### Scientific analogies in institutional economics

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**Abstract.** The article presents a critical review of physical and biological metaphors in the institutional economic theory. It is proved that physical (including mechanistic) analogies are most adequate for the associative characteristic of a statics and kinetics of institutional systems, and biological – for the figurative description of their evolution. Efficiency of use of metaphors and analogies from the most developed, vanguard areas of natural-science researches is shown.

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### Introduction

Using metaphors and a vague framework of categories and concepts are the major challenges of economic institutionalism. The amount of imagebearing terms is huge and is steadily growing. There are the following institutional terms as "climate" and "nucleus", "rods" and "crossings", "withdrawal" and "weariness", "labyrinths" and "vacuum", "matrices" and "holes", "viscosity" and "mutations", etc. These notions do not have a strictly formulated and welldefined nature very often. They are operational enough. Yet some metaphors are loosely bound with others and their positions in the general grade system have been insufficiently specified. On the one hand, pictorial images facilitate overcoming the barrier of new conceptions misunderstanding, encourage new objects and ideas involvement into the research field of institutionalism. One the other hand, they more often induce unproductive, apt to scholastic debates thus leading away from categorial means specifying and developing [1]. But if "metaphor is a means of great conceptual power" [2], then comparative analysis of metaphor constructions and the most spread analogies is a specific methodological reflection which has a fundamental meaning for development of any science or research.

Physical and biological metaphors are the two prevailing groups of metaphors in contemporary institutional economy. The former rest on theoretical branches of physics, including mechanics, as well as engineering inseparably related to "academic purposes of transforming economic theory into deterministic study such as Newtonian mechanics" [3]; the latter are based sometimes on too literal perception of A. Marshall's saying that "the Mecca of the economist lies in economic biology rather than in economic dynamics" [4]. Both directions of metaphorization are developing rather steadily increasing scientific turnover of the produced by them associative imagebearing notions growing step by step into extreme forms such as physicalism and biologism. The evergrowing *amorphousness of categorical means of institutional investigations prevents them from intensive development* to a greater degree than encourages multidisciplinary synthesis slowing down relevant reflection of the examined aspect of the objective reality in generally approved scientific terms.

Is it reasonable to use the notions from institutional matrix, structure and system (as well as field, environment, and context) as synonyms as D. Nort does or the language of science should be as precise as possible? How valuable are institutional metaphors from heuristic point of view and what their negative effects are? Is using metaphors (as the way of reality reflection) limited? How does efficiency of physical metaphors (particularly mechanistic) correlate with biological ones? What future do they have? The attempts to answer these disputable questions, to our mind, are significant for for methodological selfdetermination of institutional economic theory.

Fundamental problem of natural science metaphors is firstly their correlation with inanimate nature which functioning and developing mechanisms are quite different from the ways living systems evolution, and secondly, the fact that elements inanimate nature such as atoms and molecules are closes systems whilest living particles are open not only thermodynamically but also informationally [5]. For this reason though neoclassic conception of equilibrium is based on powerful analogy, but metaphors of this kind mostly correspond to training goals rather than to research as their strict and logical evidential base is substituted with self-evidence. Institutional processes belong to the ones which can be hardly formalized that brings to using formalization techniques from other scientific fields.

More often institutional biological analogies are created on the basis of generalized evolutionary

forms general principles and theory which methodological frames for investigating various complex, developing systems both in nature and society. Principle unanimity of laws and mechanisms of developing any complex systems (both biological and social) necessitates efficient use of ideas and conceptions of evolutionary biology. Certainly following R. Nelson and S. Winter "We emphatically disavow any intention to pursue biological analogies for their own sake, or even for the sake of progress toward an abstract, higher-level evolutionary theory" [6]. Economic evolution is far more complex and diverse than biological one, and yet these processes have certain similarities reflected in closeness (but not identity) of theoretical interpretations [7]. However "direct analogies are certainly to be avoided but higher forms of reality movement keep their link to less developed ones and the strongest links are between immediately preceding ones" [8] that is particularly significant for research methodology of evolution of economic systems. their institutions and institutionalization mechanisms.

# Materials and methods

P. Samuelson sarcastically noted in his Nobel prize lecture while generalizing Le Chatelier's principle as applied to economics, "There is really nothing more pathetic than to have an economist ... try to force analogies between the concepts of physics and the concepts of economics. How many dreary papers have I had to referee in which the author is looking for something that corresponds to entropy or to one or another form of energy" [9]. Nevertheless since 1990-s econophysics has been actively developing. This is an interdisciplinary research field, applying methods originally developed by physicists in to solve problems in economic. It was a rapid growth of synergetics that allowed adjusting analytical tools of theoretical physics to investigation of non-linear and sometime turbulent processes of economic systems development [10]. The tool set of econophysict is made up of quantum and statistical mechanics, physical kinetics, non-equilibrium thermodynamics, theory of dynamic systems and chaos, etc. [11]. Proponetns of institutionalism do not utilize these fundamental approaches comprehensively. They just turn to tenuous comparisons and general analogies by means of universal notions as bifurcation, chaos, synergetic effect. etc.

The notion of "institutional vacuum" has widely spread. It goes up to the conception of "structural holes" by R.Burt [12]. The notion is viewed as an aggregation of "blind spots" of types and forms of activities unregulated by the law, "grey zones" of free interpreting of formal rules, and "gaps" in incomplete contracts. However quantum physics defines vacuum as a space without particles but filled with quantum field in the lowest energetic (ground) state that does not allow identifying vacuum with emptiness as it appeared from classical physics statements. In other words "non-existence as absence of particles and field is impossible"[13].

G. Hodgson's conception of "impurities" is mechanistic in its content. "Impurities" are defined as institutions that "infringe on economic system of this or that type" [14], i.e. essential for its operating but not taking a dominant lead. However experience gained in related sciences (chemistry, ecology, geology, material science, etc.) is ignored as well as experience in categorizing impurities among which unintentional, latent, harmful ones, etc. are distinguished. Although "any system depends on its impurities" [15], they may influence it in different ways. The policy of economic pluralism, which G. Hodgson stands for, implies a combination of administrative and market methods and tools, both public and private institutes, i.e. a kind of "admixing" planned elements to the market system. But ignoring the variety of institutional "impurities" leads to their unilateral understanding and does not allow forming a complete theory, as the author admits [16].

Methodologic conventions of evolutionary biology are rather "flexible" as they are often disputed and revised. Economists. as representatives of other social sciences, risk to give disputable or out-of-date biological conventions the benefit of the doubt, therefore it is crucial to focus on the "forefront" of research. Using know-hows in the field of evolutionary biology allows working out unique conceptual solutions. Thus P. Luksha is developing evolutionary theory of firm basing on nich construction conception [17]. Since the 1980-s biologists have been trying to break stereotype of exogenous environment as a main mechanism of natural selection which assigns to organisms a passive role of "adaptors" to external changes and "translators" of genetic coding that obviously results from the Extended Phenotype by R. Dawkins. Evolutionary changes (dO/dt) were traditionally considered dependent on both individual organisms and their groups (O) and the environment (E) whilst changes of the environment (dE/dt) were treated independent of organisms' activity: dO/dt =f(O, E), dE/dt = g(E). An attempt to overcome a kind of externalism of conventional evolution theory is expressed by amending the formula: dE/dt = g(O, E)[18], which results in rethinking the evolution as a process of continuous, direct, and backward interactions of organisms and their ecological niches focused on selecting environment factors by the species and transferring the reconstructed environment to new generations [19]. In other words, "type of business is able to play a more active role in forming

the environment trying to make it more suitable for itself" [20]. Firms and their business landscapes interfere with the firms in fact selecting evolutionary the most effective resources and transform the nearby market environment according to their needs and capacities within the framework of constructive development strategy.

### **Results and discussion**

The profound examining of institutional changes suggests reasonably analyzing the ways of their originating, and facilitating the related pathological conditions and processes. Institutional pathologies can be tentatively defined as "various destructive manefestations in institutional constructions and mechanisms of their impact on economic agents' behavior" [21]. Certainly, it is unnecessary to apply medical analogies directly to name institutional "diseases", although such a simulation approach can be useful at the stage of forming a new part of institutionalizm. Then along with institutional "sclerosis" ("British disease"), first described by M. Olson [22], the notions of institutional "thromboses", "failure", "dischronation" (a painful loss developmental milestone of the implemented institution), etc. as well as institutional "traumas" one of which is examined by R. Kapelyushnikov [23] could be made more extended. It is acceptable to view institutional "diseases" as symptom complexes characterised by pathokinesis (i.e. pathologic process movement) in institutions and their systems. In other words, this is a set of symptoms or painful characteristics coming from malfunctioning of an institution or institutional system. Such "diseases" are characterized by progressive stream unlike institutional "syndromes" which are even though registrable manefestations of pathological phenotype but at the same time they are "congenital" (immanent to the system) and do not change within the whole life cycle of the institutional system. [24] It is important from the theory of institutional dysfunctionality perspective that numerous possible pathological states ("diseases") and pathogenesis processes which require diagnostics and therapy correspond to a certain dysfunction (as a malfunction or disorder of the functional system). New metaphors may reveal new aspects of institutional dysfunctions, destructions, and deformations.

Contemporary economics as a whole has "strayed from rigidity to viewing dynamic, evolutionary development, as well as to the analysis of emerging complex adaptive systems" [25], moving gradually towards composition analysis of boundary elements ("genes") of economic systems and the ways of their adjustment, selection, and inheritance. One of the most productive applications of biologic analogies in institutionalizm is endogenousness of the institutional factor as a reasonably required element of economic "genes" – various combinations of invariant set of endogenous factors of production and human activities in whole [26]. This methodologic step makes it possible to overcome the interpretation of institutions as external determinants of individual and collective behavior (a kind of "exoskeleton" of economic system) as well as to refuse absolutization of their role in economy evolving in isolation from other transformational and transactional factors. [27] Thus, metaphor of gene allows to understand better the complex intrastructure of institutional systems.

# Conclusion

The given review demonstrates that unambiguous answer is hardly possible, however it allows to make some intermediate conclusions.

Firstly, metaphorism is a reliable, required lerning stage of complex phenomena. On the one hand metaphorism is the way to overcome reductionism, emphasizing new aspects of the analysed objects, on the other hand, imagery always causes fussiness and polysemantics which restrain in fact theoretical analysis leading it to the sphere of institutional wandering. Metaphors in research are at the most relevant that is why developing institutional theory based on predominantly imaginative concepts can hardly become prospective. Alongside with that new areas of institution studies cannot do without applying analogies and associative constructions.

Secondly, using analogies in any science implies its orientation to the most realizable related areas of knowledge. i.e. rather to mainstream than avant-garde of other sciences. The longstanding domination of mechanic metaphors and analogies from Newtonian physics in economic theory is not explained by perceiving the complex systems from afar but by their better understanding by laypeople. That is why analogies from quantum physics and biogenetics are not so easy to survive. Cognitive benchmarking of the best theories (as analogies of the best practices in business) in the related research areas is one of the main progress vectors of institutional Furthemore, physical and mechanic analysis. metaphors should be considered as the most relevant for associative characterization of institutional systems statics and kinetics, whereas biological ones are more suitable for vivid description of principles and ways of their evolution.

Thirdly, metaphorism and formal description are extreme poles of economic methodology range. Metaphors in terminology only emphasise but do not supersede higher heuristic potential of institutional analysis as compared to neoclassical approach and its highly formalized language. According to K. Godel's theorems inconsistency (as well as consistency) of neoclassical axiomatic cannot be proved on the basis of the postulates themselves. For this reason institutional analogies (even misty ones) and metaphors (scarcely ever convincing) fulfill the major task to "undermine" the most solid axiomatic foundation of neoclassic mainstream of contemporary economic theory.

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#### References

- 1. Inshakov, O. and D. Frolov, 2010. Evolutionary prospect of economic institutionalism. Voprosy Ekonomiki, 9: 63-77.
- 2. Brown, T.L., 2003. Making truth: metaphor in science. University of Illinois Press, pp: 215.
- Vargo, S. and R. Lush, 2006. Development of new dominating logic of marketing. Russian journal of management, 2(4): 73-106.
- Marshall, A., 1920. Principles of Economics.8th ed. London: Macmillan and Co, pp: 627. Views: 15.12.2013 www.files.libertyfund.org/ files/1676/ Marshall 0197 EBk v6.0.pdf
- Dopfer, K., 2006. Rule-Based Economics. Evolutionary theory, innovations, and economic changes: VI International Workshop on Evolutionary Economy (Pushchino, Moscow Region, Russia, 23-24 Sept. 2005), IE RAS, pp: 327-342.
- 6. Nelson, R.R. and S.J. Winter, 1985. An evolutionary theory of economic changes. Belknap Press, pp: 454.
- Nelson, R.R., 2012. Why Schumpeter has had so little influence on today's main line economics, and why this may be changing. Journal of Evolutionary Economics, 5(22): 901-906.
- Inshakov, O.V., 2006. Simple bases of complex economic systems. Journal of economic theory, 3: 56-76.
- Samuelson, P., 1977. International Trade for a Rich Country. Lectures before the Swedish-American Chamber of Commerce, New York City, May 10. Stockholm: Federation of Swedish Industries. Reproduced in The Collected Scientific Papers of Paul A. Samuelson, Cambridge: MIT Press, 4(250).

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- Zhang, W.B., 1999. Synergetic economics. Time and changes in the nonlinear economics. M: World, pp: 282.
- 11. Cockshott, W.P. and A.F. Cottrell, 2009. Classical econophysics. London: Routledge, pp: 364.
- 12. Burt, R.S., 1995. Structural holes: the social structure of competition. Cambridge, MA: Harvard University Press, pp: 313.
- Martynenko, A.P., 2001. Vacuum in the modern quantum theory. Soros educational journal, 5(7): 86-91.
- Hodgson, G., 1988. Economics and institutions: A Manifesto for a modern institutional economics. Philadelphia: Polity Press, Cambridge, and University of Pennsylvania Press, pp: 384 p.
- 15. Hodgson, G.M., 1999. Economics and Utopia: why the learning economy is not the end of history. London: Routledge, pp: 357.
- Dupre J, J., 1994. Against scientific imperialism. Proceedings of the 1994 Biennial Meeting of the Philosophy of Science Association, PSA 2: 374-381.
- Luksha, P.O., 2009. Strategy of niche construction in situations of technological domination (Java and Sun Microsystems case). M: Institute of economy RAS, pp: 62.
- Lewontin, R.C., 1983. Gene, organism, and environment. Evolution from Molecules to Men. Cambridge University Press, pp: 273-285.
- Laland, K.N., J. Odling-Smee, M.W. Feldman and J. Kendal, 2009. Conceptual Barriers to Progress Within Evolutionary Biology. Foundations of Science, 3(14): 195-216.
- 20. Levallois, C., 2011. Why Were Biological Analogies in Economics "A Bad Thing"? Edith Penrose's Battles against Social Darwinism and McCarthyism. Science in Context, 4(24): 465-485.
- 21. Petrosyan, D.S., 2007. Institutional pathologies of national economy. Audit and financial analysis, 2: 372-391.
- 22. Olson, M., 1998. Eminence and decline of the people. Economic growth, stagflation and social sclerosis., Novosibirsk: EKOR, pp: 432.
- 23. Kapelyushnikov, R., 2008. Property without legitimacy?. Voprosy Ekonomiki, 3: 85-105.
- 24. Inshakov, O.V., 2006. Institutionality of economic space in the concept of spatial economics. Spatial economics, 1: 5-21.
- Dequech, D., 2013. Economic institutions: explanations for conformity and room for deviation. Journal of Institutional Economics, 1(9): 81-109.
- Penrose, E.T., 1952. Biological analogies in the theory of the firm. American Economic Review, 5(42): 804-819.
- 27. North, D., 2010. Understanding of process of economic changes. M.: HSE publishing house, pp: 256.