

## THE SUSTAINABILITY PARADIGM OF VALUE AND ENTROPIC APPROACH OF ECONOMIC SYSTEMS IN THE IDEAS OF PAUL BRAN

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### Abstract

The Romanian professor Paul Bran at the University of Economic Studies from Bucharest (1965-2006) introduced the notion of value in the economy by analyzing the entropic approach and also evaluating the concept of negentropy.

### Keywords

entropy, negentropy, economic value, sustainability.

### JEL Classification

O12, Q01

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### Introduction or need for a sustainable future

The relationship between man, environment, and economy has been a concern for the specialists trying to decipher the future of human society in order to manage them (Bran et al., 2018). Dozens of concepts have been launched in relation to the evolution of the economy, of human society, and of the environment. Only in the second half of the 20th century did the quality and integrity of environmental factors become serious objectives.

Between 1970 and 1980, within the Roma club were developed a series of socio-economic concerts, therefore launching a set of paradigms (organic growth, etc.), and stimulating the appetite for the search of new theoretical approaches.

The emergence of new concepts or the adaptation of already existing ones at a national level, for example, in which the realities of the social, economic and political space from the beginning of the 21st century are integrated and where the phenomenon of globalization finds its place, where the existence of some states considered as failed, or in financial difficulty, and major geopolitical and geo-economic manifestations, policies specificities to the

emerging states, the dominant role of the large transnational corporations in the field of economy that have their own evolution strategies being predominantly profit oriented.

Of the dozens of concepts of human society evolution including economy as the engine of society, the concept of sustainable development was developed under the aegis of the World Commission on Environment and Development, having as coordinator Gro Harlem Brundtland (1987), endorsed by the UN General Assembly and recommended as a guide for governments in their activity. At least 26 versions of the concept have appeared in the coming years, in conjunction with the concrete conditions of some countries (Androniceanu et al., 2017).

The concept of sustainable development has spread rapidly, being supported by the international institutions, reaching a common language in the School's Curriculum also, becoming a tool for drawing up really useful evolution strategies, creating an interest for civil society. For illustration, on June 10, 2014, 331,000 posts on the concept of sustainable development were recorded on the Internet, which denotes the positive evolution of the concept, supported by the aspirations of the society to foretell its future in a world full of uncertainty and complications of all kind.

In the last 30 years, other conceptual schemes for the evolution of the relationship between man-environment-economy have been proposed, such as the following:

1. The Case of Hypothesis (James Lovelock, 1979)
2. The concept of deep ecology (Anne Naes, 1979)
3. The Medea Theory or the Suicidal Planet (Peter Douglas, 2009)
4. The concept of human development (PHUD, 1992)
5. The concept of survival (Lester Brown, 2008, Florina Bran, 2011)

To their concepts were added the works of Professor Paul Bran, "Economics of value", "Management by value", which bring theoretical novelty by appealing to the notion of entropy that it uses in the analysis of economic processes being identified with the potential of natural resources.

Professor Paul Bran, in his work "Management by value", starts from the premise that: the law of value - entropy requires that the economic processes (production, consumption, distribution, exchange) as well as the processes specific to human society and those of regeneration and protection of the natural environment to be carried out within the limit of the economic potential.

In this formulation, Professor Paul Bran associates the resources with the information, the informational society thus created being able to intervene on the natural origin entropy.

The statement is in line with James Haishitt's statement that "In an industrial society the strategic resource is the capital ... In our new society, the strategic resource is the information, as Daniel Bell first stated". Between the two approaches, there is a connection between Nicolae Georgescu - Roegen and Paul Bran, respectively the emphasis is placed on the value of entropy, from the anthropocentric acceptance - the pleasure to live - to the ecocentric acceptance - saving of natural resources, on account of adding value to the Economic information, the last variant approaches the sustainability with the hypothesis that at a constant population numerically the negentropic potential can be continuously improved, giving the chance that the productive potential of the natural resources can be saved.

### **1. The entropic approach to economic processes**

The authors set out to showcase the concept of Professor Paul Bran completing the gallery of concepts developed by Nicolae Georgescu - Reogen, by presenting the human-environment-economy relationship and defining the future directions of human civilization.

The society's evolution concept in general, of the economic processes in particular, brings as a novelty to the other concepts the following elements:

- reduces the number of criteria used to define the concept, the nature used, that of entropy is integrative for all the components necessary for the production process and for the whole diversity of the environmental impact,
- defines the evolution of an economic process according to the low entropy potential, highlighting the purpose, closing the cycles of economic evolution,
- The entropic analysis of economic processes uses a natural law from thermodynamics applied in practice,
- the transformation of the entropic potential (low entropy) into high entropy, during an economic process is irreversible, thus the notion of evolution of the economic processes appears, the economic life cycle, the entropic reversibility not being possible,
- The notion, the quality of sustainability is economically viable only in the case of open economic cycles in which the potential of low entropy (natural resources and energy) is infinitely quantitative and the entropic accumulations are minimal.
- A sustainable economic process is characterized by the predominance of renewable natural resources as a raw material and the use of the sun's energy to complete the low entropy potential. An economy so organized was called a bioeconomy.
- it is possible to manage the entropy (of its transformation process) by reducing unnecessary non-economic consumption (military spending, parasitical spending) and by increasing the efficiency of the yield of entropy transformation.

## **2. Entropy and negentropy**

The instrument developed for this purpose received the name of negentropy, identified with the information used in the economic processes that acts to reduce the quantity of entropy in order to obtain products and services with the same degree of utility (reducing the degree of energy per unit of product).

Negentropy, according to Paul Bran, It is generated by the innovative spirit of man, by the talent, the tradition, the Intelligence of the personnel involved in the economic processes, by the quality of the organization processes, by education and the culture of the society.

The entropic approach to the economic processes, proposed by Nicolae Georgescu - Roegen and continued by Paul Bran by highlighting the place and the role of negentropy in the evolution of the economy, in general: can help to shape the elements that will lead the human society towards finding sustainability.

In the works published by Paul Bran, the three conceptions regarding the nature of society were emphasized. Like any new approach, the law of entropy applied to the economy has met followers (Boulding, Yashary, Miesiuk, Wade, etc.), opponents (Palinko, etc.) or passed unobserved.

An interesting position is held by Florina Bran, who says that as long as there will be the memory of the words Entropy and Economy, the name of Nicolae Georgescu-Reogen along with Paul Bran will be remembered and honored.

The authors' belief that the entropic approach to economic processes can be included among the several dozen concepts regarding the future of the economy.

Some applications of Paul Bran's concept have materialized in economic research in Romania and the Republic of Moldova:

- Outline strategies for enhancing natural resources, respecting the principles of the entropic approach,
  - Elaboration of the value-entropy theoretical model to lay the basis of value management.
- The wide-ranging work of Professor Paul Bran also had the quality of a handbook for students from economic universities. Outlining the concept of the entropic world in order to facilitate a comparison with other concepts in a world of specialists would determine the students' understanding of the concept, but also the practical implications from this perspective.

The entropic approaches through the value theory realized in Paul Bran's books are discussed as a continuation of Nicole Georgescu-Roegen's approach for explaining the processes in the current economic world.

Paul Bran said that we need to raise awareness of the depletion of primary resources, energy, in relation to population dynamics, the emergence of the consumer's society, etc.

In the new paradigm of the economic processes approach, inspired by the thermodynamic concept of entropy, Nicolae Georgescu-Roegen reconsidered the law of value as it was known in the classical / conventional economy. Paul Bran, in the works "Economics of value" and "Value management", specifies the role of the value-entropy equation. A contribution to the theory of value-entropy also belongs to Paul Bran, who proposes "The general model of the theory of value-entropy" as a novelty to the concept of concrete economy.

The model can also be considered as a methodological tool in the analysis of economic systems. The model of the entropy-value proposed by Paul Bran gives the possibility to highlight, during the entire evolution cycle of an economic process, the entropic accumulations of a drawing type, the model becoming a point of connection between the economic space and the natural environment.

The general model of the value-entropy theory can also be understood as an opportunity for the economic research to bring the model proposed by Paul Bran to the quality of methodological instrument for routine economic analysis. At the same time, there is room left for theoretical development, finding ways in the entropic approach of economic processes of externalities (positive and negative) of entropic capital, of profit as the sole economic "attractor" for the large transnational corporations that shape the global economy.

### **3. The entropy-value in Paul Bran's vision**

Paul Bran leaned with great passion on this field of dysfunctionalities - degradation of the environment - in trying to formulate an economic theory that would allow to explain the human-environment, economy-environment relation, in order to obtain some useful knowledge in the decision-making process. He notices the need for a new value paradigm, but also the difficulty of adapting it. "The road to a new paradigm began before 1989, when, dealing with the measurement or financial distribution of the value, I noticed numerous issues regarding the economic theory of that period in explaining the economic reality, as well as great dysfunctions (unemployment, pollution, economic and social imbalances) that have developed in society, both in our country (where we used work-based value theory), as well as in countries that use utility-based value theory (marginal value).

Paul Bran takes the first step to continue the new theory of economic value by specifying the physical support of value.

Paul Bran explains the discrepancy in society compared to nature through its activity. Man has deliberately fought against nature. Thus, Paul Bran pointed out in the work "Management by value", that the individualization of man within nature brought us only the victor's solitude. I found, once again, that the most dangerous things are... victories! And the victory against Nature, prepared regularly, including economic theories, is no exception.

The cosmetic adaptations of the theory regarding the anomalies that are increasingly obvious to the economic reality no longer help neither the theory nor the practical activity that it uses. It is necessary to have an in-depth reinterpretation of the phenomenon in order to obtain the value according to the laws and exigencies of Nature's sciences, understanding the economics of value, which represents a connection between the economy and the physics of value."

According to Paul Bran, the definition of value is the basis of economic sciences and represents the genetic code for the entire construction of the economic theory and practice. "Starting from the many deviations of the theories of value, and in particular of the theory of value based on work and of the theory of utility, we have come to the conclusion that the way of looking at value must be radically restructured."

The research undertaken and the results presented in the work “Economy of value” (1991) have led to a new way of looking at and understanding value.

### **3.1. The Theory of Entropy Value**

According to Paul Bran’s opinion, “Value is a transformed form of low entropy’s natural potential, existent in nature in the form of substance, energy and information. This potential is subject to successive transformations and preservations, both within the processes of the economic type (production-consumption), as well as within the processes that exists in the natural environment (photosynthesis, metabolism), and in the social environment (social life, education, research, culture, etc.)”, and the mechanism of obtaining value cannot be understood and driven outside the general laws of nature, being part of nature.

In these conditions, economic science must open up and at the same time subordinate its scientific achievements to the physical, chemical, biological and social field.

The value, in Paul Bran's conception, “is a form of created matter, an objective existence that behaves according to the laws of nature. It is the food of all living and non-living systems in the economy, society, and increasingly, even components of the natural environment.”

The road to a new paradigm of sustainability was aimed at finding new criteria for defining value, entropy, etc. Respecting sustainable consumption requires a mechanism for obtaining and managing value and entropy.

“Among scientists, relatively few, but remarkable for the durability of their works that dared to escape beyond paradigms and helped to propose their rethinking to build the theoretical foundation for the eco-economic universe, we find the late Professor Paul Bran. Perseverance, skill, discipline, optimism, dedication, creativity, were invested by Paul Bran to explore, correlate, synthesize, analyze, evaluate and create an original model Theory of Entropy Value (TVE) that can underpin solutions to the dysfunctions resulting from disregarding the complexity of interdependencies in the human-economy-environment triangle.

### **Conclusion**

The work of Professor Paul Bran can be considered a treasure to the Romanian economic science, the knowledge provided allowing to adopt an innovative perspective to solve the key challenges of the contemporary world.

"From the government to the most modest company manager, from the teacher to the artist, from the individual to the political parties, the care of value must be the compulsory supply chain for every decision. Through the social and economic organization’s model it must be encouraged to attract environmental potential, the society and previous economic processes " (Paul Bran).

Our existence and evolution cannot be separated from the context of the relationship between nature and economic evolution.

The new approach involves changing the paradigm in the economy, consumer reaction, notions of balance between nature-society in the concept of sustainability, rational and sustainable management for today, but also for the future.

For young researchers, the works of Nicolae Georgescu-Roegen and Paul Bran can be a departure stage, a professional start on an arrow of time that could prove fruitful for innovative economic thinking, so necessary for solving the deep crises of contemporary society.

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