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THE BIRTH OF MODERN ECONOMICS AND "CROSSFERTILIZATION" OF SCIENCES

The term 'crossfertilization of metaphors' from discipline to discipline was used by Dr. Rolf Von Eckartsberg (1983) to describe mutually enriching metaphorical projections between autonomous disciplines aimed at helping scientists to form a particular view of reality or develop their own theories. However, this interesting path of studying conceptual mappings has not received sufficient consideration on the part of researchers though there are insightful observations and case studies of the phenomenon in question in the works of many authors. The current article is an attempt to study the mechanisms underlying the formation of a new conceptual domain – economics – through an interaction of knowledge structures between the new and established intellectual disciplines. Metaphor, analogy, and comparison are "mediators" in this interaction and vehicles in the conceptualization of economic reality and in expressing new cognitive content.

KEY WORDS: crossfertilization, conceptual metaphor, mappings, metaphorical paradigm, organic vs. mechanical metaphors, mercantilists

Introduction

When we hear such terms as 'social Darwinism', or 'ecolinguistic theory', or 'economic biology', we understand that two disparate intellectual disciplines have intersected in a synergetic process of enriching each other. Approximately the same process takes place in scientific metaphoric mappings where new conceptualizations are achieved through a projection of one scientific domain onto another across disciplinary boundaries without sciences involved giving up their identities. Usually the target domain (the one that needs elucidation) is abstract, complex, difficult to understand and, if explained literally, requires a lengthy interpretation; the source domain (the one that supplies images for explication) is concrete, well-known, easily understood and is based on a society's shared knowledge. The interaction of two or more domains of knowledge is epistemologically significant in scientific theorizing and theory building. Moreover, this interaction cannot be qualified as a "historical accident" because each historical period is characterized by a certain typology of images which make up its 'metaphorological systematics' that

shapes worldviews and conditions the proclivity of mappings. (Blumenberg 2010). The aim of this article is to analyze conceptual mappings of the seventeenth-century leading sciences and emerging economics in order to see what sciences served as source domains for the young discipline. A historical approach to conceptual mappings helps to single out consistent patterns that ran through the entire metaphorical 'landscape', establish regular links between sciences and shed light on the possible origin of the most important economic notions and terms.

Theoretical background and methodology

The legitimacy of metaphors as full-fledged members of scientific discourse has been causing continual debates. However, decades of research have proved the centrality of metaphors in the formation of scientific ideas and worldviews. "Metaphorical bridging of the new and old is precisely the mechanism that makes cognitive shifts possible. And for that reason metaphors function as far-reaching instruments for the theoretical language in science and scientific reasoning itself" (Radman 1997, p. 61). In science, metaphors perform at least five important functions: 1) a heuristic function that helps to visualize a new phenomenon; 2) a catachrestic function filling lexical gaps in terminology; 3) an exegetical function of transmitting concepts down to new generations of scientists (Mouton 2012); 4) a theory-constitutive function that ensures the creation of a conceptual system of a science (Boyd 1993); and finally, 5) an explanatory function which provides for the dissemination of knowledge (Resche 2012).

Since its very birth, economics has been drawing heavily on the established sciences for their techniques, ideas, style, and terminology. The links of economics with other disciplines can be clearly discerned in conceptual metaphors. For example, when economists speak about 'economic growth' they equate the economy to some biological organism, thus establishing a link between economics and biology; or when journalists write that small business is 'the lifeblood of the economy' the connection between economics and physiology is easily recognized. Such interaction of sciences is called 'crossfertilization'.

By the standard definition, conceptual metaphors are systematic sets of 'mappings' or correspondences across conceptual domains (Lakoff and Johnson 1980, p. 7). Interpreted as a systematic phenomenon, these correspondences form metaphoric paradigms which shape scientific thinking over more or less lengthy periods of time, or sometimes entire epochs, but also are subject to modifications or even replacement due to scientific breakthroughs, shifts in technology, changes in social and cultural life, but mainly due to changes in the worldview.

When eventually the applicability of metaphors to various branches of knowledge including 'hard' sciences was recognized, many researches ensued which enriched our idea of metaphors: distinctive features of scientific metaphors have been singled out accentuating their explicitly cognitive nature, capability of functioning 'intersubjectively as an instrument of thought', and their capacity to contribute to concept formation and the growth of knowledge (Pulaczewska 2011, p.3). Cross science studies confirmed the relevance of mappings from one discipline onto an-

other, for example, physics and psychology (Eckartsberg 1983), biology and economics (Mouton 2012). Explicatory models were offered for processes underlying metaphorical thinking. "The realm of the imagination … is a catalytic sphere from which the universe of concepts continually renews itself without thereby converting and exhausting this founding reserve" (Blumenberg 2010, p 4). Different terms were used to denote this 'founding reserve': root metaphors (Pepper 1961); metaphorical archetypes (Black 1962), absolute metaphors (Blumenberg 2010), but the common implication is that such metaphors being a 'layer of elementary ideas' are guidelines that 'channel' our experiences, provide the ways of seeing concepts, and supply images for selection. All observable or surface metaphors can be reduced to two metaphorical veins – organic vs. mechanical – that have been running through all sciences ever since their conception. For example, when astronomers speak about 'celestial bodies', they employ an organic metaphor; when Th. Hobbes in 1651 used the phrase 'the machinery of government' he resorted to a mechanical metaphor.

Starting with the works by McCloskey (1983), economic discourse has been receiving special attention on the part of traditional linguistics, cognitive and social disciplines, political studies, philosophy of science, and metaphorology. Metaphors in economic discourse have been looked at from different vantage points: pragmatics, critical discourse theory, history of economic thought, etc. (Block 1990; Samuels & al. 1993; Semino 2008; Mouton 2012). Researchers emphasize that a study of the crossfertilization of different fields of knowledge at different historical period warrants more attention (Resche 2012, p. 98) than it receives today. The analysis in this article is carried out in the diachronic perspective within the framework of the cognitive metaphor theory combined with descriptive discourse analysis of the works of leading philosophers, scientists, and economists of the 17th and 18th centuries, with occasional glimpses into preceding epochs. This historical period has been chosen because its significance for the development of knowledge is indisputable. The 17th century, the age of Scientific Revolution, and the 18th century called the Enlightenment, are a period when modern science was in the making. A shift in the scientific paradigm which entailed a reorganization of metaphorical paradigms foregrounded the processes of crossfertilization.

Scientific background

It is believed that the first scientific school of economics was created by French philosophers in the 18th century. However, there was an age-long period that prepared the birth of the new science. In the 17th century philosophers of different schools of thought started discussing various aspects of economic life. They did not produce a comprehensive theory of the workings of the economy but there were insightful discoveries that made the conception of economics possible. Moreover, there were precursors of future economists known as mercantilists who created the first economic theory (mercantilism) and laid down the foundation of "a new discourse of economics" (Magnusson 2003, p. 62).

The 17th century witnessed a dramatic break with the old worldview. Epoch-making discoveries shook the 17th century world. Galileo's observations of Jupiter's moons challenged the deeply entrenched beliefs

that all celestial bodies revolved around the Earth. Kepler's laws of planetary motion and Newton's laws of universal gravitation eradicated the geocentric model and helped Heliocentrism to be established. Not only macrocosm underwent rethinking, the organization and fabric of the human body was revisited too due to the breakthroughs in anatomy and physiology. The explosive development of mechanics entailed a spin-off of the 'mechanical philosophy' from the mainstream natural philosophy reviving the medieval image of the universe and living beings as mechanisms. Mathematics had a more subtle impact on all sciences. They absorbed an idea that everything should be measured, weighed, counted, calculated. Such was the scientific paradigm at the birth of economics which determined the venues of conceptualization of economic reality and the proclivities in the choice of metaphors.

Human body metaphors

Human body metaphors are the most common metaphors in the writings of philosophers and economists of that epoch. It is easily explained: first, the human body and its functions are well known to everybody and, second, it was prepared by the cultural development of society in the preceding centuries. With Renaissance superseding the dark Middle Ages, there was a renewed interest in the human body which gave an impetus not only to art but to anatomical inquiries. Leonardo da Vinci (1452–1519) played a large role in the development of knowledge about anatomy. His 'Vitruvian Man' is not the only contribution to this discipline. His legacy includes more than 600 drawings of the human body with detailed explanations. Though his drawings present anatomical value, we are more interested in his descriptions of the human body and its parts. Leonardo's favourite metaphor was to compare the body to the earth. "I shall afterwards divide them [bodies] into limbs as Ptolemy divided the whole world into provinces" (quoted in Lester 2009, p. 164). His analogies extend to comparisons between the arteries of a man and underground rivers of the earth; the flow of blood to the head and circulation of water to the mountain summits; blood running from the nose and water rushing out of the earth (Keele 1979). The mappings are easily explained by the significance of geographical knowledge: it was the Age of Exploration.

A century later, Andrea Vesalius (1514 – 1564), the prominent Belgian-born anatomist, undertook a description of the human body that challenged a millennium of anatomical practice. He uses a different set of metaphors equating the human body to a building. "God, the supreme maker of things, rightly made its substance of this temperament so as to supply the entire body with a kind of foundation. For what walls and beams provide in houses, poles in tents, and keels and ribs in ships, the substance of bones provides in the fabric of man" (Vesalius 2003, p.1). In another instance he writes: "Others [bones] are like bulwarks for the other parts, thrown up by nature as the safest walls and fortifications, as for example the skull, the spines" (ibid., p. 2). He compares joints to the "hinges of doors in which the iron driven into the wall receives that which is attached to the door, and the iron from the wall enters up into that of the door" (ibid., p. 14). Interestingly, in the 17th century the famous physician W. Harvey in his description of the circulation of blood exploits the image of a house but adds warmth to it presenting the heart as a

home of blood: "As the blood-vessels are the canals and agents that transport the blood there must be a particular seat and fountain, a kind of home and hearth, where the cherisher of nature, the original of the native fire, is stored and preserved" (Harvey 1938, p. 122). No wonder they resorted to a building metaphor: the overarching metaphor at that time was "God is the divine Architect".

Physiology was another science about the human body that contributed greatly to the metaphorical paradigm of the 17th century. W. Harvey discovered and described the circulation of blood. "I began to think whether there might not be a motion, as it were, in a circle, Now, this I afterwards found to be true; This motion we may be allowed to call circular" (Harvey 1938, p. 101). Harvey's discovery created a metaphor with a great structuring power for other sciences. It was picked up and elaborated by philosophy in the works of Th. Hobbes. Impressed by Harvey's discovery, he created the most famous metaphor of all time: "Money is the blood of Commonwealth". Hobbes repeats Harvey's reasoning and even phraseology: "Money… passeth from man to man within the Commonwealth, and goes round about, nourishing, as it passeth, every part thereof; in so much it is the sanguification of the Commonwealth: for natural blood is in like manner made of the fruits of the earth; and, circulating, nourisheth by the way every member of the body of man" (Hobbes 1994, 164). From philosophy it was transmitted to economics in which it became a theory constitutive conceptual metaphor used today in the form "Money is the lifeblood of the economy". Harvey's metaphor, in its turn, is the protraction of the circle-motion metaphor which goes back to the idea of the circular motion of planets formulated by Copernicus (1473–1543) and which had a profound impact on the scientific paradigm of that period. There is a clear analogy between Harvey's description of the circulation of blood in the human body and circular motion of celestial bodies.

Body metaphors were ubiquitous: physicists called moving objects 'bodies', astronomers called planets, asteroids, and comets 'celestial bodies', Galileo referred to them as 'world bodies'. Philosophical writings are saturated with body metaphors. F. Bacon coined the term 'body politic' to explain various capacities of the King of England (Bacon 1841, pp. 177, 178). Hobbes described social institutions with the help of parts of the body: the sovereign is the soul, judicial and penitentiary systems are joints and nerves (Hobbes 1994, p. 3). Mercantilists used body metaphors in great profusion. To cite but a few examples: commodities are the body of trade, money is the soul of trade; money is the liver; commodities are the heart; exchange is the brain and so on (Malynes).

The well-established metaphorical field of body metaphors was projected into the 18th century and the economists embraced it. One of the most prominent figures in the French school of economics was François Quesnay (1694–1774). He was a doctor of medicine and a physician to the King of France but he devoted much of his time to economic studies and eventually published the "Tableau économique" (Economic Table) in 1758. With his background of a medical man, it is quite logical to find in his works metaphors comparing the economy to the human body. Two metaphors are found in his writings: first, economic sectors are parts of the body; and second, money capital is like blood of the human body.

Quesnay compared economic sectors of the French economy of his time – agriculture, manufacturing, and landowners – to the parts of the human body. In his view, the agricultural sector is the only productive sector, so agricultural labourers represent the stomach that produces the blood and sends it to the heart. The industrial workers are the lungs that supply the body with oxygen and keep metabolism going. The landowners are the heart that sends out the blood, i.e. the capital to the whole organism (quoted in Kovács 2007).

To crown it all, Adam Smith (1723 –1790), a Scottish social philosopher, rhetorician and a pioneer of economics, created the best known metaphor 'the invisible hand', which has unvaryingly been used to describe the workings of the free market and *laissez-faire* capitalism. "By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention" (Smith 1994, p. 485).

Heliocentric model metaphors

The importation of physics into economics and physiology is seen in the writings of scientists of that period. W. Harvey used the sun metaphor to characterize the position and role of the heart. "The heart, consequently, is the beginning of life; the sun of the microcosm, even as the sun in his turn might well be designated the heart of the world; for it is the heart by whose virtue and pulse the blood is moved, perfected, and made nutrient … it is the household divinity which, discharging its function, nourishes, cherishes, quickens the whole body, and is indeed the foundation of life, the source of all action" (Harvey 1938, p.102).

Adam Smith was inspired by the ideas of Newton and his predecessors. He himself wrote an essay on "The History of Astronomy". It was typical for the 18th century to visualize the economy structured like the planetary system with some concept forming its centre (the Sun). In the "Wealth of Nations" we find two instances where the economy is likened to the Solar system: in one case the centre is a household, in the other the equilibrium price, the movement of capital through the economy or price changes in the market are likened to the movement of celestial bodies.

"The natural price, therefore, is, as it were, the central price, to which the prices of all commodities are continually gravitating. But whatever may be the obstacles which hinder them from settling in this center of repose and continuance, they are constantly tending towards it" (Smith 1804, p. 52).

"Home is in this manner the center, if I may say so, round which the capitals of the inhabitants of every country are continually circulating, and towards which they are always tending, though by particular causes they may sometimes be driven off and repelled from it towards more distant employments" (Smith 1804, p. 348).

Mechanical metaphors

The dramatic development of the 17th century mechanics and technology underpinned by Galileo's theory of motion and Descartes's ideas of the world consisting of small particles in perpetual motion revived a mechanical view of the world typical of

the Middle Ages astronomy which treated the universe (macrocosm) and Man (microcosm) as a mechanism – the famous 'machina mundi' (Pedersen 1985). Leonardo da Vinci professed a mechanistic view of the movements of man. Descartes (1985) in his "Treatise on Man" compares man to a machine: "I should like you to consider, after this, all the functions I have ascribed to this machine – such as the digestion of food, the beating of the heart and arteries, the nourishment and growth of the limbs, respiration, waking and sleeping, the reception by the external sense organs of light, sounds, smells … follow from the mere arrangement of the machine's organs every bit as naturally as the movements of a clock or other automaton follow from the arrangement of its counter-weights and wheels." (Descartes 1985, p. 108)

These ideas were willingly adopted by medicine. Harvey declared that the human heart was a pump or a fountain "from which heat and life are dispensed to all parts as from a fountain head (Harvey 1938, p. 122); Malpighi[1] suggested the presence of tiny invisible machines within the human body which were in perpetual movement. Descartes's followers in England embraced the idea too. "Life is a motion of Limbs, the beginning whereof is in some principal part within. For what is the Heart, but a Spring; and the Nerves, but so many Strings; and the Joints, but so many Wheels, giving motion to the whole Body" (Hobbes 1994, p. 3).

Two powerful sub-paradigms of imagery sprang up within the mechanistic view of the world: the clockwork metaphor and the wheel metaphor. The former emphasized unvaryingly regular and smooth process and the latter a mechanism that sets everything in and sustains motion. For instance, Harvey explained pulsation with the help of the wheel metaphor. "The two motions take place consecutively but in such wise that but one motion is apparent. Nor is it for any other reason than it is in a piece of machinery, in which, though one wheel gives motion to another, yet all the wheels seem to move simultaneously" (Harvey 1938, p. 87).

Mercantilists used this analogy too. "And ever as in a Clock, where there be many wheels, the first wheel being stirred, driveth the next, and that the third, and so foorth, till the last that moveth the instrument that strikes the clock; even so is it in the course of Traffique[2]: for since money was invented and became the first wheel which stirreth the wheel of Commodities and inforceth the Action. But the third wheel of exchange of monyes between Countrey and countrey, is (in effect) like to the instrument that striketh the Clock, being therein the thing Active" (Malynes 1622).

All possible mechanical tools were used for metaphorical needs. Harvey describing the movements of the heart employs a minute description of firearms "where, the trigger being touched, down comes the flint, strikes against the steel, elicits a spark, which falling among the powder, ignites it, when the flame extends, enters the barrel, causes the explosion, propels the ball, and the mark is attained – all of which incidents, by reason of the celerity with which they happen, seem to take place in the twinkling of an eye" (Harvey 1938, p. 87). Mercantilists explaining the notion of balance of trade actually depicted the process of weighing commodities (exports and imports) on

[1] The physiologist who discovered capillaries.

[2] International trade.

scales (balances). "For as a paire of Scales or Balance, is an Invention to shew vs the waight of things whereby we may discern the heavy from the light: So is also this Balance of Trade, an excellent and politique Inuention, to shew vs the difference in waight in the Commerce of one Kingdom with another" (Misselden 1623, p. 116).

Adam Smith uses mechanical metaphor in "The Wealth of Nations". He speaks about 'machines and instruments of trade' and describes money as 'the common instrument of commerce' or a 'wheel' of circulation: "Money, therefore, the great wheel of circulation, the great instrument of commerce. … It is the circulating capital which furnishes the materials and wages of labour, and puts industry into motion. The substitution of paper in the room of gold and silver money, replaces a very expensive instrument of commerce with one much less costly, and sometimes equally convenient. Circulation comes to be carried on by a new wheel, which it costs less both to erect and to maintain than the old one" (Smith, 1804, p. 229).

Power metaphors

Political views of philosophers on monarchy, sovereign power did not pass unnoticed by other sciences. In order to stress the overpowering position of the heart, Harvey writes: "And as the prince in a kingdom, in whose hands lie the chief and highest authority, rules over all, the heart is the source and foundation from which all power is derived, on which all power depends in the animal body" (Harvey 1938, p. 137).

The idea of power runs through economic writings. A. Smith describes the power of labour. "The power which that possession immediately and directly conveys to him, is the power of purchasing; a certain command over all the labor, or over all the produce of labor which is then in the market" (Smith 1804, p. 31).

Fluid dynamics

The idea of fluidity which later was transformed into the economic concept of liquidity and generated the model of circular flow is found in all works of scientists. The image of streams, currents is drawn directly from Nature. John Locke explained trade with the help of liquidity metaphor: "For the Currents of trade, like those of Waters, make themselves Channels, out of which they are afterwards as hard to be diverted, as Rivers that have worn themselves deep within their Banks" (Locke 1714, p. 8).

Most often it is used to discuss the abundance or scarcity of money. "They [money] are like to violent flouds which bear down their banks, and suddenly remain dry again for want of waters" (Mun 1895, p. 119). "The channel of circulation, if I may be allowed such an expression, will remain precisely the same as before. One million we have supposed sufficient to fill that channel. Whatever, therefore, is poured into it beyond this sum cannot run in it, but must overflow" (Smith 1804, p. 231). In another instance he explains the work of a bank. "The coffers of the bank … resemble a water pond, from which, though a stream is continually running out, yet another is continually running in, fully equal to that which runs out; so that, without any further care or attention, the pond keeps always equally, or very near equally full" (ibid., p. 240).

Conclusion

It is evident from the above analysis that science in the 17th century established a

system of structural correlations across disciplines and the process of crossfertilization was very active. Mutually enriching interchange was prolific between physics, philosophy, and medicine. Being a worldview shaping science, physics had the most powerful impact on all intellectual spheres. It caused a shift in the entire scientific paradigm introducing a new model of the universe and discovering general laws of motion and gravitation which could not pass unnoticed by other sciences such as physiology and political economy. In its turn, it borrowed the idea of the body as an entity in its entire complexity from medicine. Mechanics gave birth to mechanical philosophy which enriched political economy (Hobbes's state as a machine) and medicine (Harvey's visualization of the heart as a pump). This circulation of ideas was possible due conceptual mappings in which metaphors served as vehicles.

Political economy and later economics relied to a great extent on these mappings in elaborating its theory, concepts, and terminology. The new science made use of the current scientific paradigm and displayed multidimensionality of mappings. It became a 'melting pot' for all kinds of metaphors (organic and mechanical) borrowing from a wide range of sciences. Very often the same concept receives several metaphorical explications, for example, money is described as 'blood', 'instrument', 'wheel' etc. Some of the metaphors proved to be so successful in theory-constitution and conceptualization of economic reality that they have been shaping economic thought ever since. Suffice it to name 'balance of trade', 'lifeblood of the economy', or 'capital flow'.

References

BLOCK, F., 1990. *Postindustrial Possibilities. A Critique of Economic Discourse*. Berkeley: University of California Press.

BLUMENBERG, H., 2010. *Paradigms for a Metaphorology*. New York: Signale Book.

BOYD, R., 1993. Metaphor and Theory Change. *In*: A. ORTONY. *Metaphor and Thought.* Cambridge: Cambridge University Press, 481–532.

ECKARTSBERG, R., 1983. *David Bohm's Suggestive Metaphors and Constructs*. Available from: http://www.earthportals.com/Portal_Messenger/bohm.html (accessed 1.07.2013).

KEELE, K., 1979. Leonardo da Vinci's 'Anatomia Naturale'. *Yale Journal of Biology and Medicine*, Jul-Aug, 52(4), 369–379.

KOVÁCS, E., 2007. *On the Use of Metaphors in the Language of Business, Finance and Economics*. Available from: http://husse-esse.hu/conferences/husse-8-conference/ (accessed 1.07.2013).

LAKOFF, G. & JOHNSON, M., 1980. *Metaphors We Live By*. Chicago and London: The University of Chicago Press.

LESTER, T., 2009. *The Fourth Part of the World: The Epic Story of History's Greatest Map.* London: Profile Books Ltd.

MAGNUSSON, L., 2003. *Mercantilism: The Shaping of an Economic Language*. New York: Routledge.

MCCLOSKEY, D., 1983. The Rhetoric of Economics. *Journal of Economic Literature*, No31 (June), 434–461.

MOUTON, N., 2012. Metaphor and economic thought: A historical Perspective. *In*: H. HERRERA, M. WHITE (eds.). *Metaphor and Mills*. Berlin: De Gruyter Mouton, 49–76.

PEDERSEN, O., 1985. In quest of Sacrobosco. *Journal for the History of Astronomy,* 16 (1985), 175–221.

PULACZEWSKA, H., 2011. *Aspects of metaphors in physics*. Tubingen: Niemeyer.

RADMAN, Z., 1997. *Metaphors: Figures of the Mind*. Dordrecht: Kluwer Academic Publishers.

RESCHE, C., 2012. Towards a Better Understanding of Metaphorical Networks in the Language of Economics. *In*: H. HERRERA, M. WHITE. *Metaphor and Mills*. Berlin: De Gruyter Mouton, 77–102.

SAMUELS, W., BIDDLE, J., PATCHAK-SCHUSTER, 1993. *Economic thought and discourse in the 20th century*. Brookfield: Edward Elgar Publishing Company.

SEMINO, E., 2008. *Metaphor in Discourse*. Cambridge: Cambridge University Press.

Research Material

BACON, F., 1841. *The works of Francis Bacon, lord chancellor of England,* Volume 2. Philadelphia: Carey and Hart.

DESCARTES, R., 1985. *The Philosophical Writings of Descartes.* Cambridge: Cambridge University Press.

HARVEY, W., 1938. On the motion of the heart and blood in animals. *In: The Harvard Classics.* V. 38. New York: Collier and Son Corporation.

HOBBES, Th., 1994. *Leviathan with selected variants from the Latin edition of 1668.* Indianapolis: Hackett Publishing Company, Inc.

LOCKE, J., 1714. *The works of John Locke, esq; in three volumes,* volume 2. London: the Black Swan.

MALYNES, G., 1622. *Maintenance of Free Trade.* Available from: http://www.efm.bris.ac.uk/het/malynes/malynes.txt. (accessed 1.07.2013).

MISSELDEN, E., 1623. *The Circle of Commerce or the Balance of Trade*. London: John Dawson.

MUN, Th., 1664/ 1895. *England's Treasure by Foreign Trade*. New York: Macmillan and co.

SMITH, A., 1804. *An Inquiry Into the Nature and Causes of the Wealth of Nations*. Hartford: Lincoln and Gleason Printers.

VESALIUS, A., 2003. *On The Fabric of The Human Body. An annotated translation of the 1543 and 1555 editions.* Available from: http://vesalius.northwestern.edu/ (accessed 1.07.2013).

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Summary

The aim of the article is to analyze the emergence of economics as an independent discipline and assess the role of "crossfertilization" in its formation. By crossfertilization we understand mutually enriching exchanges between different fields of knowledge which manifest themselves in conceptual mappings (metaphors, analogies, and comparisons) and create a metaphorical paradigm of a given period.

Seventeenth-century science was characterized by a dramatic shift in its paradigm due to epoch-making discoveries in physics, anatomy, physiology, mechanics and technology. As a result, cross-domain exchanges intensified and a new metaphorical paradigm sprang up based

on systematic structural correlations. Body metaphors, mechanical metaphors, heliocentric model metaphors, etc. constituted this paradigm and paved venues for the conceptualization of economic reality.

As has been shown in the article, the nascent science either drew on the existing paradigm or borrowed directly from established sciences, thus "crossfertilization" underlies the theory-constructive use of metaphors. Some borrowings proved so successful that they have been shaping economic thought ever since. For example, 'balance of trade' popularized by mercantilists and adopted by economics; 'money is the blood of the state' created by Hobbes on the analogy with blood in the human body and transformed into the modern-day axiom 'money is the lifeblood of the economy' and many others.

KEY WORDS: crossfertilization, conceptual metaphor, mappings, metaphorical paradigm, organic vs. mechanical metaphors, mercantilists

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