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APPEARANCE AND ESSENCE IN SCIENTIFIC RESEARCH, AND ABOUT FALSE HYPOTHESES

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Abstract. *Appearance and lack of depth can be found in many contemporary researches, which can be found in such papers being published even in prestigious journals. Inter-, trans- and multidisciplinarity in investigative approaches can sometimes be the occasion for such researches. This paper presents the case of the famous Sokal practical ironic joke, i.e. the article published by Trinh Xuan Thuan, a researcher at the Astrophysics Institute in Paris, and also a professor at Virginia University. The article exemplifies the false hypothesis and its impact on babies' health in pediatric or medical research, using the case of a study published in The Lancet, a medical journal, in 1998, by the researcher Andrew Wakefield. Wakefield's major error was a false hypothesis, completely made up and describing a close connection or link between autism and vaccines and it causes serious and problematic effects and it made sicker all the young people.*

Key words: *scientific research, scientific irony, false link or connection, false hypothesis,scientific appearance and essence.*

1. INTRODUCTION

This paper describes two fundamental errors with difficult or maybe the worst impact in researches, researchers' career and society as a final destination of any kind of scientific approaches: Sokal case and paper and Wakefield's false link between autism and vaccines.

These two cases become virtually special in that, to a lesser or greater extent, they are to be found in many researches currently published in the present world (so varied in point of both thematic range and manner of formulating the investigative hypotheses) of the testing methods or models, followed by validation or invalidation, and especially as forms of writing and publishing scientific research..

2. THE SOKAL CASE AND ITS CONTEMPORARY IMPACT

Somewhere behind Sokal case, there are some important consequences, which deserve to be well-known and the similar practices, partial investigated, and characteristic to a significant minority of young teachers and researchers in their attempts to publish papers in prestigious journals using all the necessary and unnecessary solutions, deontological or not.

Who was the real Sokal and what really means Sokal case for world research in modern times? Behind Sokal there is an ironic but also a very good and talented researcher named Trịnh Xuân Thuận and the final impact poses another question regarding the difference between the profound and the formal researches, and thus it delimitates the appearance from the essence in any type of research corresponding to different domains and their specific journal, peer review processes, peer reviewers, eligibility of the research papers, editors opinions and expertise, and finally of the accepted papers to be published even in the prestigious journals.

First of all a few words about this remarkable and ironic researcher Trịnh Xuân Thuận are necessary to be known by the readers. He was born on 20th August 1948, being now a well-known Vietnamese-American astrophysicist, and he was born in Hanoi, Vietnam. He completed his B.S. at the California Institute of Technology, his Ph.D. at Princeton University and he has taught astronomy at the University of Virginia, where he is a professor, since 1976. Trịnh Xuân Thuận is Research Associate at the Institut d'Astrophysique de Paris, being also a founding member of the International Society for Science and Religion and his areas of interest are extragalactic astronomy and galaxy formation, a lot of his researches being focused on the evolution of galaxies and the chemical composition of the universe, and on compact blue-dwarf galaxies (*The Birth of the Universe* in 1993. *The Secret Melody in* 1994, *Chaos and Harmony* in 2000, *The Quantum and the Lotus* (with Matthieu Ricard as co-author in 2001). One of the most appreciated books was *Le Cosmos et le Lotus, les confesions d'un astrophysicien* (2011), and he published together with Jean Bricmont during the same year *Pseudosciences et postmodernisme: Adversaires ou compagnons de route?*analysing the postmodernism sindrome in scientific research too. Thuận was the recipient of UNESCO's Kalinga Prize in 2009 for his work in popularizing science, and also the Kalinga chair award at the 99th Indian Science Congress at Bhubaneswar. In 2012, he was awarded the Prix mondial Cino Del Duca from the Institut de France. This prize recognizes authors whose work [1,2,3,4], literary or scientific constitutes a message of modern humanism (http://en.wikipedia.org/ wiki/Trinh_Xuan_Thuan).

The appearance or just the formalism of writing, accomplished in a research, typical of an increasing number of papers written solely for the purpose of publication in prestigious journals so as to gain more visibility for the authors in the world of modern research, makes this type of article unable to reach, or else likely to quickly lose, even if it managed to reach a minimum level of citation, sometimes even the meaning of essential researches, which encroached even into the modern so-called soft sciences inspired sometimes by hard sciences, underlines the American physicist Alan Sokal, beyond the case itself. In fact, Alan Sokal, a name used to be nothing else than an alias for Trịnh Xuân Thuận, from New York University to be more credible, closely observing the debates on the nature of science, dealt a blow to more and more theories lacking depth, while also warning on the danger of expanding apparent, shallow research (1996, *Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity*), a parody

paper *written* in a hermetical style, *baptized* by the author in that splendid manner of writing titles in the all-and-nothing way of thinking, abounding in so many cases of*scientific nonsense*, and buried into the *baroque wording of involved idiom*, ready to be apparently scientific to a novice reader, and publishedin the journal of cultural studies *Social Text*[5].

Sokal's paper is a practical joke or "*an act of intellectual salubrity*", which logically leads to a necessary end, through which a truth of scientific research is revealed under the premise that the laws of nature discovered by scientists are mere psychological, sociological and, finally, even cultural constructs delimited by social and individual capacity of understand the reality, then, *any scientific theory is suspicious because it is necessarily ridden with racism, sexism, capitalism, colonialism, militarism, and other imaginable isms.* [6]

The practical joke was exposed by Sokal, in a second article published in a different journal in *Lingua Franca*, where he explained his aim was to denounce the lack of scientific rigour of researchers preaching cultural relativism, who misuse scientific concepts, images and metaphors borrowed from "*pure*" sciences, such as physics or mathematics, mishandled and poorly assimilated, and so the result is opposing scientific meanings, which darken rather than illuminating scientific research (relativity, quantum mechanics, chaos theory or Godel's theory are cited by postmodernists as having deep political, social and culturalimplications).

The text of the paper was premeditatedly full of nonsense, but the editorial staff of Social Textpublished it without as much as asking approval by an expert in quantum physics, since it was in agreement with their own ideological bias.On the contrary, they persist in their attachment to the dogma imposed by the Enlightenment on Western intellectual thought, which can be summarized as follows: there is an outer world, whose properties are independent of the human being.And, really, of all of human kind; these properties are encoded in "*eternal*" physical laws; humans can acquire a poor, imperfect and provisional knowledge of those laws by applying "*objective*" procedures and epistemological rules prescribed by what is called "*the scientific method.*"

Some excerpts from Sokal's paper can reveal the full dimension of nonsense and the lack of utility of such a paper,which was written by the author deliberately with the purpose of warning about a potential invasion of inter-, trans-, and multidisciplinary scientific researches that are absolutely non-scientific according to their contribution to the development of a truly holistic research.

"Here my aim is to carry these deep analyses one step farther, by taking account of recent developments in quantum gravity: the emerging branch of physics in which Heisenberg's quantum mechanics and Einstein's general relativity are at once synthesized and superseded. In quantum gravity, as we shall see, the space-time manifold ceases to exist as an objective physical reality; geometry becomes relational and contextual; and the foundational conceptual categories of prior science – among them, existence itself – become problematized and relativized. This conceptual revolution, I will argue, has profound implications for the content of a future postmodern and liberatory science". [5, p. 2]

Scientific discernment, defined as perception of the difference between the good and the evil generated by their own assumptions, methods, models and results on the future research is completely crippled by the formalism of apparent and superficial approaches, whose sole purpose is ensuring visibility. The initial support given by the prestige of some journals or publications finally brings research itself into a shaded cone or into a field of the total drift of meanings and ambiguous approaches to reality.Writing that goes along the sole way of publication according to the criterion of selection and in relation only to the hierarchy of publications, may ultimately lead to an extreme situation, where people who are not worthy of scientific respect will be respected. That is why Trịnh Xuân Thuận's warning is real, and the Sokal case materializes it with the sharpness of successful experiments. [7].

Finally, the content of any science is profoundly constrained by the language in which its discourses are formulated; and mainstream Western physical science has, since Galileo, been formulated in the language of mathematics. But whose mathematics? The question is a fundamental one, for, as Aronowitz has observed, "neither logic nor mathematics escapes the contamination' of the social"… [5, pp.11 -12]

Everything looks like a syllogism full of nonsense, if someone could describe a syllogism in the following manner:

A.Physics is a great science:
16-5 equivalent (4 * 4) + (5 * 1)

B. Statistics is universally applicable:
7+4 equivalent (2 * 3 +1) + (2 * 1 +2)

C. So, physics is statistics
16-5 equivalent 7 + 4

An example of a false syllogism, nourished by apparent correctness, which does not represent a correct and logical attitude, can change the entire significance of the scientific language in general. The verb to be signifies anything else not a value of equivalence, in this case…And everything becomes phony and incorrect. Statistical physics does exist, but it brings together three disciplines of theoretical physics, related by their subject, but different by the methods they use: thermodynamics, statistical mechanics and kinetic theory…

3. WAKEFIELD'SHYPOTHESIS AND ITS PROFOUND NEGATIVE IMPACT

Another aim of this article is to exemplify the false or invalidhypothesis on the topics of medical research, using a similar case of a study published in The Lancet, a medical journal, in 1998, by the researcher Andrew Wakefield. This study also generates a difficult problem for scientific research and its impact was indeed a major and negative one. Wakefield's major error was an untrue hypothesis, completely made up and describing a close connection or link between autism and vaccines and it causes serious, problematic and disastrous effects and it made sicker all the young people [8]. The background of the paper is an investigation of a consecutive series of children with chronic enterocolitis and regressive developmental disordered assumption is the untrue hypothesis, completely made up of the close correlation between autism and vaccines. The major method was he study of a sample of 12 children (mean age 6 years [range 3–10], 11 boys) were the author referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including

language, together with diarrhoea and abdominal pain. The so called essential findings reveal the interpretation of a set of data about behavioural disorders included *autism* (*nine children),* disintegrative psychosis (one), and possible postviral or vaccinal encephalitis (two), and thus the paper have identified a possible association in time between autism and vaccines.Wakefield bad conducted invasive investigationon the children without obtaining the necessary ethical clearances ... picked and chose data that suited their case and finally the authors have falsified facts if you read the addendum: *Up to Jan 28, further 40 patients have been assessed; 39 with the syndrome.*[8, p. 640].

In 1999 a study of 500 children found no link, in 2001 another one using a bigger sample of 10.000 children also found no connection. The research has spread during the next year, in 2002, to Denmark and Finland on much larger samples of 537.000 and 535.000 children and once again found no connection. A reviewof31 studies covering an entire statistical population, more than 10.000.000 children, also found no link between autism and vaccines. *Another review of27cohort, realized in 2012, including 17 case studies, 6 controlled case studies, 5 time series trials, 2 ecological studies, 1 case cross-covering trial covered over 14.700.000 children [9].*

In the meantime, false Wakefield's hypothesis generates the wrong idea that vaccines are the real cause of the autism *(e.g. 1/4 of US parents believe that even today). The medical reality shows in 2013 that vaccines have saved 8 million babies in the entire world…*

The young scientists, researchers or teachers who are genuinely *inter-*, *trans-*, and *multidisciplinary* may have difficulties in formulating hypothesis but it is deontological or ethical forbidden to chose data using subjective selection that suited their hypothesis and finally the to falsify facts and realities

The degree of reality coverage possible by using *inter-, trans-, multi-, and cross-disciplinary* methods and models increases significantly in contemporary academic research and education, connected with a number of interdependences between science, culture and ethics, underlying the classical and obsolete tendency of isolation in mono- or unique discipline methods and models [10]. The new culture and ethics of *inter-, trans-, multidisciplinary* research remain some practical and minimal conditions, in that sense, of a realistic research and valuable impact at the same time.

4. SOME FINAL REMARKS

In conclusion, the modern research demands of strong sense of correctness and professionalism not only in specific knowledge domains but also confidence and deontological attitude in research within *inter-, trans-, and multidisciplinary investigations*, and it is up to the young research team members to respect not only the real sense of scientific language and the realistic formulating of the hypothesis, but also the validation of the final models, and even the reality of findings or results, etc. The *inter-, trans-, and multidisciplinary* research did not need as priority formal visibility or appearance, but especially ethics and reproducible sense of scientific language and principles and reliable criteria to formulate hypothesis in an impeccable manner.

In our opinion the major causes of superficiality and lack of depth in contemporary research are:
1. lack of involvement in research teams of a trans-, inter-, cross- and multidisciplinary type, applying to researchers (from students, assistants, and MA students to professors) ;
2. lack of trans-, inter-, cross- and multidisciplinary expertise of the researchers;
3. the separate, one-disciplinary academic discourse ;
4. the separate, one-disciplinary validation of theories and models in universities;
5. academic education dominated by the obsolete one-disciplinary model;
6. lack of trans-, inter-, cross- and multidisciplinary courses of lectures, and teaching academic teams ;
s7. lack of trans-, inter-, cross- and multidisciplinary education for students and MA students.

Ethical and deontological elements of any kind of research cannot include manipulation of the words and phrases that are, in fact, meaningless, all the research attitudes must not import concepts from natural sciences into the humanities without the slightest justification, and without providing any rationale for their use or display superficialeruditionby shamelessly throwing around technical terms where they are irrelevant, presumably to impress and intimidate the non-specialist readernot to use scientific or pseudoscientific terminology without bothering much about what these words mean [11,12] and a good career is revealed from the rigor and language as well as from professionalism and research competence.

The Sokal experiment, the Sokal affair, or the Sokal case revealed a phenomenon concerning the attempt to endow with absolute value the relative that is ubiquitous in contemporary culture. Relativistic extremism exploits the specificity of the language of hard sciences and seeks to reduce the deviation from the soft sciences, drifting away from both classes of sciences, language being thus manipulated to say anything and "prove" anything. Contemporary research highlights a contrasting and contradictory development, playing between experimental or practice and poetics or speech, an untenable compromise between hard and soft sciences, between their methods, between their models, and mainly between their different language, as solutions of constructive-pragmatic and social-cultural representation. This is carried so far as proclaiming a "chasm" between scientists and the other intellectuals (Weinberg), as purely objective, a prerequisite for the birth and development of modern science, i.e. the rift between the world of physics and the world of culture is an objective reality. But Sokal relapses, publishing another book in 2011 (written in collaboration with Jean Bricmont) and titled „Pseudosciences et postmodernisme: Adversaires ou compagnons de route?
The practice of science constantly resumes and questions the value of enquiry and observation, the value of discussing, or the permanent contradiction of its own answers ... Rational and irrational, logical and illogical, matter and spirit, purpose and infinite continuity, order and disorder, pure chance and necessity, objective and subjective, etc. – here are increasingly used concepts based on a *classical* vision of reality, in disagreement with experiments and practice. In this way millions of articles and books can be written without however having knowledge, science or research

advance one millimeter. This dimension or type of research should be, relatively or currently, closed…

The authors believe that honesty and common sense together with simplicity, out of all the other qualities of a researcher, can have the greatest influence on his reputation.

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ORGANIZATIONAL AND SOCIAL NETWORK MEASURES AND RESEARCH CITATIONS

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Abstract. *A network describes a correlation between individuals and how can they achieve common aims together. Correlation between them depends of the strength of links and nodes. In the paper the results can be seen of research based on the citation analysis of authors, connections between them and networking with other authors. We used a database of the National Library of Serbia, covering papers published in indexed journals from 2010 to 2014. Results have shown a positive correlation between the number of author's first neighbours and the number of citations.*

Key words: *Network theory, Node degree, Authors, Researchers, Publishing, Scientific research, Citation, Collaboration, Paper, Article*

1. INTRODUCTION

The organization consists of units that are in constant interaction with one another, creating necessary links to achieve the set goals as well as similar interests for mutual assistance and support. Therefore, the organization is a network of units and connections created in a mutual interaction under the influence of external and internal influences with a goal to enable an organization to respond more efficiently to new demands of the environment. The result of these activities is a creation of networks that can be complex and simple depending on the participants. The structure of complex network determines the type of dynamics and stability of the network (Kolasa, 2005, Strogatz, 2001, Namba and Tanabe, 2010). Network organization consists of nodes. The nodes can be individuals, teams, organizational units or organizations and links that represent the mechanisms of control, coordination and control of the participants' activities and their roles and positions in the organization within a network. The correlation between them will directly depend on the strength of the connections between the nodes. However, not all the nodes and links are equally important for network functioning. The importance of the nodes is determined based on the connection parameters by which various aspects related to the position of the nodes are calculated (Scott, 1991, De Nooy, Mrvar and Batagelj, 2005). Strong links tend to connect individuals with the same or similar interests and to group them in clusters. Examples of such networks with strong connections are the relations between friends, relatives, neighbors (Erickson and Yancey, 1980, Lin, Ensel and Vaughn, 1981). According to the research by Granovetter M.S. (1973) strong connections play an important role in organizations so they need to be closely looked into.

2. LITERATURE REVIEW

The appearance of the theory is related to the roots of the theory of social psychology and inter-organizational theory. The network theory was originally applied to describe social relations between individuals. Recently, it has also been applied in modern theories of organization and strategic management, including some prominent studies that explore the structure of the organizations in the survey conducted by Almaas, Kulkarnir and Stroud (2002) and De Nooy, Mrvar and Batagelj, (2005).

Recent research shows that the structure of networks consists of parameters that are commonly used in research to understand the complex network structure:

- Degree distribution
- Average path length and diameter
- Clustering coefficient
- Centrality

Degree distribution

Degree distribution is oneof the most important components.Given thedirection withinthe network, three important parameters are the input level (number of connections toeach node), the output level (number of outgoing links) and the total (the total number of links). According to Ghosh, Banerjee, Sharma, Agarwal and Ganguly (2011) structure of a network (p(k)) is defined to be the path of nodes in the network with degree k. However, the degree distribution is often noisy and there are rarely enough nodes having high degrees to get good statistics in the tail of the distribution.

Averagepath length and diameter

Path length is defined as the average number of steps the shortest path takes to all possible nodes in the network. The shortest time is important in establishing and transmitting information in the organization, because it defines a small number of nodes and faster data transmission. Networks with shortest path length are more efficient than all the other networks of the organization.

Clustering coefficient

Clustering coefficient is a local measure used to describe a node group in a network representing one cluster (Almaas, Kulkarnir and Stroud, 2002). Grouping clusters in the network increase the probability that two randomly chosen neighbors are interconnected.

Centrality

Defining the relationship of the central nodes and links is a parameter used in complex organizations (Gonzalez Martin, Dalsgaard and Olesen, 2010). Node centrality concepts and measures help determine the importance of node in a network. Connection with the nodes is defined as a ratio of the shortest paths between the pairs. This parameter is used to specify a node that can have a crucial role as a mediator of the interaction between other nodes (Wambeke, Liuand and Hsiang 2012). Because of the importance of this parameter,

various centrality measures have been proposed over the years (Scott, 1991) such as degree centrality, closeness centrality and betweenness centrality. The degree centrality of node k (i.e.,p_k) is defined as follows:

$$C_D(p_K) = \sum_{i=1}^{n} a(p_i, p_k) \quad (1)$$

Where n is the number of nodes in the network and $a(p_i, p_k) = 1$ if and only if node i and k (i.e., p_i and p_k) are connected; $a(p_i, p_k) = 0$ otherwise.

Furthermore, nodes with high degree centrality could be identified as informal leaders of the group (Krackhardt, 2010).

Closeness centrality is defined by distance between nodes. According to Freeman L.C. (1979) closeness centrality of node k (i.e., p_k) is defined as follows:

$$C_{C(p_k)} = \sum_{i=1}^{n} \mathrm{d}(p_i, p_k)^{-1} \quad (2)$$

Where $d(p_i, p_k)$ is the shortest path linking p_i and p_k.

Betweenness centrality (BC) describes the importance of a node as a connector between different parts of the network (Freeman, 1979). Nodes with BC> 0 connect areas of the network that would otherwise be sparse or not connected at all (Newman, 2004).

More precisely, the betweenness of node k (i.e., p_k) is formulated as follows:

$$\mathrm{C}_{B(p_k)} = \sum_{i<j}^{n} \frac{g_{ij}(p_k)}{g_{ij}}; i \neq j \neq k \quad (3)$$

Where g_{ij} is the geodesic distance (shortest paths) linking p_i and p_j and $g_{ij}(p_k)$ is the geodesic distance linking p_i and p_j that contains pk. Nodes with high betweenness centrality play the role of a broker or gatekeeper to connect the nodes and sub-group.

The network theory has grown to be a very popular filed among the researchers all over the world. Researchers are committed to searching for appropriate network topology to capture the nature of complex networks (Ravasz and Brabasi, 2003, Buldryrev, Parshani, Stanley and Havlin, 2010).

3. PREVIOUS RESEARCH IN THE FIELD OF NETWORK THEORY

In Zhou, Irizarry and Qiming, (2014) research, the network theory is used to identify accident happening. They used network theory to investigate the complexity of subway construction accident network (SCAN). The five parameters including degree distribution, average path length and diameter, clustering coefficient and betweenness centrality were used to better understand and capture the structure of SCAN. Authors have concluded that an accident chain or network actually exists.

Another research in the field of network is based on collaboration networks by Abbasi, Hossain and Leydesdorff (2012). Their research analyzes whether preferential attachment in scientific co-authorship networks is different for authors with different forms of centrality. Using a complete database for the scientific specialty of research about “steel structures,” they showed that betweenness centrality of an existing node is a significantly better predictor of preferential attachment by new entrants than degree or closeness centrality. During the growth of a network, preferential attachment shifts from (local) degree centrality to betweenness centrality as a global measure. An interpretation of the supervisors of PhD projects and postdocs broker between new entrants and the already existing network, and thus become local to preferential attachment. Because of this mediation, scholarly networks can be expected to develop differently from networks which are predicated on preferential attachment to nodes with high degree centrality (Abbasi, Hossain and Leydesdorff, 2012).

4. SOCIAL NETWORK

Everything is connected in the world. According to this, the network theory started being used in safety management, among researchers, social networks etc. In academic world, scientific collaboration networks are a complex kind of social networks since the links between a number of authors (nodes) and co-authors are growing over time (Strogatz, 2001). Collaboration is defined as a group of people working together for a common goal sharing knowledge (Lin, Ensel and Vaughn, 1981). In the recent decades, modern science researchers have used methods to examine collaboration networks. Social network analysis has given many results regarding social influence, social groupings, inequality, disease propagation, communication of information and almost every topic that interested 20th century sociology (Newman, 2001).

Social networking has become one of the most important communication tools among people nowadays (Griffith and Liyanage, 2008). However, social networks exist on the Internet websites where millions of people share interests on certain disciplines, and make available to members of these networks various shared files and photos and videos, create blogs and send messages, and conduct real-time conversations.

These networks are described as social, because they allow communication with friends and colleagues study and strengthen the ties between members of these networks in the space of the Internet (Griffith and Liyanage, 2008, McNamara, Weininger and Lareau, 2013, Zaidieh, 2012). The most famous in the world of social networks are Facebook (Facebook.com) and Twitter (Twitter.com) and MySpace (myspace.com) and others Social networking sites (SNS) have infiltrated people’s daily life with amazing rapidity to become an important social platform for computer-mediated communication provides a new method of communicating, employing computers as a collaborative tool to accelerate group formation and escalate group scope and influence (Griffith and Liyanage, 2008, McNamara, Weininger and Lareau, 2013, Zaidieh, 2012).

Social networking is built on the idea of how people interact with each other. It gives people the power to share, making the world more open and connected.Nowadays, social networking has a vital influence on our lifes as it helps a lot in every field of life such as political field, economic field and educational field (McNamara, Weininger and Lareau, 2013, Zaidieh, 2012).

5. RESEARCH HYPOTHESIS AND METHODS

Research in this paper is based on the citation analysis of authors, connections between them and networking with

other authors. The database we used is the official report of the National Library of Serbia and it contained data for 2132 authors: authors' name, their published papers during the period 2010-2014 and number of citations per each paper. Due to poor structured data base, we had to adapt it to a form that corresponds to the software Cytoscape that we have used to create a network of authors. The final database contained an 1883 authors instead of 2132 of them. Cytoscape is an open source software platform for visualizing molecular interaction networks and biological pathways and integrating these networks with annotations, gene expression profiles and other state data. Although Cytoscape was originally designed for biological research, now it is a general platform for complex network analysis and visualization (Cytoscape consortium, 2014). Software Cytoscape was a logical choice for realization of this research, given the fact that this software creates network by interconnecting nodes. The network of authors was created by interconnecting authors who had joint published papers.

Taking into consideration the data, we had in our disposal and on basis of literature review, we have formulated following two hypotheses:

H1: There is a positive correlation between the number of author's first neighbours and the number of his/her citation.

H2: If the number of co-authors of an author increases by one unit, his/her citations will increase at least twice.

6. RESULTS AND DISCUSSION

The software created an undirected network of authors. An undirected network is type of network where direction between nodes is not defined. In order to increase the accuracy, we eliminated all duplicate edges and self-loops from the network, and then we got a network consisting of 1883 nodes and 2603 edges.

Figure 1 is a graphical representation of connectivity between authors. This network consists of 137 components. The biggest network is the major component that contains the largest number of related authors.

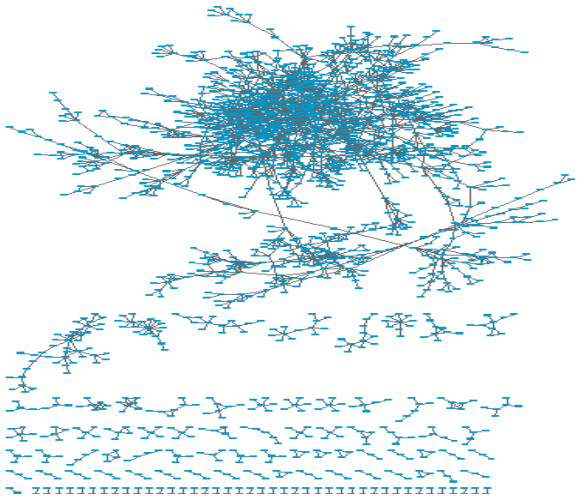

Fig. no. 1 Network of authors

Figure 2 presents the basic parameters of the network: the average number of neighbors in the network is 2.765 and also it can be seen that there is no self-loops and multi-edge node pairs.

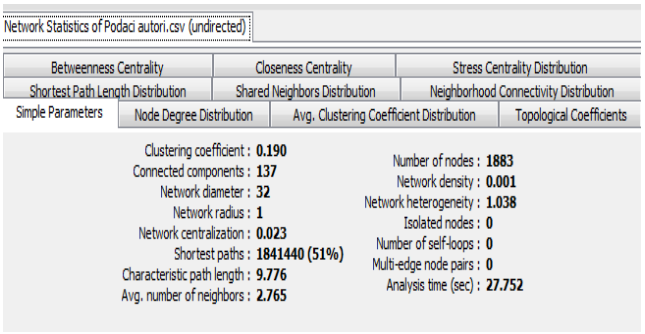

Fig. no. 2 Network parameters

Taking into consideration the sample size, we assumed that there is a normal distribution of results in both populations. According to this assumption, we were able to calculate the Pearson Correlation Coefficient and the results of this analysis are presented in Table 1.

		Number of citations	Number of co-authors
Number of citations	Pearson Correlation	1	**.324**
	Sig.(2-tailed)		.000
	N	1883	1883
Number of co-authors	Pearson Correlation	**.324**	1
	Sig.(2-tailed)	.000	
	N	1883	1883

Table no. 1: *Correlation between number of co-authors and number of citations*

The Correlation Coefficient is positive and its value is 0.324. When correlation coefficient is positive, that means that both variables are changing in the same direction. In our study, this means that if the number of co-authors of an author increases, then its citation increases too, or if the number of co-authors decreases, then decreases its citation too. The significance level is 0.000, which means that our results are statistically significant ($p<0.05$). Because of the fact that this correlation is statistically significant, it can be concluded that hypothesis H1 has been proved.

After we have proved a positive correlation between the number of co-authors and citations, we were able to take analysis of statistical linear regression. The purpose of this analysis is to calculate the level of increase in author's citations, on average, when the number of co-authors increases by one unit. The results are presented in Table 2.

The dependent variable is the number of citations and the independent variable is number of co-authors.

The value of non-standardized coefficient B is 2.52. This means that an increase of one point of independent variable - number of co-authors, corresponds to an increase of 2.52 points of number of citations, on average. This result is statistically significant, because the significance level is lower than 0.05 and we can conclude that hypothesis H2 has been proved too.

Model	Unstd. Coeff.		Std. coeff.	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.192	.677		-1.760	.079
Number of co-authors	2.527	.170	.324	14.874	.000

Table no. 2:*Linear regression*

5. CONCLUSION

Network theoryis becoming increasingly popular research field if we know the fact “on the world everything is connected and happens with the reason”. Organization or group is defined as a group of people working together and aiming to achieve a common goal. The aim of the network theory is to find connections between nodes in order to be done as efficiently as possible. Network theory is applied to describe the social cohesion between individuals. Social networks have become an important for communication between people. People have the opportunity to share information, opinions and attitudes and to be as much as possible connected together. If there is a strong connection between subjects the message will be sent as soon as possible and realise the target.

The importance of the nodes depends on parameters which are commonly used in research to understand complex network structure (degree distribution, average path length and diameter, clustering coefficient and centrality).

The study provided an overview of complex scientific co-authorship network. In our research we concluded that there is a positive correlation between the number of authors and citations. Our hypothesis show expected results.

This research will be used for the future research of scientific networks and analysis different parameters of cooperation between authors from research institution all over the world.

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FREQUENCY ANALYSIS OF THE USE OF A NUMBER OF MORPHOLOGICAL VARIANTS IN SCIENTIFIC LANGUAGE

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Abstract. *This paper presents a statistical study of morphological variants in scientific language. The major content represents the identification of the variants, and the frequency analysis of these variants. The essential source for the beginning of such an important and modern investigation is the Internet.*

Key words: *science, scientific research, scientific language, morphological variants, descriptive statistics, frequency analysis, Internet.*

1. INTRODUCTION

In any natural language, **usage** seems to be an unwritten law, a law which will ultimately have to be observed by the current generation – or the future generations… Unfortunately, usage is simultaneously (and more often than not) the source of blatant illegality. Moreover, usage seems to be (legitimately) the very opposite of *etymology*: "*When people object to the way a word has taken on a new meaning, they usually appeal to the word's history (or etymology) for support. The older meaning, it is said, is the 'correct' meaning. (…) It is fascinating to trace the changes in meaning which have taken place, but this should not lead us to condemn new senses, and to keep old senses artificially alive. Etymology is never a true guide to meaning. To believe the opposite is to engage in the 'etymological fallacy'*".[1]

So, in the natural evolution of a language, usage, alongside the "natural" linguistic law postulated by Saussure (the phonetic body of the words in a language tends to be degraded over the course of time), is the key factor.

2. MORPHOLOGICAL VARIANTS AND FREQUENCY AN ALYSIS IN SCIENTIFIC LANGUAGE

Statistical concepts are applicable (and provably very useful) in virtually all fields of research and types of scientific approaches; this idea can be hardly challenged. In linguistics, analyzing texts (or corpora) by means of statistical factors (recurrence, frequency, weight, etc.) has always been relevant, and sometimes even crucial. Numerous instances can be evoked when the contribution of statistical analysis applied to linguistics eventually made the difference between *life and death* (David Crystal mentions one such example in his book *The English Language*: someone accused of murder and nearly sentenced to death by hanging, was finally saved from the gallows after the jury corroborated the evidence with the linguistic and statistical / frequency analysis of the text of a letter wrongly attributed to him – where frequency of individual words and phrases was compared, to make up an overall style-and-language picture…).

As far as usage and its significance in standardizing language are concerned, two main tendencies have been confronting for the past centuries, at least in Europe: absolute *tolerance* vs. absolute *regulation*, but reality faces us with a virtual infinity of grayish shades. In some countries, regulatory permissiveness is the rule (e.g. in Denmark, where the official dictionary of the national language is updated and recast every two or three years, based on data collected from real speaking subjects – by adding or changing variants, be they morphological or phonetic), while countries like France (and, to a certain extent, Romania) illustrate the opposite tendency: academics are always right… In this respect, the case of language standardization in Britain can be said to be intermediary.

On the other hand, the linguist himself/herself must justify his/her mission as an *expert*: he/she is actually an informed, knowledgeable user of the language, and, at the same time, the authorized "co-author" of the standardized system of the literary / "accepted" language, a construct in constant evolution, in permanent construction. As a matter of fact, "cultivating", "grooming" the national language, and especially the scientific and technical variety of it, is by no means an end in itself, but a collectively useful pursuit, carried out for the common benefit: the closest comparison that comes to mind is growing a plant, and, moreover, trying to guide its growth, at least to a certain human extent. One of the best, most complex dictionaries in the English-speaking world is J. C. Wells'*Pronouncing Dictionary*, where the concern for studying and glossing the words of the English language in as objective a manner as possible, based on observation and generalization of a statistical type, is paramount. A magisterial work, a feat of scrupulous lexicography work and applied linguistics, this dictionary is quite admirable for the sheer seriousness and volume of work involved. (To give only a few concrete examples, the pronunciation of words like *grievous*, *anemone*, *hyperbole* is indicated together with a conventional sign warning against their common mispronunciations; similarly, terms like: *crescent* and *increase* are accompanied by meticulous, scientifically elaborated poll panels indicating actual preference for one of the respective variant pronunciations).

Comparison of language with a living *organism* (whereby language is likened to a living entity, usually a plant or animal – v. Humboldt, etc.) may sound nice and favourable, but it is rather risky, since the living world is, in fact, the realm of indeterminism *par excellence*, since it can imply abrupt changes or leaps, unmotivated shifts and modifications, inconsistencies, even *aberrations* (v. the definition of the term *aberration*:'an action or event that is different from what usually happens or what someone usually does' – *www.ldoceonline.com*) [3], etc.On the other hand, considering the evolution of language, one cannot but notice its systemic character. Saussure himself talked about the evolution of that system, highlighting the role of analogy, by dint of which local changes will ultimately lead to the overall alteration of the system – as many diachronic mutations in, subsequent to small, gradual accumulations along the axis of synchrony.

The present paper tries to capitalize on the constructive virtues of interdisciplinarity in harnessing statistics to linguistics analysis. It is virtually a study case relating to a batch of technical (i.e. 'learned', scientific) English words that exhibit certain structural inconsistencies, thereby posing problems for (both native and) non-native speakers of English.[3]The reason why the authors especially chose technical (or "specialized") terms, out of the quite substantial vocabulary of the corpus of learned words making up the vocabulary of modern sciences (i.e. the words of cultural relevance) may seem obvious. Anyway, the full explanation is that these words, which are supposed to belong to a lexicon segment definable, in stylistic terms, as (rather) "formal" vocabulary, i.e. an allegedly more "select" circle of terms, are comparably harder to affect by the deviations from the norm (which is most often determined etymologically, and sometimes demonstrably and analogically)… The logical inference would be that it would be normal for the use of language to have a more limited influence on them. (But is this the actual reality?)

The essential challenge for the present study is to analyze the (analogical) spreading or regular though non-etymological forms, which can show that regularization can be seen as tantamount to a (very natural) simplification of the morphological and phonematic components of the language systems. A secondary task is to study the alternative / variant spelling forms, an issue which, in the context, may prove almost as significant for (possible) generalizations in the sub-field investigated, and also demonstrating a certain attitude of the speakers towards the language, its use and evolution.

The mini-corpus that was subject to observation and analysis amounts to less than 25 items, all of which are terms belonging to the scientific/technical vocabulary of contemporary English, as shown in the table below. Two search engines were used: *Google* and *Ask*, and the corpora accessed were made up of academic writing on the net.[4]

Words (multiple plural forms)	**Google** search results	**Ask** search results	Observations
Apsides	96,300	8,330	
Apses	427,000	76,300	Relevant
Apsises	12,200	-	
Octopuses	651,000	225,000	Relevant
Octopodes	124,000	12,800	
Octopi	523,000	133,000	
Addenda	5,700,000	430,000	Relevant
Addendums	468,000	105,000	
Addendas	115,000	-	
Criteria	445,000,000	42,800,000	Relevant
Criterions	511,000	131,000	
Criterias	679,000	244,000	
Antennae	7,570,000	832,000	*Irrelevant – further search engines are needed (note+)*
Antennas	2,840,000	4,770,000	
Apexes	416,000	67,600	
Apices	607,000	193,000	Relevant
Apparatus	169,000,000	12,700,000	Relevant
Apparatuses	7,670,000	515,000	
Appendixes	2,580,000	264,000	
Appendices	17,400,000	2,150,000	Relevant
Aquariums	29,300,000	3,210,000	Relevant
Aquaria	9,790,000	1,260,000	
Automatons	528,000	1,260,000	
Automata	29,200,000	1,450,000	Relevant
Bureaux	73,700,000	1,150,000	*Irrelevant – further search engines are needed (note ++)*
Bureaus	30,600,000	3,210,000	
Cerebellums	44,800	6,510	
Cerebella	393,000	50,200	Relevant
Curricula	17,700,000	2,440,000	Relevant
Curriculums	6,860,000	694,000	
Formulas	57,000,000	8,200,000	Relevant
Formulae	13,100,000	1,940,000	
Genera	96,300,000	5,450,000	Relevant
Genuses	117,000	15,900	
Hiatuses	279,000	42,500	
Hiatus	34,900,000	4,140,000	Relevant
Maximums	2,860,000	407,000	
Maxima	131,000,000	6,640,000	Relevant
Minimums	8,030,000	1,080,000	
Minima	63,500,000	1,340,000	Relevant
Nuclei	22,200,000	4,050,000	Relevant
Nucleuses	73,200	8,270	
Phenomena	68,900,000	10,800,000	Relevant
Phenomenons	462,000	99,900	
Syllabuses	532,000	144,000	
Syllabi	4,930,000	799,000	Relevant
Strata	65,600,000	4,060,000	Relevant
Stratums	336,000	24,200	
Vortexes	486,000	113,000	
Vortices	2,610,000	448,000	Relevant

Note+: The search for **antennae** returned **110,710** results on academic data bases http://anelis1.summon.serialssolutions.com.ux4ll8xu6v.useaccess control.com/search?s.q=antennae The search for **antennas** returned**1,010,699**results. Note ++: The search for **bureaux** returned 159,398 results and the search for **bureaus**returned209,729 results.

Table no. 1. Assessment and frequency distributions of the grammatical plurals appropriate in accordance with the majority use

The charts below, which are graphic representations of the distributions studied, can help, through their better visibility, to assess the claim of such or such plural form to grammatical appropriacy, where quantitative information is relevant; frequency of occurrence could be analyzed by using multiple search engines (e.g. Google and Ask).

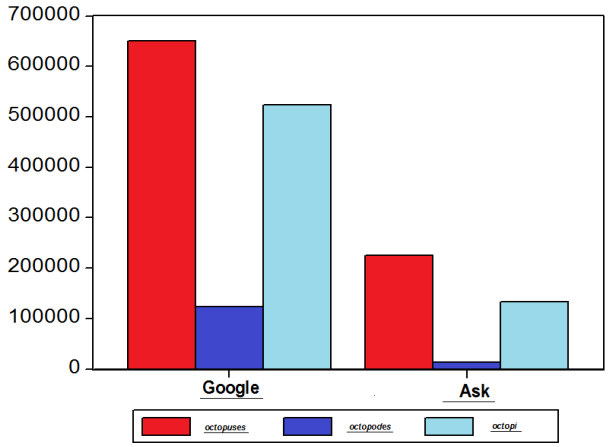

Fig. no. 1 An example of graphical analysis of frequency for the plurals variants of **octopus**

The terms included in the (parallel) list (c) illustrate a lexical class that cannot be called specifically technical or scientific terms, although they are certainly learned terms: [5]

(a) **antenna** [æn'tenə] – *pl.* **antennae** /**antennas**

apex ['eipeks] – *pl.* **apices** / **apexes** ['æpi¸si:z / 'ei-]

apparatus [¸æpə'reitəs, -'rɑ:təs, 'æpə¸reitəs] – *pl.***apparatus** / **apparatuses**

appendix [ə'pendiks] – *pl. anat.* **appendixes** / *pl.***appendices** [ə'pendi¸si:z] „annexe".

automaton [ɔ:'tɔmə¸tɔn, -tən] – *pl.* **automata** [ɔ:'tɔmətə] / **automatons**

cactus ['kæktəs] – *pl.* **cactuses** / *spec.* **cacti** ['kæktai]

calyx ['keiliks, 'kæliks] – *pl.* **calyxes** / **calyces** ['kæli¸si:z,

'keili-]
cerebellum [ˌseri'beləm] – *pl.***cerebellums** / **cerebella** [ˌseri'belə]
cerebrum ['seribrəm] – *pl.* **cerebrums** / **cerebra** ['seribrə]

chateau / **château** ['ʃætəu] – *pl.* **chateaus** / **châteaux** ['ʃætəuz]

cicada / **cicala** [si'kɑ:də / si'kɑ:lə] – *pl.* **cicadas** / **cicalas**; **cicadae** [si'kɑ:di:] / **cicale** [si'kɑ:lei]
colloquium [kə'ləukwiəm] – *pl.* **colloquiums** / **colloquiua** [kə'ləukwiə]

contralto [kən'træltəu, -'trɑ:l-] – *pl.* **contraltos** / **contralti** [kən'trælti, -'trɑ:l-]
cranium ['kreiniəm] – *pl.* **craniums** / **crania** ['kreiniə]
criterion [krai'tiəriən] – *pl.* **criteria** [krai'tiəriə] / **criterions**
curriculum [kə'rikjuləm] – *pl.* **curricula** [kə'rikjulə] / **curriculums**

dilettante [ˌdili'tɑ:nti] – *pl.* **dilettantes** / **dilettanti** [ˌdili'tɑ:nti]
discus ['diskəs] – *pl.* **discuses** / **disci** ['diskai]

fauna ['fɔ:nə] – *pl.* **faunas** / **faunae** ['fɔ:ni:]

flora ['flɔ:rə] – *pl.* **floras** / **florae** ['flɔ:ri:]

formula ['fɔ:mjulə] – *pl.* **formulae**['fɔ:mjuˌli:] / **formulas***(chem., mat.; also fig.)*
flamingo [flə'miŋgəu] – *pl.* **flamingos** / **flamingoes**
fresco ['freskəu] – *pl.* **frescoes** / **frescos**

fungus ['fʌŋgəs] – *pl.* **fungi** ['fʌŋgai, 'fʌndʒai, 'fʌndʒi] / **funguses**
genus ['dʒi:nəs] – *pl.* **genera** ['dʒenərə] / **genuses**
halo ['heiləu] – *pl.* **haloes** / **halos**
hiatus [hai'eitəs] – *pl.* **hiatuses** / **hiatus**
iambus [ai'æmbəs] – *pl.* **iambi** [ai'æmbai] / **iambuses**; **iamb** ['aiæm, 'aiæmb] – *pl.* **iambs**
larynx ['læriŋks] – *pl.* **larynges** [lə'rindʒi:z] / **larynxes**
libretto [li'bretəu] – *pl.* **librettos** / **libretti** [li'breti:]
memorandum [ˌmemə'rændəm] – *pl.* **memorandums** / **memoranda** [ˌmemə'rændə]
novella [nəu'velə] – *pl.* **novellas** / **novelle** [nəu'velei]
nucleus ['nju:kliəs] – *pl.* **nuclei** ['nju:kliˌai] / **nucleuses**
palazzo [pə'lætsəu] – *pl.* **palazzos** / **palazzi** [pə'lætsi]

phenomenon [fi'nɔminən] – *pl.* **phenomena** / **phenomenons**
radius ['reidiəs] – *pl.* **radii** ['reidiˌai] / **radiuses**
radix ['reidiks] – *pl.* **radices** ['reidiˌsi:z] / **radixes**
retina ['retinə] – *pl.* **retinas**/**retinae** ['retiˌni:]

rhombus ['rɔmbəs] – *pl.* **rhombuses**/**rhombi** ['rɔmbai]

stratum ['strɑ:təm] – *pl.* **strata** / **stratums**
syllabus ['siləbəs] – *pl.***syllabi** ['siləˌbai] / **syllabuses**
tableau ['tæbləu] – *pl.* **tableaux** ['tæbləu, 'tæbləuz] / **tableaus**
tempo ['tempəu] – *pl.* **tempos** / **tempi** ['tempi:]
trapezium [trə'pi:ziəm] – *pl.* **trapeziums** / **trapezia** [trə'pi:ziə]
vacuum ['vækjuəm] – *pl.* **vacuums** /**vacua** ['vækjuə]
vertebra ['və:tibrə] – *pl.* **vertebrae** ['və:tibri:] / **vertebras**
vertex ['və:teks] – *pl.* **vertexes** / **vertices** ['və:tiˌsi:z]

vortex ['vɔ:teks] – *pl.* **vortices** ['vɔ:tiˌsi:z] / **vortexes**
(b) **bureau** ['bjuərəu] – *pl.* **bureau**/ **bureaux** ['bjuərəuz]
flamingo [flə'miŋgəu] – *pl.* **flamingos** / **flamingoes**
fresco ['freskəu] – *pl.* **frescoes** / **frescos**

grotto['grɔtəu] – *pl.* **grottoes** / **grottos**
halo ['heiləu] – *pl.* **haloes** / **halos**
manifesto [ˌmæni'festəu] – *pl.* **manifestoes** / **manifestos**
memento [mi'mentəu] – *pl.* **mementos** / **mementoes**

motto ['mɔtəu] – *pl.* **mottoes** / **mottos**
(c) **aquarium** [ə'kwɛəriəm] – *pl.* **aquariums** / **aquaria** [ə'kwɛəriə]
bureau ['bjuərəu] – *pl.* **bureau**/ **bureaux** ['bjuərəuz]

candelabrum [ˌkændi'lɑ:brəm] (*rare sg.***candelabra** [ˌkændi'lɑ:brə]*) – pl.* **candelabra**, **candelabrums**

cicerone [ˌsisə'rəuni, ˌtʃitʃ-] – *pl.* **cicerones** / **ciceroni** [ˌsisə'rəuni, ˌtʃitʃ-]

colossus [kə'lɔsəs] – *pl.* **colossi** [kə'lɔsai] / **colossuses**
focus ['fəukəs] – *pl.* **focuses** / **foci** ['fəusai]

grotto['grɔtəu] – *pl.* **grottoes** / **grottos**
gymnasium [dʒim'neiziəm] – *pl.* **gymnasiums** / **gymnasia** [dʒim'neiziə]

hippopotamus [ˌhipə'pɔtəməs] – *pl.* **hippopotamuses** / **hippopotami** [ˌhipə'pɔtəˌmai]
manifesto [ˌmæni'festəu] – *pl.* **manifestoes** / **manifestos**
maximum ['mæksiməm] – *pl.* **maxima** ['mæksimə] / **maximums**
memento [mi'mentəu] – *pl.* **mementos** / **mementoes**
millennium [mi'leniəm] – *pl.* **millenniums** / **millennia** [mi'leniə]
minimum ['miniməm] – *pl.* **minima** ['minimə] / **minimums**

motto ['mɔtəu] – *pl.* **mottoes** / **mottos**

narcissus [nɑ:'sisəs] – *pl.***narcissuses** / **narcissi** [nɑ:'sisai, -'sisi:]

persona grata [pə:'səunə 'grɑ:tə] – *pl.* **personae gratae** [pə:'səuni: 'grɑ:ti:] / **personas gratas**
referendum [ˌrefə'rendəm] – *pl.* **referendums** / **referenda** [ˌrefə'rendə]

sanatorium [ˌsænə'tɔ:riəm] – *pl.* **sanatoriums** / **sanatoria** [ˌsænə'tɔ:riə]
symposium [sim'pəuziəm] – *pl.* **symposiums** / **symposia** [sim'pəuziə]
terminus ['tə:minəs] – *pl.* **termini** ['tə:minai] / **terminuses**

ultimatum [ˌʌlti'meitəm] – *pl.* **ultimatums** /**ultimata** [ˌʌlti'meitə]
Further, special searches could be conducted, in a future contribution, along the following lines:
1. Is there any possibility for Google searches to be conducted resulting in detecting plural forms that are different from the dictionary, normative forms below?
addendum [ə'dendəm] **addenda** (maybe, forms like **addendas** or **addendums**)
alga ['ælgə] *(rarely; – pl.* **algae** ['ældʒi:]*)* (maybe, forms like **algas**)
ampulla[æm'pulə]– *pl.***ampullae**[æm'puli:] (maybe, forms like **ampullas**)
apsis ['æpsis] – *pl.* **apsides** [æp'saidi:z, 'æpsiˌdi:z] (maybe, forms like **apses** – different from the plural form of ***apse*** – or ***apsises***)
bacterium [bæk'tiəriəm] – *pl.* **bacteria** [bæk'tiəriə] (maybe, forms like **bacteriums**)
barman ['bɑ:mən] – *pl.* **barmen** (▲*rare* **barmans**) (forms like **barmans**)
bateau [bæ'təu] – *pl.* **bateaux** [bæ'təuz] (maybe, forms like **bateaus**)

cortex ['kɔ:teks] – *pl.* **cortices** ['kɔ:ti¸si:z] (maybe, forms like **cortexes**)
dynamo['dainə¸məu] – *pl.* **dynamos** (maybe, forms like **dynamoes**)
erratum [i'rɑ:təm] – *pl.* **errata** [i'rɑ:tə] (maybe, forms like **erratums**)
larva ['lɑ:və] – *pl.* **larvae** ['lɑ:vi:] (maybe, forms like **larvas**)
libra ['laibrə] – *pl.* **librae** ['laibri:] (maybe, forms like **libras**)
locus ['ləukəs, 'lɔk-] – *pl.* **loci** ['ləusai, 'ləuk-](maybe, forms like **locuses**)
pharynx ['færiŋks] – *pl.* **pharynges** [fə'rindʒi:z] (maybe, forms like **pharynxes**)
quantum ['kwɔntəm] – *pl.* **quanta** ['kwɔntə] (maybe, forms like **quantums**)
rondeau ['rɔndəu] – *pl.* **rondeaux** ['rɔndəu, 'rɔndəuz] (maybe, forms like **rondeaus**)
spectrum ['spektrəm] – *pl.* **spectra** ['spektrə] (maybe, forms like **spectrums**)
stimulus ['stimjuləs] – *pl.* **stimuli** ['stimjul¸lai, -¸li:] (maybe, forms like **stimuluses**)

NOTES

(1) The only term that can be proved to have three plural forms is **octopus** (***octopuses***, ***octopodes***, ***octopi***). A similar search concerning the corpora distribution of *apsis* (*apsides, apses, apsises*), *addendum* (*addenda, addendums, addendas,*) and *criterion* (*criteria, criterions, criterias*), possibly also *frustrum*,would also be instructive.

(2) In some cases, usage, as captured by dictionaries, has been so decisively significant as to make the compilers gloss (as *MacMillan* does) irregular plural forms as the legitimate lemmas (e.g. *bacteria, criteria, alga, data*…).

(3) When the issue of meaning is also considered, the procedure used in the present contribution becomes virtually insoluble (how on earth could anyone check the meaning and use of every single occurrence as appearing in the texts searched?): e.g.

genius ['dʒi:niəs, -njəs] – *pl.* **geniuses** („musical, national etc."; *fig.*); **genii** ['dʒi:ni¸ai] („spirit, in Roman mythology" *also fig.*, "ghost, demon; djinn")
domino ['dɔmi¸nəu] – *pl.* **dominoes** („game") / **dominos** („article of dress")
index ['indeks] – *pl.* **indexes** / **indices** ['indi¸si:z]
stamen ['steimen] – *pl.* **stamens** / **stamina** ['stæminə]
milieu ['mi:ljə:] – *pl.* **milieus** / *franc.* **milieux** ['mi:ljø](the French for mis very formal)
calculus ['kælkjuləs] – *pl.* **calculuses**; *med.* **calculi** ['kælkjulai]
polypus ['pɔlipəs] – *pl.* **polypi** ['pɔlipai]; *(also* **polyp**: *zool., anat.)*
data ['deitə, 'dɑ:tə] *(pl., although usually considered* ***uncontable)*** → *sg.***datum** ['deitəm, 'dɑ:təm]< or **datum** *(originally, sing.; today hardly ever used)* – *pl.* **data** (although it is provable, by empirical means, that virtually nobody ever uses *datum* today!),
agenda [ə'dʒendə] *(pl. of* **agendum***; now considered sing.)*; **agendum** [ə'dʒendəm] – *pl., rare* → **agenda**

2. Terms not included in the list of the technical/scientific words, some of them having traditional or analogical irregular plurals (e.g. those in the sets "names of fish/birds/hunted or stock animals", plus the nouns ***fruit*** and ***fish***); the asterisked words represent mere issues of spelling:

antelope['ænti¸ləup] – *pl.* **antelopes** / **antelope**
***banjo** ['bændʒəu] – *pl.* **banjos** / **banjoes**
***buffalo** ['bʌfə¸ləu] – *pl.* **buffalo** / **buffaloes**
***calico** ['kæli¸kəu] – *pl.* **calicoes** / **calicos**
***cargo** ['kɑ:gəu] – *pl.* **cargos** / **cargoes**
carp [kɑ:p] – *pl.* **carp** / *rare* **carps**
catfish ['kæt¸fiʃ] – *pl.* **catfish** / *rare* **catfishes**
charr / **char** [tʃɑ:] – *pl.* **charr** / **char**, *rare* **char(r)s**
cherub ['tʃerəb]– *pl*. **cherubs**/**cherubim** ['tʃerəbim¸-ubim]
chub [tʃʌb] – *pl.* **chub** / **chubs**
coalfish ['kəul¸fiʃ] – *pl*. **coalfish** / *rare* **coalfishes**
cod/ **codfish** – *pl.* **cod** / **codfish** / *rare* **cods** / **codfishes**
coley ['kəuli, 'kəli] – *pl.* Δ **coley**–**coalfish**.
crayfish ['krei¸fiʃ]– Δ*AmE* **crawfish**–*pl*.**crayfish**/**crayfishes**
dogfish ['dɔg¸fiʃ] – *pl.* **dogfish** / *rare* **dogfishes**
***dwarf** [dwɔ:f] – *pl.* **dwarfs** / **dwarves**
fish – *pl.* **fish** / *rare* **fishes** „varieties, kinds"
fruit – *pl.* **fruit** / *rare* **fruits** „kinds"
gazelle [gə'zel] – *pl.* **gazelles** / **gazelle**
***ghetto** ['getəu] – *pl.* **ghettos** / **ghettoes**
grouse [graus] – *pl.* **grouse** / **grouses**
hake [heik] – *pl.* **hake** / **hakes**
hoof [hu:f] – *pl.* **hoofs** / **hooves** [hu:vz]
***mosquito** [mə'ski:təu] – *pl.* **mosquitoes** / **mosquitos**
perch – *pl.* **perch** / **perches**
pike – *pl.* **pike** / **pikes**
ruff – *pl.* **ruffs** / *rare* **ruff**
saithe [seiθ] – *pl.* **saithes** / *rare* **saithe**
salmon ['sæmən] – *pl.* **salmons** / **salmon**
sardine [sɑ:'di:n] – *pl.* **sardine** / **sardines**
***scarf** [skɑ:f] – *pl.* **scarfs** / **scarves**
seraph ['serəf] – *pl.* **seraphs** / **seraphim** ['serəfim]
snipe – *pl.* **snipe** / **snipes**
springbok, *rare* **springbuck** – *pl.* **springbok** / **springboks**
squid [skwid] – *pl.* **squid** / **squids**
sturgeon ['stə:dʒən] – *pl.* **sturgeons** / Δ *rare* **sturgeon**
***tobacco** – *pl*. **tobaccos** / **tobaccos**
***tornado** [tɔ:'neidəu] – *pl.* **tornadoes** / **tornados**
trout – *pl*. **trout** / **trouts**
***wharf** [wɔ:f] – *pl.* **wharves** / **wharfs**
whiting – *pl.* **whitings** / *rar***whiting**
wildebeest ['wildi¸bi:st, 'vil-] – *pl*. **wildebeests** / **wildebeest**
zander – *pl*.**zander** /*rare* **zanders**
zebra ['zi:brə, 'zebrə] – *pl.* **zebras** / **zebra**
zucchini [tsu:'ki:ni, zu:-] – *pl.* **zucchini** / **zucchinis**

In addition to the purely statistical survey, a further subdivision would be in order, where the "purely phonetic vs. morpho-phonemic" subtypes of plural (mainly of the kinds: ***tornadoes*** / ***tornados***, and ***wharfs*** / ***wharves***) would be supplemented by the classes of the invariable plurals (for names of animals, e.g. ***wildebeest***, ***snipe***, ***carp***, ***trout***, etc.), and the bookish plurals (which are seldom regularized), vs. the class of the regularized plurals (e.g. ***seraphim*** / ***seraphs***)
It is easily noticeable that, in such cases, usage notes are necessary even for native speakers of English, e.g.: • "In Latin, **data** is the plural of **datum** and, historically and in specialized scientific fields, it is also treated as a plural in English, taking a plural verb, as in *the* ***data were*** *collected and classified*. In modern non-scientific use, however, despite the complaints of traditionalists, it is often not treated as a plural. Instead, it is treated as a mass noun, similar to a word like **information**, which cannot normally have a plural and which takes a singular verb. Sentences such as ***data was*** (as

well as ***data were***) *collected over a number of years* are now widely accepted in standard English"; • "Although **agenda** is the plural of **agendum** in Latin, in standard modern English it is normally used as a singular noun with a standard plural form (**agendas**)"; • "The word **media** comes from the Latin plural of **medium**. The traditional view is that it should therefore be treated as a plural noun in all its senses in English and be used with a plural rather than a singular verb: *the media **have** not followed the reports* (rather than 'has'). In practice, in the sense 'television, radio, and the press collectively', it behaves as a collective noun (like **staff** or **clergy**, for example), which means that it is now acceptable in standard English for it to take either a singular or a plural verb"; • "Based on the Latin forms, the correct singular is **candelabrum** and the correct plural is **candelabra**. However, these forms are often not observed in practice: the singular form is assumed to be **candelabra** and hence its plural is interpreted as **candelabras**. In nearly 50 per cent of the examples in the British National Corpus the singular is incorrectly given as **candelabra**". (At other times, the problems posed by the form (and grammar) of certain foreign nouns are even more complex, *e.g. **octopus***: "The standard plural in English of **octopus** is **octopuses**. However, the word **octopus** comes from Greek and the Greek plural form **octopodes** is still occasionally used. The plural form **octopi**, formed according to rules for Latin plurals, is incorrect)". All the dictionary quotations are from *The* NEW OXFORD *Dictionary OF* ENGLISH.

3. CONCLUSION

In the same context of applying statistics to linguistic research, we think it would be worth studying, in point of usage and frequency of use, such hybrid semantic variants (or 'barbarisms') occurring in Romanian, which are either borrowed from English or not, as: *oneros*, *intrepid*, *vocal*, *versatil*. Unfortunately, it would be impossible to search for pronunciation variants as phonetics cannot be recorded in net texts; so, the only option for that kind of study is to *methodically* conduct linguistic surveys.It is apparent that standardization, very much like explaining, detailing and systematic description of natural languages, also possesses an important conventional/conventionalized component, which often relies on imposing constraints, simplifications, or even forcing common logic, and sometimes on grossly denying historical and etymological evidence and / or flagrant abuse. In this country at least, everything seems to be sacrificed for the idea of clarity, nice round (scientific) conformity and parallelism. (Here are just a few examples: *aşază*, *înşală*, *ceapă* ['tʃapə] / *cepe* ['tʃepe], *Coreei*, *o impericopitată*, *chimen* (considered to be masculine), *datorită* (usually described today as having a "positive" implication, vs. *din cauza / pricina*), spelling the Romanian sound [î] in two ways, as *î* and *â*, using the ghost-word *sunt*, etc.).

Thus, statistical distribution studies like the example above should be undertaken for such controversial issues, in order to be able to reach really objective, reliable results (let us compare them with the rules issued from valid analogies, e.g. why the imperative *nu fi* has only one *i*, unlike *să nu fii*). And then, what should the common user of the language believe – especially if they happen to make their own judgment, operating with some basic comparisons, i.e. analysis based on analogy? He/she is left practically at the mercy of chance, allegedly guided by a coterie of self-proclaimed linguistic *gurus*.Obviously, dictatorship of usage (or "common" use), under the guise of maximum tolerance (which proves to be, in fact, a kind of laxity drifting to absolute values or implications), is not likely to be a wise option. Therefore, we believe, based on experiments like the one illustrated above, that a well-advised, moderate, objective intervention by the linguist should be welcome, provided that it is made in good faith, based on the rules of logic (especially analogy) and common sense, and true respect for the inherent practical use of the language (which actually represent reality, life itself), a use that has to be observed, recorded and analyzed by such desirable scientific methods as the methods provided by statistics. The final result should be placed somewhere in the area traditionally called *the golden mean*.

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RELATIONS OF THE ORGANIZATIONAL NETWORK CLUSTERING COEFFICIENT AND ACADEMIC STRENGTH OF THE UNIVERSITY

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Abstract.*This article aims to describe how employee organizational network clustering coefficient can affect the academic strength of university. We have simulated the influence of clustering coefficient using communication frequency. Our hypothesis was that the improvement of communication can increase the academy strength of university. Densely related clusters provide better and faster communication within network, which we simulated using communication probability between individual nodes, and probability of information transfer within that network.We have also shown how increase of number of connections between nodes can influence increasing the probability of information transfer within the teaching staff.Better connectedness and communication within the teaching staff members positively affects cooperation. Better cooperation can imply greater commitment, better research papers, and also better ways of transferring knowledge on students which will ultimately increase the academic strength of the university. Intense communication will also influence transfer of tacit – internal knowledge that will unconsciously affect on deepening the approach to the matter, and also on better research quality implemented by the teaching staff.The conclusion we have reached in this research is that the increase of clustering coefficient improves communication among teachers, and thus on increasing the academic strength and reputation of the university.*

Key words: *clustering coefficient, simulation, probability, network, academic strength, university.*

1. INTRODUCTION

This article discusses the influence of clustering coefficient on the academic strength of the University. When we discuss the academic strength of the University we think of reputation and quality of knowledge that is transferred to university students. In this article we will try to determine the manner in which a high degree of clustering enables the increase of academic strengths of universities. The effect of clustering coefficient on the academic strength of the university will be observed through the channels of communication among teachers. We believe that the improvement of communication channels will affect on making of cohesion of different skills that will help in transferring knowledge to the students, and consequently the reputation of the university.

Even the first theorists who were dealing with networks realized that the strength of the network lies in its connections (Pool and Kochen, 1978; Rapoport and Horvath, 1961). The nodes are connected with direct and indirect connections within a network. As a result of these connections, members embedded in these networks gain access to information and knowledge of direct partners and that of others in the network to which they are indirectly connected (Ahuja 2000; Guliati & Gargiulo 1999).

Connected nodes in the network create channels that direct the movement of information and knowledge across the network (Ahuja 2000; Owen – Smith & Powell 2004). Each member of network is acting both as a recipient and as a transmitter of information (Ahuja 2000). The structure of these networks greatly affects the dynamics of diffusion of information within the network.

Large-sample studies have found that direct alliance relationships facilitate knowledge flows between partners (Gomes-Casseres 2006, Mowery 1996), and enhance the innovative performance of firms (Deeds & Hill 1996; Stuart 2000). This research is also applicable on Universities where the actors aren't firms but teaching staff. We believe that a better networking, with better relationships and increased communication among teachers also allow movement of knowledge within the university. This movement of knowledge and information can increase innovation and creativity of university staff, and therefore the academic strength of the university.

In a related study Uzzi and Spiro (2005) examined the network structure of the creative artists who made Broadway musicals from 1945 to 1989, and concluded that the large-scale structure of the artists' collaboration network significantly influenced their creativity, and hence on the quality of musicals that they have worked on. This research has caused us to question whether the interconnection of the teaching staff may affect the increase in the quality of teaching, which would later imply and increase the reputation of the university.

We have used clustering coefficient as basic tool for illustrating this hypothesis. Sociologists (Coleman 1988, Granovetter 1992) have suggested that densely clustered networks give rise to trust, reciprocity norms, and a shared identity.However, the essence of Granovetter's work is focused on the "strength of weak ties" (Granovetter 1973; Granovetter 1983). High clustering coefficient, increasing interaction, affection and giving history to the relations between employees, a relation Krackhardt (1992) relates as "Phylos". All these elements lead to a high degree of cooperation that affects innovation and creativity in their work. Greater transparency, trust and reciprocity that emerges within clusters (Uzzi 1997), are not the only benefits that provides a high degree of correlation within clusters. The intensive interaction among cluster members leads to the exchange of tacit - internal knowledge (Hansen 1999, Zander and Kogut 1995). The high degree of clustering coefficient (high degree of correlation), indicates an increase in the capacity of transmitting information through the possibility of disseminating information rapidly to all nodes in the network. Such a network structure corresponds to densely connected social capital, which is seen as one of the organizational advantages (Nahapiet & Ghoshal 1998).

2. METHODS

Method that is used for the analysis is simulation of clustering coefficient increase in organizational network. Method is combined with experience from case study analysis and inductive reasoning. Clustering coefficient represent relation of the number of formed triangles (three

nodes connected to each other), and the number of triangles that can be formed in a network. To explain how the greater degree of clustering coefficient influences communication increase, we have simply used the probability of transmission of information. Consider the following picture:

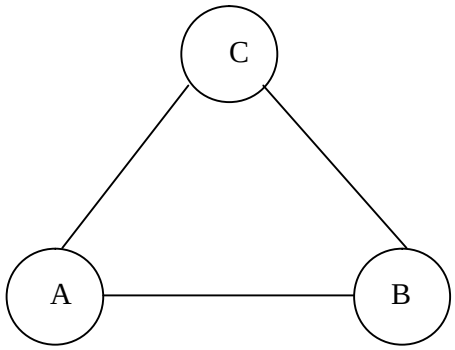

Figure 1. Clustered triangle

We can see three connected nodes in the picture. Every node is in interaction with the other two nodes. We will consider relations between them as a two-way communication channels (node A can transfer information to node B, and node B can also transfer information to node A). We can now take set the probability of information transferring from one node to another at 0.5. By this probability we consider that there is 50% chance of transferring information from one node to another.

3. RESULTS

A detailed analysis of influence of clustering coefficient was conducted on 5 node network. We began with the assumption that every node in the network is connected with two neighbor nodes (A-B; B-C; C-D; D-E; E-A). This way we acquired connected network where clustering coefficient equals 0. The picture will show us basic network model on which we started our research:

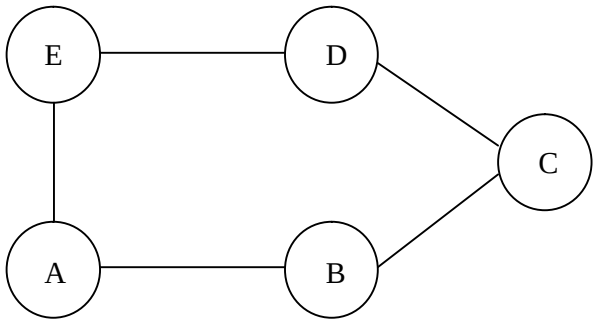

Figure 2. Non-clustered organizational network

Once we have set up a basic model, we started with the simulation by adding of new connections. In each new iteration, we added one new connection, and increased clustering coefficient by increasing the number of triangles. Each link in our network represents a two-way connection between nodes that are linked together. It should denote the information transfer probability from one node to another. The value of the probability of transmission of information in our analysis is 0.2 (which means that the node A will transfer information to node B with the probability of 0.2).

In this model we observed transmission of information from node A to node D. In our basic model only two ways of information transfer from node A to node B was across node E (AED) and across nodes B and C (ABCD). By adding new connections various possibilities of information transferring emerged and indicated new ways of getting from node A to node D. When calculating the different ways of connecting node A and node D, we did not take into our account links that will include same node more than once. We only used the connections in which every node is used once. In the following table we will show the influence of clustering coefficient to increase the probability of information transfer from node A to node D.

Influence of clustering coefficient on increasing the probability of information transfer			
Iteration	Added connections	Clustering coefficient	Probability
1		0	0.048
2	+EB	0.1	0.0576
3	+DB	0.3	0.1056
4	+AC	0.4	0.1552
5	+EC	0.7	0.1776
6	+AD	1	0.3776

Table 1. Simulation results

As we can notice, each iteration increases probability of transmitting information. In the first iteration (our basic model) there were only two ways in which information could be transferred from node A to node D. Those two ways are AED and ABCD. The probability of transmitting information via links AED we managed to get by multiplying the probability of information transfer from node A to node E (AE) with the probability of information transfer from node E to node D (ED):

Paed = Pae*Ped = 0,2*0,2 = 0,04

Paed – Probability of information transfer from node A to node D across node E

Pae – Probability of information transfer from node A to node E

Ped – Probability of information transfer from node E to node D

In a similar manner we calculated the probability of information transfer from node A to node D across nodes B and C:

Pabcd = Pab*Pbc*Pcd = 0,2*0,2*0,2 = 0,008

We sum up the probabilities and got the probability of information transfer from node A to node D:

Pad1 = Paed+Pabcd = 0,04+0,008 = 0,048

In second iteration we added connection between nodes E and B (EB). By adding new connection we increased the probability of information transmission and provided four new ways for information dissemination. With this 4 ways of information transfer probability has increased, and now it amounts 0.0576. We apply the same principle for other iterations. The result we obtained was expected, and that is that with each new iteration, the probability of transmission of information grew. When we reached the maximum clustering coefficient, the probability was almost twice as high as in the structure where nodes A and D are directly connected. This illustrates the fact that the network is, in the

spirit of Aristotle systematic review, more than the sum of its parts.

4. DISCUSION

In analyzing the influence of clustering coefficient on magnifying the academic strength of universities we observed an idealized model of connection among the teaching staff. We did not take into consideration influence of different attributes such as formal procedures for communication that are prescribed by the university. We also did not consider the behavioral aspect of teaching staff nor the appearance of any disagreement among the teachers. Our relations were binary, without details describing the relation. We tried to establish how would clustering coefficient function in the idealized system and how would he support the transfer of knowledge, ideas and skills among the teaching staff.

As a basic hypothesis, we pointed out that better communication among teaching staff will positively affect academic strength of university. We based this hypothesis on the idea that enhancement of communication will enforce the higher flow of knowledge, ideas and skills. This flow will enable teachers to observe matter they are dealing with, from different angles. We observed two ways in which communication could affect the magnification of the university's reputation:

1. Better communication can bring some innovation in their thinking, which can later be present in the scientific papers that will be published. Publishing quality scientific papers directly influence the enhancement of the academic strength of university.
2. Better communication will affect the transfer of knowledge in terms of curriculum and ways of transferring knowledge to students. In this way the matter would be more understandable and better explained to the students. The knowledge gained in this way is generally applicable in practice, and hence the students' employability will be greater. Increased employment of students from a certain university acknowledges the quality of the university, which positively affect on its reputation.

In this article we have simulated the direct influence of clustering coefficient on increasing the probability of information transmission.Greater speed and probability of transmission of information should imply larger aggregation of knowledge at the university. The effect of increased communication influences not only the sharing of information, yet the creating of synergistic effect where new knowledge will emerge from the existing knowledge.

Our analysis suggests that each new connection will not lead to the same increase in the probability of information transfer. Each new connection opens new possibilities for transferring information, and each link will contribute to facilitate interaction between the nearest nodes. The probability depends also on the manner in which the nodes will be connected. If the connection is formed away from the nodes between which we want to establish communication, the connection will not significantly affect the probability of transmission of information. On the other hand, if the new connection is created close to or between two nodes that we consider, the probability of transmitting information will increase dramatically. On the next two graphs we can see how the position of connection can affect the probability of information transfer.

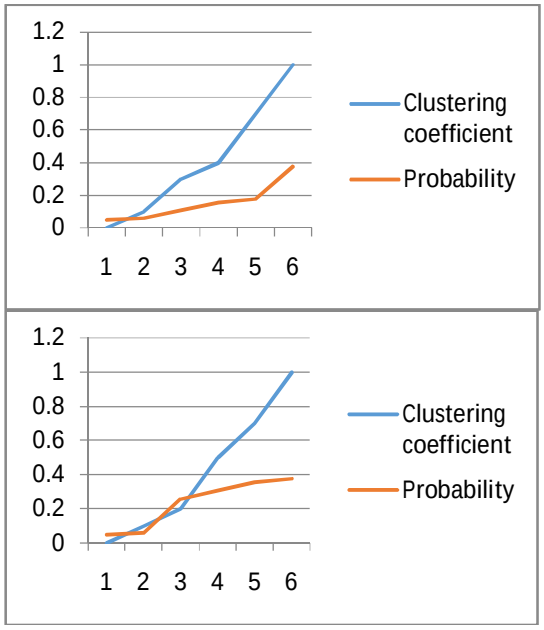

Figure 3. Simulation of clustering coefficient increase on different network structure development

As we can see from our graphs increasing of clustering coefficient always influence on increasing of probability of transferring information, but this relation isn't always proportional. Both graphs are showing us the same network model, the only difference is in order of adding new connections. On the first graphics direct link between nodes A and E was added last – in the sixth iteration, while in the second graph this relation was added in the third iteration. From these graphics we can clearly see that the probability will not grow for the same value with each new connection in the network.

This conclusion points us to another essential element that allows the degree of clustering affects the improvement of communication, and therefore the academic strength of the university. That element is network connectivity. There is a possibility that the network of teachers in the university has a high degree of clustering, but the network is not properly connected. Grouped, dense clusters (e.g. departments, collaborating cliques) often form in the network, and do not mutually share information and knowledge. On the organizational structure level, this phenomenon is known as "functional silo". (Ensor 1988). The disconnect network will affect the transfer of information in a way that information transfer will have a contribution only within the cluster, and will not reach its spread to the entire organization. The disconnected network is very present in the universities from both business and personal reasons. Many teachers believe that their subject has nothing in common with other subjects, and considered that they do not need to share knowledge with teaching staff from other departments. The existence of functional silos is observed and criticized in MBA curricula of top-ranked U.S. business schools (Navarro 2008). These teachers communicate only with teaching staff from their department, and departments dealing with similar matter. This reduces the possibilities of interdisciplinary, multidisciplinary and trans-disciplinary. Transfer of knowledge and ideas is not necessarily linked to scientific research - information or knowledge can be in the domain of good practices, or operational functioning of the organization.

Information, knowledge and mostly ideas from other contexts can encourage lateral thinking (De Bono 2010). It is considered an essential element of creativity, the inevitable factor of academic progress.

If we want clustering coefficient to have an influence on academic strength of university we must eliminate clusters and form functional integrated network. In practice this means eliminating organizational silos. We don't need to connect network to its limits, when clustering coefficient equals 1, which is in most cases practically impossible.It is enough to eliminate the "islands" in the network and focus on eliminating bottlenecks of communication that have a monopoly on bridging network capital. From our example we can conclude that relatively low clustering coefficient (0.4) enables information transfer with the probability 0.1552, in regard to the probability of0.2that we would get if we had direct connection between nodes. In practice, this would mean that the remote professors at the University will transmit information on similar scale as if they were in the same department. Every relation that is established between the clusters represents a great opportunity for the exchange of knowledge and information between clusters.

5. CONCLUSION

Based on the analysis of the clustering coefficient, we have concluded that it can greatly affect the academic strength of the universities, but also that its influence does not have to be realized if the network is not connected, and organizational silos are present. Disconnected networks dramatically drop chance to provide efficient information transfer within network. We have shown that with increasing clustering coefficient comes the growth of probability of information transfer among the participants in the network - in this case among the teaching staff. Probability increase can enforce grouping of knowledge and ideas, which will cause better cooperation among the teaching staff as well as easier and faster transfer of information. Improvement of information transfer will positively affect the communication and cooperation among teaching staff, which will implicate better ideas, researches and better plan and program of lectures. We have also shown that every new connection would not be equally important for increasing the probability of information transfer. The position of creating new relation will determine modification of probability, whether the probability will change dramatically or would it be an irrelevant change. Connections between dense clusters will be more influential on probability of information transmission than connections within clusters.

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SCIENTIFIC DIMENSIONS IN MUSICOLOGICAL RESEARCH

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*"Scientific research is that place where questions are asked and answers are sought to the most difficult and most important science and technology matters, with a direct impact on mankind's medium- and long-term welfare."*Marius Leordeanu

Abstract.*Musicology is a scientific field that studies music and its manifestations. In its turn, musicological research elucidates an infinite range of questions and problems occurring in the context of the interaction of human personality with musical art and that require scientific solutions. Moreover, the science about all the musical phenomena is manifested as a form of music self-knowledge. In this respect, musicology is a system of systematic music knowledge that examines the content and form, functions, evolution, and many other aspects whose solutions contribute to the formation of musicians' stylistic orientations, to the determination of purposes in the practical activity, to the adjustment of the artistic communication process, etc..*

Keywords:*music, science, musicology, musicological research.*

1. INTRODUCTION

"*Music* has always had a significant importance in human life, even if people have been more or less aware of this phenomenon over time" [1, p.155]. The influences of music on human personality manifest affective and intellectual complexities borne by our nature. Thus, the impact between music and man causes an ever increasing number of questions that are obviously rooted in the scientific field.

After all, *what is music*? There are countless more or less scientific attempts to define this word. Looking for a conventional summary of all the explanations existing in this respect, we can say that music is the art of combining various sounds in such a way as to generate various human affective states and to express feelings, impressions or certain ideational aspects.

Ever since ancient times, music was born due to purely useful needs, while later, in the following historic periods, it became one of the usual forms of artistic manifestation, with a specific communication role and function. Viewed as a part of human life, *music and its manifestations* have had, over time, countless motivational sources, in the attempt of being studied more or less scientifically. At the same time, the music field has always exercised a strong attraction on great thinkers and scientists of all times, who, in their attempt to find and determine viable fundamental regularities, contributed, to various extents, to the establishment of a musical science known under the name of *musicology*.

2. MUSICOLOGY – THE SCIENCE ABOUT MUSIC

Although it was designated an independent science only in the Age of Enlightenment – a period when an impressive number of fundamental papers were written in various fields of knowledge, and consequently, most sciences were constituted in their contemporary aspect– musicology empirically includes millenary theoretical references. These references have contributed to the formation and establishment of a scientific field, whose complexity is paradoxically focused on only one object of study – knowing the sound art in its various hypostases. Being a part of the science system, musicology is among the scientific fields whose foundations were laid way back in ancient times, such as sociology, pedagogy, history, theology, ethics and aesthetics, etc. As is the case of each of the above mentioned sciences, given that science is a set of knowledge in a certain field, musicology includes the whole knowledge about music. The etymology of this word confirms that: from Greek, the two roots *mousiki* (μουσική) and *logos* (λόγος) mean science or word about music. At the same time, the translations in various international languages (*musicology* in English, *musicologie* in French, *Musicwissenschaft* in German, *musicologia* inItalian and Spanish, *μουσικολογία* in Greek, and *музыковедение* or *музыкознание* inRussian, etc.) do not change this meaning at all.

Based on the decoding of this word, scientists propose various means of perceiving the term *musicology* and various methods of studying music and its manifestations which, as a whole, lead to the conclusion that the science about all the musical phenomena is manifested as a form of self-knowledge of music. In this respect, musicology is a system of systematic knowledge in the field of music that examines the content and form, functions and evolution, as well as many other aspects whose solutions contribute to the formation of musicians' stylistic orientations, to the determination of purposes in the practical activity, to the adjustment of the artistic communication process, etc.

"Many branches of musicology determine the question: which is the place of this subject matter among contemporary subject matters? The answer is conditional upon an evolutionary aspect [...] Musicology was included among humanities, or, according to certain conceptions, among the sciences of the spirit[...] On the other hand,the emergence of branches of musicology that depend on the natural sciences was present since ancient times and is revived again nowadays" [2, p.13]. In the beginning, music was studied from the perspective of other fields, as well as from the perspective of mathematics (the *mathematical theory of sound* developed by Pythagoras), ethics(the *Pythagorean ethos* theory, continued by Plato and Aristotle), history (*the history of music* initiated by Heraclides Ponticus and continued by Plutarch), etc. Later, scholastics followers imposed to theoreticians *musica coelestis* (celestial music) and *musica mundana* (earthly music), and in the Middle Ages, music was the only art that enters *quadrivium*, along with astronomy, arithmetic and geometry. The Renaissance applied new theoretical aspects in the study of sounds and the relations between them (after Zarlino) and in the modal system (after Glarean), and then the Baroque promoted, in principle, organology and the new innovative systems (temperate and chromatic). The versatility of the Baroque representatives (Praetorius, Kircher) leads the science of music towards that of nature or towards humanities (musical theory, history and encyclopaedia (Forkel, Cantemir), *ethnography* (Cantemir), a*esthetics* (Baumgarten), etc.).

"Along with the problem of musicology's place among sciences, another problem that concerned researchers from ancient times, was that of including its branches in a unitary system" [2, p.13]. Ancient researchers grouped the subject matters of music in two main categories: *theory and practice*, while Middle Ages researchers retained this principle of dichotomy besides *musica coelestis* and *musica mundana*. The modern science of music returned, in the Age of Enlightenment, to the classification problem and proposed a structuring according to various objective and subjective factors. Thus, musicology included all the branches of studying music, and grouped them according to various criteria: *historical and systematic*, *history-ethnology-psychology*, *theory-history-ethno-musicology-music criticism*, etc. In the 19th and 20th centuries, this systematisation is continued, and among musicologists concerned with this problem there were Riemann, Adler, Wellek, Keldish, Drager, Wiora, Handschin, etc. Moreover, since the differentiation of certain primary branches from secondary ones continuously varied depending on changes occurred in the musical culture, a few musicological subject matters were withdrawn in the background in favour of adopting others, among which *musical linguistics*, *semiotics*, *musical sociology*, *cybernetics*, etc., but "the evolution of musicology is thus related not only to its continuous improvement along with the scientific knowledge, but also with the emergence and gradual development of the branches that are part of it" [2, p.13].

Contemporary musicology adds, in the evolution of the main interdisciplinary field, both its ontological level, as well as its epistemological one. The problem of interdisciplinarity is nowadays a sine qua non means within the musical science. Given the specific nature of musicology, the correlation among the inner subject matters of the system is essential in a scientific study.

3. A FEW REFERENCE POINTS IN MUSICOLOGICAL RESEARCH

"Although it is the oldest of the sciences of art, the only one acknowledged as such in Antiquity and taught in Medieval universities, the science of music, according to the traditional modern thinking, is still positioned within limited coordinates. Widening the contemporary horizon, diversifying musical facts, the scientific progress determines, in the musical science, a review of the object and methods of research" [2, p.12]. However, just as in the case of other sciences, musicological research is based on a few important reference points: object of study, objectives, functions, methods of research, etc.

Among the first parameters of a scientific study there is the objective, which is closely interrelated with the objectives, either singular or multiple within one and the same investigation. According to them, a scientific research in the field of musicology can be crucial from the theoretical point of view, essential in knowing music and its laws, or applied, initiated with the purpose of implementing the theoretically determined aspects into practice. The connection between the two types of musicological study is indispensable, and the theoretical, as well as the applied research cannot be carried out absolutely separately. Moreover, a few musical laws determined following a theoretical study can have access towards the society only by means of another practical study, applied in fields such as musical pedagogy, theology, criticism and musical journalism, etc.

When we talk about the selected object of study, it is important to mention that a musicological research can examine many musical aspects. They can be aesthetical or philosophical in nature, focused on the content of music and the day-to-day reality, but they can also focus various cultural aspects of music. Two other important directions inthe musicological research, which also represent two major fields of musicology, are ethnomusicology and professional musicology. The first is related to the various forms of existence and perpetuation of folk music, while the second one refers to the manifestations of professional art, to the musical language elements, the composition and interpretation techniques, etc.

In conclusion, any musical manifestation and form of existence of music can lead to a new research in this field, especially since "the object of musicology is amplified not only in space, but also in time. In its preoccupations, it adds the present to the past, and eventually the future" [2, p.12]. Nevertheless, the central object of musicology, which is the starting point of all scientific investigations, is the musical work in itself. And, since it "experiences the same diversification in all its hypostases: creation – interpretation – perception" [2, p.11], it leads to three directions of musical study that provides the researcher with three potential ways of finding and determining finalities.

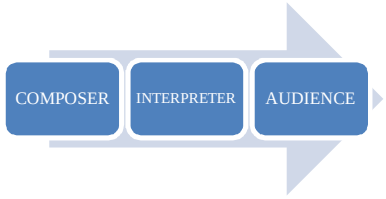

Figure 1: Participants in the realization of a musical work

Each participant of the triad that can be seen in figure 1 manifests its own attitude related to the musical work and expresses interest in it in a certain manner. The composer presents the product of his composing activity, and the audience receives his message. The link between these two extremities is the interpreter's activity, whose duty is to provide a connection between the message conveyed by the composer and the message perceived by the consumer audience, in such a way as to guarantee an infallible finality of the process. However, there is only one composer and there are several interpreters, but listeners can be many, different, with various education and unpredictable moods" [3, p.16]. In such case, the musicologist's activity intervenes, and is oriented towards the scientific perception of the message of the musical work created by the composer and its analysis, either from the point of view of composition theory or techniques, or from that of interpretative art, in such a way as to favour a reception as effective as possible by the audience. However, "the composer does not write for a predictable audience; instead, he generally launches his message in the unknown" [3, p.16], while on the other side, "the interpreter, remaining at the same informational level, becomes, in an extreme hypostasis, creator too, while on the other side he is completely circumvented from a minus-infinity of the total scientific organization acquired by certain creative conceptions" [2, p.11].

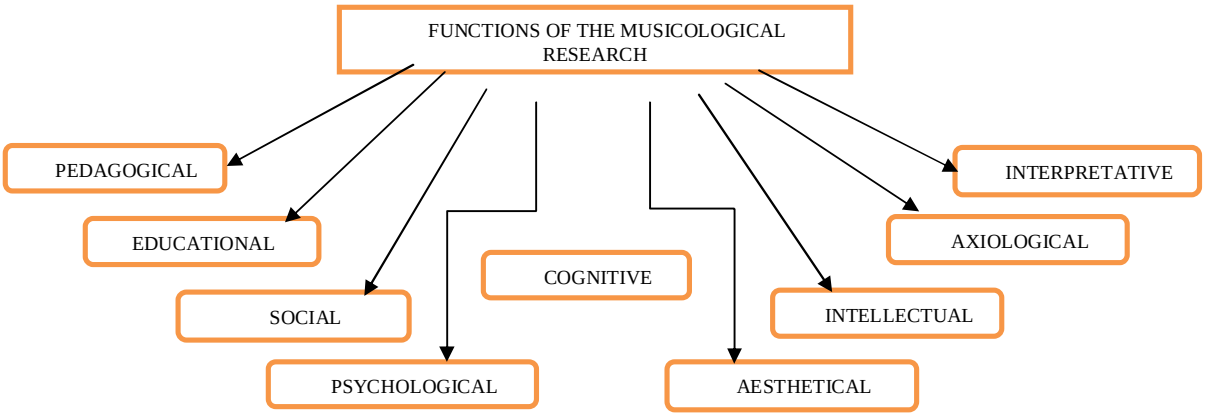

Figure 2: Several functions of the musicological research

The first function mentioned in the figure above and one of the most important in a research in the field of musicology is the pedagogical one. This implied a familiarization of the musicians and music lovers with the music and its laws, a conveyance of the cultural values by means of musical perspectives with the purpose of cultivating artistic preferences and predilections. The educative and social functions aim at educating various social classes through musical art, and the psychological and aesthetical ones – the implications of music under a superior form of beauty into the affective, emotional and volitional life. The next two potential functions of a musicological research indicated in the figure above are the cognitive and the intellectual ones, which allow for the accumulation, maintenance and conveyance of knowledge about music in the form of highly refined and complex intellectual activities. Musicology operates with authentic artistic values that belong to the human spirituality as a whole. The axiological and interpretation functions involve a deep knowledge of the musical phenomenon and aim at assessing it, and then the explanation and translation of the knowledge using various criteria of analysis of the reviewed phenomena. In conclusion, whether pedagogical, axiological, social or cognitive, the function can be individual in the case of a musicological research, or can be associated with other functions, more or less closely interrelated.

4. CONCLUSIONS

Contemporary musicology tends to penetrate as deep as possible into the musical phenomenon and to research, inan exhaustive manner, any form of musical manifestation, especially due to the fact that "contemporary thinking experiences a new wave of embedding sonority and musical temporality" [5, p.15]. The object of study of musicology was and still is as multilateral as possible, and the conglomerate of means of musical expression is cannot be subjected to unitary perceptions. Consequently, the researcher has to cope with a huge composing production, with a complexity that is slightly discouraging,in a variety ofstyles that are impossible to systematize based on a unique criterion" [5, p.13]. The more we insist on the investigation, the more questions are raised. These questions can become, intheir turn, other objects of study themselves, because one cannot exhaust the resourcesof a musical work by studying it. "The substance requires you to return, it cannot be perceived all at once. The meanings have to be understood little by little, they cannot be seen instantly" [3, p.16]. Moreover, as Robert Sapolsky said in his paper *Why Zebras Don't Get Ulcers*, Science is not meant to cure us of mystery, but to reinvent and reinvigorate it [6]. Therefore, if a researcher intends to know a musical work, he can discover new and important details, both from the theoretic point of view of science as well as from the practical one. Thus, by means of an infinity of objects of study, or of scientific studies respectively, a continuity is provided by correspondence in the existence of musicology as scientific field.

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ECOLOGY VERSUS ENVIRONMENTALISM OR HOW GLOBAL WARMING BECAME A RELIGIOUS PHENOMENON

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Abstract. *Whereas delimitations between science and ideology are still possible due to the Popperian criteria of fallibility, the growing trend towards interdisciplinarity makes things harder and harder. The encounter between disparate domains pose challenges for methodological rigor in science, as incommensurability of paradigms, difference between experimental techniques of incompatible mind-frame of contrasting scientific communities forced to come together may end up not in dialogue but in cacophony. Environmental issue give a sample about the predicaments of finding the common denominator between social sciences (sociology, economics) and the passion for nature. More so, the peril grows when ecology morphs into ecologism, an outright ideology bent on manipulation the general public with doctored half-truths. Therefore, the present article argues for a careful baby-step approach that might facilitate social science become acquainted with ecology and fashion moderate, fact-based solutions.*

Key words*: science, ideology, Karl Popper, Thomas Kuhn, ecology, ecologism, environmentalism, pressure groups*

1. INTRODUCTION

An irony of present times is that science often manages to acquire features that, throughout history, have been exclusively associated with religious movements. The above statement may seem strange, but only if our perception of the modern age remains shallow: at school we learn that religion and science are inversely proportional – more science equals less religion and superstition! Far from being static worlds, the relationship between religion and science is much more complex. The ideology or better said the ideologies- the real-life century-long creeds of modernity, have made use of science to such an extent as to pervert it at the interest of many utopian purposes. Eugenics, Holocaust, concentration camps are examples where ideology and the progress of medicine joined hands in order to change society (-ies) from the roots up.

At present one of the most discussed scientific fields, environmental protection (whose base is ecology, a branch of science studying the interdependent relationships between live organisms and the components of their environment), is getting assaulted and suffocated more and more frequently by successive waves of environmental and political activists. Each of them trying to promote and impose their own view on how the human civilization should interact with its environment.

This article distinguishes clearly between ecology (a neutral field, studying the relationship between humans - environment) and environmentalism (an ideology, constantly trying to fit humans into its point of view about nature).

The question of environmentalism cuts through one of the most sensitive and seldom problematic questions of our times in science, namely the push towards interdisciplinarity. As it has become a buzzword in recent decades, interdisciplinarity entails the risk of tossing away deeper methodological considerations about the character of scientific inquiry. Jointness or fusion of plural domains, it is not and it cannot be organized in a simplistic additional fashion (science A + science B) without taking into account the contrasting or even incommensurable paradigms from which they stem. Therefore, interdisciplinarity in general, and sociological environmentalism as an example, are in peril of either ending up as a mere postmodern hotchpotch or to be hijacked by ideology and sheer demagoguery.

2. TO BELIEVE VERSUS TO KNOW

Before going further, a clarification of terms is necessary. What is "science" and what is "ideology"? Graham C. Kinlock and Raj Mohan consider that "*ideologies are systems of evaluation that try experiences in terms that are logical and full of understanding. They try to stimulate and precede action, and in this way they become indispensable in dealing with human reality*."[1]

Ideologies develop as society's complexity develops, and their very existence embodies group conflicts that cannot be reconciled [2]. However, Roger Eatwell cautions attention that we should not mistake a doctrine with those movements acting on behalf of it [3].

The difference between science and ideology is marked by fallibility/falsification, to quote Karl Popper's already legendary formula. Therefore, the character of scientific theories resides in their match to measurable facts. Validity of a scientific statement or otherlasts until it is disproved, or replaced by something better. [4]By comparison, ideologies are never wrong, no matter what empiric reality shows.

They justify by changing "*the significance of significance*", as the above quoted Kinloch and Mohan righteously observe [5].

3. THE JOURNEY TOWARDS A SEMANTIC ABUSE

With human care towards nature becoming an increasing component of public speech, many of us are starting to fail to see the difference between ecology (defined as an effort to understand the world) and environmentalism (as an effort to change it, not taking into account if we actually understand the world enough to change it for the better). Therefore, bearing in mind the Popperian requirements for evaluating scientific endeavour, one should be careful first to give clear purpose to the terms employed and draw differences between the connotations those terms may acquire in time.

One of the first definitions of ecology appears in Bruce Russett's works, an influential author on foreign affairs: "*As ecology is defined as the relationship between organisms or groups of organisms and their environment, I also tried to explore the relationship between political systems and their social and physical environment*." (1967). In 1987 Blakie and Blackfield provided a wider definition, and label political

ecology as a pioneering field which combines: "*preoccupation towards ecology with general preoccupation towards political economy. Together, the two include dialectics between society and resources of (sub)soil, as well as between social classes and groups.*"[6] - the latter has the merit to emphasize that relating to the environment is not uniform within the human society/species, it depends on social class, culture, nationality or employment of the individual. Even if saving the planet is something with which all of us can agree upon, the devil always lays in the details, which seldom are apparent to untrained eyes and can therefore be instrumentalised for various partisan lobbyists or profit seekers.

4. THROUGH THE "GREEN" JUNGLE

No one is estranged from the ideological war that took place throughout the historical eras and continues to take place within fields such as politics, religion and culture.

Less known to the public is the infiltration of ideology and propaganda into the world of science, sometimes so deep that it endangers the scientific process in itself. From The Flat Earth and Geocentric Solar System promoted by the Catholic Church for centuries, to the myth of The "Virgin" Yellowstone Park and, more recently, to global warming, ideology has a habit of defeating science and bending the "truth" in order to fashion it according to market-centric standards or gather public attention.

For the last two decades, various political and activist forces have slowly transformed subjects such as global warming (supposedly resulting solely from human activities) and climate change (supposedly resulting solely from human activities) from studies, scientific debates and polemics, into propaganda with a pseudoscientific backing. We make a distinction between geo-climate activities taking place in natural and the ones produced by human/anthropic activities. However, for those who choose to look deeper into the realm of details, there is no consensus in the scientific community with regards to these much heated subjects, both in the "for" and in the "against" camps. And from here things become much more complicated than the simple story that "global warming and climate change are caused solely by human activity, there is no doubt" that is currently served to the public by all possible mass-media channels [7].

The idea battle is incredibly sharp and varied. A few examples from both camps are given bellow:

I. *The increase of solar radiation would be the real cause of global warming and climate change that we notice at present, **not** man-made CO_2.*

The theory removes not one, but two bricks from the foundation of the greenhouse effect of human origin: firstly it designates the Sun as the dominant (close to monopoly) factor in climate variations, secondly it dethrones CO_2, affirming that the Sun (directly and indirectly) controls the way clouds are formed, as clouds actually represent over 90% of the greenhouse effect (gases such as CO_2 and CH_4 finding themselves in the 10% left).

II. *Increase in the quantity of heat released into the atmosphere due to human activities would be the real cause for global warming and climate change that we notice at present, therefore **not** man-made CO_2.*

As global energy demand increased, we started burning increasingly higher quantities of fossil and nuclear fuels. Of the resulting energy: 60% is lost directly to the atmosphere through the chimneys of power plants, as it is well known that only 40% gets transformed to electricity. From these 40%, only 25% reach consumers, the rest is lost again to the atmosphere as heat released by high voltage lines. And out of those 25%, almost all come back as heat to the atmosphere (your TV set, your laptop and your light bulbs generate more heat than that what they were designed to do).

Conclusion: 90% of the energy produced by humans globally, (one way or another) reaches the atmosphere as heat; and energy demand seems to increase continuously.

Low and high altitude atmospheric measurements, as well as satellite atmospheric mapping, both give the same conclusion: the atmosphere is getting warmer, but not where we would expect it! Temperatures have increased more rapidly and by more degrees at Earth's **surface**, than at 10-12 km above the ground where we actually find the highest concentration of greenhouse gases (such as CO_2).

III. *Change of albedo (reflectivity) of Terra due to human activities would be the real cause of global warming and climate change that we notice at present, therefore **not** man-made CO_2.*

The same atmospheric measurements, as the ones for the above theory, can also affirm that the cause of global warming is likely to be the change in Earth's reflectivity, due to activities such as deforestation and urbanisation: cutting forests leaves behind bare soil which absorbs much more solar energy than the leaves of trees, and asphalt and tall concrete buildings absorb even more heat than bare soil/initial vegetation.

IV.*It is not the increase in atmospheric CO_2 concentration that leads to global temperature increase, **but it is the increase in global temperature that leads to an increase in atmospheric CO_2 concentration**.*

There are scientists out there that agree with Al Gore's famous graph, but they think that the CO_2-temperature relationship is the other way around.

V. *Global warming is a good thing: in a warmer world, atmospheric catastrophes would be less frequent and carry less strength.*

The atmosphere is a thermal engine, continuously transporting heat from the equatorial area to the poles. Global warming would warm not only the equatorial area, but the polar areas also, and the equations of thermodynamics predict that, in this scenario, the Earth's atmosphere would become calmer and calmer as global temperatures would increase.

The main idea that connects global warming and current society is **climate change**. This idea is being paraded so much and so far beyond the limits of absurdity, that the authors of the current text are amazed that the public has not reached conclusions such as: either climate has never changed **before humans** appeared on Earth, or **the only factor** leading to climate change is human activity. Both variants are not only with very unlikely, but actually just plain ridiculous. On one hand, we cannot consider such a massive, complex and diverse system as being completely static by its own internal mechanisms, on the other hand we cannot ignore the influence of other factors which are much bigger than humans (such as the cyclic variation and the variation along geological times of solar radiation; the role of carbon buffers played by the oceans, by the organic matter within all ecosystems and by carbonated rock formation; gas emissions from tectonic processes, etc.). Carbon buffering represents the propriety of certain natural or artificial systems to decrease the variations of atmospheric CO_2 concentration

(by means of its absorption from the atmosphere, storage and subsequently it is release back to atmosphere).
The "devotees to global warming" movement has become The Inquisition for the current scientific world, influencing socio-economical decisions without scientific basis, ignoring scientific basis or even going against it.
Ecology versus environmentalism follows the old story of reason versus interest: ideological groups (of any kind, including environmentalists) must create problems or project the illusion of problems in order to propagate their own ideas or to achieve certain goals. Thus global warming is an "industry" in itself, at the moment the existence of tens of thousands of jobs depends on the "existence" of global warming. ***And on the whole, what guarantees do we have that if we do follow what we are being told (we actually do decrease or fully stop CO_2 emissions), that the climate will not go through a "catastrophic change" for the human civilization anyway?***

Let us say that tomorrow we completely stop releasing CO_2 into the atmosphere (and we also absorb all that we have released so far), and then the day after tomorrow (pun intended) we enter a new ice age, for a very simple reason: climate continues its natural evolution by means of its own internal mechanisms. And, more than that, what if it's exactly the CO_2 emissions we stopped, that would have been the method by which us, humans could have prevented that ice age? ***In this* scenario CO_2 emissions would have been a good thing.**

So "CO_2"is nothing else but a battle of ideas, whose only tactics are: demonizing the adversary and adulation of our own stand on things (and, in the scenario above, even placing it on a pedestal). For further details, one is invited to see the documentary: *The Great Global Warming Swindle.*
The global warming idea is a socio-economic vicious circle, as more and more scientists are becoming interested in the subject, the field of study starts to see more and more funds and move more and more money. This was and continues to be solid motivation for the new scientists that get involved to publicly support the idea, even before putting it through the test of scientific study. Scientists are more interested in spectacular prophecies than precise/exact/ correct predictions, another example through which human nature/the human factor can influence the scientific process.

5. CONCLUDING REMARKS. A POSSIBLE DIALOGUE BETWEEN POPPER AND KUHN?

For ages, mathesis universalis- a science of all sciences able to grasp a common language for all walks of knowledge has been a beautiful dream, seldom bordering utopia. In medieval times Scholastics claimed to play such role. With a life span much longer and a wider geographical range, Alchemy's pretence to give a summa sapientia brought together Christian and Arab thinkers. Isaac Newton himself, from many points of view the father of modern science, was, at least later in his life, a consummate alchemist, doubled by an astute reader of the *Kabbala* [8].
Recently, with the advent of the industrial revolution same mantle would be assumed not necessarily by one science, but by different paradigms (courtesy Thomas Kuhn): positivism, behaviourism, quantum physics, bio-ethics and so on. Given all the above, is environmentalism the new grand paradigm to chart the praxis in the 21st century? And if this is so, then how can one channel it, in order to remain within the borders or reason, empiric inquiry and fact-based conclusions?
This article sketched a few thoughts about the perils of using environmentalism as a political instrument. The red thread to underpin the whole argument states that an interdisciplinary rendezvous between environmental studies/ ecology and social sciences, as fashioned by Al Gore's "*An inconvenient truth*" and "*The Great Global Warming Swindle*" documentary, shows how a debate may be oversimplified and deformed by manipulation.
Social scientists are rarely prepared to grapple with the specificity of the natural environment not to mention their lack of knowledge in chemistry or physics. On the other side, those with and ecological background might be ignorant with regards to social theories, school of thoughts, unwanted consequences of assuming one ideology or the other due to some fancy slogan or catchy flag. At the same time, mutual ignorance may deceive those who venture into the realm of interdisciplinarity and lead them to mistake lies with credible results [9].

How to avoid doctaignorantia and bridge a substantial dialogue between disciplines in order to craft sound policy oriented solutions? One answer - sketched here as food for future thought - might imply fusing Karl Popper with Thomas Kuhn. Although their world views have been presented as incompatible [10], both of them strive to find how knowledge is produced through the interaction of academic communities. While Popper repeated that scientists should be careful to maintain a free society among themselves and periodically mistrust their own research; Kuhn spoke more about how group established mentalities (namely paradigms) drive the pursuit of truth.

Given the nowadays interdisciplinary makeshift between social sciences <-> ecology <-> public awareness towards the environment, probably we should first confess a paradigm crisis (the first step towards redemption is to confess one's mistakes and limits) and only thereafter work to mend whatever differences and semantic misunderstanding may still be separating us, all within the boundaries of pluralism. To discipline the inter-disciplinarity is not an easy task at all, and its reward will not be the much craved *mathesisuniversalis*, but a *lingua franca* for the age to come.

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GENERAL THEORETICAL ASPECTS REGARDING BIBLIOMETRICAL RESEARCH

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Abstract. *An important role in information services is bibliometrics, which monitors and analyzes information resources, and provides a knowledge management in a social and organizational context. Providing this information is done via bibliometric research through the librarian.*

Key words: *bibliometrics, scientometrics, metrics, bibliometric research, bibliometric indicators, bibliometric databases.*

1. INTRODUCTION

Today's term *bibliometrics* merges with the term *scientometrics*, and is increasingly replaced with the term *metrics*. For these terms some definitions have been attempted over the years [1,2,3]. Thus, in 1969, Pritchard, Nalimov and Mulcheko almost simultaneously introduced the terms *bibliometrics* and *scientometrics*; the definition they give for the former term is *an application of mathematical and statistical methods to books and other press communications of the media type* (Pritchard), and for the second, *the application of those quantitative methods dealing with the analysis of science seen as a process of information* (Nalimov).

In 1988, Vinita took over the term of *infometrics* and explained that it *deals with electronic media, and includes topics such as statistical analysis of scientific texts and the hypertext system, the circulation of documents in libraries, measurement of information in electronic libraries, models for production and management of information, and quantitative aspects of information storage.*

In 1994, Glanyel and Schoephlin argued that *bibliotemetrics* and *infometrics* include *all the quantitative aspects and scientific communication models, storage, dissemination and storage of scientific information.*

The most commonly used of the three terms, is *bibliometrics*, which is also the most frequent in the literature; it is defined as being the branch of bibliology branch whose scope is the quantitative study methods relating to the production, characteristics and flow of information [4].

2. MODERN BIBLIOMETRIC RESEARCH

Therefore, society as a whole needs a review of the exigencies of the moment. It seems that teachers, researchers and students increasingly need librarians.

Only they can restore the balance to the scientific community, it is they who will be responsible for the content of the information handled and used in libraries and documentation centers, in both processing and information processes, and the so-called info-documentary processes. At present only they have the necessary skills related to the specific specialty of that content. A reference librarian or bibliographer is an information specialist, a person who must prove both his/her analytical ability and his/her good knowledge of the various systems of information retrieval.He/she can involve himself/herself in the work meant to support the education and research process by means of: a) providing consulting services and specialized assistance; guidance in the modern information system, by querying databases (which are purchased institutionally, because individual costs are not justified); b) supplying products in print and digital format regarding information literacy (first-year students are given a leaflet when they enrol, or are informed that there is a library guide, a guide for consulting the databases, etc). c) development of bibliographies on request.

In these circumstances, visiting the library becomes mandatory for users, who will discover an even wider range of publications and valuable information that meets their needs.

On the other hand, those who are expected to make knowledge in their areas advance are those who write and publish articles and papers in journals that are recognized by the scientific community. It is to their interest that the result of their research should reach all the colleagues in the scientific community as quickly as possible, and especially that they could get a feedback that expresses the measure of their value. Sometimes, this does not happen or happens with more difficulty because prices of subscriptions to scientific journals are prohibitive, or there are various hindrances from the publishers. The author is asked by the publisher, for his/her paper to be published in a top-ranking scientific journal, that he/she gives them their copyright, lest the author should not subsequently post the article on their Web site, being liable to be sued by the publisher. And it will take some time, because there occurs the "embargo" that delays information from reaching those interested, as a certain spell of time should elapse before it eventually appears in a commercial data base – a period the publisher needs to publish the paper version.

From that angle as well, librarians feel involved and advocate *open access to scientific information*, free and rapid implementation of literature in scientific periodicals for all researchers in all countries to use, and protecting it via non-restrictive licenses, which should allow any type of use in compliance with certain rules on attribution and citation.

In an attempt to understand the scope and dynamics of the scientific world and its interaction with the rest of society, we find that there are several different dimensions and dynamics to distinguish. A comprehensive approach to the problem is provided by the regular statistics and reporting released by the *National Science Foundation in the United States*. [5]

We can mention some of them:

I. The cognitive dimension of research

The activity of research has a set of special connotations, as an organized cognitive activity in society resulting in discovering more appropriate representations of reality, disseminated in society, that is published and stored in bibliometric databases that make them more available.

Research is usually carried out in the academic disciplines, and new knowledge is produced, which can be new only if it is recognized as such worldwide.

II. The commercial dimension of research

Research income = the income of the group concerned, arising fromexoliting the intellectual property rights of the results of the research. This dimension can be determined directly from the accounts of the respective institution if the group assessed is the staff of one institution.

Some institutions have other purposes, too: practical (commercial exploitation of scientific authority in the form of consultancy services), educational or accounting. Whatever the involvement, the literature would profit, it will be promoted, ideas will be exchanged, will be professional improvement, and itwill all reflect the quality and progress in the field. The bibliometric analysisenvisages the evaluation of scientific research productivity and effectiveness. The rate of input / output is regularly calculated, and resourcesare monitored at all levels and, on that basis, allocated. The place of a researcher or organization in the national, regional or world system can be determined, who is the leader in a particular field of research, or even the dynamics of scientific directions, the history of science, etc.

Databases provide access to differentiated bibliometric indicators. The basic components of bibliometric tools are generally: 1) *the units of bibliometric analysis*: books, monographs, reports, theses, articles in journals, reviews and other periodicals; 2) *the basic unit in bibliometric analyses*: the article in peer reviewed scientific journals; 3) *the elements of bibliometric analysis*: the articles, the authors, the references and citations; 4) *the simple bibliometric indicators*: the number of items, the number of authors, the number of citations; 5) *complex bibliometric indicators*: index of citations, impact factor, Hirsch index, etc.

Therefore, the units of analysis can be books, theses, magazine articles, papers, etc. The statistical expression of the various ratios of these elements represents *the bibliometric indicators*. We use the following*bibliometric indicators for publications*: the impact factor, the relative influence score, and the Index Copernicus Value [6].

The impact factor is an index that allows us to approximate the value of scientific publications and help to compare them.It allows assessing the importance of a journal or review, and is calculated as equal to the number of citations of the article or paper, divided by the number of citable articles over a period of time (Thompson company do this calculation;it is generated using data from the Web of Science;it can be found in the *Journal Citation Reports* or on the website of the journal).It is assumed that, the more important a journal is in a field of science, the more it will be used and cited, and so it will have a higher impact factor.

The relative influence score is the ratio of the influence score of the articles in a journal and the influence score of the journal. The article influence scoreis calculated by Thomson Reuters in *Journal Citation Reports*. This indicator is important for the eligibility of the titles of teachers in higher education, of the professional degrees in research and development, and the habilitation certificate(for detailsone mayconsultthe UEFISCDI link at:http://uefiscdi.gov.ro/ articole/3055/Scorul-relativ-de-influenta.html).

The *Index Copernicus Value* comes from the international platform specialized in promoting scientific results. It enables collaboration between researchers and publishers of scientific journals. *IC Journal Master List* is a database that indexes over 13,000 journals in the world. For ICV calculation methodology one can access:http://jml2012.indexcopernicus.com/page.php?page=3.

As *significant bibliometricindicators for articles* one can analyze the citation index and the Hirsch index. The *citationindex* (number of citations) remains the most widely used indicator, and it represents all the citations of an article over a period. It is found in *Web of Science*, *Scopus*, *Google Scholar*and *Publishor Perish* and. However, *Google academic* does not search in library subscriptions. The *Hirschindex* (or *h-index*) is the bibliometric indicator that measures the scientific visibility of an author, his/her scientific performance.A scientist has an *h* index if h scientific articles of the total number ofhis/her published articles each has at least h citations numbers. This index (calculated by *Scopus*, *Web of Science*and *Publish or Perish*) has the capacity of highlightingthose researchers who have made a significant contribution in their field, but did not gainthe reputation they deserve from the scientific community.

Ca *indicatori bibliometrici pentru autori* există şi este mai des accestat *Publish or Perish,* un software gratuit de analiză a citărilor ce utilizează datele din Google academic şi Microsoft Academic Search. / As there bibliometric indicators for authors and Publish or Perish accestat often, a free software citation analysis using data from Google and Microsoft Academic Search Academic.

Other indicators that are often used are Altmetrics and Webometrics. The former shows how far and how wide the content of a paper was spread on the web, and the content of the papers could be signaled on social networks, blogs or libraries through the management of references such as Mendeley, Zotero, Connotea, End Notes (seehttp://altmetrics.org/manifesto/), the latterprovides a) indicators underlying the ranking of universities (Nobel laureates, medals, Highly Cited Researchers, papers published in Nature or Science, large number of papers indexed Science Citation Index Expanded (SCIE) and Social Science Citation Index (SSCI), and b) indicators underlying the ranking of world universities: the volume of the web content, i.e. web pages and web files, as well as the visibility and impact of the web publications through the full number of occurrences of the link on the webhttp://www.webometrics.info/en/Methodology

Bibliometricresearch is aimed at three target groups of "contemporary bibliometrics": a) bibliometrics for *bibliometricians*, which considers informationmeant for users (it helps librarians to manage the collections of series and the subscription budgets, and publishers to monitor their competitors); this research represents basic research in bibliometrics and is aimed at the methodological aspects of developing and operation of instruments; b) bibliometrics for *researchers and scientists* (it helps them to keep abreast of scientific information in a particular area, to identify the journals relevant for their research). This is the group represented by most of the users; c) bibliometrics for *policy makers and managers in the field of science* (the tools provide data necessary for evaluating research,for individual and / or institutional scientific evaluation).

However, bliometric research has some disadvantages. Some mediocre people may become 'learned'thanks to the "bibliometric method", while a real, innovative researcherfails to progress and remains unnoticed. What could be of interest is cognitive rather than quantitative evaluation: this is the only path leading performance. Another major drawback is the fact that older specialized literature

and it could be omitted, because the main goal is to cite recent literature (within 5 years).

The Library of the Piteşti University provides access to the bibliometric database*Thomson ISI - Web of Science*–which is actually a complex and comprehensive information resource; it isat once a bibliometric and bibliographical database, available on line onthe*Web of Knowledge* platform. There are references on journals and conferences, most of which have with an ISI impact index. It is a useful tool for librarians in terms of decisions on annual procurement of journals.The user can set up their personal account, thus becoming part of the online community of researchers, and sohaving the promise of visibility:i) alerts configured for citations; ii) list of relevant journals, viewing or sending their contents by e-mail; iii) lists of saved results; iv) reports of the articles published and criteria received in keeping with the years, and for some papers and articles it is even allowed to access the full version; v) citations, the sum of all citations, average number of citations per articleand *Hirschindex*, etc.Also,an alert for citations can be created, so when the article is cited, a notification will be received by e-mail. In much the same way,the articles related to it can be seen, as well as the references used, and whether the journal that published the article selected is ISI or not, through a link to the database *Journal Citation Reports*. It can also generate a graphical representation of the impact factor.

The *Institute for Scientific Information* (ISI) has been indexing scientific journals, conferences and patents after an evaluation process since 1955, when it was founded by Eugene Garfield, now being part of Thomson Reuters Corporation. A journalthat is not found among the journals indexed journal ISI is considered to be BDI (indexed in international databases), so it is part of the *Master Journal List*.

The*Master Journal List* includes all the journals that are found in the various scientific products of the Thomson Reuters Corporation of Philadelphia, USA. *Thomson ISI – Journal Citation Report* is available online on the *Web of Knowledge* platform and provides quantifiable statistical data that allow visualization of ISI journals, with no exceptions, and only the full list of the journals, and statistical data on the dynamics of citations (e.g.citations of the articles in the journal, in an annual report, and/or the table including the papers that have cited the papers in the journal).

At the address http://addmin.apps.isiknowledge.com can be viewed Romanian ISI journals. ISIannually publishes the *Journal Citation Report*, which lists several scientometric indicators. Publishing in an ISI journal means to respect certain international requirements of research and writing, providing the chance of being read and commented on. *Thomson ISI – Dervent Inovation Index* includes data on patents and inventions recorded in 40 countries, including Romania.

It provides an international overview of an invention, including its novelty, its legal owner and its degree of protection. It helps users to identify the progress of technology, reduces duplication of research in a particular field, oversees the global activity of all competitors, develops new ideas, identifies the possible gaps in the market and leads to the patenting of new research.An important role in information services is bibliometrics that monitors and analyzes information resources and provides a knowledge management in a social and organizational context. Providing this information is done by means of bibliometric research, helped along by the librarian – a *guide and leader*, a *mediator of culture and science*, a *creator of links*.

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Excerpt from the list of publication of the authors of indexed articles THOMSON REUTERS ISI-WEB OK KNOWLEDGE at the University in Piteşti, in 2013 (inter-, trans-, cross and muldisciplinary papers)

Name	Surname	Institution	Papers ' title	Journal	ISSN	Impact Factor (IF)in2013
Savoiu	Gheorghe	Universitatea din Piteşti	**FOREIGN DIRECT INVESTMENT BASED ON COUNTRY RISK AND OTHER MACROECONOMIC FACTORS ECONOMETRIC MODELS FOR ROUMANIAN ECONOMY**	**ROUMANIAN JOURNAL OF ECONOMIC FORECASTING, VOL. 16:1, PAGES: 39-61 (THOMSON REUTERS ISI-WEB OK KNOWLEDGE) PUBLISHED :MARCH 2013**	1582-6163	0.208
Dinu	Vasile	Academia de Studii Economice Bucuresti				
Ciuca	Suzana	Universitatea din Piteşti				
Dicu	Maria Magdalena	Universitatea din Piteşti	**RESEARCHES CONCERNING THE TITANIA COATINGS FORMED ON TITANIUM BY PLASMA ELECTROLYTIC OXIDATION**	**OPTOELECTRONICS AND ADVANCED MATERIALS - RAPID COMMUNICATIONS, VOL 7, ISSUE 5-6, MAI-IUNIE 2013, P. 402-405**	1842-6573	0.449
Abrudeanu	Marioara					
Moga	Sorin					
Bubulinca	Constantin					
Plaiasu	Adriana Gabriela					
Giosanu	Daniela	Universitatea din Piteşti	**THE ISOTOPIC ANALYSIS - A GOOD TOOL FOR VERIFYING THE GEOGRAPHICAL ORIGIN OT WINES**	**REV. CHI. (BUCHAREST), 64(4), P 414-416, APRILIE 2013**	0034-7752	0.677
Vajan	Loredana Elena	Universitatea din Piteşti				
Costinel	Diana	Icsi Rm. Valcea				
Deliu	Ionica	Universitatea din Piteşti				
Neagu	Mihaela	Universitatea din Ploiesti	**ADSORPTION STUDY OF PHENOLIC COMPOUNDS SUBSTITUTED WITH NO2 AND CL GROUPS ON ACTIVATED CARBON**	**J ENVIRON PROT ECOL, 14(2), P 552-558, APRILIE-IUNIE 2013**	1311-5065	0.338
Vajan	Loredana Elena	Universitatea din Piteşti				
Giosanu	Daniela	Universitatea din Piteşti				
Giosanu	Daniela	Universitatea din Piteşti	**A COMPARATIVE STUDY OF DIFFERENT METHODES USED TO DETERMINATE THE CHROMATIC PARAMETERS OF RED WINES**	**J ENVIRON PROT ECOL, 14(3), P 907-912, IULIE-SEPTEMBRIE 2013**	1311-5065	0.338
Vajan	Loredana Elena					
Paunescu	Alina	Usamv Cluj, Poli-Tehnica Bucuresti	**THE PROTECTIVE ROLE OF MALVIDIN ON THE HEMATOLOGICAL, BIOCHEMICAL AND HISTOPATHOLOGICAL PARAMETERS OF MARSH FROG(PELOPHYLAX RIDIBUNDUS) EXPOSED TO SUBLETHAL DOSES OF ROUNDUP**	**FARMACIA, 61(3), P 439-447, 2013**	0034-7752	1.251
Dima	Romulus	Politehnica Bucuresti				
Ponepal	Maria Cristina	Universitatea din Piteşti				
Brainzea	Gheorghita	Universitatea din Piteşti				
Iosub	Ion	Universitatea din Piteşti				
Soare	Liliana Cristina	Universitatea din Piteşti				
Draganescu	Doina	UMF, Bucuresti				
Dinu Pirvu	Cristina	UMF, Bucuresti				
Iosub	Silvia	Politehnica Bucuresti	**ANTHOCIANIN AND CARBOHY-DRATE CONTENT IN SELECTIVE EXTRACTS OBTAINED FROM BLACK GRAPES VARIETIES**	**REV. CHIM. (BUCURESTI), 64(10), 1078-1082, 2013**	0034-7752	0.677
Soare	Liliana Cristina	Universitatea din Piteşti				
Rau	Ileana	Politehnica Bucuresti				
Meghea	Aurelia	Politehnica Bucuresti				
Soare	Liliana Cristina	Universitatea din Piteşti	**THE EFFECTS OF SOME PESTICIDES ON SPORE GERMINATION AND GAMETOPHITE DIFFERENTIATION IN ATHYRIUM FILIX-FEMINA (L.) ROTH. AND POLYPODIUM VULGARE L.**	**NOT BOT HORTI AGROBO, 41(2), 458-462, 2013**	1842-4309	0.476
Dobrescu	Codruta Mihaela	Universitatea din Piteşti				
Popescu	Monica	Universitatea din Piteşti				
Boeru	Alina Gabriela	Universitatea din Piteşti				
Savoiu	Gheorghe	Universitatea din Piteşti	**METHODOLOGY FOR CALCULA-TING A COMPLEX INDEX FOR ASSESSING THE PRESURE OF REGIONAL INDICATORS ON PUBLIC ADMINISTRATION**	**TRENSYLVANIAN REVIEW OF ADMINISTRATIVE SCIENCE, ISSUE 40E, P. 16-22, OCTOMBRIE 2013**	2247-8310	0.532
Dinu	Vasile	Academia de Studii Economice Bucuresti				
Manea	Constantin	Universitatea din Piteşti				
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Tetiu	Ovidiu	Spitalul Judetean Arges				
Savoiu	Gheorghe	Universitatea din Piteşti				
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Mihaila	M.	Spitalul Judetean Arges				
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Sudharsan	S.	Vhnsn College, India				
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TEAM RESEARCH PRINCIPLES, OR ABOUT THE FUTURE OF INTER-, TRANS-, CROSS- AND MULTIDISCIPLINARITY IN SCIENTIFIC RESEARCH

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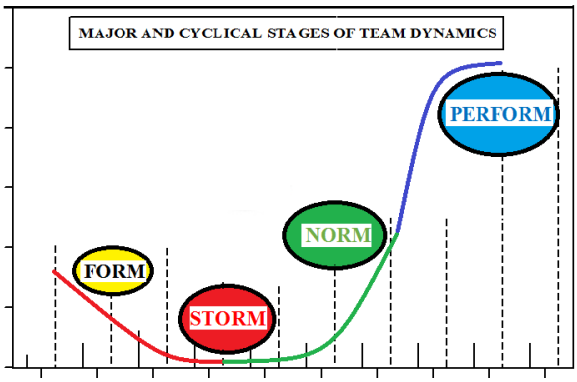
Abstract. *This paper underlines the importance of team in the contemporary scientific research. A brief history of the concept of team and derived from here of the team principles generates the introduction. The major subjects of the paper are discussed in the fundamental part of the article, and these are the understanding of a modern team, the specific features of the research team, and finally, the article's authors describe the specificity of Mircea Maliţa's way of thinking about team principles within a project, as the most adequate form of modern research..*
Key words: *research team, team dimension, team research principle, inter-, trans-, cross-, and multidisciplinarity.*

1. INTRODUCTION

The scientific literature uses the word *team*in many variousmeanings. The word *team* means in the common language either a group in which scientists, teachers, researchers work together intensively to fulfill a common goal, or, in a scientific research way of speaking, the team is an association made up of people working together to achieve a mission, and share responsibilities for attaining the expected results [1].The most usual team in classical scientificresearch was the so-called "small research team" defined by a small group of researchers with complementary abilities or skills and proved competencies dedicated to solve a scientific problem or project as a common purpose with reciprocal advantages. Out of the people who gathered together or who are part of a research team (built ad hoc or not ad hoc), the great majority of them recognizes the usual cycle stages required by the development of a scientific research team or otherwise knows the classical pattern: i. Forming; ii. Storming; iii. Norm-setting and iv. Performing (Figure no. 1).



Source: Adapted from [2] and Ed Horner graphical vision (2013)
Figure no.1.The stages of team development

Any brief history of the team principles must include Maximilian Ringelmann, a French agricultural engineer, born in 1861, and his fundamental ideas the so called triad of a performing research team. He succed to formulate for the first time perhaps, the major principle of team work: a) the more people pull on a rope, the less effort each individual contributes, though the total force generated by the group rises; b) the optimum team size to complete or achieve a set of tasks seems to be around 3-5; c) the targets designed to be completed by small groups are indeed efficiently conducted by small groups. The four classical principles of the usual team building in contemporary management, are somehow different, but the final results lead to a deeply concordance with Ringelmann's first principle of team work, even today (Figure no. 2).

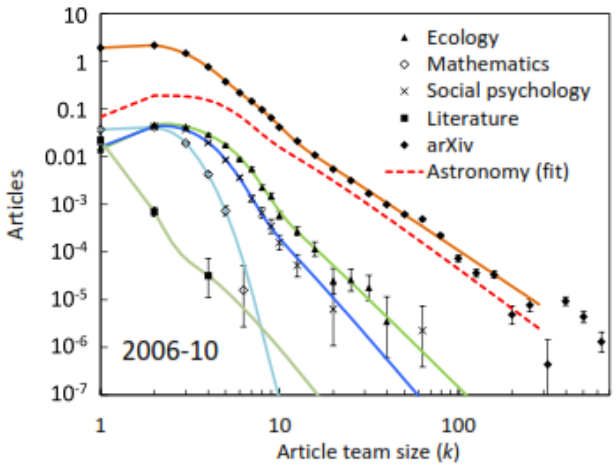
Source: [3] *The principles of Team Building*
Figure no.2. The classical team principles in management

The modern research team building means the reunion of the more detailed principles known as the "ten gold existence conditions of a team": i) the unity of the research purpose; ii) the profound communication of the information; iii) the embrace conflict; iv) the scientific respect; v) the clear goals; vi) the active and permanent participation; vii) the necessary of partnership and collaboration; viii) the importance of the specific and detailed roles; ix) the full trust; x) the optimal standards able to offer the cohesion, trust and harmony.

2. THE SPECIFICITY OF THE SCIENTIFIC RESEARCH TEAM

There are important properties of the time and space evolution, and internal structure of teams still uncovered, but little attention has been paid to the most basic property defined by its size. In the domain of team's size Milojevic's model is

very important being based on two principles:
a) *smaller (core) teams form according to a Poisson process*;
b) *larger (extended) teams begin as core teams but consequently accumulate new members through the process of cumulative advantage based on productivity* [4].
A lot of studies have emphasized the exponential growth of the dimensions of thescientific research team during the last five decades, especially in published papers work and in the light of different authorship methods and models. The dimension of a scientific research team explodes using the allure of a power law. During the decade between 1960 and 1970 both the core and the extended teams were relatively small (e.g.. 1.1 and 2.5 members and the average size of core teams has increased to 3.2 members), between 2006 and 2010, after Milojevic's analysis, the team size has reached the value of 11.2 members (as in Figure no. 3).



Source: Milojevic's paper [4] fig.no. 5 p. 3987
Figure no.3. The evolution of the team size in scientific research

An excerpt from the conclusions of Stasa Milojevic's paper underlines that the team size will continue to grow even in the next decades in the scientific research.

In modern academic education, the entrepreneurial accents of which are obvious, the knowledge acquired by students and graduates, assistant lecturers and professors should be as many theoretical building blocks for construing theoretically and practically implementing projects; in modern research, the research team should be the fundamental, optimized support of the research project, paper, etc.

The concrete activity of conducting and implementing a project or a published paper takes place under the impact of *theoretical and practical premises*, of which it is advisable that each team member does not omit at least the following *factsor minimum requirements* [5,6]:
1. all those involved in the specific activities of the project or of the research paper will *follow the same goals*, otherwise theteam selection was useless, and should be resumed;
2.all the objectives of the project or of the research paper will be declared, so there will be no hidden goals, or goals that were not explicitly stated, otherwise the project manager is incompetent or, what is even worse, dishonest;
3. *all those involved in team research team will be under the presumption of honesty* (to one another), if this truth is not met, then the team cannot be functional;
4. *each of the team members must possess a minimum, yet sufficient stock of knowledge and experience in project management* or as a member of a team writing a scientific paper (including the field or scope or the project in question), otherwise the project manager's decisions cannot be operative;
5. *all those who are part of the team will meet in order to successfully complete the project or the research paperthat will work on*, so they know the success criteria;
6. *all those who are part of the team will know the project's or the research paper'sgoals one by one*, thus understanding the importance of certain activities in the final realization of the project, much more easily;
7. *all those who make up the team will be informed clearly, promptly and in detail about those aspects considered as essentially relevant about the funder, their objectives, those targeted by the project* or *the research paper*(information about who the client, target audience or group of users are).

The first four questions you the research project manager or of the main author of a published paper should answer, in the practice of forming and the functioning of a team, are related to how he selects a relatively homogeneous team that is appropriate to the scientific target, then what kind of responsibilities will be assigned to the team, then how their responsibilities will be communicated to them, and, finally, how the project or the published paper's tasks will be adjudicated individually.

The research project or the paper are concepts strongly related to how human actions or activities are understood. The main feature of a research project or paper nowadays are their threefold collective character: through the target group as beneficiary, through the partnership as initiation, and through its team spirit as achievement [7]. Of the three features of a project or article, however, the dominant one is its conducting in terms of team spirit.

But before trying to comply with these truths or minimum requirements, all the participants in a project must know the laws of a team, summarized in a famous formula by Romanian mathematician Mircea Maliţa: "common language and heterogeneous contribution" for all the co-workers in the project [8,9]. A fact that was first reported in the Romanian economics literature by Costin Murgescu, and magisterially synthesized by Mircea Maliţa, identifies five principles considered vital to address an economic and social project, or papers and books authored jointly, by means of "team spirit" [8,10].

A first principle of team operation is *refusalof identity*, expressed by the already established formulation: "*two identical people will never be a real team, able to solve a complex project or article.*"

However, the extreme situationmust also be carefully evaluated when the people involved are so different that there no common language can hold between them. Aggregating qualitative diversity of the team members replaced their simple quantitative summation once and for all, over the whole life cycle of a project, or book, or article, from their initiation to their writing and eventual implementation. Refusal of identity ineluctably matches, via the project, book, or article, the heterogeneity of the team members.

A second important principle is recognized by asserting the *primordial significance of the project, book or article***.**Thus, a project, a book or a paper exist and last as long as the team members understand that team spirit is subordinate, no less than the team as a whole, to the spirit of the project, book or paper. Consequently, modern society will, through generalization, encourage projects, books, papers that are original and innovative, rather than teams or institutions that are eternal or "frozen".

A third principle can be summarized in the formulation: *it is advisable that the manager should be the centre or the node of the relational network within the team.*In terms of practical details, any team has a centre or a relational node, identical to the "de facto" manager of the project, book or article, which the whole team should be subordinate to. Normally, this "de facto" manager will become the formal manager, being the person in the team network who has the maximum number of real connections with the team members. The team that does not cultivate, but denies or reduces its centre, annul their project, book or article, and condemn themselves to extinction.

The fourth principle is the principle of *multidimensional thinking and systemic action of the team.* According to this principle, the team's thinking essentially differs from the qualitative thinking of the individual team members, who conduct the project through a multidimensional, systemic (or "whole") approach rather than as a result of aggregating the part-wise individual (i.e. one-dimensional) approaches.

As can be easily found, there is an obvious analogy to the distinction between mere summing and statistic aggregation, and it coincides with the synthetic approach, where the system is more than the sum of its parts. The fifth principle, that of team spirit quality, states that team spirit and teamwork in achieving the project, book or paper is, in point of quality, fundamental different from the individual spirit of those who make up the project team and work towards that target. The spirit of cooperation, solidarity, cohesion, or, in general terms, spirit of partnership, partner intelligence and development towards total partnership are to be educated, they are constantly acquired, accumulated.

3. SOME FINAL REMARKS

The team members should not be many, in terms of number and quantity, but rather cover the issues of the project in terms of quality: so, "*non multa, sed multum*", or, in a more modern variant, "*non numero, sed pondere*".

In today's projects, books and papers, effective management team focuses, among other things, on three success criteria for its structure:

i) it is recommended that the team manager does not come from the scientific or professional field specific to the project, book or paper;

ii) the success of the project, book or paper is inversely proportional to the value disparity of the team members' level of intelligence,

iii) closely comparable individual practical performance of the team members increases the chance for the project, book or paper to be eventually declared a real success.

Poor management of a team in research projects, books or papers is due, among other things, to the manager's or first author's excessive involvement in the technical details of the project, book, paper, by the team's polarizing heterogeneity and the inequalities in the team members' individual practical performance [11] ...

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