emergence**; • has no capacity to reflect on anything but can **support human thinking**; …

3 Conclusion

- The **human** is a **socio-bio-physical system**. The physical is nested by the biotic and the biotic is nested by the social. It is a complex system. It is a holon.

- The **machine** is **not a system** at all. It is a mechanism.

- The **technosocial system** is a **social system** that harnesses **machines** for the fulfilment of social functions.

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