Value Creation in Symbiotic Innovation Ecosystems

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The New New Growth:

Innovation Ecosystems as a Laboratory for Next-Generation Innovation Policy

What can hermit crabs teach us about innovation, technology, and policy?

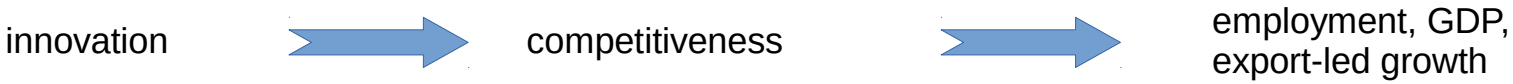
"Marin Hermite Crab" by Rorolinus -CC BY-SA 4.0 via Wikimedia Commons

The Starting Point

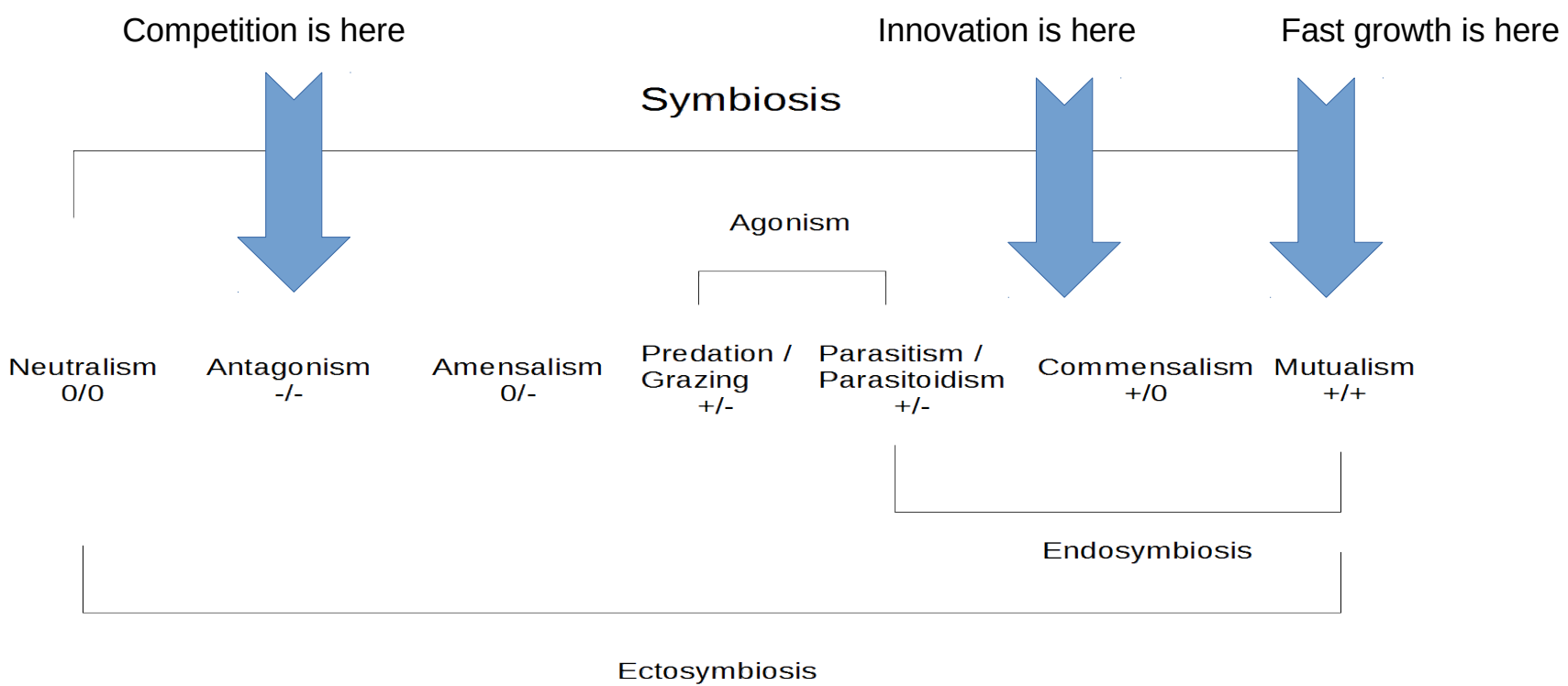
- Policy concepts are now strongly rooted on industrial era models of value production. There is a growing mismatch between policy frames and everyday reality.
  - We need “next-generation policy” that better aligns policy with the current reality.

- “Ecosystem” has become the new buzzword but it reflects the point that innovation and value creation now occurs in complex dynamic interaction that can not easily be described using old terms. Ecosystems are a fertile ground to study innovation processes that don't fit well with extant models.

Let's rethink our 20th century innovation policy model, looking more carefully what happens in ecosystems:



Symbiosis in Nature



Mutualistic Symbiosis is Common

- We studied several settings where mutualistic symbiosis is prevalent.
  - GrowVC Group, Swiss-French microtech transition, open hardware projects, crowdfunding, SHOKs.
- In an ecosystem, the actors become linked into a shared functional system. The activities of ecosystem participants (what they do and why they do it) can only be understood in the context of the overall system.
  - The survival and growth capacity can not be reduced to the characteristics of the participants.
- These systems are not mechanistic input-output systems or dynamical systems.
  - The actors act based on models of future. Ecosystem participants are not reactive but anticipatory. If we use classical physics, equilibrium models, computer algorithms, or dynamics to describe such systems, the models look as if the future would influence the present.
  - They have emergent characteristics. An ecosystem is more than a sum of its parts.
  - To describe and model ecosystems, we need mathematical formalisms that can capture organizational and relational aspects of ecosystems.
- *Relational biology* provides important insights.

Chimeric Dynamics in Ecosystem Evolution

- Chimera is a unit whose behavior depends on the genetic fusion of two previously independent units.
  - Mitochondria in eukaryotic cells, hermit crab, ecosystems, human technology...
- Their survival and growth capacity can not be reduced to the characteristics of their components.
  - You can not add up attributes of the chimeric components to find the attributes of the chimeric unit.
  - Chimeric combination creates spaces of behavior that did not exist before.
    - "Add as many mail-coaches as you please, you will never get a railroad by so doing."

Schumpeter, 1935

Innovation has inherently expansive dynamics. This implies a concept of growth that is more than "more of the same."

Such growth is only indirectly and partially visible in the current indicators.

By definition, trajectories miss innovation.

Key Messages (Policy)

- Biology-informed ecosystem studies suggest that innovation policy needs to move out from industrial policy toward broader development policies.
- The definition of innovation as “exploited knowledge-based competitive advantage” is exceedingly narrow and does not capture synergistic growth or value production.

- Value and expectations are now signaled using a rich set of channels that far exceeds the imagination of even the best economists.
- Very few goods and services in ecosystems are “commodities.” Services are better understood as structural interdependencies and symbiotic relations.
- Money and markets start to look like an artifact of the pre-21st century capitalism.
- Innovation policy can not be justified by economic arguments. It is the other way around: economics needs to be justified by what we know about innovation.

- New sources of knowledge are becoming relevant for next-generation innovation policy. In our research, we use relational biology and mathematical category theory to understand organizations, ecosystems, and innovation.
- Next-generation innovation policy is based on revised understanding of innovation, value creation, and, for example, IPR.

Key Messages (Research)

- Symbiosis generates value that is not captured by current indicators.
  - Our claim: this dark matter of knowledge-based economy is rapidly growing and increasingly important in the future. This is where the true growth opportunities are.
- To understand value creation in ecosystems, we need stronger mathematics than currently used in economic theory.
  - Using sufficiently strong mathematical formalisms we can show that extant models of value production cover only very exceptional types of processes.

- We need a new “constructivist” model of economic value.
  - Value is not “intrinsic” or “subjective:” it is relational. Value is produced at the point of consumption. This value model is tightly linked with real theories of learning and innovation.
  - Conventional models of (economic) value assume that the problem is about choice under scarce resources. These models do not work well in creative and expansive economy.
  - Commodities may be an exception. In general, value creation is based on capability to realize latent value opportunities.
  - This type of value creation is a key driver for innovation but can not be aggregated by conventional accounting systems. It is, however, already monitored and observed on the net.

Thank You!

Innovation creates new valuable ways of being and doing. This is the essence of the knowledge society.

A relatively small fraction of the resulting progress is visible on the market. In the information society nation states had to aggregate and generalize value but lost most of it in the process.

Now we can try and get it back.