
Information, mass and energy equivalence principle applied to society

Society through the lens of Information

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This research focusses on the development and application of a measurement system for the functionality of anthropogenic designs, i.e. man-made constructions, systems, organisations or products often are negative interdependent (they benefit some, but at the cost of others—i.e., or profit for one at the cost of everyone: so called externalities). This study tries to bridge physical systems with social systems. It observes society through the lens of information. Information doesn't seem yet being understood as a physical substance which warrants functionality of universal and natural systems. Nature can no longer be seen as matter and energy, but must be interpreted as matter, energy and information (Campbell Jeremy, 1982) [1]. Rolf Landauer stated that information is physical (Landauer,

Rolf, 1991) [2] and related it to entropy which leads to disorder in systems, describing the measure of entropy in a number of bits which are binary units of information.

Preamble

The ability to communicate i.e. exchange and use information as the energy required to remain autopoietic (self-maintaining) applies to all physical, biological and therefore anthropogenic systems, because man is an intrinsic part of nature. Man-made goals are often ulteriorly motivated and therefore are or become dependent on non-communication which leads to an entropic (disorderly) state due to an energy i.e., a deliberate information shortage a.k.a. as lying which defines entropy. We are living in a society, which finds

itself in a harmful crisis of perception (Capra, 1991) [3] because people do not understand the significance and meaning of information as the energy that forms, builds and maintains order and safeguards functionality. Life sustains life itself. Living creates and sustains negentropy or order, in an entropic universe. Life somehow escapes the 2nd law of thermodynamics since life started to emerge.

Sustainability, Climate Change are contemporary goals abused to disguise and enforce all kinds of regulations. It costs the taxpayers dearly to reduce CO2 emissions, but this method of enforcement is negative interdependent. Better is to change 'sustainability' into 'Non Harmful Functionality' of man-made things. Norbert Wiener [14] (1954), the founder of Cybernetics (the science of governance and control in the animal and the machine) concluded that our universe is entropic. This means that it tends towards an equilibrium (nothing moves anymore) but that the dynamics of natural and universal entropy are the basis on which life thrives. He wrote that our planet somehow is an enclave where life sustains life and maintains the conditions for survival and evolution by using feedback (information).

Disinformation

When we observe how disinformation is used to manipulate reality while this is physically impossible but harmful, we can use this science to learn. It will become demonstrable that ideological goals, which depend on information deficit (lying or the suppression of information) can't ever be achieved. Censorship by UN, US or EU laws is impossible, because they can't break the physical trinity of information-matter-energy. The harmful result of censorship will be social and environmental entropy (societal disorder) as you now already can observe.

Unfortunately such goals have been and still are being enforced causing great harm to all living systems.

Cognition. According to research by Humberto Maturana [4] and Francisco Varela, means in short the processing of all relevant information with the environment in order to be sustained. They found that cognition is inseparable from autopoiesis (self-maintenance) in nature.

Social Cognition. Niklas Luhmann, sociologist argued

that the basic idea of autopoiesis also applies to non-biological, social systems, producing their own elements (Seidl, David, 2004) [5]. He understood human made organisations and society as polycentric collections of interacting social systems (Monkelbaan, Joachim, 2019) [6] through communication. i.e. cognition and distinguished three types of social systems: interaction (conversation), organisations and function systems (systems of communication).

The Universe is a physical system that contains bits of information. Each elementary particle carries bits of information. Dr Melvin Vopson [12] describes it as follows: atomic and subatomic particles and cells (human and non human) carry information in themselves, about themselves. He suggests that Information could be the 5th State of Matter, next to liquid, solid, gas and plasma. He developed the second law of Infodynamics which demonstrates that information is indeed physical and validates the mass-energy-information equivalence. Information has mass. Electrons carrying information work together in a systematic way to perform a quantum logic operation. A computer and our cell phones operate like the universe because they are part of it and to operate they must obey the same physical laws. Computers and the universe are information processors. Quantum computing is currently made possible by information; the universe already works that way. (Lloyd, Seth, 2016) [7].

Quantum information processing analyzes the universe in terms of information: the universe consists not only of photons, electrons, neutrinos or quarks, but also quantum bits or qubits. Professor Lloyd says the universe is a giant computer, processing information in quantum bits (qubits).

The universe, a computer, the human body, the environment, businesses; all living systems are information carriers, receptors and/or transmitters. The information they carry can be understood as meaning, observed and understood by human consciousness and processed by its brain thru perception by all senses. Without the human ability to interpret information and meaning, the usefulness of bits of information can't be detected.

Therefore it is of importance to learn how people perceive reality. Fritjof Capra talks about a Crisis of Perception (Capra, 1991, 2016) because he states that

Entropy or disorder occurs by a false perception (P) of life: symbol Ankh – information deficit (i) outside the limitations of reality (R) Realimiteit (Truth) = **outside boundaries of functionality = dysfunctional, potentially harmful**

$$\infty = ((\text{Ankh} + i) \leq R) \times P$$

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Negentropy or order occurs by a correct perception of life (P : symbol Ankh + sufficient relevant information (i) within limitations of reality (R) Realimiteit (Truth) = **inside boundaries of functionality** In fact: **non harmful functionality** depends on the quality and quantity of information!

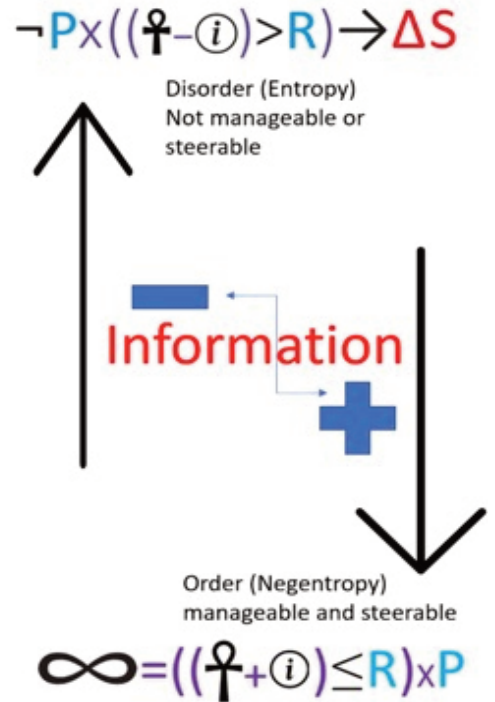


Figure 1. Symbolic representation of the relationship between information, human perception, entropy and reality.

people perceive our world as something outside of them. This mind-body paradigm persists. (See Figure 1.)

The process of understanding what information entails starts with the description of the two laws of thermodynamics. Information understood as energy obeys the same laws of physics. First and Second law of thermodynamics (Clausius, Rudolph 1865) [9]. There are two kinds of processes, heat and work, that can lead to a change in the internal energy of a system. This is the same as saying that any change in the energy of a living system must result in a corresponding change in the energy of the surroundings outside the system. In other words, energy cannot be created or destroyed.

Information influences matter and reality because it always is a part of them. Matter, energy and information form one physical reality. Information can't be disconnected nor separated from the physical reality. This means that man can't escape reality, because he is always a part of it, whether he prefers it or not. With physical information in the form of feedback as influencing energy through cognition, processes that use all available and relevant information are adaptive whilst processes that not use all available relevant information become non adaptive.

Entropy is the measure of order or disorder in a process or living system by the availability or unavailability of energy=information. Information answers to the same law of physics, namely that natural entropy can be influenced

by information, which is used by our universe and planet to create order and structure. Information can't be destroyed because it is connected and a part of quantum reality i.e. the fabric of existence and has mass. Universal simplicity and elegance apply as follows:

When one observes the current state of our global society one can understand that many anthropogenic (man-made) systems are causing disorder and are harmful. Without having to mention all that has gone and is going wrong, you the reader will know what is meant. This study is an attempt to synthesise the causality by following the first goal of the School of Athens which was; Seek knowledge of Cause: Conclusion: information deficit. Can it be so simple? Yes! By developing and completing 4 projects based on synthesis, rather than analysis, this research aims to scientifically and empirically demonstrate that this statement is correct.

Regulating complexity is impossible. Controlling reality by force, which is based on information deficit, is impossible. We observe that a societal surreality is being enforced by the suppression (re censoring) of information. This is unachievable because of the laws of physics, which say that information can't be divorced from the physical reality (Khalili, Jim, 2016.) [10] Therefore societal systems that lack information and that are enforced by rules are doomed to collapse which history confirms, as they lack the needed information, read **energy**, to do the work i.e., to perform.

Feedback Loop Functionality of living systems

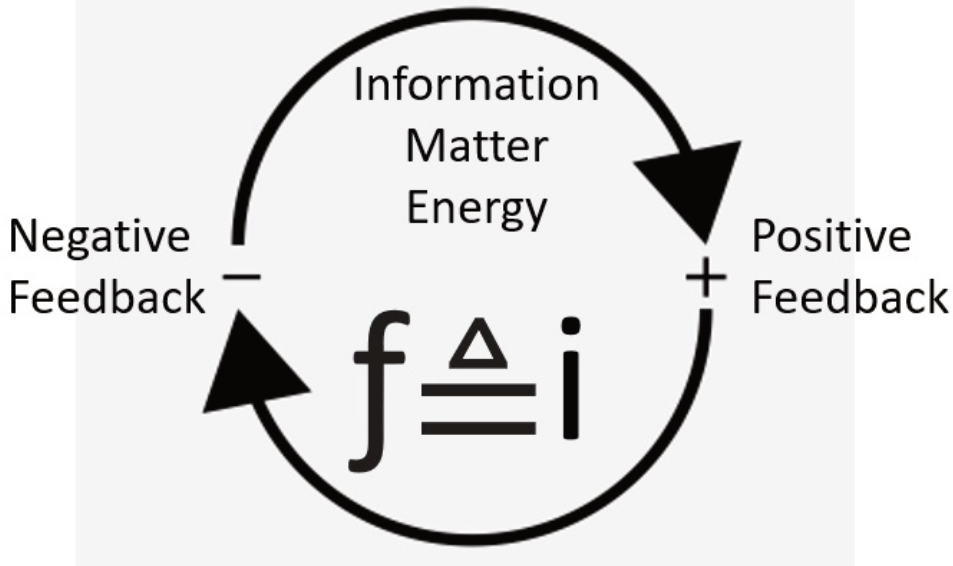


Figure 2. Feedback loop of functionality of living systems.

Social Entropy in Open Systems

Kenneth D. Bailey corroborates the unlimited application potential of his Social Entropy Theory [11]. The relationship of the first and second law of thermodynamics is not just physical, applicable on closed systems, but also related to social, so called open systems. Closed systems where laws of physics apply can't be separated from open social systems, because the same laws of nature apply to both. When information deficit occurs, energy deficit occurs which means that 'work' can't be done, hence functionality ends. (See Figure 2)

History

Greek, Roman and Italian civilizations collapsed due to

$$H = - \sum_{i=1}^k p_i * \log_2(p_i)$$

Figure 3.

untruths, which are equal to information deficit. Now, just look around; our social cohesion is being destroyed once more by disinformation. All nature requires of man is to tell the truth.

Information = Negative Entropy or Negentropy.

This means that entropy, i.e. the decline of energy to do work can be reversed by information. The probability of uncertainty can therefore be reversed by a quantity at a certain quality of information, which demonstrates Landauer's observation of the physicality of information relating it to thermodynamics. Dr Melvin Vopson who proposes the mass-energy-information equivalence, measures the quantity of information in the universe. He designed the theoretical framework upon which this statement rests and currently proposes a method of

testing it by weighing the quantity of information (the number of bit and bytes) held on a hard drive and comparing it to the weight after the data (bits and bytes) of information has been erased.

His second law of Infodynamics can be understood and applied to stabilize living systems by maximizing the usefulness of information, thereby creating negentropy (order) of living systems, which otherwise would be entropic, disorderly.

He tested 'symmetries' and found that natural systems that manifest symmetry need less information to sustain themselves than non-symmetric systems. They use information in the most efficient way, so less energy is required. This confirms Claude Shannon's Information

Entropy [17]. His work enabled the current compression of information in bits and bytes such as in MP3's. (See Figure 3)

DNA

In biological living systems communication for gene expression is not regulated, but dynamically 'steered' by DNA to

produce the exact and correct proteins all the way from our genes to the functionality of large entities. It involves interaction and communication with the environment.

The working of DNA and Shannon’s theorem can be deemed equivalent regarding the transmission of information. DNA is understood as the source of the message and or transmission and proteins are the receivers. The message in the form of information must be structured. Lila Gatlin [16] of the University of California, Berkeley wrote ‘Evolutionary Indices’ to understand entropy in DNA messaging in higher and lower organisms and came to the conclusion that they are the same because of the uncertainty principle which is the inability to know everything fully. DNA stores the hereditary information in a particular sequence of symbols from an alphabet of four letters: A,T,C and G, which means this is a language.

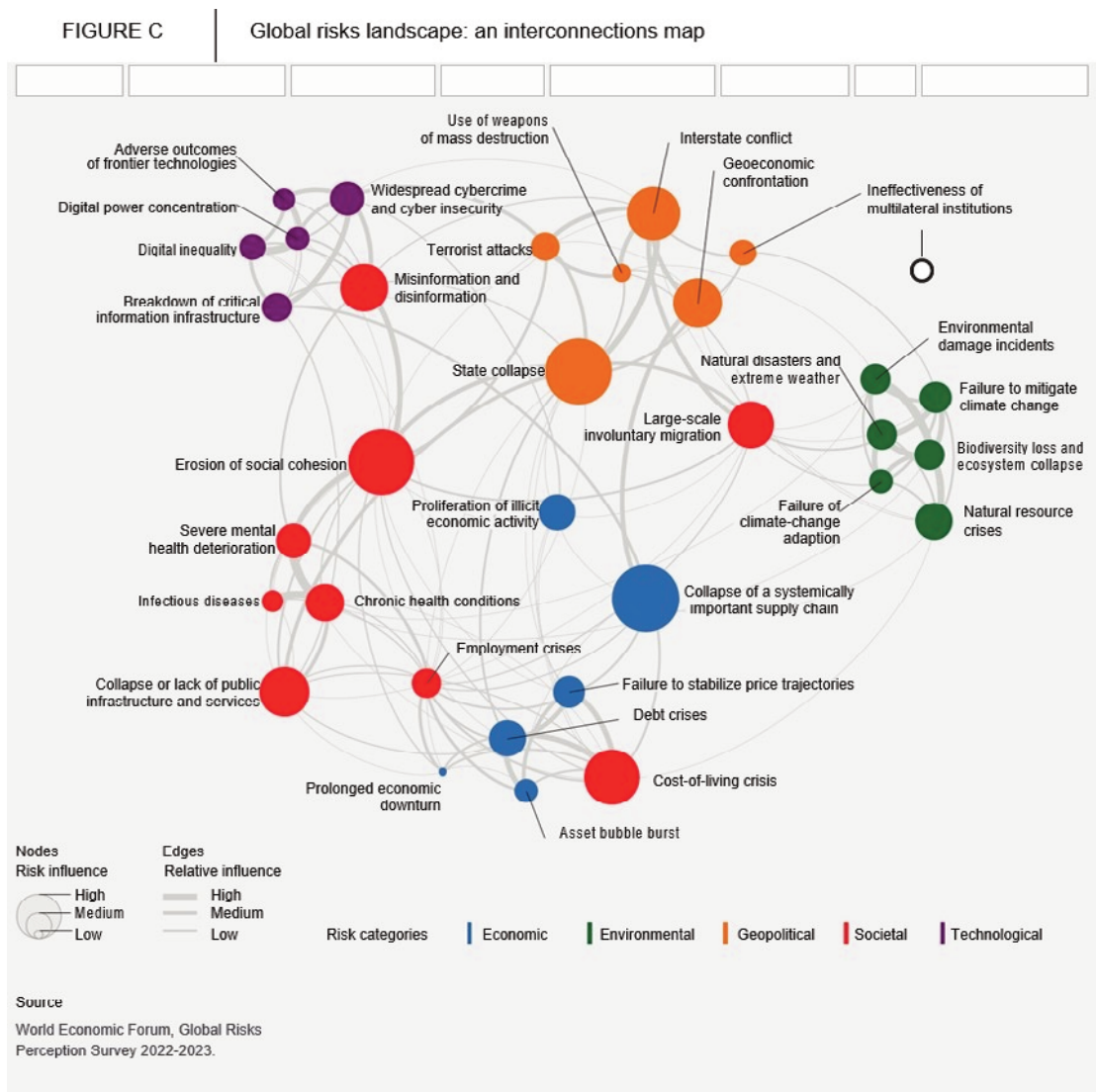
Performance Probability Patterns

The probability of outcomes can therefore be predicted by measuring the quantity and quality of information in

any system, thing, product, organisations or government. When we look at non-functioning (non performing) human made systems, it becomes quite simple to ask these two questions: was all relevant—a minimum quantity of optimal information used and allowed? Was this system allowed to communicate freely? The probability it wasn’t may be larger than the probability of full transparency. Information in the form of always asking the maximum number of questions (Heinz von Foerster) [15] is therefore key. Improved Performance Probability can be achieved by the use of optimal information, because this implies sufficient energy is available to give matter form. An elegant universe indeed.

At the time of writing this article an entropic acceleration in our world can be observed and felt. The World Economic Forum publishes their Global Risks Report every year: Please see [Figure C](#) below.

My research finds that 79% of global risks are caused by a deliberate information deficit (someone, somewhere is lying—trying to escape the laws of physics). 21% is



caused by natural, universal, global systems such as weather, sun, volcanos, oceans, which can't be controlled by man.

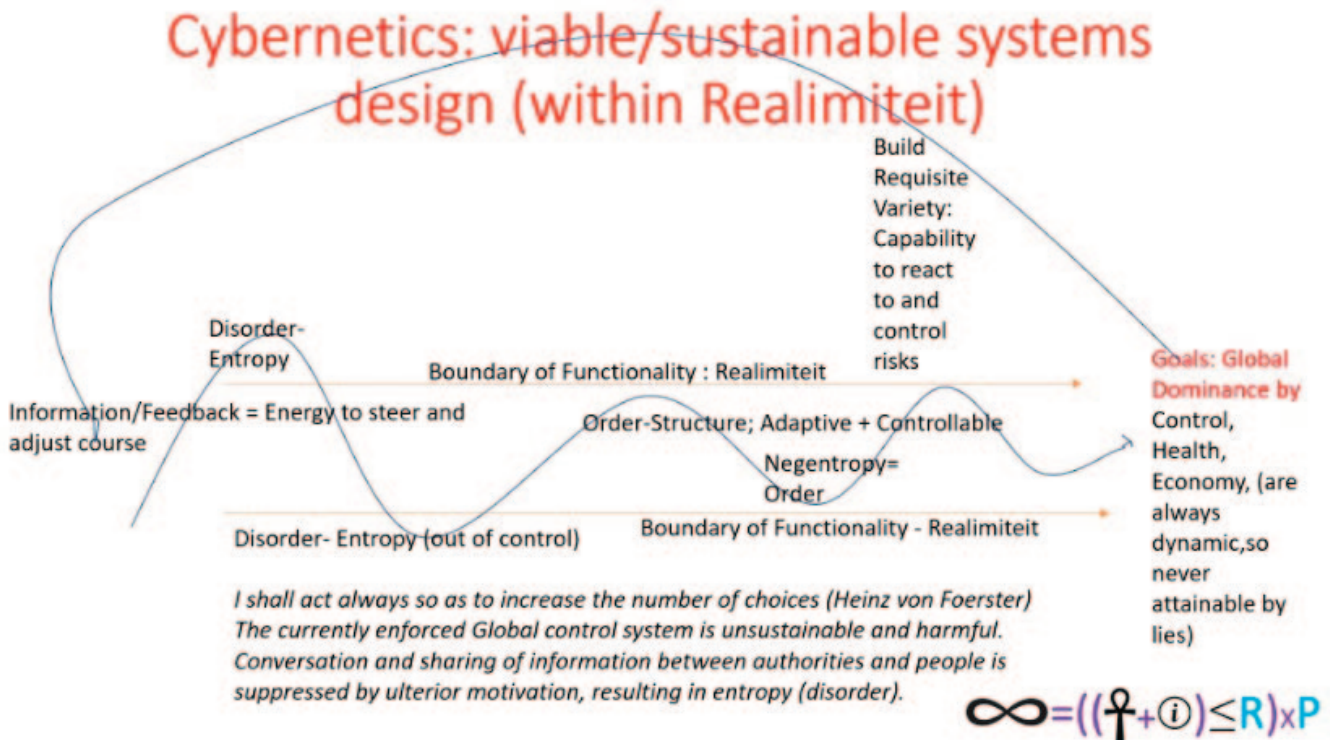
When you look at the man-made mess, you would now know that they can be solved, by adding true information in the form of corrective feedback. This is how biological, universal and human life functions and continues to evolve; it seeks and applies all needed information as its energy to function and survive.

As follows: **this chart** below represents a feedback loop mechanism. Note the entropy caused by trespassing the limitations of reality (Realimiteit) which are the boundaries for functionality. Entropy is accelerated by lying, cheating, censorship, gaslighting, etc. rendering **any enforce** goal unattainable but execution of such goals are or become harmful. Entropy must be corrected by negentropy which actually proves to be equal to information.

About the Author:

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