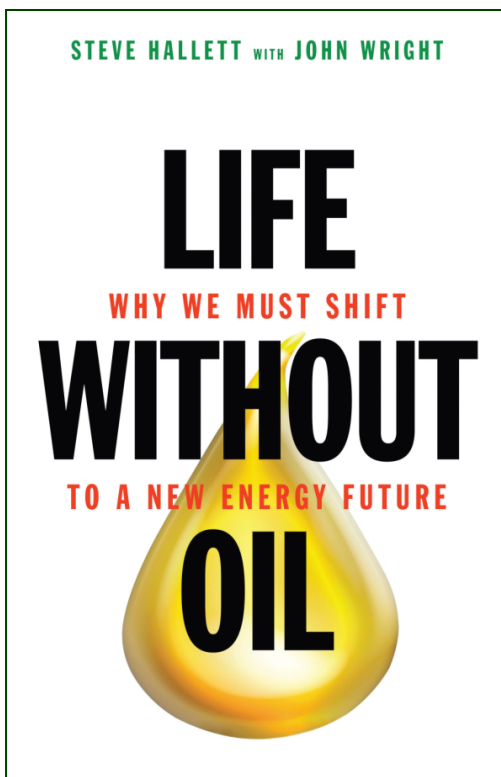
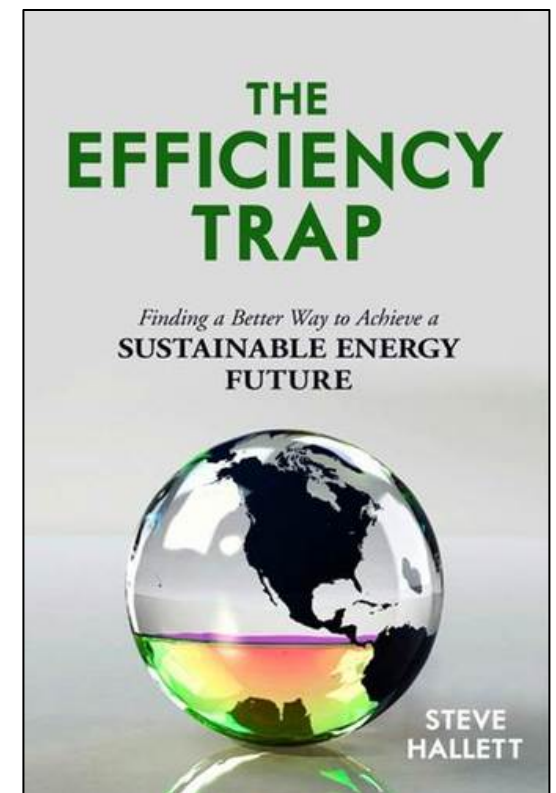


Efficiency Traps In Ecological and Economic Systems



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College of Agriculture
PURDUE
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What is the Role of Efficiency in Antitrust Law?

Original Conception:

To maintain competitive prices by resisting cartels, monopolies, monopsonies and carefully managing mergers and acquisitions

Focus is on the question of fairness between producers and consumers

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Thoughts on Dynamic Efficiency:

Contains valuable insights

Harder to define and measure

1st Efficiency Trap:

Efficiency promises to conserve but actually consumes.

2nd Efficiency Trap:

Efficiency promises to control and strengthen systems, but it actually makes them vulnerable to sudden failure.

Efficiency Trap:

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Second Efficiency Trap:

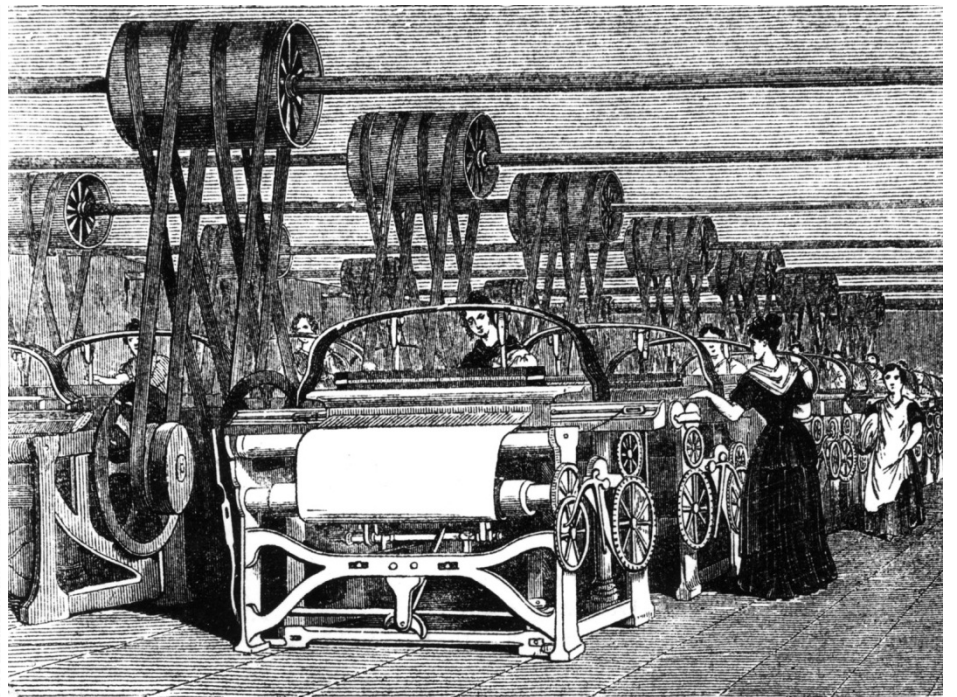
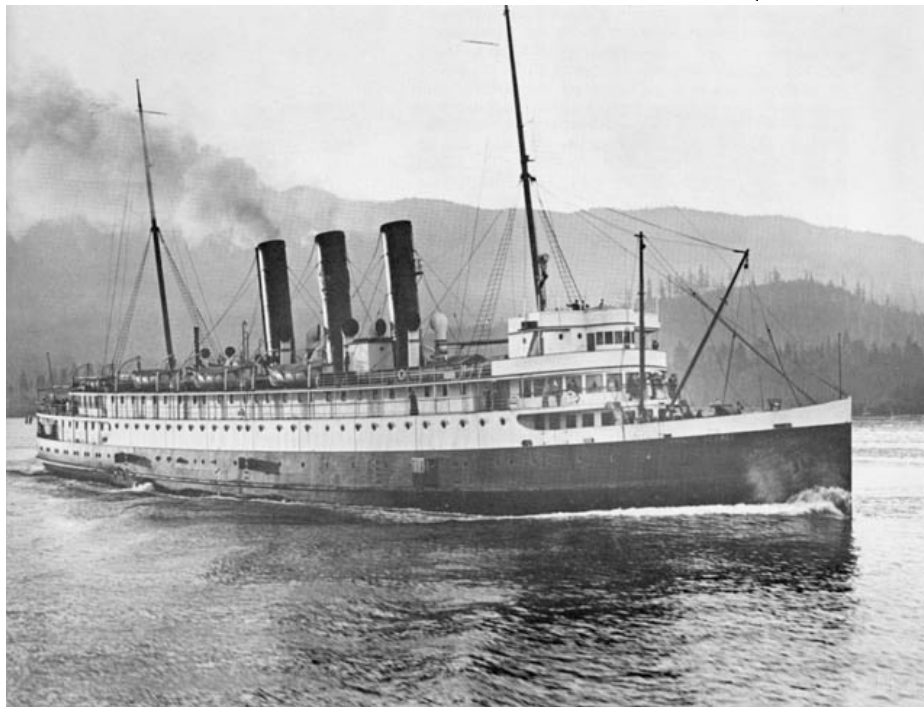
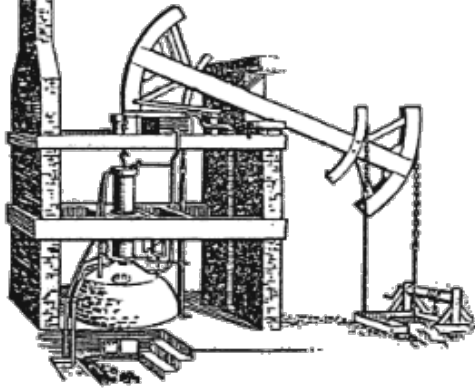
Efficiency promises to control and strengthen systems, but it actually makes them vulnerable to sudden failure.

“It is very commonly urged that the failing supply of coal will be met by new modes of using it efficiently [and that] the coal thus saved would be, for the most part, laid up for the use of posterity. It is wholly a confusion of ideas to suppose that the [efficient] use of coal is equivalent to a diminished consumption. The very contrary is the truth...”

W. S. Jevons. 1865. *The Coal Question*.

THOMAS NEWCOMEN

ENGINEER
1663 — 1729





Household refrigerators 1950-2010:

Efficiency : 170% increase

Volume: 175% increase

Electricity consumption per unit *increased*

The number of units used *increased a lot*

ed Malts

COLD BEER

Imported Beer









“GOOD”

“BETTER”

“BEST”



ciency does not conserve energy, it causes more to be consumed

Efficiency Trap:

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Some Systems Appear to be Very Simple*



Negative Feedback

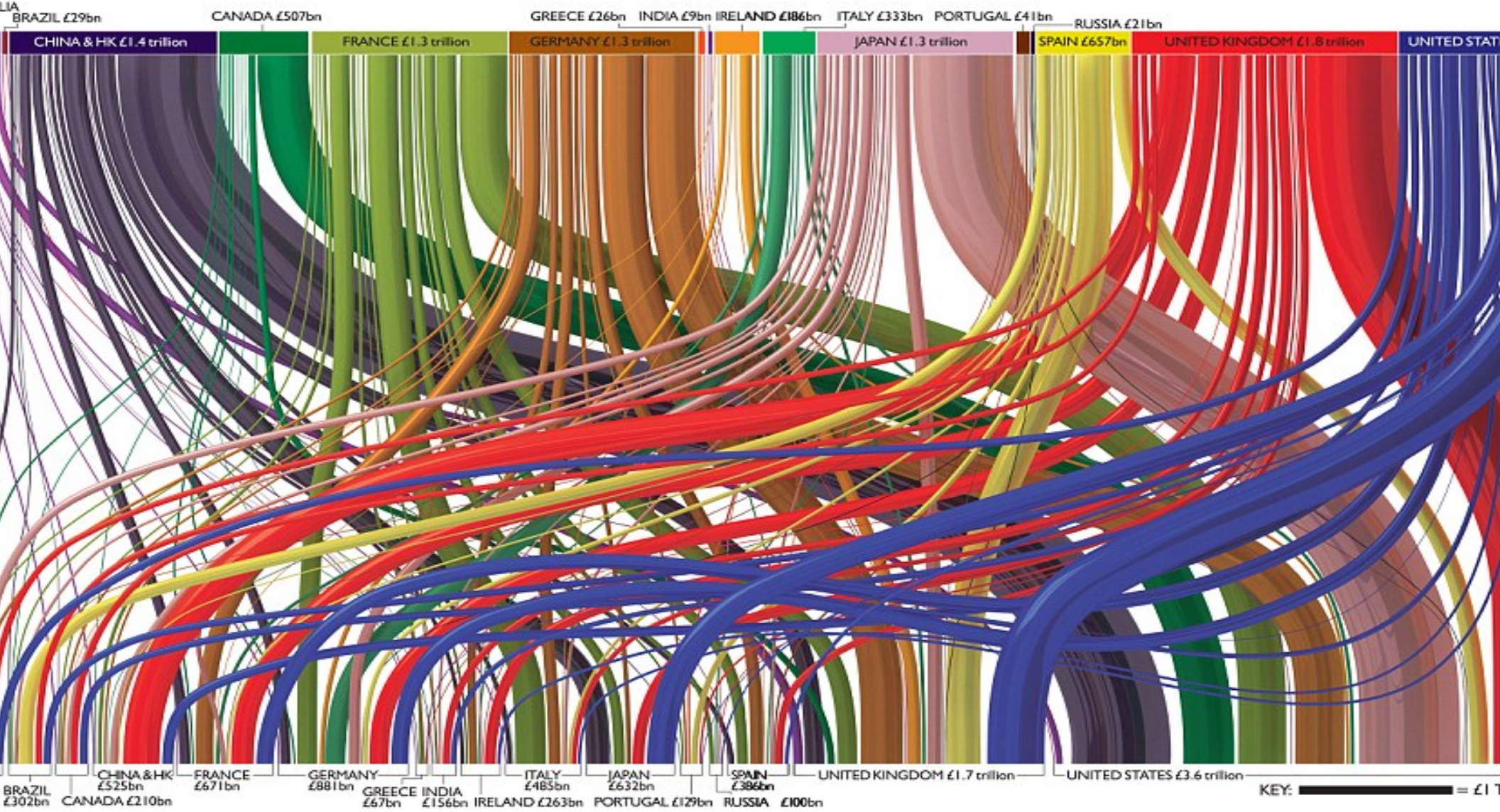


Positive Feedback



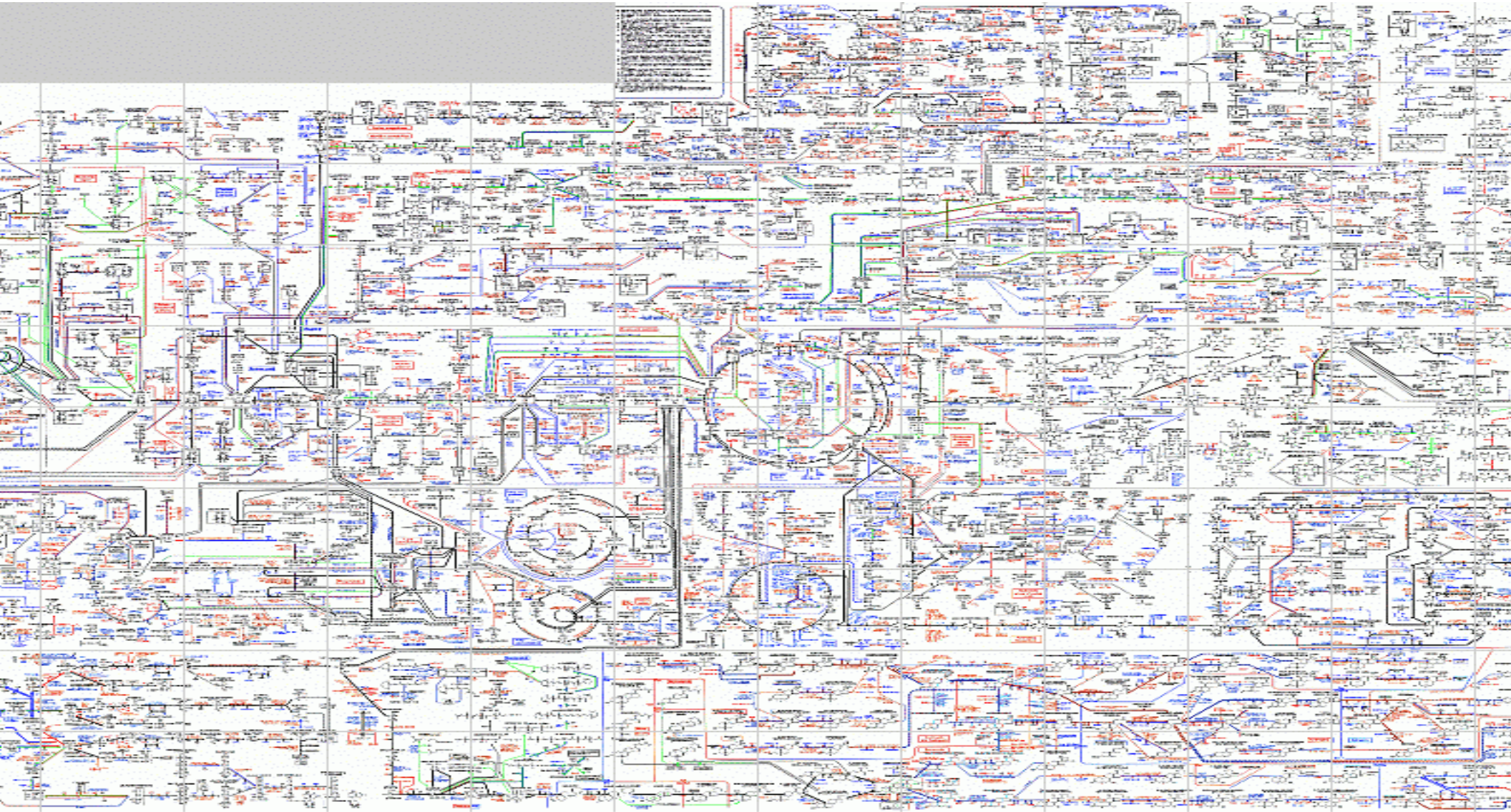
* Although few turn out to be as simple as they

Some Systems Appear to be Very Complex*



* But nonetheless follow some reliable

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* But nonetheless follow some reliable

A photograph of a dense tropical jungle. Sunlight filters through the thick canopy of green leaves and vines, creating a hazy, ethereal atmosphere with visible light rays. The scene is filled with various types of plants, including large green leaves and thin, hanging vines. The overall tone is soft and natural.

Some Systems Appear to be Very Complex*

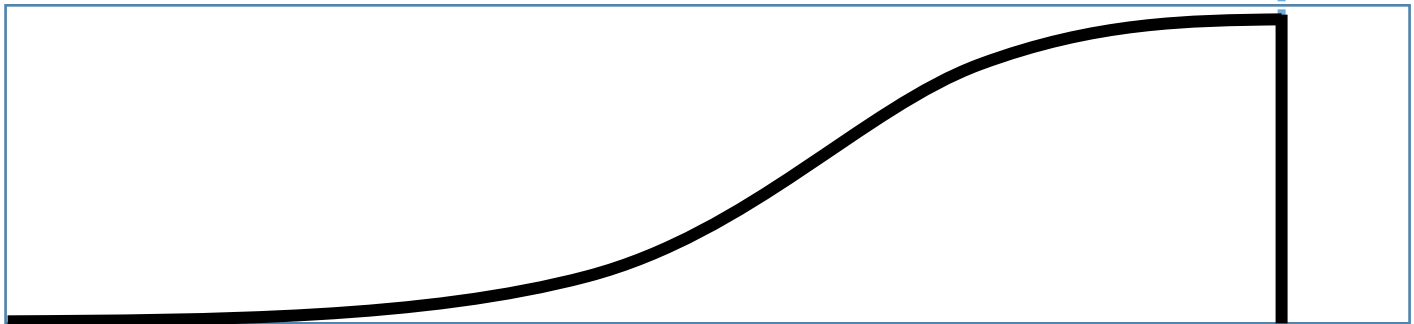
* But nonetheless follow some reliable

How a Forest Works...





Productivity



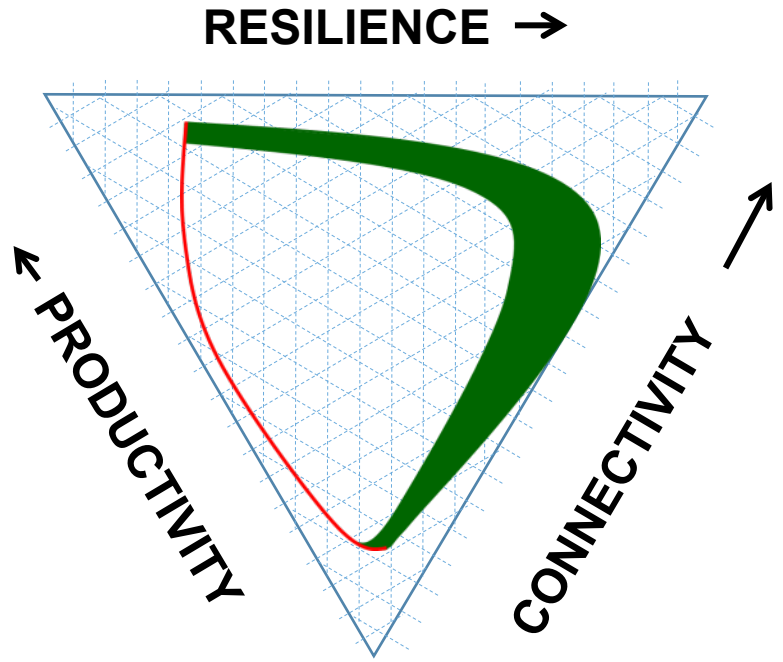
Connectivity

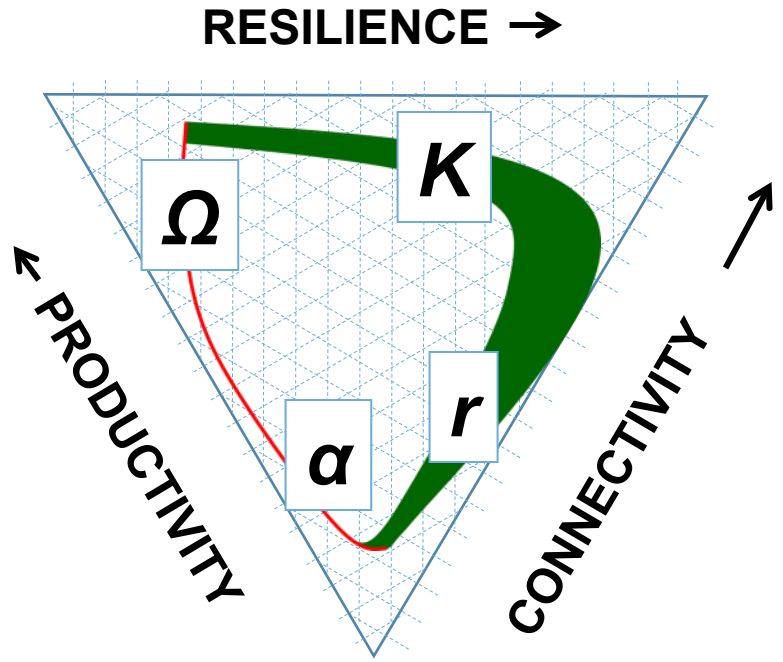


Resilience

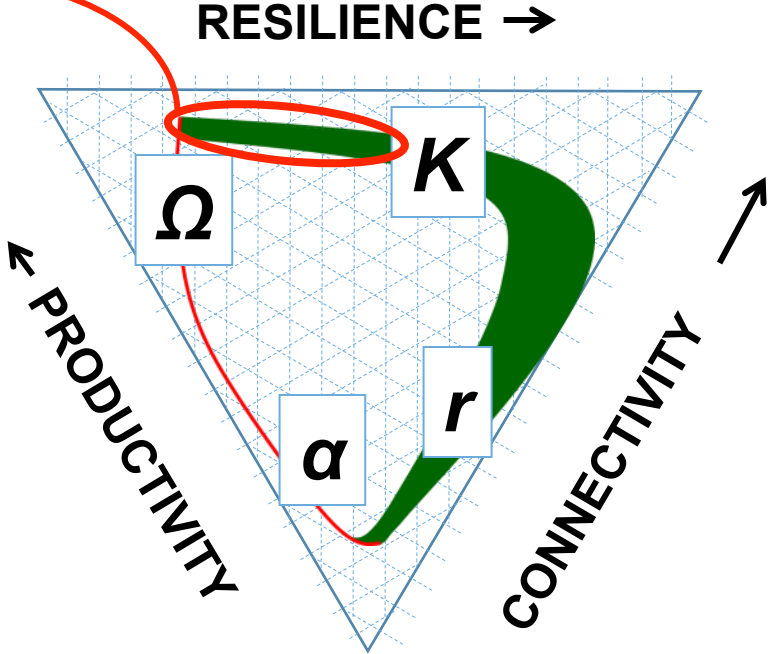


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Focus on efficiency
maintains productivity but
masks imminent failure





The apparent strength and productivity of the forest of towering trees masks an underlying vulnerability caused by a history of...well, monopoly, mergers and acquisitions...



Negative Feedback



This simple predator-prey relationship is actually unstable. If lions monopolize the savannah the system will fail.

Predator-prey relationships are much more complex in nature -- complexity and diversity are linked to stability



Characteristics of Sustainable Systems:

- Constant Energy Input
- Completely closed loops (recycled nutrients)



Characteristics of Resilient Systems:

- High Diversity
- Decentralized Networks
- Rapid Feedbacks: Closed Loops (e.g. recycling)
- Self Organization
- Dynamic Change with Adaptation

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Thoughts on Dynamic Efficiency: Better Understanding Needed

Contains valuable insights

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...cont/

Comments on Efficiency:

Efficiency is difficult to define and has different meanings in different disciplines.

Efficiency is an engine of growth and innovation, and therefore risky in resource limited systems and risky in the long term

Efficiency streamlines and simplifies systems which can increase productivity in the short term but reduce diversity and resilience in the long term

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Suggestions from an Ecologist:

Return to the initial conception of antitrust that emphasizes a direct approach

Study systems-level (dynamic) analyses of the risks that may be masked by short term economic gains.

“I believe that one ought have only as much market efficiency as one needs, because everything we value in human life is within the realm of inefficiency – love, family, attachment, community, culture, old habits, comfortable old shoes.”

Edward Luttwak