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SEARCHING FOR A COMMON DISCURSIVE SPACE BETWEEN THE NATURAL AND SOCIAL SCIENCES BY USING OF ANALOGY

POSZUKIWANIE WSPÓLNEJ PRZESTRZENI DYSKURSU DLA NAUK PRZYRODNICZYCH I SPOŁECZNYCH POPRZEZ ZASTOSOWANIE ANALOGII

Kamila Magdalena Musiał [A,E-F]

Department of Production Systems and Environment, National Research Institute of Animal Production, Poland
Zakład Systemów Produkcji i Środowiska, Instytut Zootechniki – Państwowy Instytut Badawczy, Polska

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Abstract: The need for discourse, and polemics in science is evident across many disciplines. The aim of this paper was to identify selected interpretations of biological strategies within social sciences, based on reasoning through analogy.
Material and methods: Method of analogy may support discovery of new ways to expand evaluative frameworks of distinct scientific disciplines. This study compares certain assumptions to examine whether theoretical debate across different fields of knowledge facilitates emergence of shared conceptual ground.
Results: Economics, classified as social science, has from its early stages drawn analogies to natural processes. A field of inquiry where these two domains may intersect is evolutionary economics. This is because various human behaviors in the economic sphere can be related to mechanisms that occur naturally in the biological world.
Conclusions: Evolutionary economics may provide a platform for interdisciplinary discourse, based on assumption that economic development, like nature, is subject to continuous transformation governed by principles of natural selection.

Keywords: analogy, natural sciences, economic sciences, sphere of knowledge

Streszczenie: Potrzeba podjęcia dyskursu, a zatem polemiki w nauce zaznacza się w wielu różnych jej dziedzinach. Celem opracowania było wskazanie wybranych interpretacji biologicznych strategii w naukach społecznych, na podstawie rozumowania poprzez analogię.
Materiał i metody: Metoda analogii może być pomocna w odkrywaniu sposobów oceny zjawisk czy poszerzania pól oceny dla odrębnych dyscyplin. W pracy porównano pewne założenia, w celu wykazania czy dyskusja teorii w obrębie różnych obszarów wiedzy ułatwia odnalezienie wspólnej dla nich płaszczyzny.
Wyniki: Ekonomia zaliczana do nauk społecznych, już we wczesnych fazach istnienia odwoływała się poprzez analogię do procesów przyrodniczych. Sferą poznania, w której te dwa obszary wiedzy w pewnym sensie mogą być zbieżne jest ekonomia ewolucyjna. Jest tak ponieważ różnorodne zachowania człowieka w płaszczyźnie gospodarczej można odnieść do mechanizmów funkcjonujących w sposób naturalny w przyrodzie.
Wnioski: Ekonomia ewolucyjna może stanowić pewną przestrzeń dla dyskursu na poziomie interdyscyplinarnym, dzięki założeniu, że rozwój gospodarczy podlega podobnie jak przyroda ciągłym zmianom zgodnie z prawami doboru naturalnego.

Słowa kluczowe: analogia, nauki przyrodnicze, nauki ekonomiczne, sfera poznania

Adres korespondencyjny: Kamila Magdalena Musiał, Zakład Systemów Produkcji i Środowiska, Instytut Zootechniki – Państwowy Instytut Badawczy, ul. Krakowska 1, 32-083, Balice, Polska; email: kamila.musial@iz.edu.pl ORCID: 0000-0002-6713-341X

Introduction

One of the outcomes of the encounter between the natural and social sciences is the differentiation in the ways research activities are conducted within each domain. According to this view, the natural sciences are oriented toward explaining processes, whereas the social sciences emphasize understanding them through rigorous reasoning criteria (Kałążna, Rosicki, 2013). These disciplines also differ in their modes of explanation: while the natural sciences predominantly use causal and functional explanations, the social sciences employ causal, functional, and intentional ones (Grobler, 2006). Economics, as a part of sociology, draws on Comte's idea by analyzing human behaviors that are rational and driven by material interest. As a result, certain economic concepts and ideas have been imported into the domain of sociology (Brzeziński et al., 2008). Biology, by contrast, is a truly unique science because, like the cognitive sciences, it locates human beings and their cognitive abilities within the natural world. In this way, it serves as a crucial bridge between the social sciences and the broader field of natural sciences (Miłkowski, 2011).

Although these fields of knowledge analyze the world around us in slightly different ways, they are all classified as empirical or inductive sciences. This shared classification may help establish a somewhat more universal platform for discussion of similarities in the strategies they describe. This is possible due to the broad framing of certain phenomena, which allows them to be compared by analogy and thus become subjects of debate. The need for such discourse, which in fact may take a form of an academic polemic, is apparent in many areas of the social sciences. At the same time, the semantic field of the ongoing debate continues to expand, which in some cases may result in the blurring of meanings and content (Rypel, 2017). In general terms, discourse refers to a set of values, concepts, and views whose cognitive dimension relates to socially accepted axiological systems, designed to organize our perception of the world and enable the evaluation of reality. In this context, discourse constitutes any communicative exchange concerning the negotiation or agreement of meanings between participants in a discussion, including those representing different academic disciplines (Sławkowa, 2006).

One way to seek opportunities for interdisciplinary debate among fields classified as empirical sciences is through an analysis of the legacy of biological sciences. According to Gecow (2014), in recent years there has been growing popularity in applying methods from biology to fields not directly related to it. Following this line of thought, nature and therefore biological sciences can serve as a source of reference and analogy for many other disciplines, including economics as part of the social sciences. This is clearly visible in the form of metaphors drawn directly from the legacy of Charles Darwin (Kałążna, Rosicki, 2013). A potentially shared space for such reflection may be found in evolutionary economics. This is an economic concept that allows for the explanation of economic processes by analogy to the evolutionary processes continuously occurring in the living world (Kwaśnicki, 2009). A key component of this shared conceptual framework is the scientific theory of evolution by natural selection, which has long been a source of inspiration for various fields of knowledge. Bringing together achievements from such different areas of inquiry may help us better understand the place and role of humans within nature. This is particularly important because *Homo sapiens*, as an integral part of nature, engages in various interactions, including social ones, that are closely tied to the state of the environment in which they live (Musiał, 2023). These environmental connections are becoming increasingly significant due to growing awareness of ecological threats, which also affect human populations in different parts of the world, an area of concern not only for biologists but also for scholars across the social sciences (Bańka, 2002; Ciszek, 2020). The aim of this paper is to highlight selected interpretations of biological strategies within the social sciences, based on analogical reasoning. Evolutionary economics is presented as a potential platform for such discussion.

Analogy as a tool for discourse between different fields of knowledge

Analogy is a specific type of relation based on similarity, it may also take the form of a parallel between particular objects, indicating mutual connections betwixt them (Biegański, 1913). Reasoning through analogy can aid in the search for new ways of assessing phenomena and discovering common mechanisms underlying various segments of reality. In the realm of knowledge acquisition, analogy is noted for its ability to support intellectual development and expand evaluative frameworks (Musiał, Musiał, 2021). In the humanities, such parallels facilitate the expression of complex thoughts, emotions, or judgments in an indirect or ambiguous manner, often through the use of metaphors. In this case the theory of metaphor may be useful, because it shows the idea of projecting images from one scientific field into another. It was proposed by Lakoff and Johnson (1999), and according to that concept the purpose of the philosopher's work should be to clarify how metaphorical basis of language, so also systems of knowing, originates in the embodied experience of individuals. It is interesting that according to some findings from cognitive science, human reason is a form of animal reason, and that's why also our interactions with the environment provide the mostly unconscious basis of what is real (Johnson, 1999).

Analogy proves useful in categorization, in the search for reference points, and in systematization. It allows for the creation of new terms and concepts, the naming of phenomena, and the description of events or processes. It also plays a significant role in redefining existing words and their meanings, helping to avoid ambiguity and enhance precision in language usage, whether within a single language or across multiple ones, by identifying similarities and differences in meaning (Biela, 1989). According to this author, analogy also has its place in the natural, formal, and social sciences. In formal sciences, a simple example is: "the proportion 2:4 is the same as 4:8". In the natural sciences, analogy has historically inspired inventions and contributed to a deeper understanding of the world. This method allows for associations between biological processes and patterns of development in nature (Nęcka, 2005). Analogy can also support the identification and transfer of regularities from one discipline to another, such as from economics to politics. It has enabled bold hypotheses and claims, some unverifiable at the time they were proposed, that later became sources of inspiration for further exploration. This was the case with the early reception of theories by Nicolaus Copernicus, Max Planck, and Albert Einstein.

Parallels can also be observed in areas central to economics and derived directly from strategies found in the world of living organisms. These parallels reflect similarities between mechanisms found in nature and those that govern economic systems. References to natural science in economics were already present by the mid-20th century, as seen in the use of metaphors such as "animal instinct" to describe entrepreneurs' profit-driven behavior or the instincts of various "players" in liberal markets. These notions were explored by John Maynard Keynes (1956). Milczarek-Andrzejewska (2014), also drew on natural sciences in her analysis of the concept of "force" in economic thought, effectively borrowing this notion directly from biology. This aligns with Wilkin's (2014), reflections on the boundaries of economics as a science, where he emphasized the need to expand analytical scope and methodology and seek inspiration beyond economics itself. Similarly, Hardt (2015), argued that economics should find new inspiration in philosophy and break free from overly rigid methodological constraints. What is more, Kwaśnicki (2001) identified numerous areas of scientific inquiry where analogy can help uncover universal regularities, and he recommends biology as a particularly rich and inspiring source of analogies for economics. The concept of natural selection holds a special place in this context, with its universality reflected, for example, in the neoclassical idea of maximization. Seeking analogies between natural and economic mechanisms may thus help identify some interdisciplinary connections within science.

A common ground for discourse between the natural and economic sciences

The economic sciences emerged significantly later than the natural sciences, largely as a consequence of capitalism's development. Yet even in their earliest stages, economics employed analogical reasoning to indirectly reference natural phenomena and processes. What continues to link these two fields is a historical perspective, which is marked by both shared and independent theoretical developments within biology and economics alike. The unifying element betwixt them is, above all, the human being – the subject of inquiry in both sciences. Many strands of contemporary economics have their roots in the natural sciences. A particularly prominent area where analogies between the two become visible is evolutionary economics, which addresses concepts such as competition and disequilibrium. This is because human behavior in the economic realm, can often be interpreted through mechanisms naturally occurring in the biological world (Musiał, Musiał, 2021).

Evolutionary economics, as a distinct approach within economic theory, draws inspiration from the evolutionary development of the world, its origins, transformations, causes of change, consequences, and projected continuity. It also represents a departure from the autonomy of economics as an isolated science, instead advocating its interconnection with broader spheres of life (Dąbrowski, 2011). The rise of this school of thought was stimulated by the growing influence of evolutionary theory, especially natural selection. Evolutionism, understood as a metascience, became both an impulse and an integrating force linking economics with detailed natural sciences such as biology and chemistry, as well as with the social sciences, of which economics is now a part (Zalega, 2015). According to this author, evolutionary economics can analyze economic development by assuming that the set of active factors within an economy change in accordance with the laws of natural selection, a process that is irreversible and closely tied to instability and disequilibrium. This field may also be seen as both a component and outcome of hybridized theories and methods. It operates within the frameworks of complex systems theory, self-organization theory, institutional economics, and post-Keynesian economics. These foundations reflect multiple shared premises between evolutionary theory and the social sciences, including economics. Key assumptions include the unity of the world and, consequently, the unity of knowledge about it, as well as the belief that humans are merely a part of nature.

Thus, human behavior within economic systems should also be examined using methods derived from the natural sciences. These assumptions include the awareness that the world humans inhabit is subject to constant natural processes and transformations that are ever-present, directional, and consistent with the idea of progress. It is equally important to recognize the relative permanence of human nature, which despite ongoing evolution, retains many stable characteristics. It is generally accepted that change occurs through gradual, evolutionary processes. For example, Bartkowiak (2008), in exploring the relationship between nature and the economy, presents numerous analogies between natural laws and economic regularities, while emphasizing the fundamental primacy of the former. These natural laws can serve as sources of insight and expand the scope of economic inquiry. In the economic sciences, evolutionism is often presented as a set of theories describing the developmental trajectories of nations or regions, as well as the progress occurring within them. In its formative stages, evolutionary economics primarily focused on issues within the scope of microeconomics, applying corresponding analytical methods.

Moreover, Włodarczyk (2012) after analyzing the essence of evolutionary economics, has pointed out that it directly draws on the assumptions of the Darwin-Wallace evolutionary theory and its successors. He also emphasizes that the transformations or evolution of economic systems reflect the actions of individuals shaped by biological evolution. In this sense, there are indirect

analogies between the patterns of biological evolution and economic transformations. In economics as well, metaphors borrowed from biology are often employed, bringing the two fields closer through narrative structure and shared terminology. This is particularly evident when referring to past events and processes, a methodological approach taken, for example, by the history of economic thought or the history of economic development. Evolutionary economics similarly uses methodological and even terminological tools derived from biology and evolutionary theory. A typical example is the analogy between the human life cycle and the economic life cycle of a company or product, so its birth, growth, and eventual decline. Also, the new evolutionary economics remains focused largely on research, situated within the domain of microeconomics. However, it is now a highly formalized field, relying heavily on game theory and mathematical modeling. It explores transformation processes and models future development scenarios for various sectors such as industry, services, markets or consumption.

According to Kwaśnicki (1996), there is possible to identify many areas of economic research, where analogies to biology, and within it, to evolutionism or ecology can offer creative inspiration. Such analogies apply for example to the analysis, and understanding of economic processes, and innovation in terms similar to natural changes. Just as ecological studies investigate the influence of changing natural environment on the local fauna and flora, economics can observe how a naturally evolving business environment affects economic actors. Interestingly, Charles Darwin himself was inspired to publish his revolutionary theory by readings from other fields of knowledge, not directly related to biology. Hence, these texts also have become sources of analogy and comparison. One of them, titled "An essay on the principle of population", first published in the 18th century, was written by the economist Thomas Malthus. In that essay, Malthus introduced the idea of limiting population growth (Bołdyrew, 2009). He proposed that the size of the poorest parts of the human population tends to remain stable, despite a high potential and actual fertility within that group. This, he argued, results from the presence of various factors that curb growth, an idea that directly mirrors mechanisms found in the natural world. The most significant of these is food scarcity (Krokos, 1997). This early linkage between evolutionism and the economic or broader social sciences was established through analogical reasoning. It may be viewed as a foundational moment in the later development of theories concerning natural selection, and eventually economic biology (Zalega, 2015).

Darwin's theory, the origins of which trace back to his journey around the world aboard the HMS Beagle as a young man, remains a relevant scientific philosophy and serves as a cornerstone for research into the cooperation and variability of living organisms (Piekiełko-Zemanek, 1983; Falińska, 2010). The outcome of that voyage was a revolutionary theory, that shifted the prevailing paradigm from species fixity to the evolutionary change (Szafer, 1959). According to the theory of evolution, all life on Earth emerged and transformed over vast stretches of time, through a slow process of adaptive changes. The concept of natural selection holds that individuals of any species vary among themselves, and that each generation produces more offspring than the previous one. Given the environment's limited carrying capacity, only a portion of these individuals survive to reproductive age, and they are the best adapted to prevailing conditions (Szarski, 1997). This mechanism of natural selection operates through what Darwin called the "struggle for existence", in which organisms must compete for limited environmental resources. As a result, species have developed diverse life strategies shaped by selection pressures to ensure optimal adaptation to their ecological niches.

A key and universal research area within evolutionary economics is the study of competition strategies, an ongoing struggle to enhance survival prospects under favorable developmental conditions. Analogies drawn from the natural sciences in this context are both numerous and diverse.

This is because competition is fundamentally the driving force of natural selection, without which life as we know it could not exist (Darwin, 1959). Without competitive pressure, harmful mutations within the reproductive lineage would accumulate unchecked. Mutations, in turn, influence an organism's ability to compete with others in an ecosystem defined by complex interactions. Despite current negative trends such as declining biodiversity, the Earth still supports a wide variety of species, an abundance that first exploded in the early Phanerozoic era (Weiner, 1999). Darwin's theory continues to illuminate the intricate, interdependent dynamics that define life's evolutionary tapestry.

As a result of its influence, Darwinism became not only a widely recognized biological theory but also a conceptual tool for explaining various broader social phenomena. One example is its extension into fields far beyond biology. As Mirek (2010) notes, such reflections often concern the ethical behavior of individuals within tasks and relationships that span entire social groups. Already in the 19th century, social Darwinism emerged as a development of philosophical positivism. Its creative ideas were adapted by the social sciences, particularly sociology. Evolutionism, the central notion of this current, can be traced in the thought of ideologically and thematically diverse figures such as John Stuart Mill, Georg Wilhelm Friedrich Hegel, Karl Marx, and Auguste Comte (Justyński, Justyńska, 2012). A similar explanatory approach to economic behavior can also be found among the physiocrats, who viewed economic activity as governed by both resources and natural laws (Kwaśnicki, 2021). In various socio-economic disciplines, the term evolution has often been replaced with concepts such as development, growth, change, progress or decline. Today, Darwinian-based evolutionary theories remain present in social sciences related to economics, such as sociology, which explores the influence of biological evolution on human culture and society (Kaczmarek, 2013). Evolutionary sociology investigates questions closely aligned with economics, including theories of shared origins or the formation of economic conditions and attitudes, such as the genesis of poverty or wealth, the fragmentation of economic agents, and their diversity. Both disciplines also analyze natural selection, for instance, in relation to human capital development, family structures, or household economics. The concept of gradualism, the idea that cumulative small changes can significantly shape long-term development, is also discussed (Mayr, 1998).

Economics can align its modes of inquiry with analogical references in the natural sciences, even at the cost of challenging neoclassical paradigms. For this reason, evolutionary economics incorporate assumptions and analyse that rest, to varying degrees on analogy. It is particularly relevant for understanding the economic behavior of diverse actors. This includes analogies to the massive presence and variation of organisms within ecosystems, used to reflect the vast number and heterogeneity of economic entities. Among the laws of nature with clear parallels to economics Bartkowiak (2008), identifies the struggle for existence, whose economic counterpart is competition, and natural selection, which corresponds to the strategic decisions and development paths pursued by economic actors. According to Kwaśnicki (2021), diversity is essential for long-term evolutionary economic development. This view is partly rooted in a principle formulated in the 1930s by British geneticist Ronald Fisher, who proposed the fundamental theorem of natural selection. It states that the rate of increase in the fitness of any organism at a given time is equal to its genetic variance in fitness at that moment (Fisher, 1930). However, Kwaśnicki (2021) notes a key difference: Fisher based his theorem on a fixed set of genotypes, and thus a closed set of solutions. This raises the question of whether the emergence of new solutions, i.e., innovation is driven by diversity regulated by the selection environment. In this sense, Fisher's principle may be generalized to encompass long-term technological and economic development.

Another area highlighting analogies between biology and evolutionary economics is mutation. In nature, mutations can be both creative, because they generate diversity, and destructive, through

leading to the extinction of certain genotypes. In economics, this relates to innovations that drive technological progress, management practices, and the broader economy. Additionally, the cyclical extinction events observed in the natural history of our planet find a parallel in recurrent economic crises, which result in the collapse of various economic entities, both large and small. Thus, the continuous selection in nature, driven by natural selection, provides a model for the formation of adaptive strategies and the gradual elimination of ineffective ones. A similar process can be seen in the behavior of entrepreneurs operating in open markets, and in the survival or growth of firms that, in pursuing profit, longevity, and development, act in the spirit of Darwinism, so they struggle to survive and constantly adapt to rapidly changing external conditions.

Summary

Today, evolutionary economics is viewed in multiple ways, including as one possible method for explaining economic phenomena through analogies drawn from strategies observed in the world of animals. Its origins are rooted in the Darwinian revolution, which remains a key source of inspiration. Social sciences provide fertile ground for integrating insights from various other disciplines, making analogy a useful tool for economic reflection, especially when grounded in selected principles of natural functioning. Drawing parallels between biological and economic mechanisms reveals the universal role of competition, evident in both animal ecology and economics, where it manifests through natural selection. Nature operates under the condition of limited resources, which necessitates constant competition among individuals across species. The transposition of ideas about natural change and development into the economic realm marked the beginning of evolutionary economics.

Evolutionary theory is universal in scope and applies to many dimensions of life, thus it is considered a metascientific framework. Evolutionary economics offers a shared discursive space between the natural and economic sciences, by enabling a unified perspective on fundamental concepts such as the struggle for existence, present in both domains. Social mechanisms often reflect their origins in nature, such as the metaphorical use of animal instinct to describe the human pursuit of profit. Likewise, biological diversity and the abundance of organisms find economic analogs in the variety and multiplicity of economic actors. Starting from the definition of analogy as a method of understanding, based on similarity or correspondence, this approach is recognized as common and intuitive in everyday experience of both the animate and inanimate world. Thus, analogy becomes a valuable method for enhancing thought processes and generating new ideas and solutions across disciplines. Since human economic activity is embedded in nature, it is inherently subject to natural laws and dynamics. Therefore, engaging in scientific discourse, through applying methods from the natural sciences to analyze and describe economic processes, offers not only a creative and insightful cognitive framework for better understanding the economy, but also potential strategies for stimulating desirable economic developments.

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