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Energy, Complexity, Democracy ... Collapse?

KEY WORDS:

complexity; collapse; peak oil; energy; resilience

SHORT ABSTRACT:

Human societies become more complex over time. Today's networked globalization offers unprecedented depth of bureaucracy, rules, procedures, and degrees of specialization. Societies commonly respond to challenges by creating additional layers of complexity—new diversity, greater connectedness. Nevertheless, anthropologist Joseph Tainter argues in his book "The Collapse of Complex Societies" (1988) that the soaring costs of supplying the constant inflow of energy that is required for maintaining social complexity can put societies at risk of sudden collapse. Facing an economic and ecological crisis, we revisit Tainter's argument, unpack its elements, define key concepts, and place it in a broader debate on the relationships between energy, social complexity, democracy, and societal collapse. We ask: What does Tainter and other literature on complexity and collapse contribute to the debate on economic degrowth and reorganization? As such, our analysis addresses the need to face the current crisis and discusses demand for societal transformation.

LONG ABSTRACT:

Introduction

At the level of big history, the relation between energy and complexity is clear. The history of the universe in general (and Earth in particular) displays a marked trend towards increasing levels of complexity enabled by an abundant flow of energy. As a result, the universe gradually moves towards a state of thermodynamic equilibrium.

At a finer grain of analysis, however, the relationship between human civilization and energy is less linear and more tumultuous. The development of social complexity requires a constant supply of energy to sustain itself, and the process of energy production, in turn, significantly influences the character and organization of society. As a result, social complexity changes over the lifespan of its energy foundations—sometimes rapidly—and with important implications for a civilization based on finite fossil fuels.

Societies respond to a range of challenges by creating additional layers of institutional complexity as argued by anthropologist Tainter in his book "The Collapse of Complex Societies" (1988). But ultimately, this problem-solving mechanism can put the survival of complex civilization at risk. Tainter's argument goes as follows: Bureaucracy, new rules, detailed procedures, and greater degrees of specialization are common and to some extent effective measures that societies implement to respond to problems and to maintain social peace. Yet such high levels of social complexity require a constant inflow of high-quality energy and as societies grow more complex, the costs of producing that energy increase progressively. Energy scarcity can thus become a serious threat to civilization. In other words, the return on investment in social complexity diminishes over time and will ultimately turn negative once a certain threshold level of complexity is reached. Above this

level, the marginal problem-solving capacity of social complexity declines, while the marginal costs of energy production keep rising. Consequently, continued investment in complexity can overstretch society's resources, create rigidities and leave a society vulnerable to collapse, i.e. a sudden and significant loss of social complexity.

In the midst of an economic and ecological crisis, we revisit Tainter's argument, unpack its elements, define key concepts, and place it in a broader debate on the relationships between energy, social complexity, democracy, and societal collapse. Our paper also highlights the implications of these abstract relationships for contemporary human civilization, specifically the risks of peak oil and the potential for resurgence of forms of social complexity other than global networks such as tribes and hierarchy.

Research Questions

Our central research question is: What does Tainter's argument and other literature on social complexity and societal collapse contribute to the debate on economic degrowth and reorganization of society in the face of economic and ecological crisis?

In our discussion, we address the following subsidiary questions:

1. What is social complexity, where does it come from, and how does it change?
2. Why do human societies grow more complex over time and what is the return on investment in social complexity?
3. Is the marginal return on investment in social complexity diminishing over time? Why or why not?
4. What are the implications for societal resilience, democratic governance institutions, and the state of the Earth's biosphere?

Theoretical and Methodological Approach

We draw on literature in anthropology, political science, and ecological economics and also apply insights from the natural sciences to the analysis of social phenomena. We adopt a complex systems approach assuming that all complex systems—physical, ecological, social—have analogue characteristics and exhibit similar dynamic behaviours. Empirical examples guide and support our conceptual exploration.

Contribution to the Debate

Our research brings together literatures on complexity, energy, and societal collapse, which to date have existed largely separate from each other divided by disciplinary boundaries. As a result, we offer a new perspective in the degrowth debate, exploring the idea of reframing degrowth as decomplexification.