



Is that affordance essential?

Pathology in service systems and redesigns for sustainability

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Pathology? Service system?

A pathology in a service system may be

(a) resolved with

a reformation, or

(b) dissolved with

(i) a transformation through complexification, or

(ii) a transformation through decomplexification

Outline

- 1. Motivating cases
2. Essential or discretionary
3. Offerings, high- and low-ability clients
4. Affordances and abilities
5. Pathology
6. Ecological resilience
7. Cross-scale structures, panarchy
8. High-gain efficiency, low-gain sustainability
9. Innovation: reformation or transformation

Cases of service systems in stress

<i>Service systems</i>	<i>Service(s)</i>	<i>Beneficiaries</i>
1. Municipal services	<ul style="list-style-type: none"> •Solid waste disposal •Snow clearing •Day care •Dental care 	<ul style="list-style-type: none"> •Urban / suburban •Seniors / youth •Unions
2. Employee pensions (airline, auto makers)	<ul style="list-style-type: none"> •Defined benefits / defined contribution 	<ul style="list-style-type: none"> •Retirees •Career employees •Unions •Other funders
3. Open source software, open data	<ul style="list-style-type: none"> •Applications / data / software •Licensing •Asset distribution •Work coordination 	<ul style="list-style-type: none"> •End users •Developers •For-profit enterprises

Essential: in public services; in (general) systems

Services should be identified as essential where there are reasonable grounds for accepting the probability, or even the possibility, that human life or public safety would suffer if a work stoppage interrupted the duties of these employees. It should be noted that positions where occupants are to be available during their off-duty hours to report to work without delay to perform the essential services are also included.

Some examples of government programs that may be considered essential include, but are not exclusively:

- border safety/security
- correctional services
- food inspection
- health care
- accident safety investigations
- income and social security
- marine safety
- national security
- law enforcement
- search and rescue

(Treasury Board of Canada Secretariat 2005)

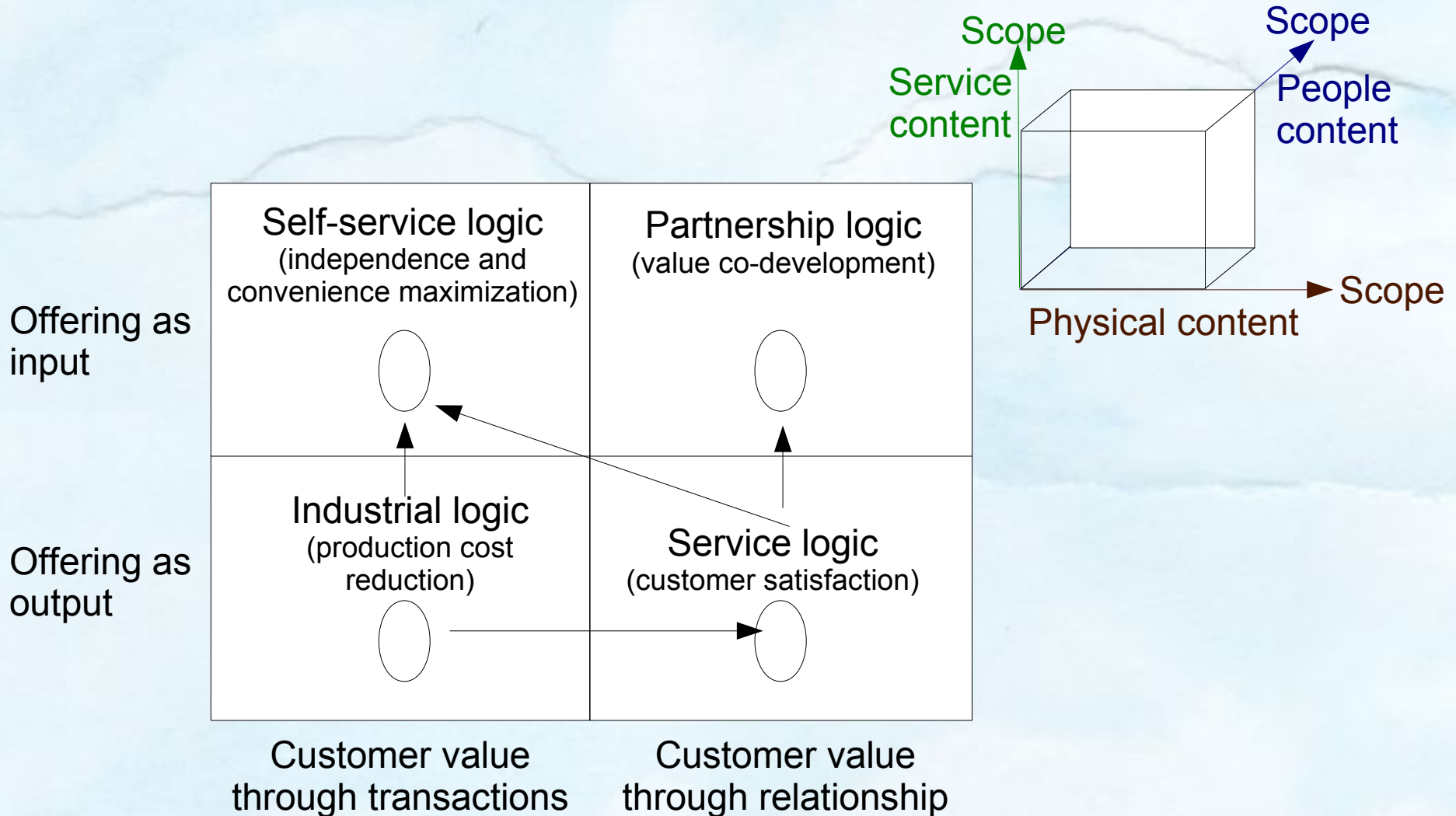
There is a subset of parts that is sufficient in one or more environments for carrying out the defining function of the whole; each of these parts is separately necessary but insufficient for carrying out this defining function.

These parts are essential to the system; without any one of them the system cannot carry out its defining function. An automobile's engine, fuel injector, steering wheel, and battery are essential for it – without them the the automobile cannot transport people.

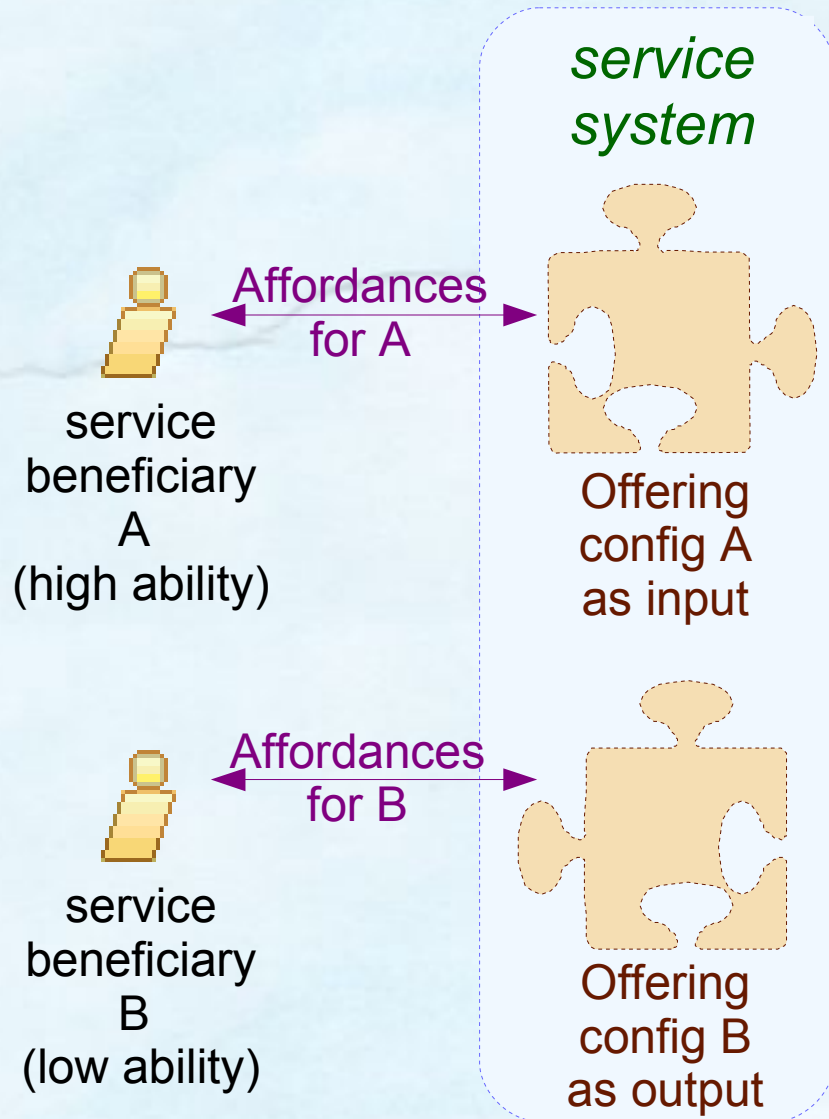
Most systems also contain nonessential parts that affect its functioning but not its essential function. An automobile's radio, ashtray, floor maps and clock are nonessential, but they do affect automobile users in other ways – for example, by entertaining them.

(Ackoff 1994, p.19)

A high- or low-ability client may prefer an offering as an *input*, or *output*, of coproduction



Affordances and abilities [are] inherently relational



The term *affordance* refers to whatever it is about the environment that contributes to the kind of interaction that occurs. [...]

An affordance relates attributes of something in the environment to an interactive activity by an agent who has some ability, and an ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance.

The relativity of affordances and abilities is fundamental. Neither an affordance nor an ability is specifiable in the absence of specifying the other.

Pathological state, in living systems theory

A pathological (abnormal, unhealthy, maladjusted, or inefficient) state in any living system is one in which, for a significant period, either one or more of its critical variables remain beyond the normal steady-state range, or excessively costly adjustment processes must be used to avoid this.

Either malfunctioning of the system's own subsystems, or stresses, e.g., unfavorable conditions in the environment or suprasystem, can force variables out of their normal steady-state range.

Such pathologies exist at all levels of living systems and, since all have similar subsystem processes, comparable classes of pathology are found at all levels.

Eight causes of pathology in living systems are listed below. [...]

(a) Lacks of matter or energy inputs:

....

(b) Excesses of matter or energy inputs:

(c) Inputs of inappropriate forms of matter or energy:

(d) Lack of information inputs:

(e) Excesses of information inputs:

(f) Inputs of maladaptive genetic information in the template:

(g) Abnormalities in internal matter or energy processes:

(h) Abnormalities in internal information processes:

(J. G. Miller & J. L. Miller 1991, p.247)

Low ecosystem resilience → opportunity to transform

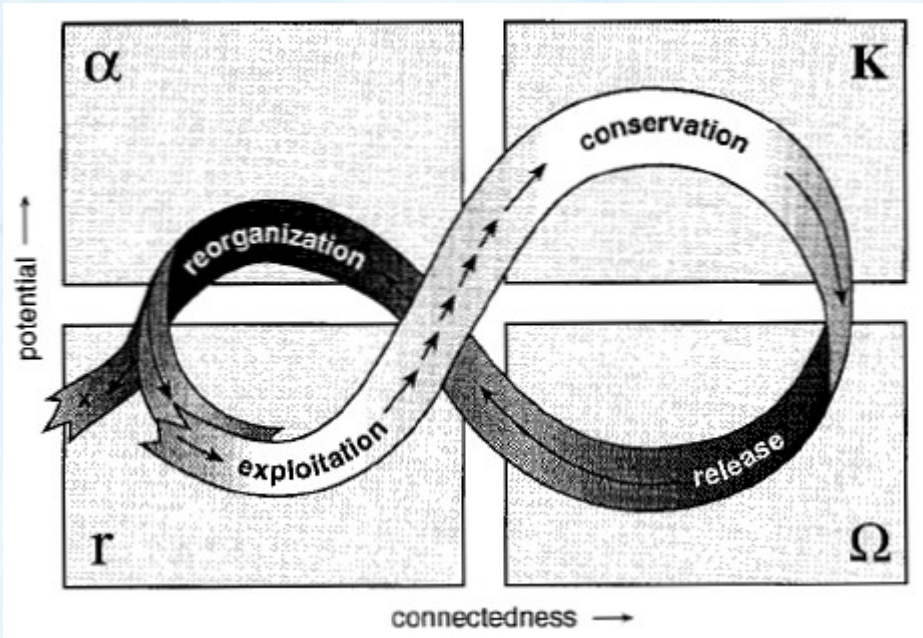


Figure 4. A stylized representation of the four ecosystem functions (r , K , Ω , α) and the flow of events among them.

[Holling 2001]

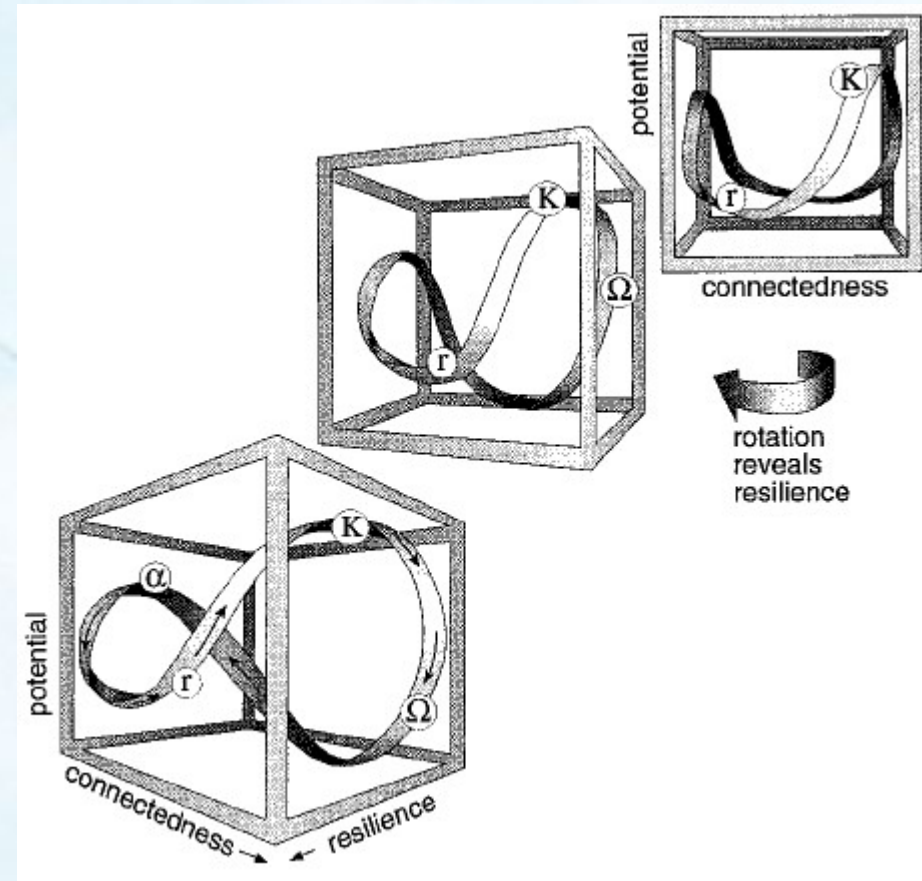


Figure 5. Resilience is another dimension of the adaptive cycle.

Cross-scale adaptive cycles, panarchical connections

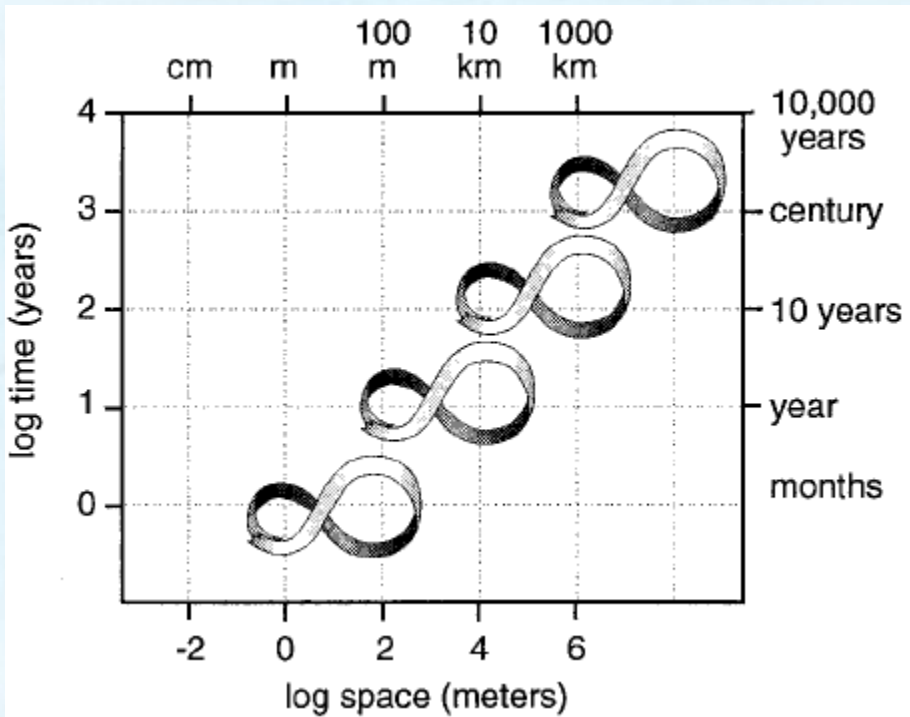


Figure 6. A stylized panarchy. A panarchy is a cross scale, nested set of adaptive cycles that indicates the dynamic nature of structures depicted in the previous plots.

[Holling 2001]

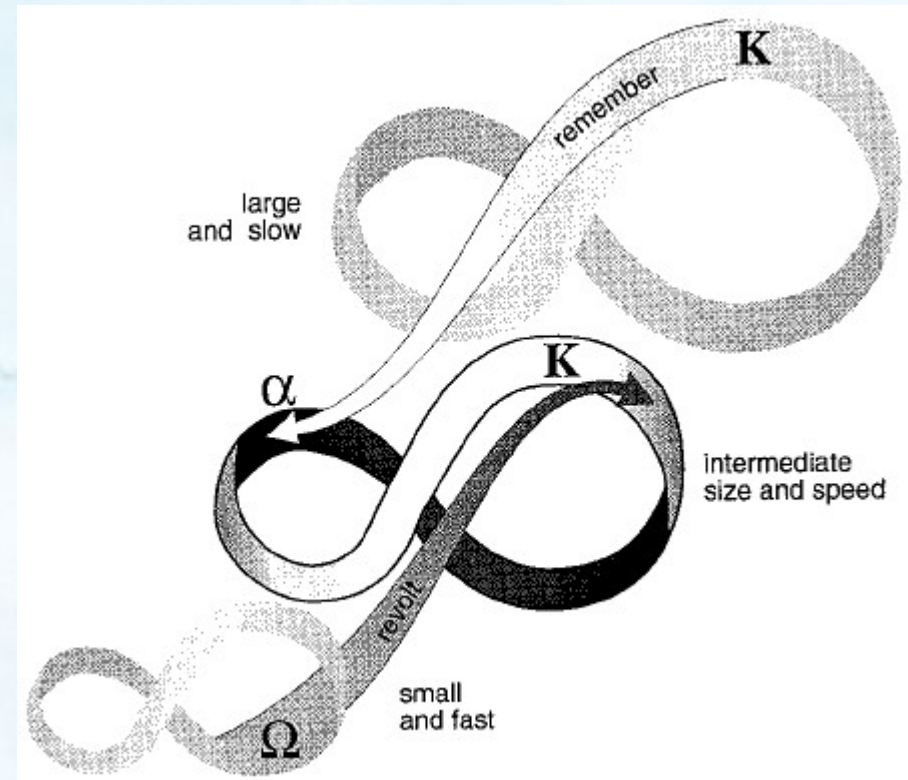


Figure 7. Panarchical connections. [...] the “revolt” connection ...can cause a critical change in one cycle to cascade up to a vulnerable stage in a larger and slower one. The ... “remember” connection ... facilitates renewal by drawing on the potential that has been accumulated and stored in a larger, slower cycle.

Complexify for high efficiency with low variety, or decomplexify for high variety as sustainable

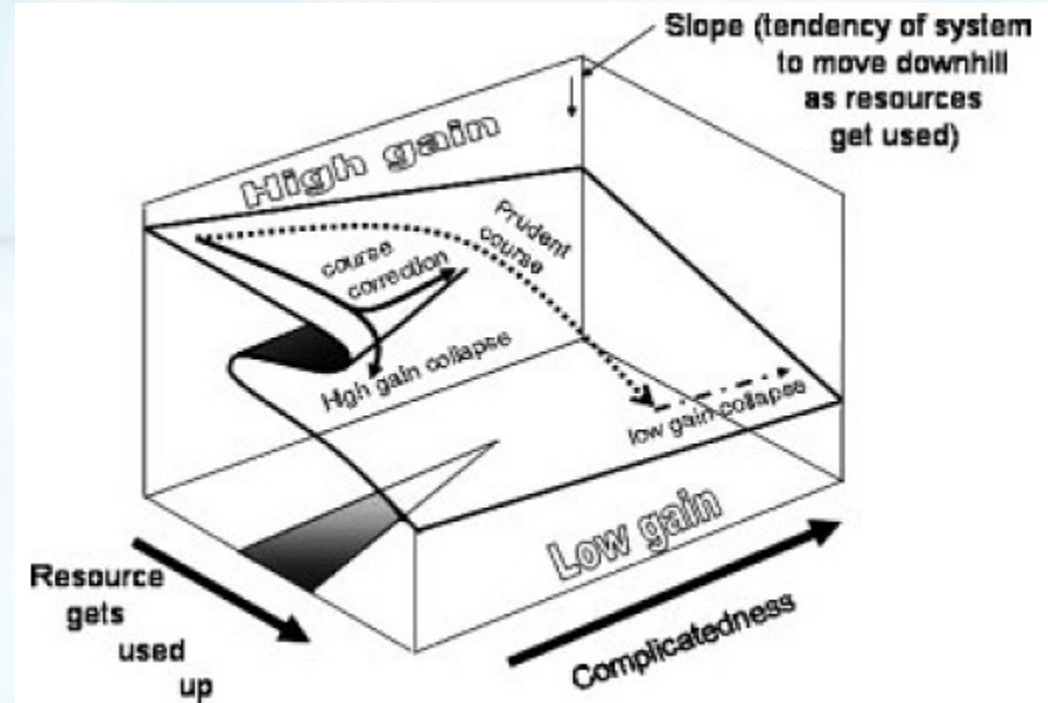
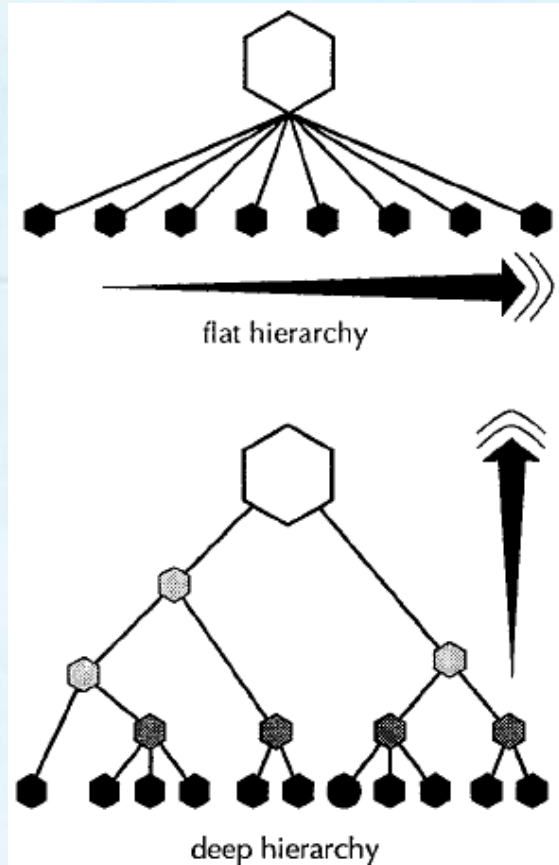


Figure 7. A representation of the tracks that lead from high to low to super low gain patterns. [Allen, Allen, Malek 2006]

Figure 3. The top hierarchy shows increases in complicatedness by increasing the structural elaboration. Structural elaboration is portrayed as widening the span in horizontal differentiation. The bottom hierarchy shows increasing complexity, by an elaboration of organization. New levels appear as new constraints emerge as limits to the positive feedbacks of the emergent process. Elaboration of organization increases hierarchical depth. [Allen, Tainter, Hoekstra 1999]

Innovation (Drucker, 1992)

Innovation depends rather of what we might call "organized abandonment."

To get at the new and better, you have to throw out the old, outworn, obsolete, no longer productive, as well as the mistakes, failure, and misdirections of efforts of the past.

Think of the old medical saying: "As long as the patient eliminates there is a chance. But once the bowels and the bladder stop, death does not take long."

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