EVOLUTION AND IMPACT OF ECONOPHYSICS & SOCIOPHYSICS ANOTHER BOOK PROPROSAL AFTER THE PUBLISHING OF ECONOPHYSICS: BACKGROUND AND APPLICATIONS IN ECONOMICS, FINANCE, AND SOCIOPHYSICS, ACADEMIC PRESS, ELSEVIER

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Abstract. *The project of a second volume dedicated especially to Econophysics & Sociophysics is actually the essence of this article. The initial title of this second book was intended to be "Econophysics & Sociophysics" but the final remained "Evolution and Impact of Econophysics & Sociophysics". This book was proposed to the ELSEVIER ACADEMIC PRESS as publishing house that also printed the first successful volume entitled "Econophysics: Background and Applications in Economics, Finance, and Sociophysics, Academic Press, Elsevier Publishers" (2012) [1]. The editor and an important contributor for the two books remains the same Gheorghe Săvoiu. The major question for the author of this paper is whether such a book can still be relevant. Any publishing house can still analyze and decide, together with any of the readers of this Journal. In fact, even this issue of ESMSJ may or may not be among the last published issues, in relation to the dialogue generated by its three articles, the last two of which are proposals for books not contracted and not finalized so far with any publishing house...*

Keywords: *book proposal, Econophysics, Sociophysics, publishing house, relevancy of a book.*

1. INTRODUCTION OF A PROJECT OR ABOUT A PROPOSAL OF A NEW BOOKBOOK

This second project of Econophysics had the next proposed title *"EVOLUTION AND IMPACT OF ECONOPHYSICS & SOCIOPHYSICS"* and as subtitle **"Econophysics, Sociophysics & other inter-, trans-, and (multi)sciences, based on physical models".** The editor remained *Gheorghe Săvoiu,* the same editor as in the first one and the initial list of contributors included *Radu Chişleag, Ioana-Roxana Chişleag Losada, Mircea Gligor,* *Constantin Andronache, Ion Iorga Simăn, and Gheorghe Săvoiu.*

2. BRIEF DESCRIPTION OF PROJECT'S SCOPE AND CONTENT

This book is intended as a sequel to the scientific undertaking of the first volume titled *Econophysics: Background and Applications in Economics, Finance, and Sociophysics*, published by Academic Press, Elsevier Publishers, in 2012 [1], presenting the results of the activity of a number of Romanian researchers, with an interest in multi-, trans- and interdisciplinarity, grouped around the international workshop **E**xploratory **D**omains of **E**conophysics. **N**ews (EDEN), which is held annually at the University in Piteşti, Romania. Because Elsevier did not accept more than one project I send this second project to Palgrave (sometimes in real life a change is better than I think). This second independent book continues the specific approach to multi-, trans- and interdisciplinary sciences, based on characteristic scenarios and models (e.g. Econophysics, Sociophysics, Quantum economics, Demographysics, Socio-optics, born from the apparently isolated knowledge of classical sciences such as Economics, Sociology, Demography, Optics, Physics and extended through physical models into new or beyond unknown frontiers). Multi-, trans- and interdisciplinarity approaches apparently have a common origin, and define characteristic forms of the antonym of unidisciplinarity, or knowledge acquired by means of a single discipline.
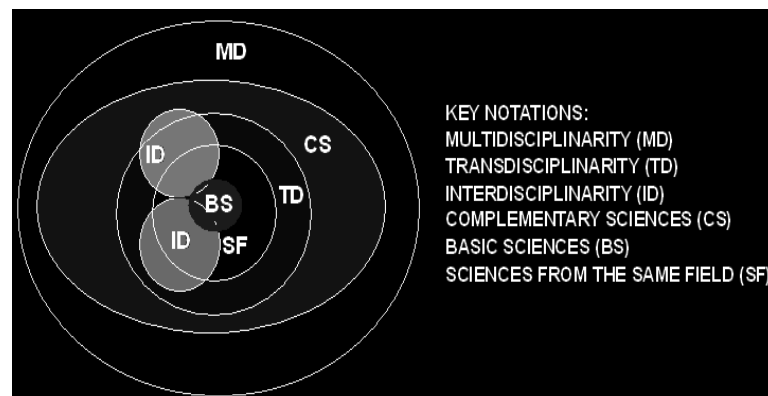

Fig. 1 Inter-, trans-, and multidisciplinarity in the universe of sciences

In its open meaning, with no claim of completeness, *unidisciplinarity* represents turning to account the concepts, variables, methods, theory and models of a single science, defining an early stage of knowing and understanding reality.

Having recourse to a single scientific type of thinking (*unidisciplinarity*) rarely occurs in practically solving complex problems; the unidisciplinary model built from the dominant thinking of one discipline is less and less capable of providing a sufficiently comprehensive scientific knowledge in modern science and scientific research. While sciences or scientific disciplines may share an increasingly common field as a result of multi-, trans- and interdisciplinarity, specifically from respect for various knowledge and several intellectual inquiries, not only the differences between them become more and more vast, but also the common intersected areas are expanded

Traditional philosophers' minds have often had a native inclination for creating a unified theory of reality and knowledge, and this means a passion for multidisciplinarity; likewise, the researchers' minds had real inclination for plurality and a leaning to trans- and interdsciplinarity.

How can one balance the usual or traditional philosophers' minds and the researcher's minds in the contemporary scientific approach?

Therefore, this book, as the second one written by the members of the group of the international workshop EDEN, offers a different approach from the classical one, based on physics, models, methods and theory, needed for a better understanding of the more complex reality from economical and sociological phenomena. The book also presents new scientific concepts and fields like Quantum economics, Demographysics, Socio-optics, etc., and new models and solutions for the changing reality, and the key points necessary for a better knowledge approach are somehow supported – and expressed in pragmatic models and methods, by examples, case studies and prospective aspects.

This new approach will distinguish this book from other publications, textbooks and academic journal articles. In order to reach a large audience, and to address key policies in educational systems issues in academic institutions, as well as highlighting how multi-, trans, and interdisciplinarity based on physics models and thinking relate to systemic knowledge and global world issues, the book is written in multi-scientific language, harmonized by one member of EDEN workshop's team, specializing in philology, lexicography, etymology and scientific language. Despite the need for audience the clarity and rigour cannot avoid scientific explanations, ranging from methods to models, from laws to algorithms. The old project of this second book was drafted per chapters in proportion of 60%, and the book could be edited within 10-12 months (the following

structure of the new book being ready eight years ago).

3. PROPOSED CONTENTS

The periodical meeting of the multidisciplinary group of academic professors and researchers, capable, during the workshops EDEN, of making up a first significant nucleus of an academic orientation in Romania towards the new scientific universes of the 21st century (from the universe of classical economics or physics to that of the "*statistical and quantum econo-, socio- and bio-physics*" or to that centred on the theory of the "*networks and cords*", etc.), has resulted in several potentially significant outcomes; the expansion of the latter, but from contradicting, confirms the general expansion of the multi-, trans- and interdisciplinary universes in today's disciplinary and scientific multiverse. (For EDEN or Romanian School of Econophysics Sociophysics, and see: http://www.eoht.info/page/Romanian+school+of+physical+socioeconomics).

3.A. THE FIRST PART
THE MODERN MULTIVERSE OF INTER-, TRANS-, AND MULTISCIENCES, BASED ON PHYSICAL MODELS

Chapter 1
Author: Gheorghe Săvoiu
MODERN INTER-, TRANS-, AND MULTI-SCIENCES AND THE SPECIFIC TAXONOMY IN THE MULTIVERSE OF SCIENCES

The first chapter describes not only the contemporary relations between economics and physics, but also between many, many other sciences, or more correctly scientific Universes, in a so-called "Multiverse" of disciplines in the field of contemporary scientific research. The idea of a multi-, trans- and interdisciplinarity fields, resulting from the reunited universes of Econophysics, Sociophysics, Quantum Economics, Demographysics, etc. is a normal consequence of the development of inter-, trans- and multi-disciplinary thinking during the XXth century and especially in the next one. The definitional issues of this new disciplinary Multiverse are detailed against a short historical background of teaching and researching physics about the Universe. Two special examples about Multiverse as a synthesis, or a reunion of universes of multi-, trans- and interdisciplinarities, are detailed through the work of two scientific researchers in the field of mathematics and history of logics field, Dan Barbilian & Ştefan Odobleja, and Anton Dumitriu some important ideas from their books and papers are described in the lines of this chapter. Any of the science's conceptualizations focused on four

significant elements, variables of a specific reality, as well as characteristic and distinctive methods, theory and models. The beginnings of taxonomy in the Universe of sciences and finally in the Multiverse of sciences, and its rigorous development, emphasizing the role of three moments, books and personalities, are the subject of the first chapter. The second section describes the context of the new century, in which multi-, trans-, and interdisciplinarity are amply increasing, exponentially developing the universe of scientific research, generating new and original approaches through new sciences and derived disciplines. In the third section, arguing the need for principledly and adaptively rethinking the classification of sciences, two taxonomy alternatives are presented, which are graphically called "iterative" and "symmetrical, or mirror", as alternatives to the current situation. Some final remarks emphasize the importance of the creative approach in trying to adapt to a more dynamic reality resulting from the multiple requirements of inter-, trans-, and multi-disciplinary as well as inter-, trans- and multi-scientific researches [2-3].

Keywords: Universe, Multiverse, Sociophysics, Quantum Physics, Quantum Economics, Demographysics, scientific research, science, taxonomy, inter-, trans- and multidisciplinarity, iterative and symmetric taxonomy.

Chapter 2
Author: Gheorghe Săvoiu
VARIABLES IN THE SPECIFIC THOUGHT OF INTER- TRANS-, AND MULTI-SCIENCES AND RESEARCHES: THE IMPORTANCE OF EPSILON

Contemporary variables are more and more involved into multi-, trans- and interdisciplinary thinking and research. This chapter aims to highlight the importance of variation paradigm in modern scientific research, using a process of passing relatively easy from changing levels, to variability, and finally to variables (underlying the importance of epsilon). The chapter describes some of the major characteristic variables in physics, economics, sociology, history, mathematics, statistics, demography, etc. It emphasizes the importance of the first inter-, trans-, and multidisciplinary variable in econometrics, the residual variable, which is indeed an economic, statistical and mathematical variable at the same time, but also an innovative and historical explanation for reality, followed by other increasingly interesting variables from Econophysics, Sociophysics and other inter-, trans- and multidisciplinary sciences. Some final remarks about the new inter-, trans- and multidisciplinary context and the role of modern inter-, trans- and multidisciplinary research variables in this

investigation close, naturally and symmetrically, the circle of the scientific thought [4].

Keywords: Paradigm, variation process, variability, multidisciplinary, (residual) variable, epsilon.

Chapter 3
Author: Gheorghe Săvoiu
SOCIOPHYSICS & QUANTUM ECONOMICS

The contemporary economic reality could be more adequate for new Sociophysics and Quantum economics' models and methods. These new inter-, trans- and multidisciplinary thinking, research, and sciences are able to perform economical and social analysis, better than contemporary econometrics or economic statistics, sociology or social statistics, in general. Other aspects inside this second chapter are related to the significance of time concept in the contemporary Economics through Physics way of thinking and to the integration of the inter-, trans- and multi-disciplines thought into a better statistical evaluation of the Economic results. This could be also a consequence of the experience generated by the global crisis in the economic world. The author believe that new inter-, trans- and multi-sciences can solve the problem of a better coverage of economic realities, through more adequate and comprehensive methods and models. In addition to this main purpose, the paper could be a good explanation for a better understanding of the recessions [5-7].

Keywords: Sociophysics, Quantum economics, Macrorealism, Particle, Multidisciplinary sciences.

Chapter 4
Author: Gheorghe Săvoiu
DEMOGRAPHYSICS, DEMOGRASTATISTICS AND OTHER NEW INTER-, TRANS-, AND MULTI-SCIENCES OF DEMOGRAPHY

The demographic diversity is covered by traditional approaches with a lot of difficulties or based on the classical and unilateral point of view. This chapter confirms the need for alternative interpretation of the demographical processes through physics and various subsystems that compose the demographic phenomena, such as migration or natural movement of human populations. A rigorous scientific research of human population and of the global demographical system and can be conferred by the vision of integrative statistical physics, whose essential optical systems analysis is based on the premise that the properties do not reduce the amount of individuals as units (atoms, particles, etc.). The keystone of the construction of the systemic vision in Statistical Physics starts using the existing deviations and variations in the area of statistical units. The same physical thought transforms the human populations in the studied

objects and the system in interactions between subsystems using probabilistic or stochastic nature of the behavior units (as major components of the analyzed systems). The new approach of this chapter is based on statistical physics and demography (e.g. Demographysics as a reunion of the both sciences). As migration flows and natural movements represent the subsystems the of the human populations system, so on all of these reunion aspects between the demographical theory and physical models become comparable and sometimes even similar, to those conferred by physics to sociology or economics, which have defined during the last two decades the new sciences called Econophysics and Sociophysics, and more recently Demographysics and Demograstatistics. Nowadays, and especially in the very next future Demographysics and Demograstatistics may come to life because of the new instruments and models applied to explain social and demographical phenomena, in spite of classic Demography relying on the duality particle-wave which seems convenient to model relationships among society and its members. Thus, it is a stimulating approach for this new science entitled Demographysics and Demograstatistics, to model social and even everyday life phenomena [8-11].

Keywords: *Statistical Physics, Demography, Demographysics, Demograstatistics, physical models, demographical & demographysical models*

3.B. THE SECOND PART
ECONO-, & SOCIOPHYSICS' APROACHES AND CONTEMPORARY IMPACT, BASED ON THE RIGOUR OF THE PHYSICAL MODELS (ECONO- AND SOCIOPHYSICS APPLIED)

Chapter 5
Author: Mircea Gligor
MAPPING MACROECONOMIC TIME SERIES INTO WEIGHTED NETWORKS

The correlations between GDP/capita growth rates of 27 European countries are scanned in various moving time window sizes. The square averaged correlation coefficients are taken as the link weights for a network having the countries as vertices. The network average degree and the weight set variance are found to be monotonic functions on the time window size. The statistics of the weight distributions as well as the adjacency matrix eigensystem are discussed. A new measure of the so called country overlapping is proposed and applied to the network. The ties and clusters are better emphasized through a threshold analysis. The derived clustering structure is found to confirm intuitive or empirical aspects, like the convergence clubs i.e. have a remarkable consistency with the results reported in the actual economic literature [12]. **Keywords:** *Fluctuations, correlations, network, clusters.*

Chapter 6
Authors: Radu Chişleag & Ioana-Roxana Chişleag Losada
SOCIAL COMMITMENTS OF THE SCIENTISTS, PHYSICS AND CORRUPTION

Physics may offer powerful tools to be used by socially committed scientists to model social, political and economic phenomena, among them corruption. The word corruption was used in Physics and Philosophy, in Antiquity, to describe an alteration of the actual motion (behaviour) of a body, with respect to that expected to be, due to the physical law applicable. The alterations of the actual motions of bodies have been explained by physicists by using Physics models. The authors have used Physics models to find characteristics of social corruption, characteristics which are exposed in this chapter. A few simple Classical Physics models are introduced in the paper - the three Newton laws, conservation laws, dimensional homogeneity, and the basics of the processing of data. These models are being used by the authors to explain some classical or contemporary examples of social and economic corruption, and may be used by socially committed scientists to identify and understood corruption, possibly suggesting how to fight and forecast concrete cases of corruption, models being applicable to explain many other everyday life phenomena [13-14].

Keywords: *Corruption, fraud on law, physics models, action and reaction, inertia, proportionality, conservation principles, dimensional calculus, dimensional homogeneity, error estimation, Sociophysics, Socio-optics.*

Chapter 7
Author: Mircea Gligor
STATISTICAL PROPERTIES OF WEIGHTED MACROECONOMIC NETWORKS

The properties of the weighted networks are investigated using some statistical physics tools, taking into account the statistical ensemble of the networks with fixed number of vertices. As application, the correlations between GDP/capita time series are investigated in various time windows, over the time interval 1993-2008. The target group of countries is the 27 EU members in 2008. The mean correlation coefficients are attached to the edges of a fully connected weighted network having the countries as nodes. Particularly, the concept of entropy, based on the probability of one particular realisation from the statistical ensemble, may yield some more information about the structure, stability and evolution of the EU country clusters. [15].

Keywords: *Network, clusters, free energy, entropy.*

Chapter 8
Author: Mircea Gligor
STATISTICAL PROPERTIES OF SMALL WORLD NETWORKS

Some of the most significant points in the study of the „small world" (SW) effect are briefly reviewed in the first section of this chapter, starting from the Milgram's sociological experiment, the paradigm of the „six degrees of separation", and the Watts and Strogatz' model. Based on interviews and questionnaires we found that the pupils network, in a school with about 1,000 pupils is a SW network with a mean degree of separation between 2 and 3. The problem is important taking into account that the spread of news, jokes, fashions, rumour, as well as epidemics, all take place by contact between individuals, far faster over a social network in which the average degree of separation is small than it can over one in which the average degree is e.g. 25. The third section is theoretical. The statistical ensemble of networks with fixed number of vertices was constructed and analyzed. A probability has been assigned to each two-individual connection by random attachment mechanism, and the corresponding partition function was built. The basic thermodynamic quantities, namely entropy, free energy, average energy per link and thermal susceptibility have been defined using the partition function. The variation of the thermodynamic quantities have been investigated during a thinking process of network deconstruction, which consist of removing the vertices one by one, in decreasing and, respectively, increasing order of the overlapping coefficients. Some evidences for critical points have been found, the corresponding phase transitions being generated by removing several special vertices from the system [16].*

Keywords: *Small-world network, minimal path length, clustering coefficient, phase transition*

3.C. THE THIRD PART
THE TIME-SPACE IN ECONO- AND SOCIOPHYSICS AND THE FUTURE OF THE MULTI-, TRANS-, AND INTER-SCIENCES

Chapter 9
Author: Gheorghe Săvoiu
THE CONCEPT OF TIME-SPACE IN THE PHYSICAL THOUGHT AND THE INFLATION-UNEMPLOYMENT CONCEPT, IN ECONO-PHYSICS AND SOCIOPHYSICS

The concept of time in physics has evolved from the statutes of absolute time to that of a space-time object, omnipresent and exclusive, in the generalized theory of relativity. Physical thinking has attracted under its influence imaginary time as well, decomposing it in three senses: the entropic sense, the psychological sense, and the cosmological sense. Physical thinking has personalized itself within a space of the expanding universe, and the analogy with the economic phenomenon, particularly with inflation, is only natural. From the analytical overlapping of the concepts there emerge similarities between the space-time of the theory of relativity, and economic space-time, named here as Inflation-Unemployment concept. Which are the similarities of physical and economic thinking about time and inflation, space and unemployment? An attempt to define what is the meaning of time, time series, indices time series and physical correspondences a brief historical background of a hundred years of inflation in Romania, some significant graphical resemblances, together with the specific method used in physics to analyze economic data and economic processes and finally a short review of major results and new domains in refereed literature are the principal themes or the major content of this paper, which remains nothing else but a modest contribution for starting a debate about the concept of space-time in physics as a remarkable start point inflation-unemployment analysis [17].*

Keywords: *Time, Space-Time Object, Imaginary Time, Entropic Time, Psychological and Cosmological Time, Time Series, Indices of Inflation, Inflation-Unemployment concept, Equilibrium of Development, Non-equilibrium of contraction.*

Chapter 10
Author: Gheorghe Săvoiu
THE FUTURE MULTIVERSE OF INTER-, TRANS-, AND MULTI-SCIENCES OR DISCIPLINES IN ACADEMIC EDUCATION & SCIENTIFIC RESEARCH

The final chapter emphasizes the importance of the creative approach in trying to adapt to a more dynamic and complex reality resulting from the multiple requirements of multi-, trans-, and interdisciplinarity as well as inter-sciences or inter-researches. As multi-, trans- and interdisciplinarity grow more complex, it represents a unique opportunity for new sciences but also for multi-, trans- and interdisciplinary dialogues and discourses, where a lot of pseudo-militaristic and geopolitical metaphors have been used, either to support or to neglect their impact. Scientific knowledge has sometimes been treated like a geographic territory, over which one can fight and others can make peace, but all of them need a modern solutions of surviving and expand knowledge. The more abstract the new sciences appear to be, the best solution to be understood remains not the highly abstract concepts of their specific knowledge, but a common language that can make these sciences and scientific disciplines

look more tangible. Foucault's assertion that "taxonomy must be more than an intersection of words and things", and become actually the "History of Systems of Thought" (Foucault, 1970), and the readiness of its changes should be similar to demographical records, in the sense of almost "instantly" capturing the birth of the new sciences in areas of multi-, trans- and interdisciplinary impact, at the level of the life cycle of modern science. It is also imperative that the road from science to scientific disciplines should be ever shorter, as a major impact in the expansion of the scientific universes and the quality of modern multiverse [18-19].

Keywords: *Science life cycle, discipline life cycle, future of science, scientology.*

Speaking about market and competition inside any publishing universe, the major prospective readers could include undergraduate students, bachelors, MA students, PhD students, professional researchers and academic teachers (physics, economics, sociology, behavioural sciences, law, demography, etc). A secondary market could be also any other association or group of specialists and analysts from the economic (especially banking and financial) and social environment who watch more profoundly the socio economic, behavioural, econophysics and social phenomena.

A comparative list of books or, rather, a small enumeration of some books that this project could try to resemble in the editor's opinion could include the following landmarks (including author, title and publisher):

[20]. Chatterjee, A. Saha Institute of Nuclear Physics, Kolkata, India; B.K. Chakrabarti, Saha Institute of Nuclear Physics, Kolkata, India (Eds.), *Econophysics of Markets and Business Networks*, 2007. XII 266 pages (New Economic Windows) Geb. ISBN 978-88-470-0664-5 as a *book reviewing the modern Econophysics researches in the structure and functioning of the complex financial network systems.*

[21]. Takayasu, H. *Practical Fruits of Econophysics: Proceedings of The Third Nikkei Econophysics Symposium*, Springer, 2006, 390 pages ISBN 4431289143, 9784431289142 *as proceedings of the Third Nikkei Econophysics Symposium, "Business Models in the 21st Century - Risk Management and Expectations for Econophysics," held in Tokyo in November 2004, including cutting-edge researches on the practical application of Econophysics and covering many topics from the predictability of markets, the analysis of rare events, to he mechanism of crashes markets' correlation, wealth distribution, and network structures in economics, etc..*

[22]. Chakrabarti, B. K., Anirban Chakraborti, A.; Chatterjee, A., *Econophysics and sociophysics: trends and perspectives,* Weinheim: Wiley-VCH,

2006. ISBN-10: 3527406700 ISBN-13: 978-3527406708, 648 pages as a *book intending to provide the reader with updated reviews on such major developments in both Econophysics and Sociophysics, by leading experts in the respective fields and providing a panoramic view of these developments in the last decades.*

[23]. Galam, S. *Sociophysics: a physicist's modeling of psycho-political phenomena,* New York: Springer, 2012 as a book trying to *explain why and how humans behave much like atoms, at least in some aspects of their collective lives, and then proposes how this knowledge can serve as a unique key to a dramatic leap forwards in achieving more social freedom in the real worldand also for a better comprehending of the richness and potential of our social interaction, and so distancing ourselves from inanimate atoms.*

[24]. Arnopoulos, P. *Sociophysics: Cosmos And Chaos In Nature And Culture* Nova Science Pub Inc (March 2005), ISBN-10: 1590339673 ISBN-13: 978-1590339671, 257 pages, *having a holistic scope in making it an appropriate reference work in many courses, such as: Global Ecology; Evolutionary Biology; Macroeconomics; Sociological Theory; Philosophy of Social Science; Theoretical Physics; Thermodynamics; Macrohistory; Behavioural Science; General Systems Theory; and, Inter-, Cros-, Trans- and Multy disciplinary Studies.*

The project means 160 pages ± 20% and it requires maximum 20-30 graphs/charts, 20-30 tables and 4-5 illustrations etc.

4. A FINAL REMARK

Any project is exposed to initial waste, but also to reductionism and final synthesis, and this book cannot be an exception to the rule. The enthusiasm of the author of the article has decreased over time, with the passing of the years and the role of this approach is to identify the existence of any journalistic interest or at least a ray of curiosity...

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Research: The Importance of Epsilon, *ESMSJ*, vol. 2 (2) pp. 29-35.

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