Advanced Process Architectures

PART FOUR

The Future of Process Architecture

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Process Economics

- Production Costs
  - Direct cost of producing the product
  - Essential processes
- Transaction Costs
  - The costs of transactions that do not contribute directly to the product
  - Support processes

- Process improvement tends to increase transaction costs by demanding more non-productive transactions
  - Do adding transactions really ensure increased quality?
  - When the Process enactment is under pressure, it is the work that involves transaction costs that is neglected
- The process considered as a system includes both kinds of costs where the ratio between these kinds of cost vary depending on the situation

Process System

- Process economic system balanced homeostatically between gain and loss
  - Compensatory actions are taken to distribute gains and minimize losses within the system
  - A balance is sought between transaction and production costs
  - A balance is sought between the needs of the organizational meta-process and the project process
  - A balance is sought between work and play within the system
  - A balance is sought between the social and the technical within the system
- Multi-dimensional balancing is the name of the game
  - Kinds of work are gestalts of balances that we participate in between production and consumption through the "inscription" that creates the product from the consumed resources

Is Systems Thought Enough to Understand Process Systems?

- Not all projects can achieve multidimensional balancing
  - Environmental characteristics or changes sometimes make balancing impossible
  - Most immature projects are out of balance in some aspect or many aspects
- If there is no silver bullet, then perhaps we will have to practice our process work according to the medical analogy of Brooks
  - If we merely have a view of health and not disease, it is not possible to practice medicine
  - Medicine is the study of disease -- not just health, but health in relation to disease

Strange Economics

- Potlatch
- Aztecs
- Marshall Plan
- Pork barrel bills
- IR&D that is cutoff without gaining results
- Unused Process Descriptions
- Immature and unwise processes

- What do these have in common? -- Waste
  - Not just waste, but unreasonable unaccountable waste
- Anti-economics (anti-production) is a reality
  - Destructive activities, corruption, incompetence, failure to perform
- Between anti-economics and economics there is the uneconomical, or waste:
  - Waste causes flows within the system that result in side-effects of unexpected production

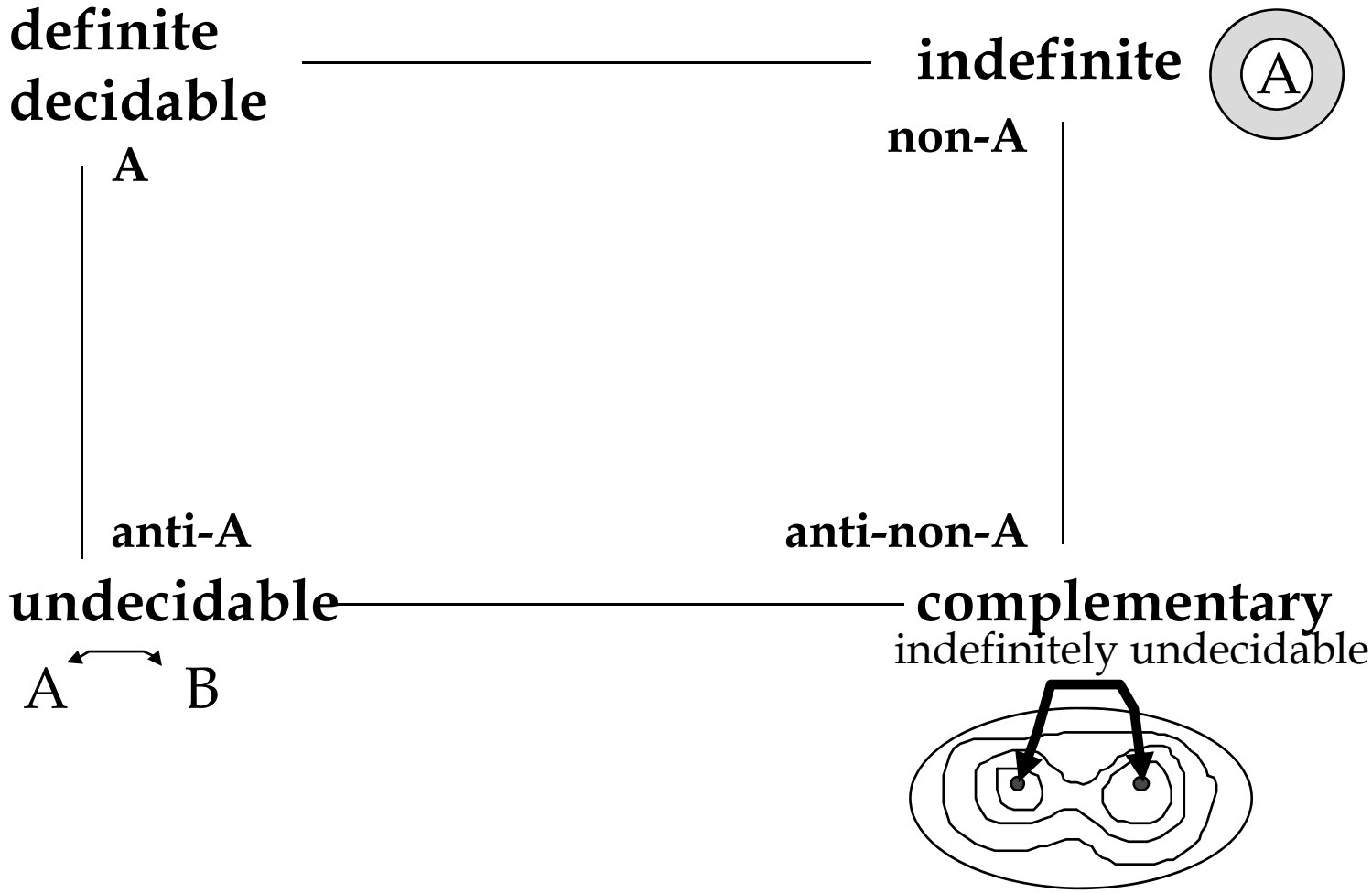
Undecidablity

- No system can be axiomatically closed (Godel)
  - There are always propositions within any formal system (of sufficient complexity) that are undecidable given the axioms of the system
- Thus, between the system and the anti-system there must be anomalies which cannot be definitely placed in either or both
  - This is the realm of unintended side-effects that haunts any system
  - Every system must have this shadow which is not part of the anti-system nor part of the system, but something in between and inexplicable
- Between work and anti-work (destruction) is play
  - we cannot decide if play is good or bad

Indefiniteness

- Systems are definite delineations of objects and their relations
- Every system has an umbra of indefiniteness where sharp distinctions between what is inside and outside cannot be made with definiteness
  - Idealized systems (such as processes) have an even higher degree of indefiniteness than material systems
  - The borderline cases which cannot be determined definitely continuously haunt every system
- Work strives to make everything definite, but play deals with the unavoidable indefiniteness which haunts every system
  - Indefiniteness indicates the limits of our power to impose order on a given material realm by a system

Greimas Square



- Both undecidable and indefinite yields complementarity

Extending our concept of economy

- The undecidable indefinite shadow of side-effects of a system must be taken into account
- We extend the concept of economy from the ***restricted economy*** of the system to the ***general economy*** of the meta-system
  - We consider not just systemic energy flows, but global flows that may interfere with each other and produce effects from interactions with other systems or with itself within the meta-system
  - We add to transaction and production costs the costs of the simulacrum (simulation costs)
  - Within the general economy there are many artificial or virtual or "side" effects which are discounted as mere appearances which take effort to discount and ignore
- These can only be dealt with at the meta-systemic level by non-routine work

Levels of Economy

- George Bataille introduces the distinction:

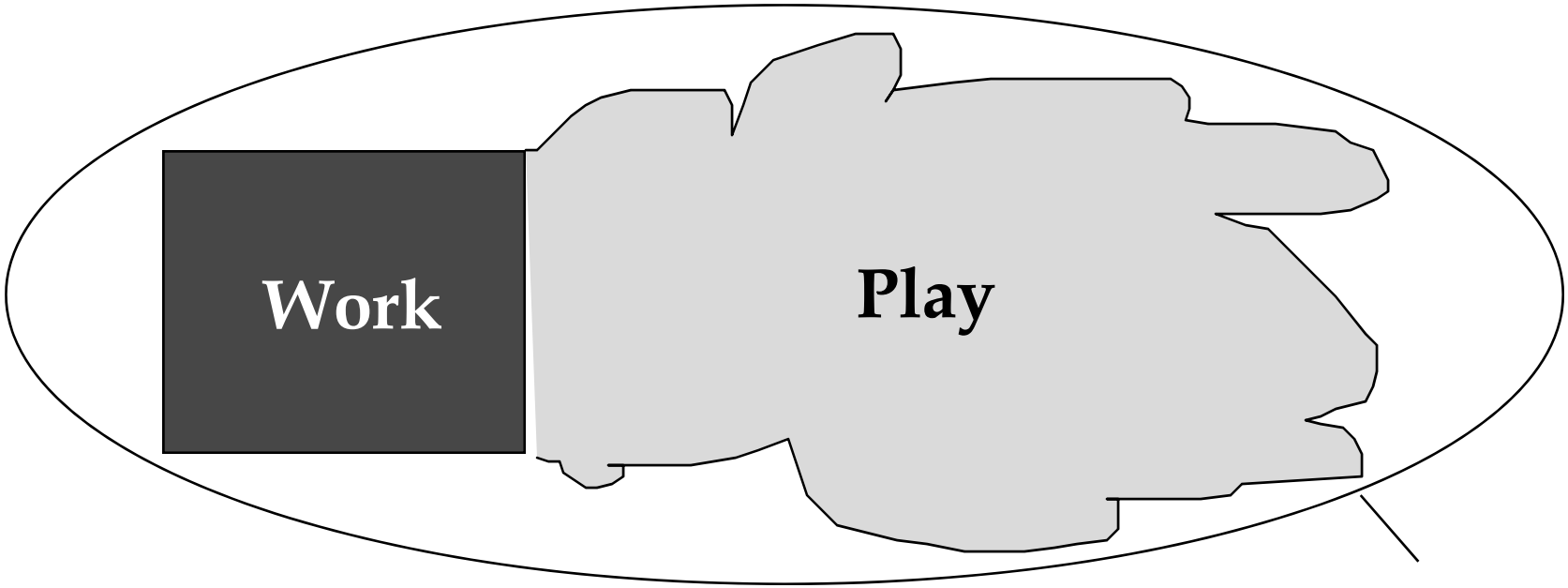
General economy	Restricted economy
Play	Work
Global energy flows	Bounded energy flows
meta-system	system

Diffused Process

- We speak of process as being social or cultural because it is diffused within the organization and among the people enacting the process
  - There is an aspect of this diffused process that we cannot treat as a system as socio-technical systems would like to do because it is too indefinite and undecidable to be considered as a system
  - This diffused aspect of process is crucial, and it coincides with the paradox of play within the system of work
- That which is both undecidable and indefinite is always complementary -- such as the complementarity of work and play
  - One cannot be considered without the other
- It is this diffused arena that is the adjunct to every work process that non-routine work attempts to deal by constructing meta-models
  - The diffused part of the process is the line of work/going concern

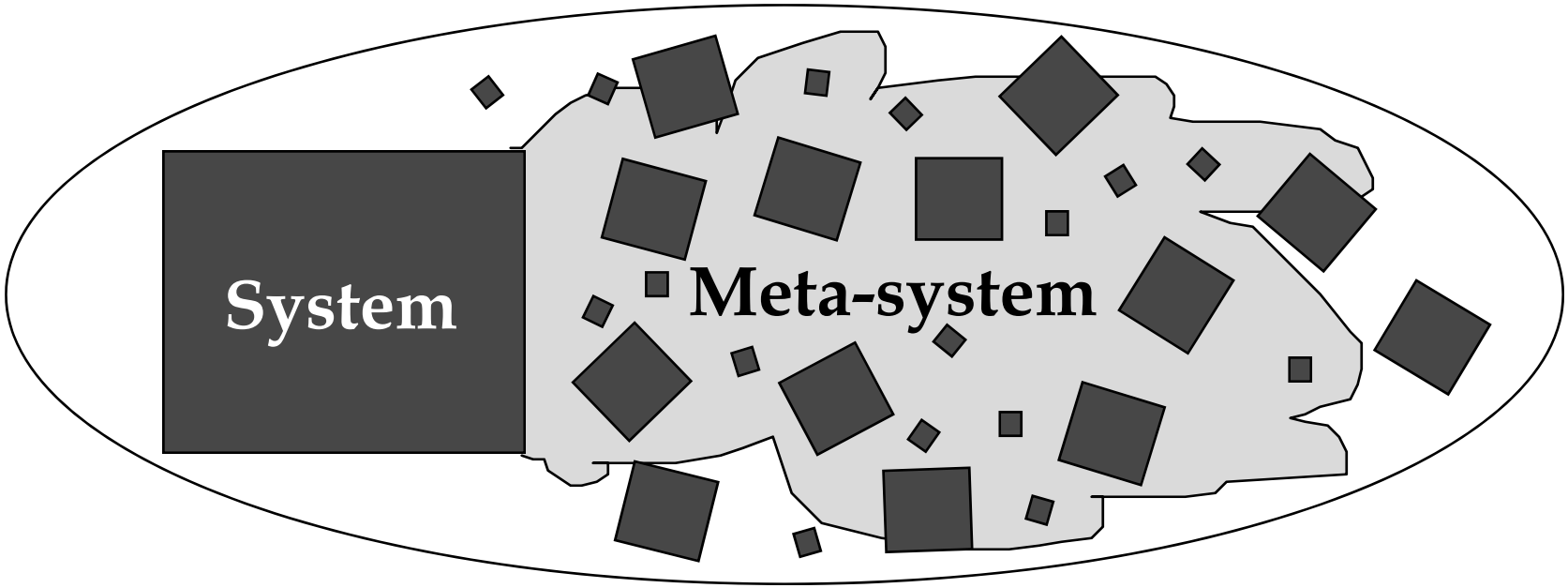
Shadowland

- Every restricted economy has a general economic shadow



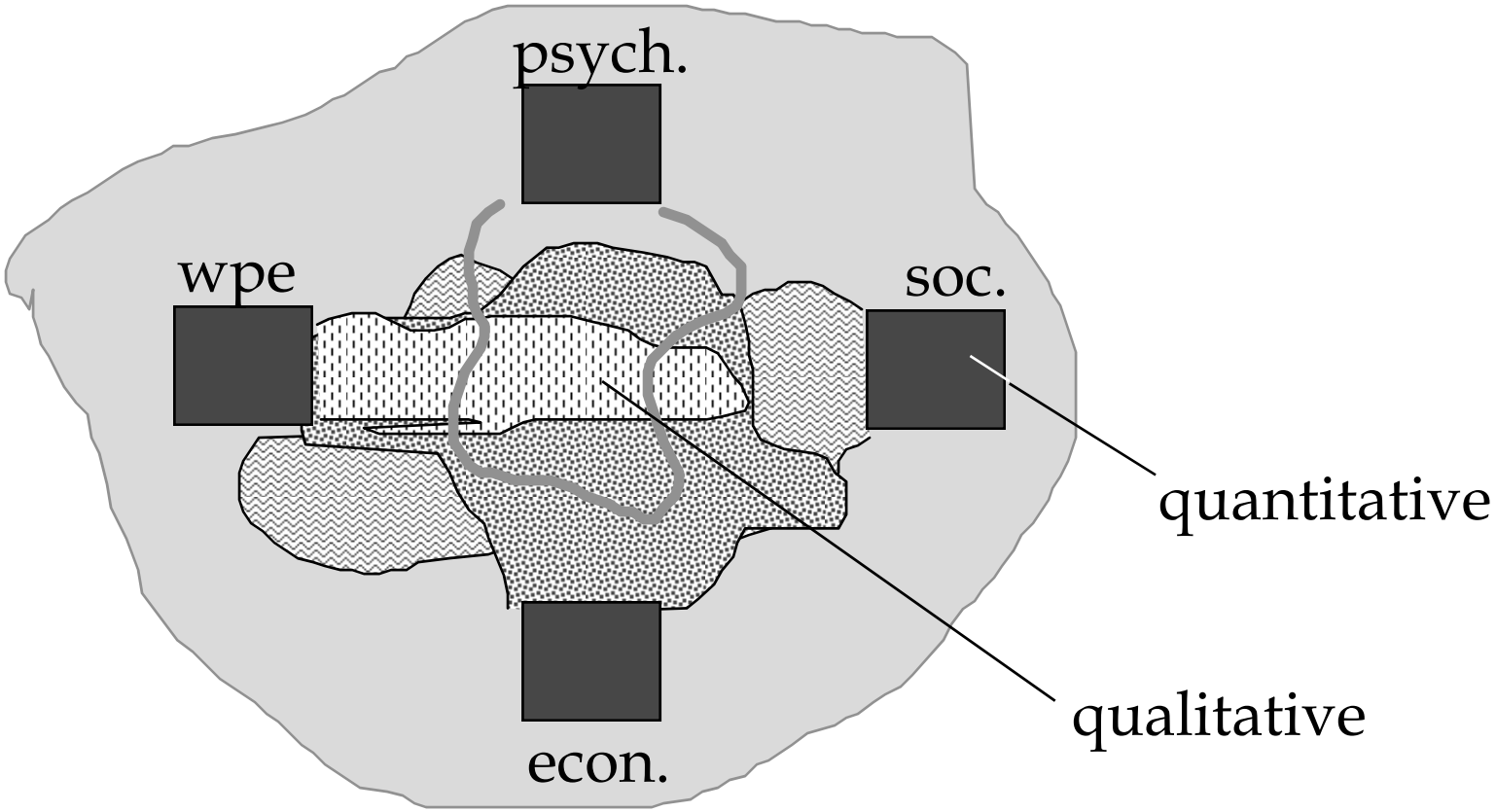
Reality	Simulation (game)
restricted economy	general economy
system	meta-system
pro/de-scription	going concern/line of work

Disassembly



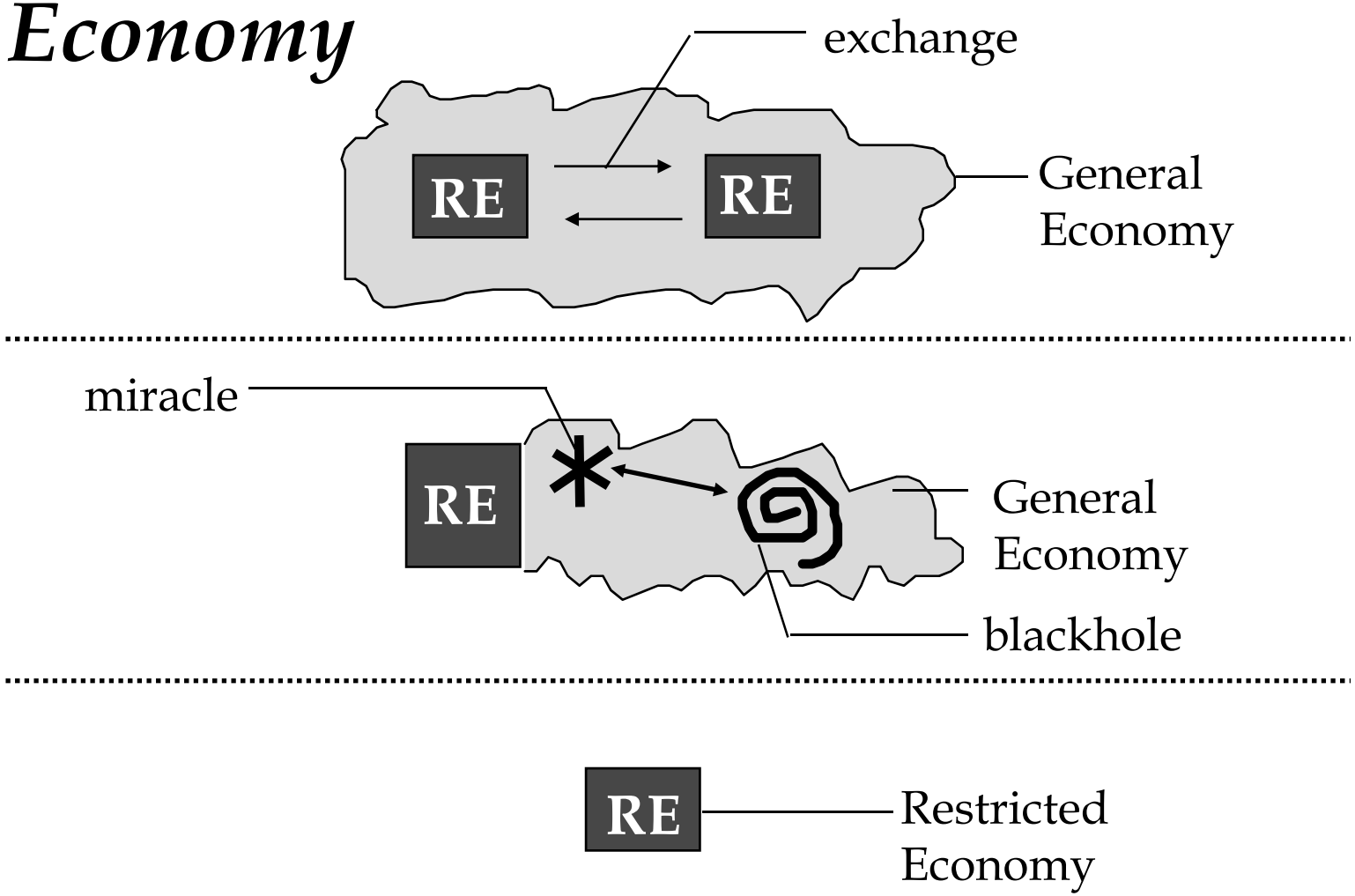
- Meta-systems are like disassembled systems

Human Process



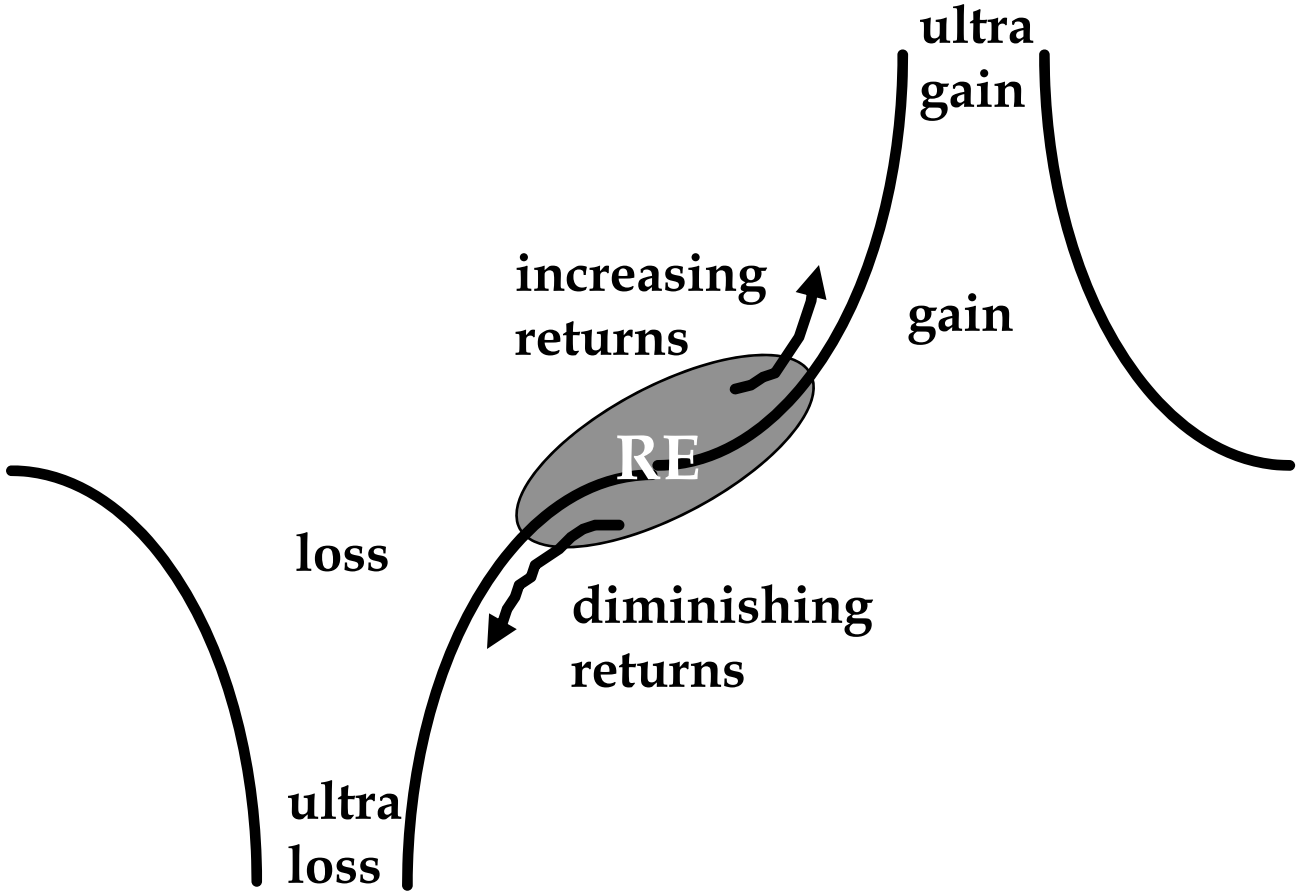
- Overlapping shadows of disciplines define the process arena

Complementary Views of General Economy



- Exchange versus Extreme Opposites

Adrift in the Stormy Seas



- Non-routine work negotiates the general landscape

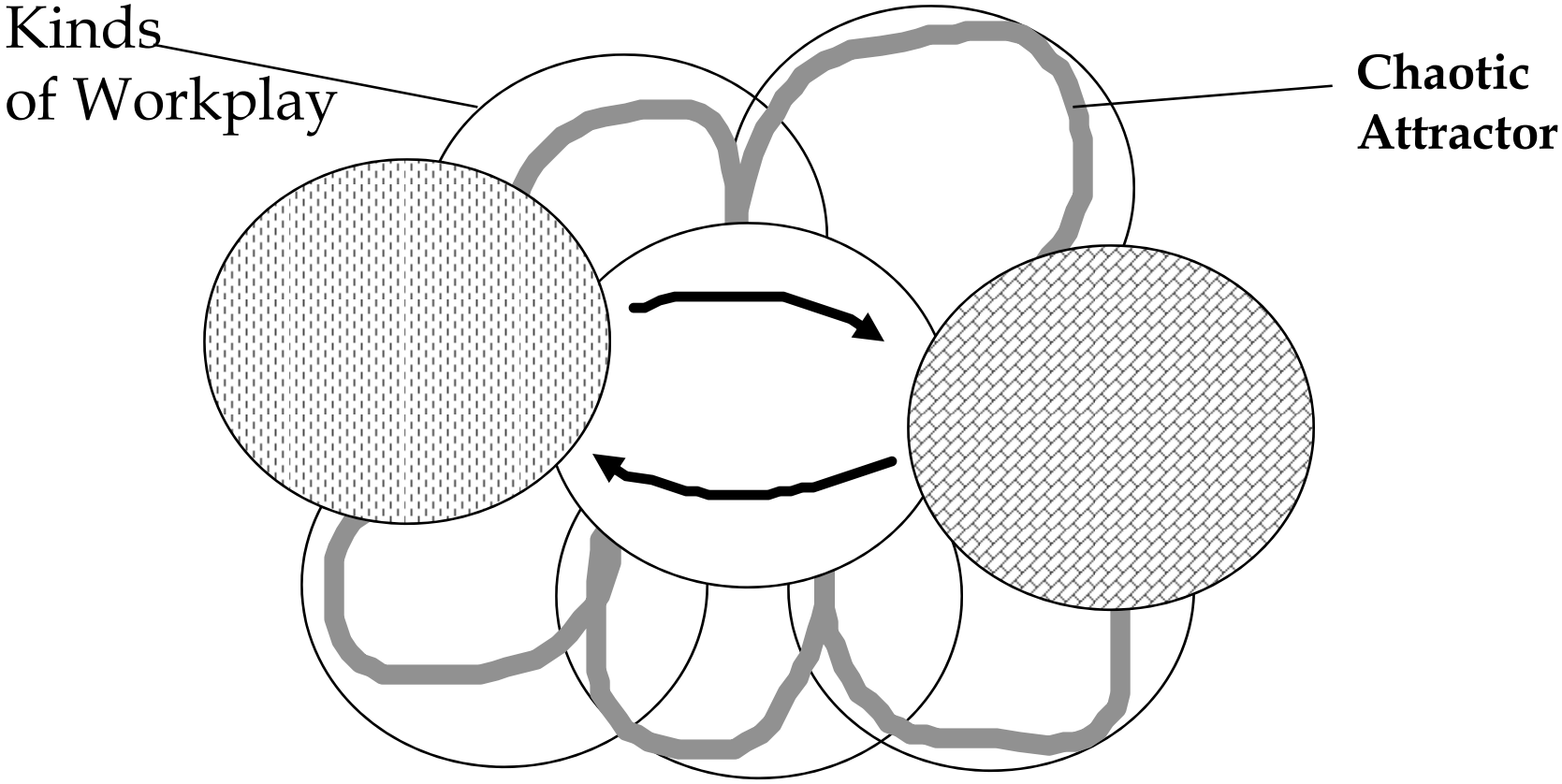
Suppression

- In Work Process Engineering, the general economy is suppressed
- But this is a contradiction because the essential nature of process as context is general economic, i.e. participates in undecidible and indefinite relations
  - Whatever we take to be the definite and decidable aspects of process, there is always something more which cannot be defined and decided that is left over
- We must stop suppressing the general economy of the process and instead use it in a positive way
  - It is the suppression of the general economy which causes us not to be able to handle non-routine work
    - It is by non-routine work that we navigate the general economic landscape

Surfacing

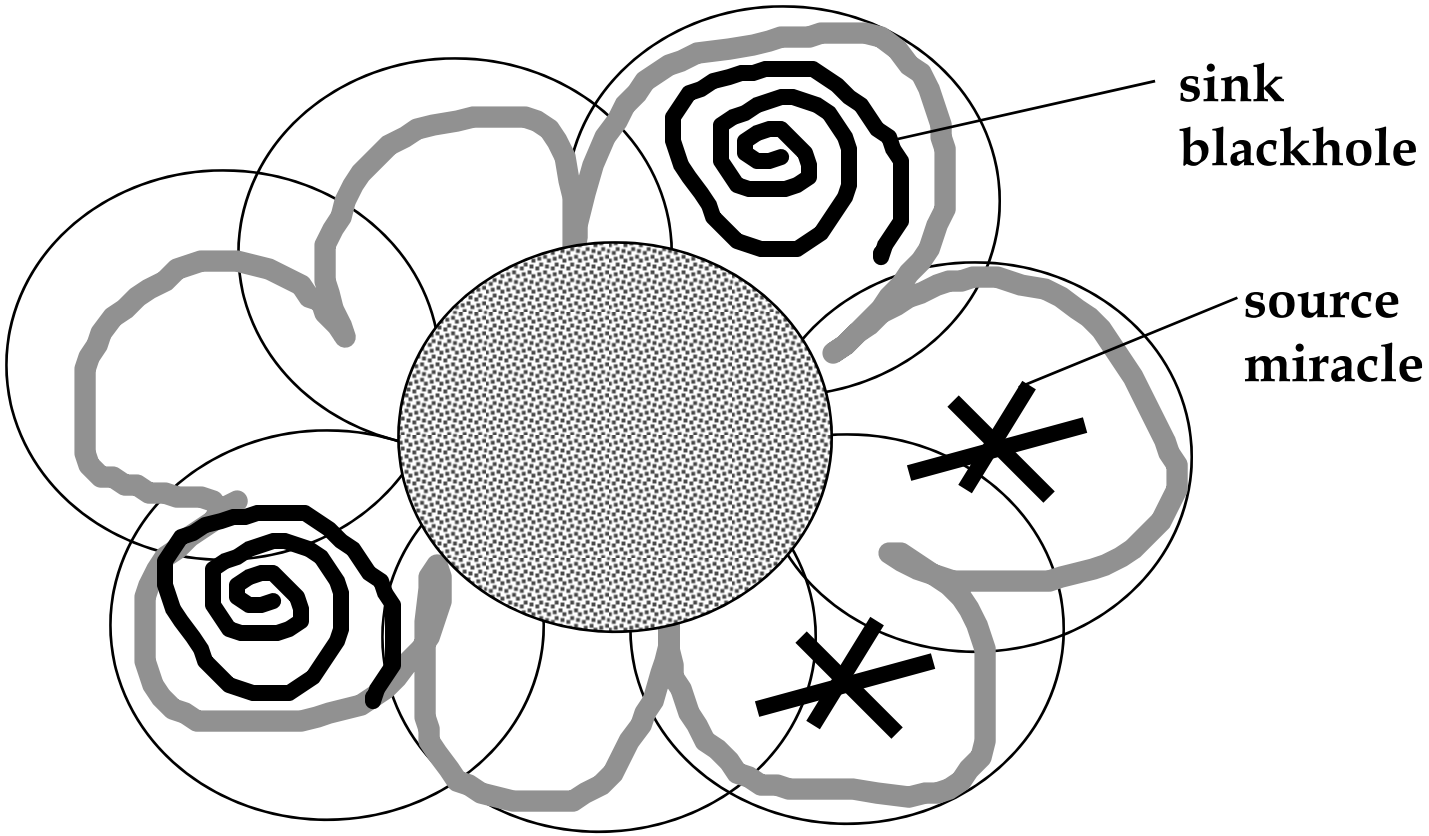
- When we stop suppression of the general economy
  - We see the social field made up of tensits, tendencies in a situation, within which exchange takes place
  - We also see the sources and sinks in that field and its dynamism
- The point is to allow the field to be a meta-system without trying to make it a restricted economy -- and yet to optimize our place within that field
  - Optimization within the dynamic general economy takes sensitivity and intuition
- We allow the restricted economy to play within the field of the general economy
  - The only way to trace the general economic field is through what-if simulations

Exchange Between Kinds of Work



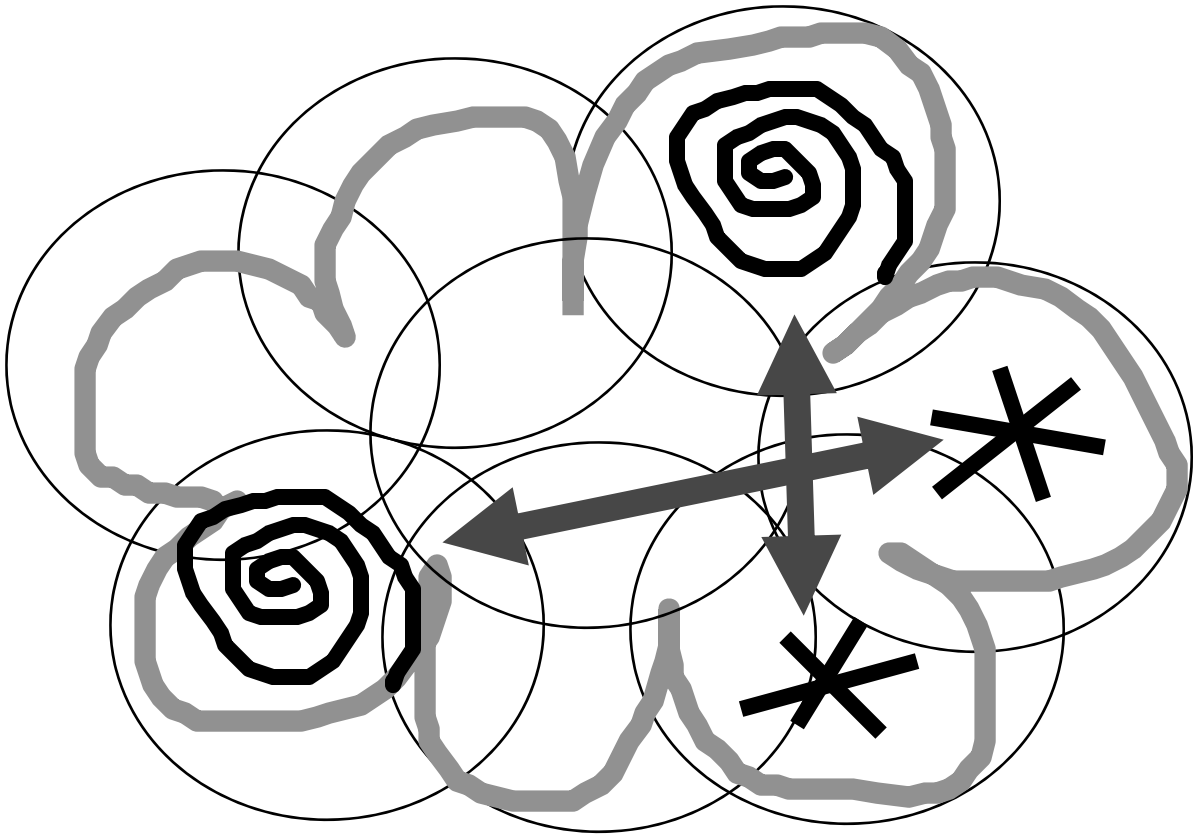
- Each kind of work exchanges information within the general economy defining the relation between all the different kinds of work

Many Economies of Work



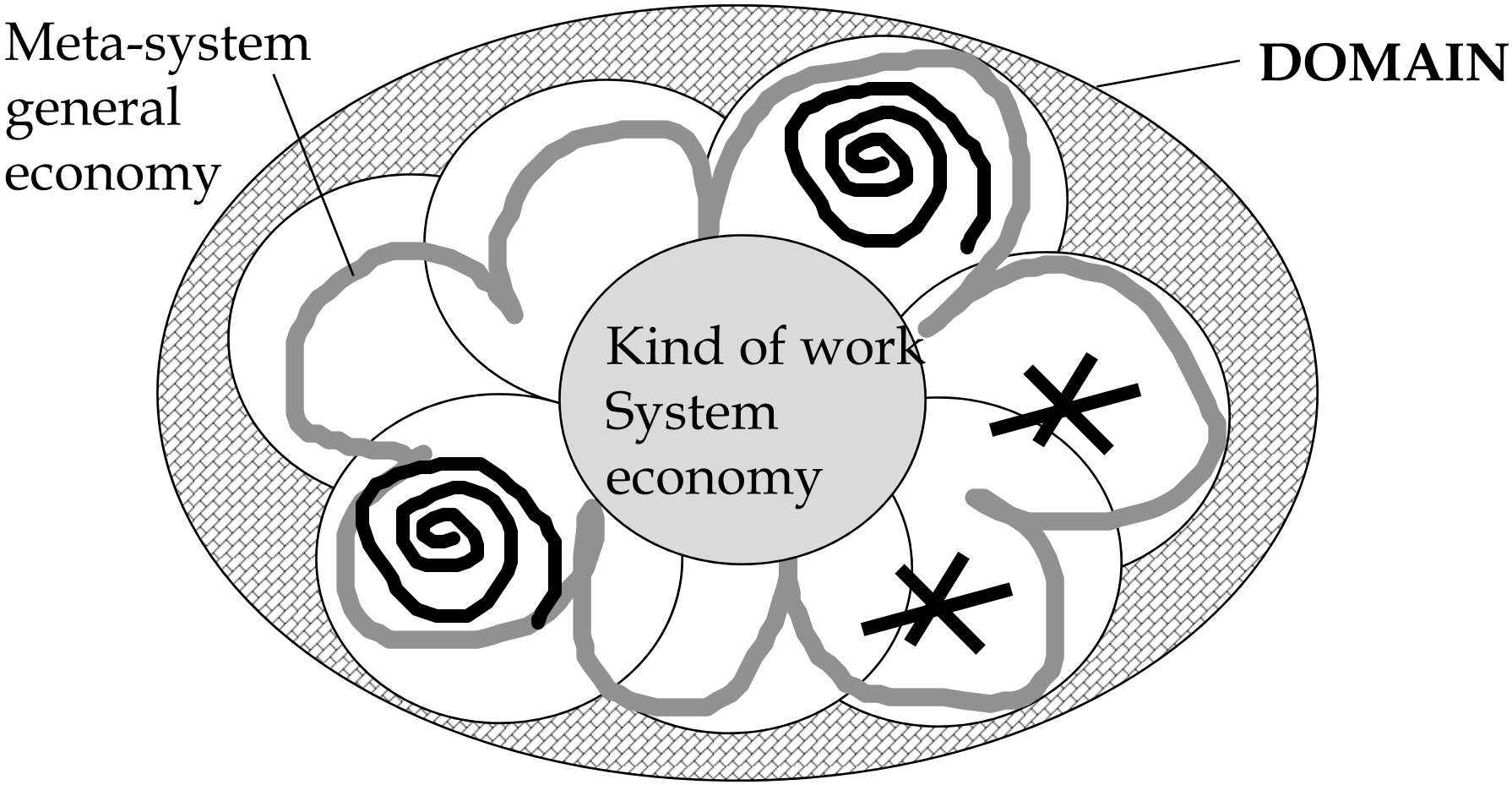
- Each kind of work relates to the whole field of other kinds of work in a general economic way seeing it as field of sources and sinks

Discontinuities in the Process



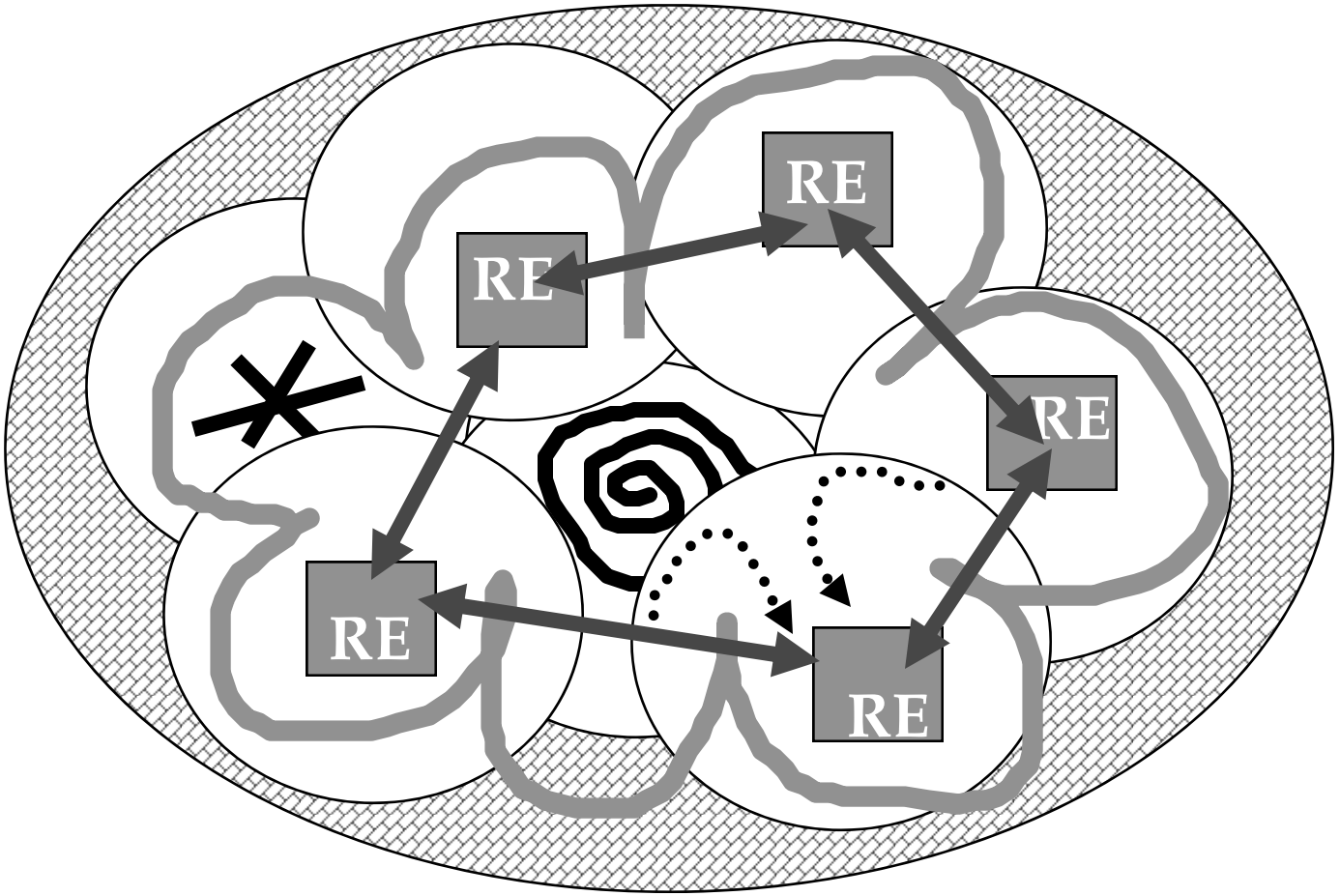
- The process may have many radical discontinuities between different kinds of work that cut across the organization

Closure



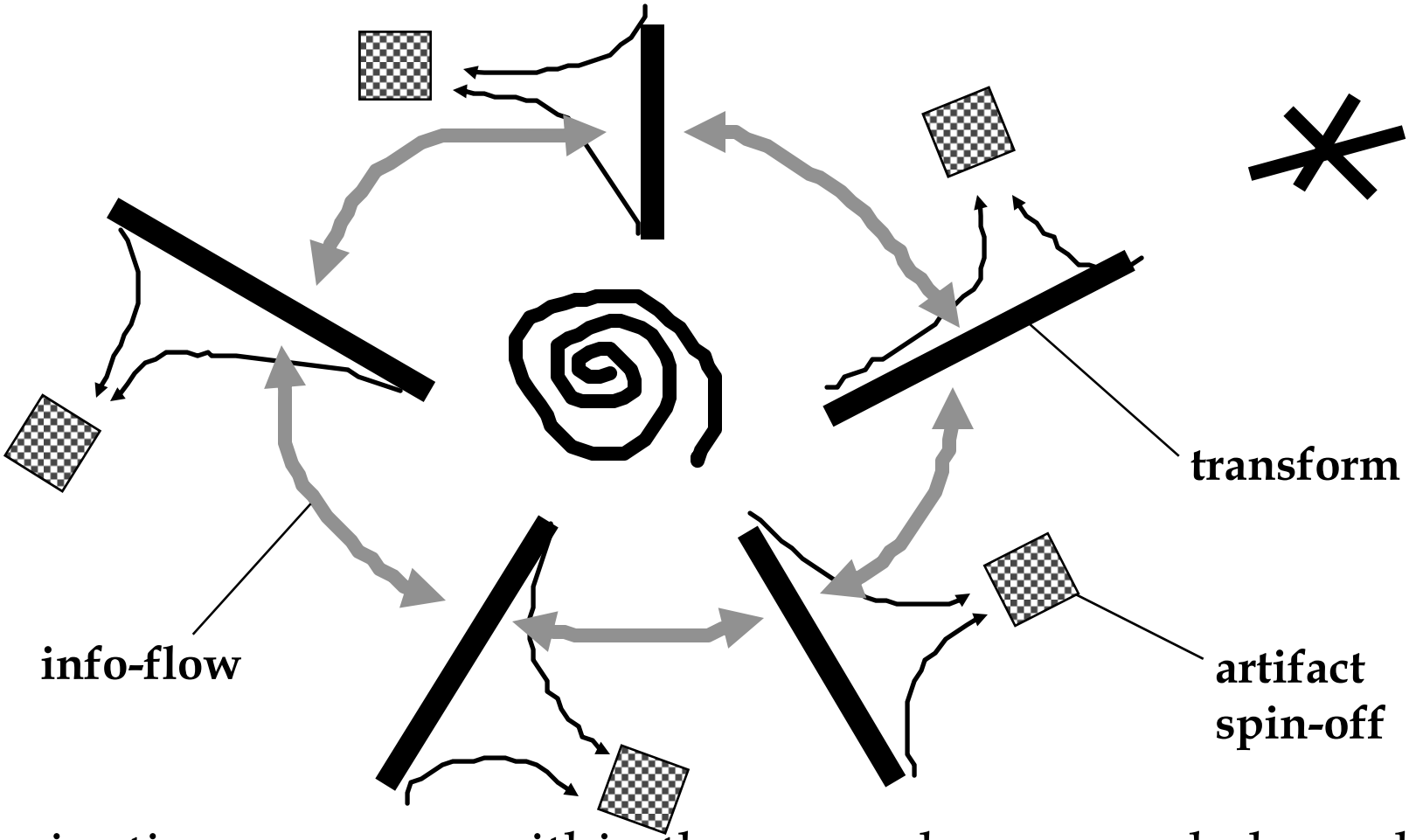
- Domains (meta^2-systems) give closure to general economies

Balanced Restricted Economies



- Each restricted economy is a dissipative system
- A set of balanced dissipative systems form an autopoietic system

The emergence of general process



- Dissipative processes within the general economy balanced between source and sink

General process . . .

- Sources and sinks:
  - The "context" of the general process is the domain of the discipline
  - Recognizes blackholes and miracles of the general economy
  - Both loss and gain must be accepted -- even ultra-loss and ultra-gain
- Rings:
  - Attempts to set up transformation rings that skirt the blackholes while taking advantage of the miracles
  - Essential processes naturally form autopoietic rings
  - Essential, support, and control processes form a meta-ring
- Information exchange
  - Process is not a system, but the interchange between systems, or showing and hiding gestalts, of kinds of work
  - Exchange of information occurs between kinds of work as dissipative systems (restricted economies)
  - Products are spin-offs of the information exchange

Consequences of the General Process

- There is always complementary views of process
  - Exchange between systems in the meta-system
  - The shadowy field that emanates from a system full of pitfalls and windfalls
- Non-routine work is the adjustment of the systems to the general economy through the creation of meta-models that solve the dichotomy between what really happens and what should happen
  - Process can never be a system gestalt projected by a single discipline
  - Process is always epistemic, interdisciplinary, and ecological
- Process needs to be descriptive of the general economy as it operates, not restrictive and prescriptive
  - Prescription occurs in instantiation, whereas the generic organizational process should only be descriptive
  - Lines of work and going concerns are part of the process, not something separate

Autopoietic Theory

- Biological theory of "self-production" or self-organization focused on individual living systems instead of the species
  - A special systems theory developed by Maturana and Varela
  - Posits "closed" systems which appear different to different observers and cannot be completely known
  - A distinction between the boundaries that observers draw and the natural boundaries created by the system itself
- Has implications for processes
  - We should allow projects to organize their own processes, not impose them from outside
  - Outside observers always have a distorted view of the boundaries between elements of internal processes
  - Processes do not occur at the organizational level -- it is only a meta-game

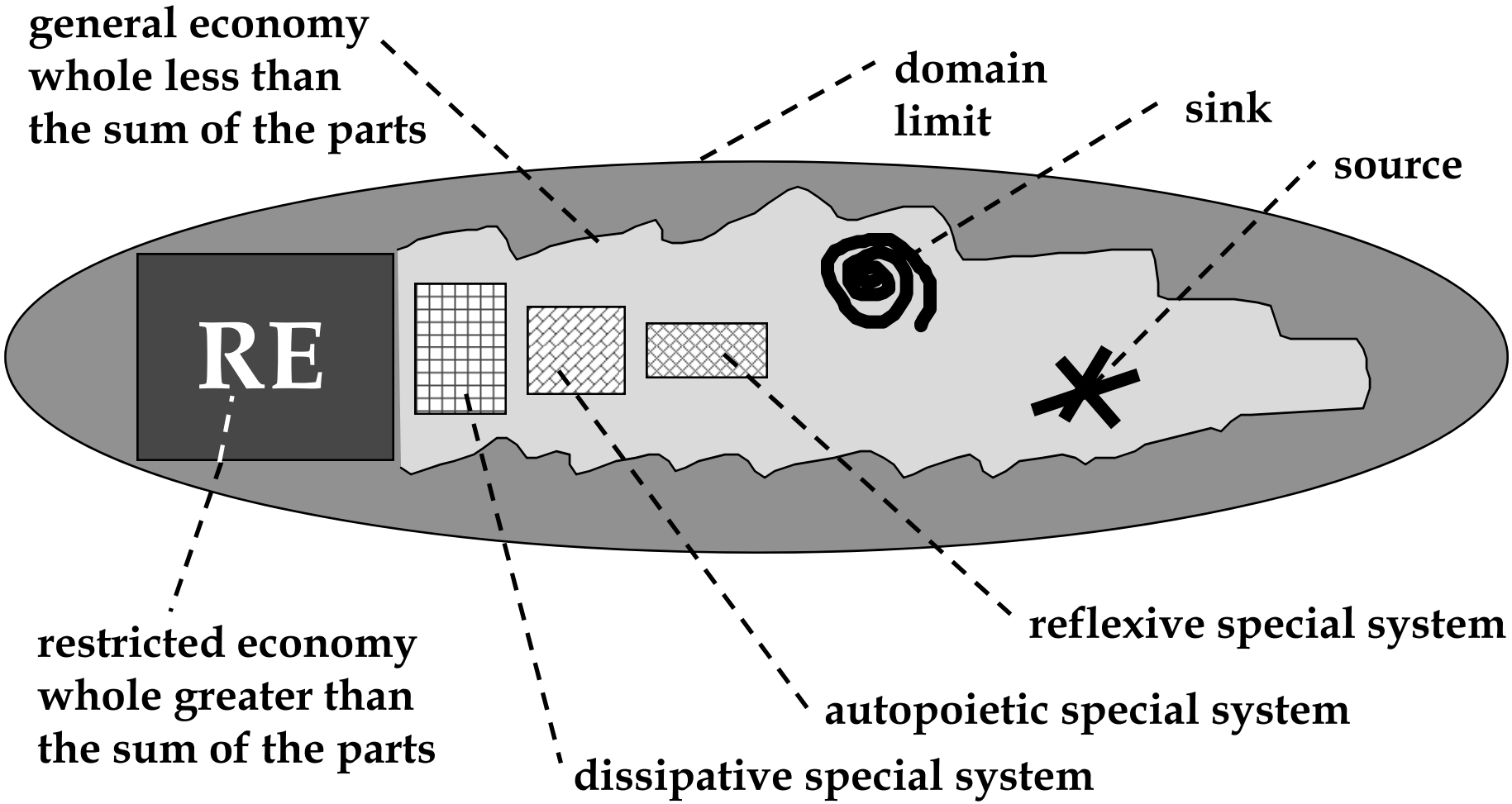
Autopoietic Organization

- Organization is not the same as structure
- Homeostatic maintenance of organization
- Systems pop into and out of existence
- Controlled by a hypercyclical ring
- Well-defined boundary produced by dissipative systems operation
- Made up of nodes that together produce each other

Autopoietic Theory is not Social

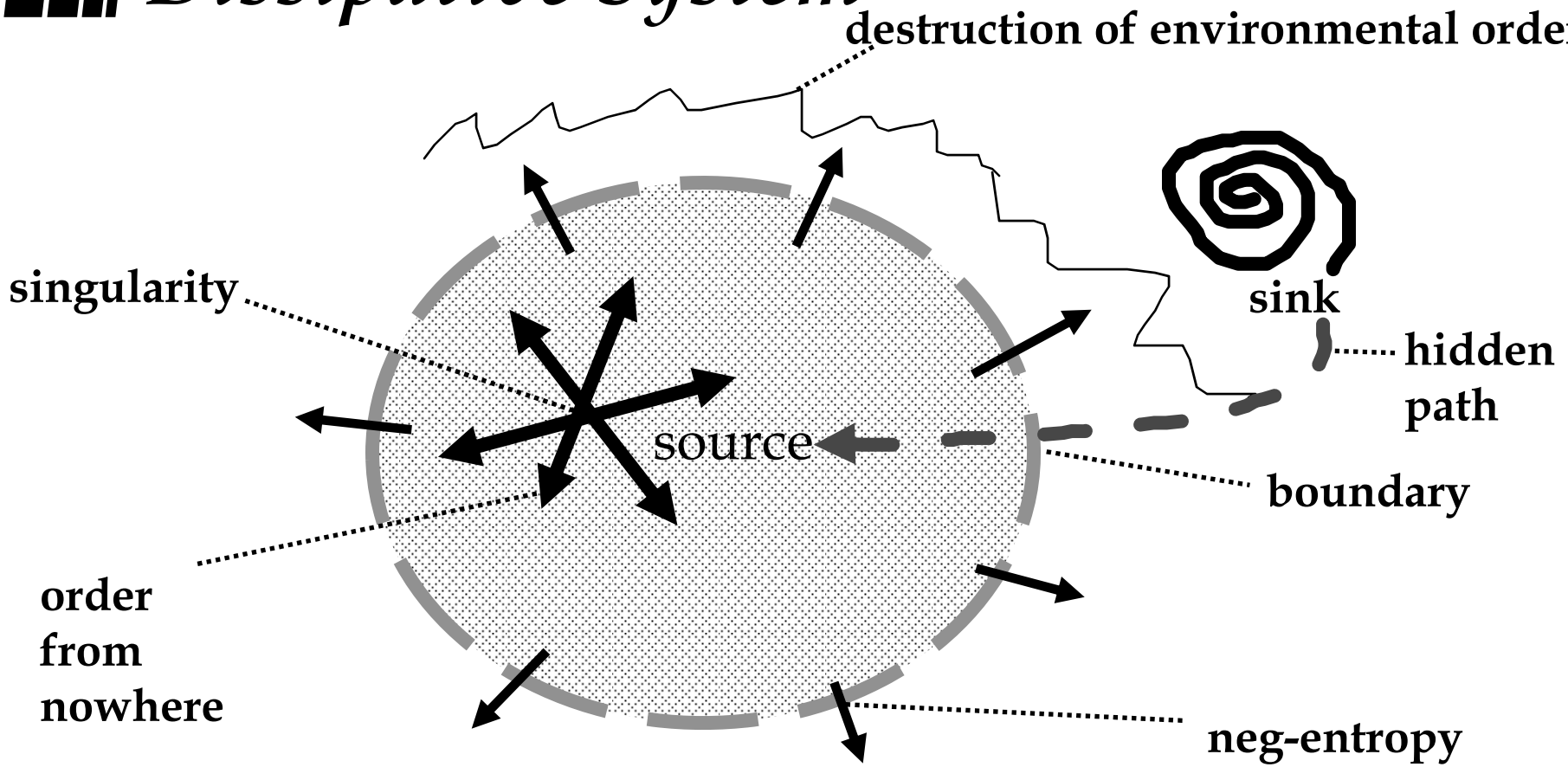
- Needs extension in order to apply to social situations
  - There is clearly a next higher level beyond the autopoietic (merely living)
  - This level may be called ***reflexive*** autopoietic because it uses symbolic exchange to mirror itself to itself
- The reflexive level is heterodynamic instead of homeostatic
  - It is an ecstatic non-dual mindbody dynamics
  - It produces rhizomatic products of wild variety
  - It is the epitome of change changing itself in boundless self-mirroring
- The components of these higher order reflexive special systems are autopoietic systems
  - Within the domain there are multiple autopoietic rings of essential transformations which work together to produce heterodynamic behavior

Hierarchy of Special Systems



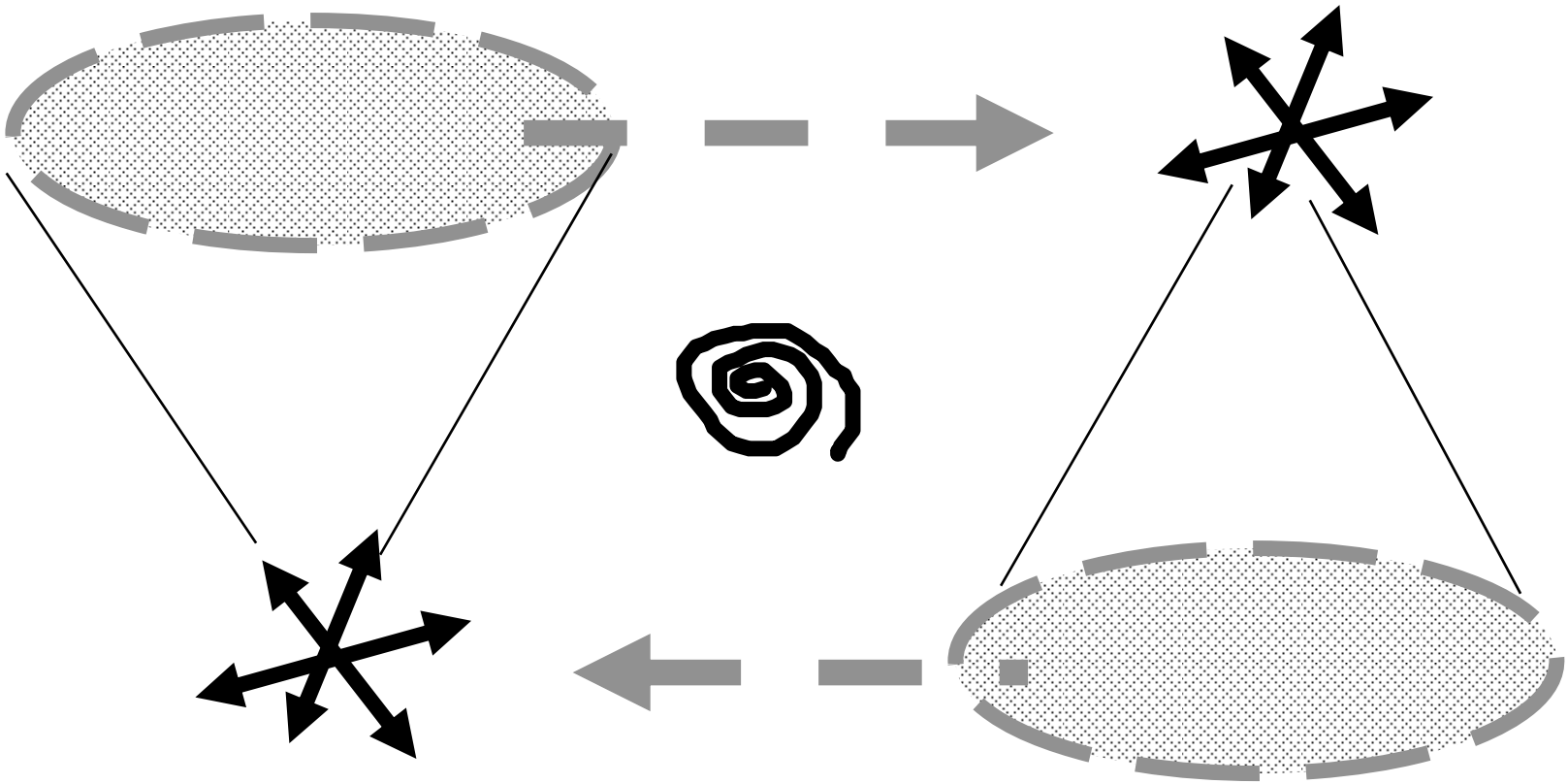
- In the special systems the whole is exactly equal to the part

Dissipative System



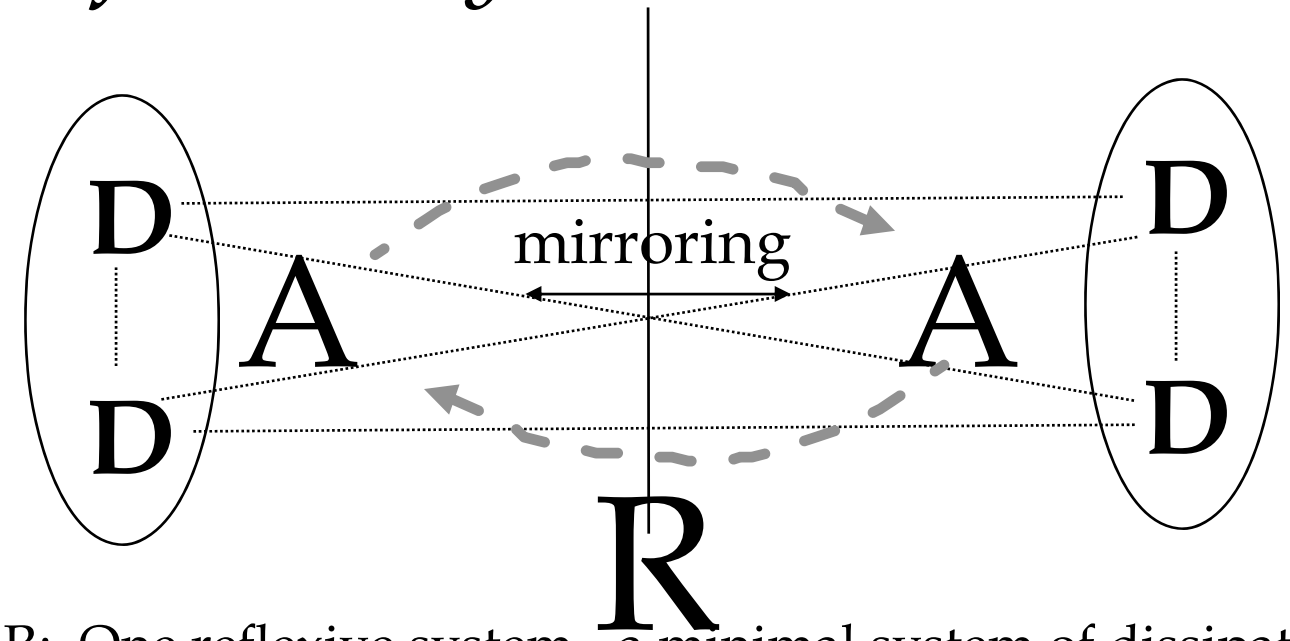
- The action of kinds of work are always dissipative
- Like an Escher waterfall
- Chiasma between patterning and forming activity

Autopoietic System



- Multiple dissipative systems in balance
- Like symbiotic Escher waterfalls
- Chiasma between cognitive and living

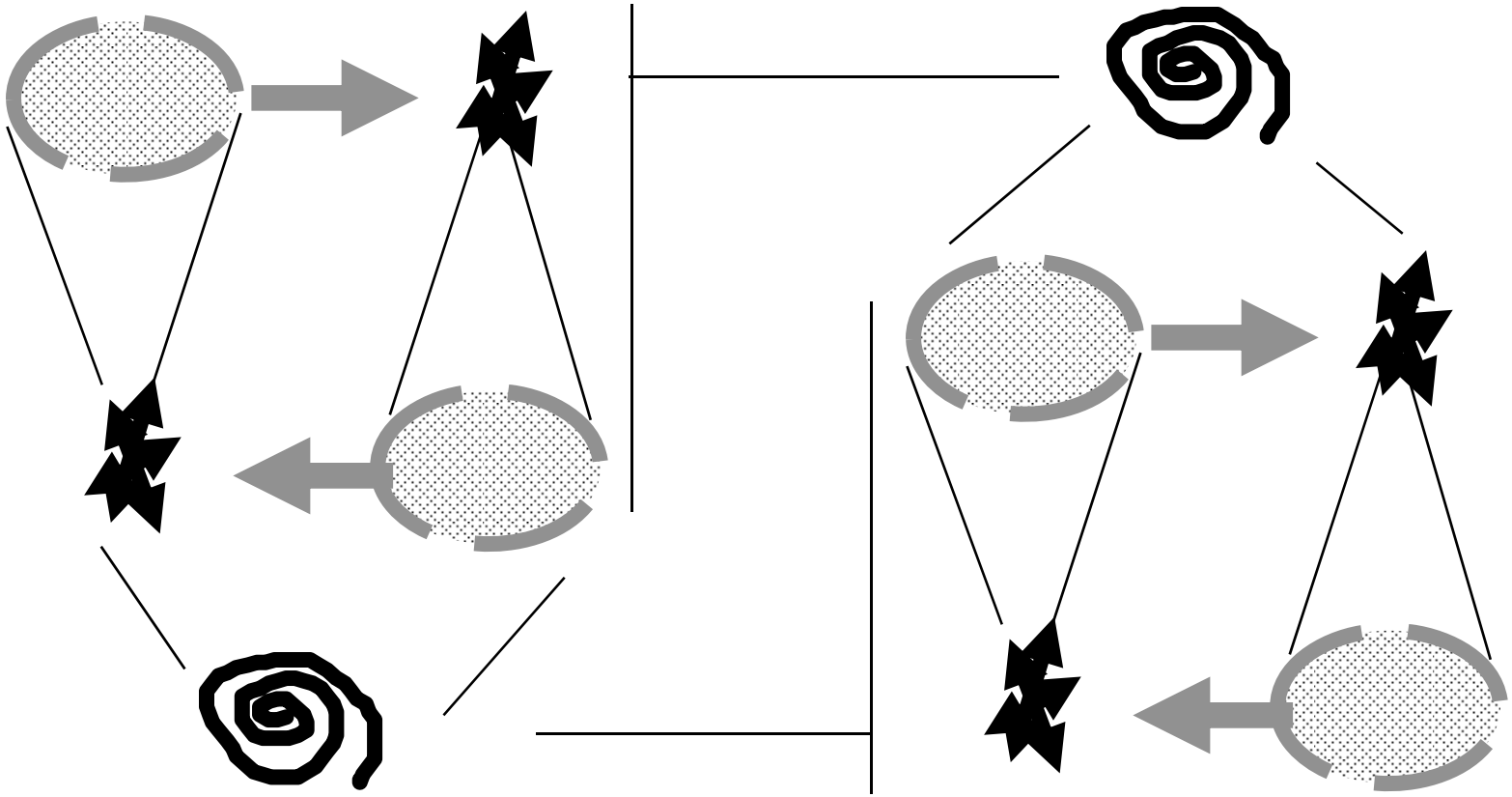
Reflexive System



- R: One reflexive system - a minimal system of dissipative systems
- A: Two autopoietic systems - engaged in exchange
- D: Four dissipative systems

- When autopoietic systems engage in exchange within the general economy, then we have a reflexive system
- Chiasma between social and psychological

Heterodynamic



- Reflexive systems are a dynamic balance of the the extreme opposites of the general economy

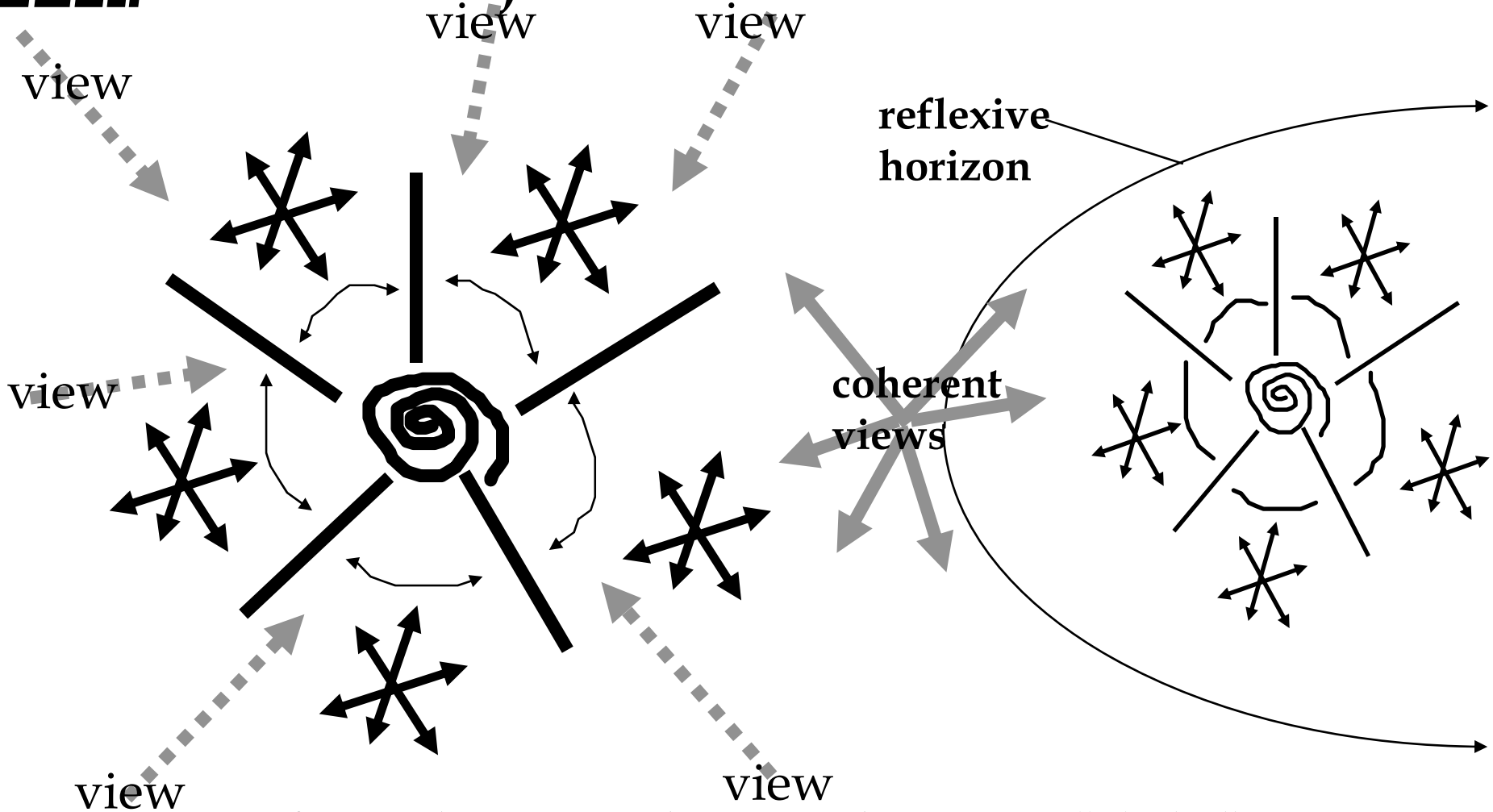
Autopoietic Social Process

- The source of the playful general economic aspects of human process
- Highly efficient
  - Low energy or information loss
  - Like a superconducting process
- Makes social and psychological phenomena possible
- Able to create balance between miracles and blackholes of the general economy
- Generates non-dual behavior and trance as a basis for dualistic individual behavior
- Produces the “hyperspace” within which non-routine work operates to connect kinds of work

Teams

- Autopoietic social processes are exemplified by teams that "*click*"
  - They exists as a possibility between the waterfall and evolutionary life-cycle as the dual of the spiral model
  - When we add learning reflection to the autopoietic ring then we get self-organizing behavior
  - Adaptive and flexible homeostasis is heterodynamic
- Such teams continually create their processes as they produce their products as spin-offs
  - They function out of balance as an open system in a fluctuating environment without losing coherence
  - They are out-of-balance and in-balance simultaneously
  - They apply non-routine work to the general economy
  - They produce routine work as their primary effect
  - They produce work products flow as a side-effect

Social Self-Consciousness



- Views of team become coherent when team "clicks"
- Mead's "Generalized Other" becomes embodied in team

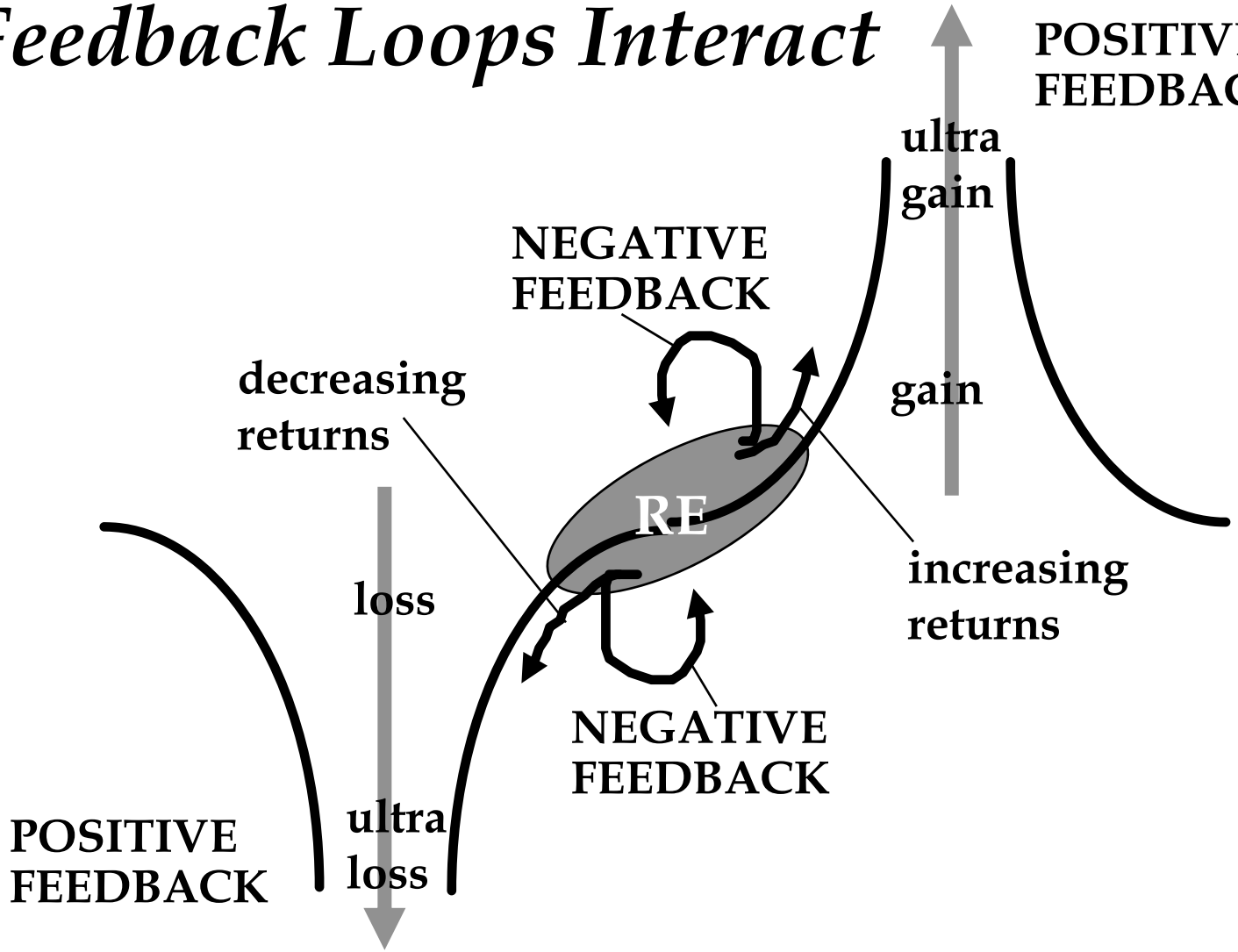
Implications for process

- In a team that "clicks," everyone has an accurate picture of the ***Other*** within the group
  - Information flows seemingly effortlessly, and transformations are satisfying in themselves
  - Harmonic interactions produce perfected results
  - It violates our thermodynamic expectations, like solitons do
  - The harmonic pops in and out of existence unexpectedly
- The goal of perfected harmonies is not empty
  - There is a rare state that corresponds to it that can be realized by social groups
  - Existence of the net-entropic possibility causes us to restructure how we look at the process architectures for enactment
  - This restructuring redefines the goal of work process engineering within the general economy and the special systems

Mapping the General Economy

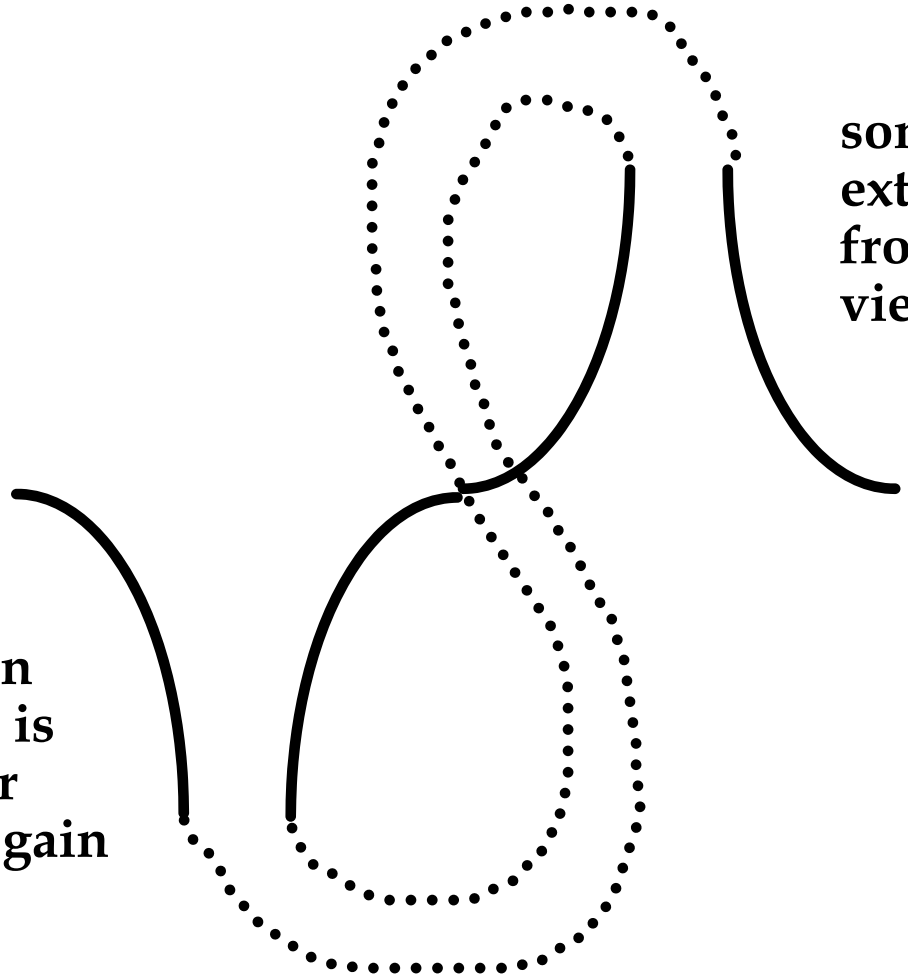
- System dynamics was invented as an approach to modeling general systems by Jay Forrester of MIT
  - Uses discrete differential equations to model complex feedback within systems
  - The most famous application was to modeling the world economy into the future
  - The modeling technique has been applied by Tarik Hamid to modeling the software development process at a high level
  - JPL has used the technique to model the development of the space station on the basis of data from the space shuttle
- These models can represent positive feedback loops which can represent increasing returns and ultra gain and loss

Feedback Loops Interact



- System Dynamics equations can model the relation between positive and negative feedback loops

Rollover of Extreme Opposites

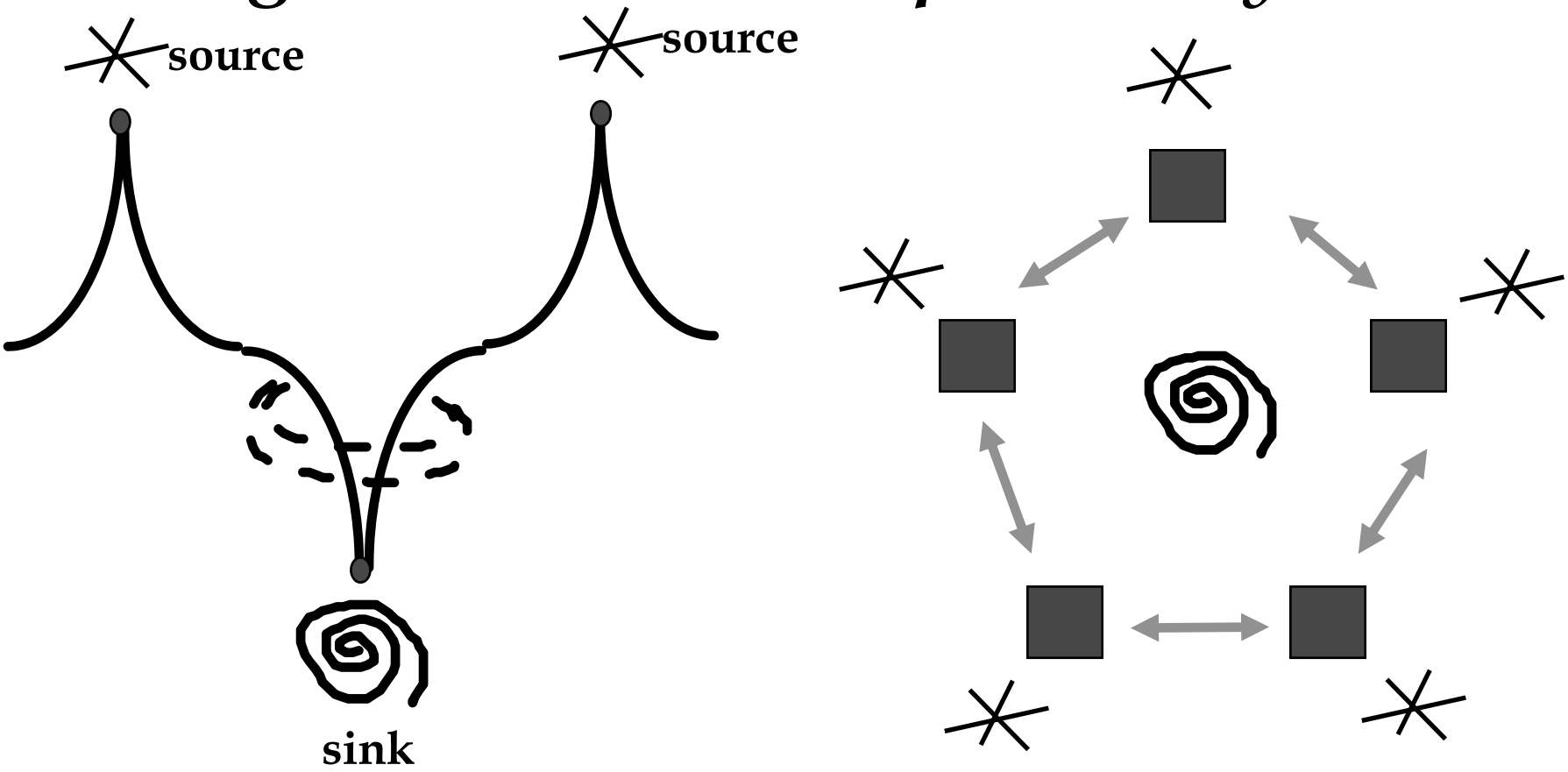


sometimes an extreme gain is from another viewpoint a loss

sometimes an extreme loss is from another viewpoint a gain

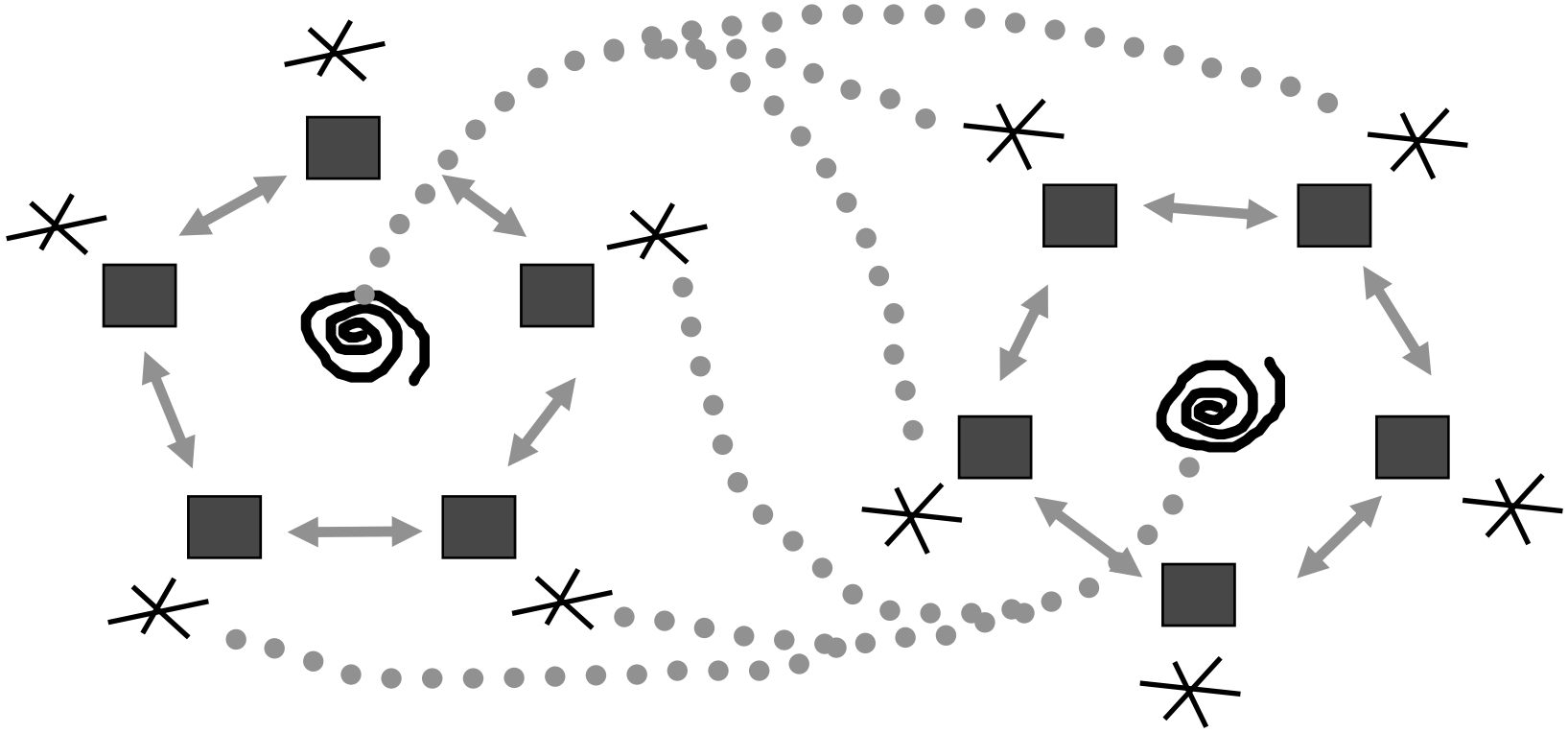
- Gain is loss and loss is gain -- NEWSPEAK

Singularities in Autopoietic Systems



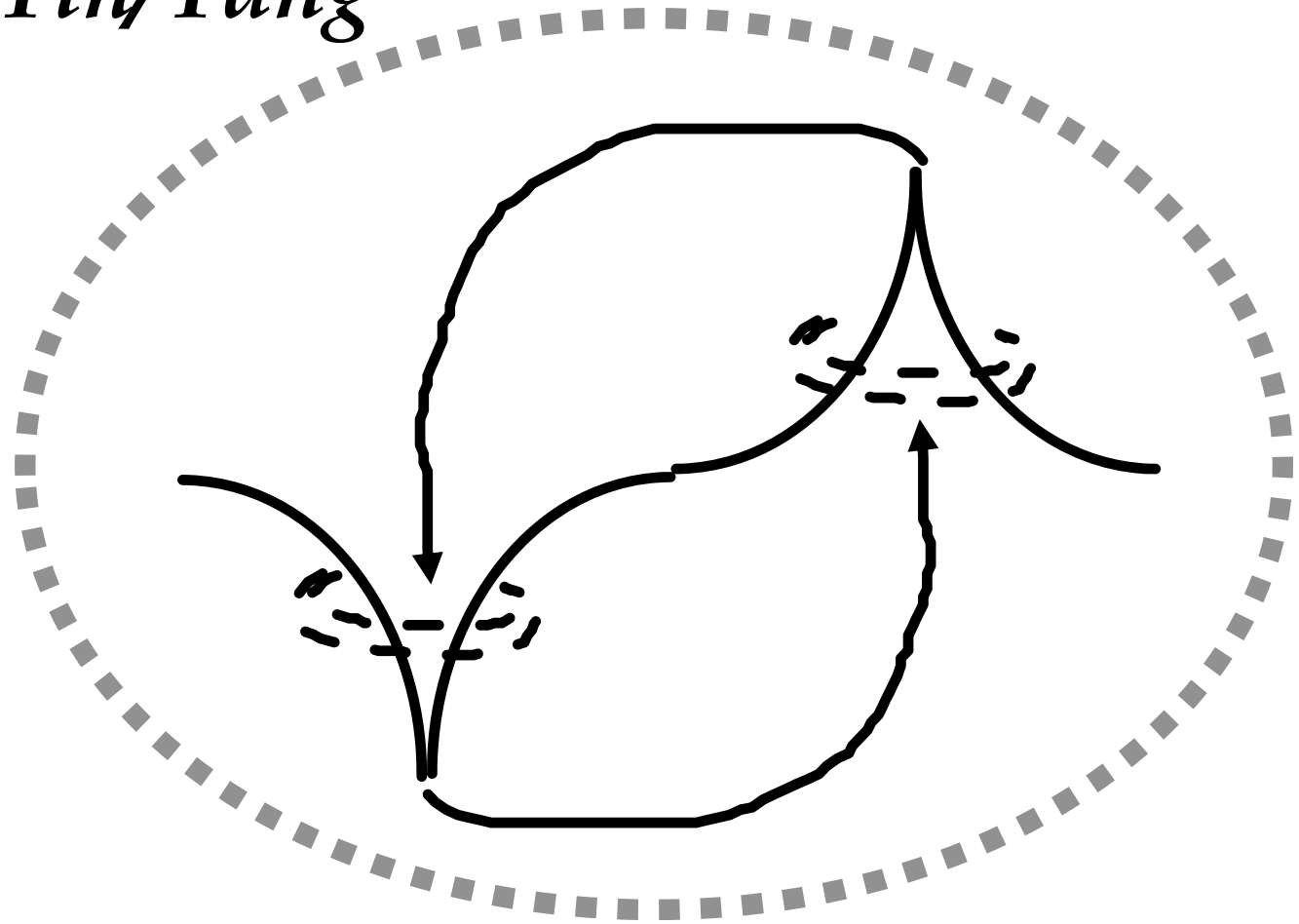
- The autopoietic system makes use of positive singularities (sources) and avoids or stabilizes around negative singularities (sinks)

Symbiosis



- Autopoietic systems engaged in complementary exchange

Yin/Yang



- The sink of one is the source of the other
- Assumes closure at the meta-meta-system level

Shift Worldviews

- Instead of assuming the difference between Logos and Physus, we might follow the Chinese and assume no dualistic separation
  - Instead assume distinction between Chi and Li
    - Li = Pattern left behind
    - Chi = Unfolding
  - All systems unfold and leave behind a pattern of that unfolding
  - Whether that unfolding is internal or external is irrelevant
  - The opposite of unfolding is infolding, a simultaneous opposite effect
  - Un/infolding causes intertransformation between system and a meta-system with three harmonic possibilities
- Between these two poles of transformation there are the three harmonic possibilities of the special systems

Shift Worldviews

- The central special system is the autopoietic system
  - It forms what is called the hypercyclic ring that the Chinese called the *five hsing* transformations
  - The closed autopoietic system governed by the hypercycle balances against each other the dissipative and reflexive special systems
  - Chi is the movement of the dissipative system imposing order outward
  - Li is the reflection of the reflexive system that causes the similitude of orderings to be recognized many places by complementary mirrorings
- The infoldings and unfoldings cause Chi and Li to continually be self-produced governed by the *five hsing* transformations between restricted and general economies

A vision of future process

- The future process considers the whole human being in all their possible relations to the world
- It is non-dual because it no longer splits Logos and Physus
- It recognizes possible harmonic states that can be achieved by human teams
- It sets up the conditions for attaining those harmonic states in order to produce the most perfect products possible
- It recognizes the role of play in work and work in play
- It recognizes the role of the general economy in relation to the restricted economy
- It exploits the relation between the heterodynaimc reflexive special system and the autopoietic special system as well as the dissipative special system system