

**THEORY OF CONSTRUCTAL INFONIMICS: THE ESSENTIAL CONNECTION BETWEEN  
THERMODYNAMICS AND INFORMATION AS THE WORLD MOVES TO A CONNECTED  
FUTURE**

**Mark Heyer**

Institute for Constructal Infonomics

**ABSTRACT**

This proposed paper builds on the Theory of Constructal Infonomics [1], first presented in Bucharest, Romania in 2017 and published in the Proceedings of the Romanian Academy of Sciences. Through a better understanding of the essential thermodynamic/information architecture that motivates and defines success for all life forms, we may better understand, predict and control the evolution of our future as a species.

The Theory of Constructal Infonomics describes how the thermodynamic/information architecture of life shapes and drives all life forms, from simple bacteria to sexual reproducers to extended “virtual” life forms, including families, and tribes, religions, nation-states, and social media. It explains how stored energy, including material wealth and its information equivalent, knowledge, are the essential elements that all organisms must invest, and from those investments, achieve an amplified energetic return in order to survive the Second Law. In addition, it demonstrates that hierarchical complex organisms share the precise motivation as each of their constituent dependent organisms. E.g., the motivation of a human being is identical to the motivation of every cell in its body, including all the gut bacteria, viruses, etc. Individual humans carry the same survival motivation into their roles as dependent organisms within larger, sometimes nested, virtual life forms, e.g., families, companies, nations. It defines the fundamental requirements for the origin of life and applies empirically to all life forms here on Earth and hypothetically, at least for now, throughout the universe.

With that background, the paper will then focus on applying the Theory to the current world situation as a case study. Power in the societal sense is the product of both thermodynamics (material wealth and energy flows) and information (knowledge and information flows). We are now experiencing the shift from industrial revolution high-thermodynamic, low-information wealth and power accumulation to distributed-thermodynamic, high-information, global societies and organizations. Notably, some nation-states that depend on brute physical dominance and suppression of information to build their wealth find it difficult to realize a positive return for their efforts in the modern co-dependent world. The discussion will focus on:

- The impact of global, real-time communication (e.g. Web 3.0, Metaverse, Crypto, social media)
- The diminishing role of nation-states
- The rise of transnational corporate power
- The power of individuals cooperating globally
- The rise of non-state actors, e.g., Anonymous

Despite shifting forms and forces, human progress is driven by the thermodynamic calculus of using information to amplify energy and evade the Second Law. By understanding this fundamental architecture of life, we can better predict and control the evolution of our future as a species or the planet.

Keywords: Information theory, origin of life, social media, power, wealth, knowledge

[1] Mark Heyer, "The Constructal Theory of Information." *Proceedings of the Romanian Academy Series A-Mathematics Physics Technical Sciences Information Science* 19 (2018): 178-182.