

## ON BIOLOGICAL METAPHORS IN ECONOMIC DISCOURSE

Ljiljana Vukićević-Đorđević

Faculty of Science, University of Kragujevac, Serbia  
Phone: +38163638595, E-Mail: ljvukicevic@yahoo.co.uk

**Abstract.** *Metaphors are closely related to the principle of meaning extension. They have often been understood as conceptual rather than purely linguistic phenomena since the conceptual mapping functioning within our conceptual system allows more concrete concepts to be connected with the more abstract ones. Economists and financial professionals often appeal to biological metaphors in order to exploit the scenario from the living organism domain and its life cycle from birth to death. Analogies between biological and economic systems, in the light of cognitive and emotional functioning, may be both descriptive and functional, the former being related to the field of semantics and the latter being not simply a form of linguistic convenience.*

*Economic journals often tend to attract the widest possible audience. Since economic terms are often vague and incomprehensible, the authors often resort to vocabulary and expressions that seem familiar and even mundane. Understanding economics as an evolutionary system and following the principles of biological evolution the world of business and entire economic discourse have become more comprehensive.*

**Key words:** *metaphor, biology, business, process, cognition*

‘Truths ... are metaphors that have become worn out ...’

Friedrich Nietzsche

### 1. INTRODUCTION

Language is a living organism. It emerges, spreads, develops, enriches itself, survives, flourishes and sometimes, eventually, under unfavourable conditions, fades away and dies. Thus, language is not only a set of words organized by grammar rules, no matter how such set might be complex and abundant, let alone the system of grammar rules. Literal language has long been considered the foundation for figurative language and the latter being assumed more complex. However, alternative views presented so far argue that figurative language makes use of the same kinds of linguistic and pragmatic operations that are used for literal language (Glucksberg 2001, 10). Conventional figurative language comprises both cognitive and linguistic components and is widely accepted not only because of its artistic and rhetorical purposes, but also for the principle of economy in language.

Some authors propose that metaphors and literal phrases are both understood by drawing on denotative and connotative associations of their terms in an interactive fashion, using the same basic criteria when assessing adequacy for interpretation (Burbules et al. 1989, 93). Generative strategies are required for comprehension of both metaphors and literals, and what should be emphasized here is that our thinking is largely metaphorical and based on metaphorical concepts. Increasing knowledge in conceptual domains may affect

development of metaphors. The imagery structure between the conceptual domains in metaphors was the subject of two theories – conceptual metaphor theory (CMP) and blending theory (BT), the former dealing with ‘source’ and ‘target’ domain, and the latter positing more than two mental representations. Broadly speaking, CMP assumes Aristotelian way of looking at the matter by which metaphors are implicit similes, while BT is based on conceptual blends and ‘much psychological work on figurative language’ (Philip 2011, 76).

And often, when trying to specify physical objects and non-human entities as being a person, we, language users resort to personification since we comprehend a wide variety of experiences with non-human entities in terms of human motivation, characteristics, and activities (Lakoff and Johnson 2003, 33). The point is in employing an explanatory power of the most obvious ontological metaphors, imputing human characteristics to items that are not human.

However, ‘metaphor is often a serious figure of argument, not an ornament’ (McCloskey 1995, 215) although some authors think that ‘metaphor can be viewed simply as text decoration ... and a fundamental basis for argument and storytelling’ (Henderson 1994, 343). Alfred Marshall was the first to analyse business development with reference to a natural cycle of growth, change and decay in the late XIX century, and Jacob Viner proposed that the so-called circulation of money originated from William Harvey’s discovery of the circulation of the blood (Charteris-Black 2000, 155). David Ricardo dealt with the economic order as a gravitation process and Karl Marx rejected Darwin’s theory of gradual change and put an emphasis on the struggle for existence. Strangely enough, Sir Isaac Newton wrote *the paper Representations on the Subject of Money*, discussing inflation. Perhaps one of the most quoted phrases so far was the one coined by Adam Smith – ‘*the invisible hand*’ – a natural guide of economic subjects in capitalism through competition for scarce resources. Some authors connected business and weather cycles, and it was not so long ago when Ghiselin said that biology is ‘natural economy’ (Ghiselin 1978, 233) and Milton Friedman suggested the role of natural selection in neoclassical theory. With the advent of Keynesian economics, ‘animal instincts’ of speculators were rediscovered and slowly but surely biological metaphors have been routinely used in economic discourse..

## 2. BIOLOGICAL PROCESSES – THE ACTIVITIES OF LIFE

Metaphors are closely related to the principle of meaning extension. They have often been understood as conceptual rather than purely linguistic phenomena since the conceptual mapping functioning within our conceptual system allows more concrete concepts to be connected with the more abstract ones. Thus, the existing phrases tend to be exploited by drawing on complex semantic and syntactic relations (Philip 2011, 76).

Business world, as a language itself, is also a fruitful soil for metaphors in both colloquial and academic use. Economists and financial professionals often appeal to biological metaphors in order to exploit the scenario from the living organism domain and its life cycle from birth to death. Very often quantitative events inherent in the world of economics are also explained and understood in metaphors. The idea may have something in common with the concept of sustainable development which ultimately implies survival. Economic development ought to be maintained at a steady level along with the preserving of natural resources and without severe ecological damage. In that

sense, all the entities functioning within a complex economic system can be observed as subjects in the living world and thus ecosystems and ecological attitudes may be applied to organizations and business. Of course, nature actually does not design systems demonstrating long-term stability, it is only a misguided belief, and confirms that ‘existence per se is not a trustworthy measure of the general health, functionality, or persistence of either biological or organizational ecosystem’ (Mars et al 2012, 278).

When distinguishing living from non-living things, seven activities are often mentioned as exhibiting the characteristics of life: nutrition, respiration, movement, excretion, growth, reproduction and sensitivity. Each of these activities comprises a vast array of words and expressions, domain-specific chunks and metaphors that are deployed in both worlds – biology and economics – in literal and metaphorical senses.

### 2.1. Nutrition

Growth, maintenance and repair of both systems – biological and economic – require energy. In biological systems it is provided by food. Since BUSINESS IS AN ORGANISM is a typical example of an entity metaphor, it means that we take the experience from the field of biology and deal rationally with it. Thus, businesses/ companies/markets emerge, boom, flourish, cooperate, compete, and – sometimes – fail or even die. In the meantime, they all may be ‘hungry’ and such ‘hunger’ may be gratified or even satiated.

Giving free rein to the power of imagination, numerous collocations are possible and the unlimited set of metaphors – the abundant variety of nature is transmitted across the network of businesses, markets, stock exchanges and complicated relationships determined by the eternal target of elusive balance between demand and supply. Here we present the word chart created on the grounds of the collocations for the word ‘food’. Needless to say, this is only a single view exploiting a group of particular words or phrases with endless possibilities outside the boxes waiting to be picked up. The chart is followed by the examples that have been collected from the large-circulation newspapers or journals dealing with business-related topics. They illustrate different aspects of nutrition.

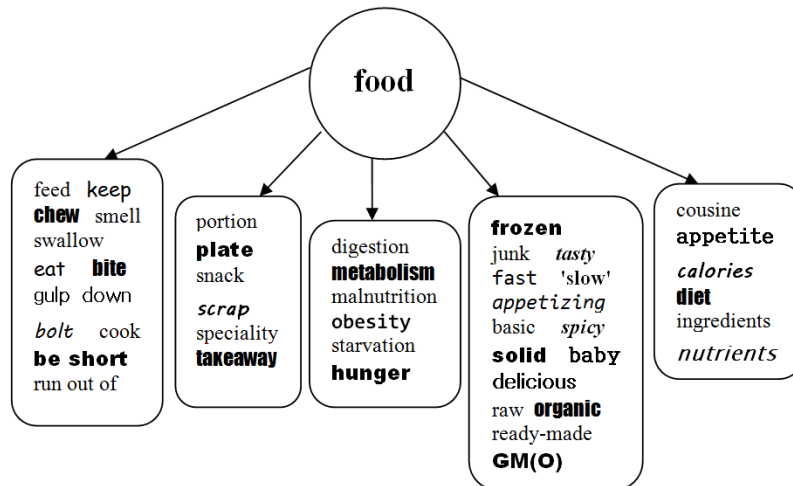


Fig. 1

- ‘Roche’ *digests* ‘Genentech’ (= ‘Roche’ bought ‘Genentech’) [The Economist, Dec 10<sup>th</sup>, 2009]
- Merging Brewers: Tough *to Swallow* [The Economist, Feb 1<sup>st</sup>, 2013]
- Cuba’s Economy: *Unappetising* (= not appealing to investors) [The Economist, Jun 23<sup>rd</sup>, 2005]
- ‘Bright Food’ is a *hungry* company. [The Economist, Oct 7<sup>th</sup>, 2010]
- *Appetite* for Latin American Bonds Remains High in January. [The Economist, Jan 23<sup>rd</sup>, 2014]
- ‘Old Masters’ are a *bread-and-butter* business, with the occasional dollop of cream...
- [The Economist, Dec 1<sup>st</sup>, 2007]
- The workers may be *biting off* more than they can *chew*. [The Economist, Apr 24<sup>th</sup>, 2008]
- Even if LBO loans make money, they are more like a *junk-food snack* than a substitute for private equity’s *staple diet* of industrial companies. [The Economist, Aug 28<sup>th</sup>, 2008]
- A lack of vitamin D caused by shorter days can lead to depression... Do we need *Vitamin D supplements* for Wall Street? [The Economist, Oct 28<sup>th</sup>, 2009]
- Pushing profit guidance down a fifth leaves a *bad taste*. [The Financial Times, Sep 23<sup>rd</sup>, 2014]

## 2.2. Respiration

The metabolic process in animals and plants in which organic compounds are broken down – respiration – is often misconceptionally attributed to breathing since respiration requires oxygen and carbon dioxide is an end product. Either way, the exchange of carbon dioxide and oxygen actually takes place, and respiration itself is the process of releasing energy from food. Thus, breathing can be considered as the first step in the process of respiration to follow through the catabolic process of a cellular activity. Business world and business-related metaphors are more involved in this initial stage, dealing with ‘breathing’ metaphors, as in the following examples:

- Saving the Euro: A Bit of *Breathing Space* [The Economist, Jul 22<sup>nd</sup>, 2011]
- They smoked foreign capital but they did not *inhale*. [The Economist, Feb 1<sup>st</sup>, 2014]
- ‘Forests are the lungs of our land’, said Franklin Delano Roosevelt. Twenty years ago, the world’s *lungs* were diseased. [The Economist, Aug 23<sup>rd</sup>, 2014]
- The huge amount of financial aid it receives has kept the country’s press in a state of ‘permanent *artificial respiration*’. [The Guardian, Oct 20<sup>th</sup>, 2010]
- Every few years, the semiconductor industry takes a *deep breath* and stuffs four times as many components on to silicon chips as before. [The Economist, Jan 22<sup>nd</sup>, 1998]
- Banks *breathe* £1bn *sigh of relief* as Vickers report rejects full break-up [The Guardian, Apr 11<sup>th</sup>, 2011]
- Exponential expansion in computing power, and the ability to *diffuse* innovations rapidly, could mean growth like that of the late 1990s. [The Financial Times, Jun 29<sup>th</sup>, 2014]
- Further debt write-downs on Greek debt would give Greek industry a little *oxygen*, perhaps somewhat remediating the acute Greek youth unemployment. [The Economist, Jul 20<sup>th</sup>, 2013]

- September and the European debt crisis seemingly under control, at least temporarily, the banks have been given a chance to *exhale*. [The Financial Times, Nov 12<sup>th</sup>, 2012]
- Shareholders objected to the lack of financial or operational targets attached and described it as “pay for *respiration*”. [The Financial Times, May 5<sup>th</sup>, 2009]

### 2.3. Movement

Animal body motion and the reference to the amount of time needed for particular activities have made the foundations or a starting point for the vast array of movement metaphors. To start with the simple voluntary movements of body parts, such metaphors may spread across the ample field of activities – *walking, running, staggering, creeping, dancing, swimming, diving, jumping, strolling, climbing, flying, crawling, dragging, floating, approaching, reaching* – let alone many more not randomly selected here – or, to determine the current position and signal trends or future directions, employ spatial orientation words and expressions, such as *in(side)/out(side), up(ward)/down(ward), front/back, on/off, over/below*, etc., which is, also, illustrated in the following examples:

- Malaysia has taken *the first step towards* merging three of its biggest financial institutions... [The Financial Times, Oct 9<sup>th</sup>, 2014]
- Unwilling to *bow* to the demands of the holdouts, and consequently unable to keep the restructured bonds current either, Buenos Aires *threw up its hands* and gave up on its attempts to pay its creditors under US law. [The Financial Times, Jul 31<sup>st</sup>, 2014]
- Treasuries *dance* below 6%, the odds of that happening grow larger. If it does, dumping bonds now will come to look like a *brilliant move*. [The Economist, Dec 18<sup>th</sup>, 1997]
- The bank – now 25 per cent government-owned – is trying to *wriggle free* of its last remaining housebuilding interests, while continuing to lend to the sector. [The Financial Times, Sep 9<sup>th</sup>, 2014]
- Grain and petrochemicals worth billions of dollars risk being *marooned* far from market ... [The Financial Times, Dec 5<sup>th</sup>, 2012]
- Mr. Abe's is doing the right things but putting pressure on employers to *raise* wages is a *wrong move*. [The Economist, Mar 9<sup>th</sup>, 2013]
- The *fall* in exports will raise questions about whether demand can *keep pace* with expanded capacity in the Scotch sector. [The Financial Times, Sep 22<sup>nd</sup>, 2014]
- Iron ore prices *have slumped* by 40 per cent this year below US\$80 per tonne amid a jump in production and a *slowdown* in demand growth in China. . [The Financial Times, Oct 9<sup>th</sup>, 2014]
- It may be the most dramatic *plunge* among *emerging*-market currencies in recent days, but it is hardly alone. [The Economist, Jan 27<sup>th</sup>, 2014]
- Czech productivity *has stagnated*, while labour costs have *crept upwards*. [The Financial Times, Oct 7<sup>th</sup>, 2014]

### 2.4. Excretion

Waste products arisen as a result of metabolic activity ought to be eliminated from living things. It is very important in maintaining the constancy of an organism's internal environment. Thus, physiological processes can proceed at optimum rates. Such regulation, homeostasis, involves monitoring the changes in both inside and outside the organism and by means of receptors it is possible to bring about necessary adjustments. Business

world follows suit – waste need to be eliminated, be it related to time, energy, raw materials or money, since everything is a matter of making profits. Blood, sweat and tears!

Metabolism and economic processes were found to have a close similarity – anabolism and catabolism as ‘within-skin’ life processes are close to production and consumption as ‘outside-skin’ life processes (Daly 1968, 394). Similar organization of these processes resulted from their purpose – maintenance (and enjoyment!) of life. Physiocrats would here emphasize the supremacy of nature.

- Last December, Prime Minister Shinzo Abe promised to boost the *metabolism* of Japan’s sluggish economy. [The Financial Times, Oct 3<sup>rd</sup>, 2013]
- It seems that Christmas was not so bad after all—and that many retailers have since enjoyed bumper *clearance* sales. [The Economist, Jan 15<sup>th</sup>, 1998]
- Already, the business community is *in a cold sweat* thanks to another law that will facilitate state intervention in the private sector... [The Financial Times, Aug 15<sup>th</sup>, 2014]
- ... a metropolis that had itself been *breaking down cultural toxins* and processing rich nutrients for two millennia, yet could only do so by *manufacturing hectolitres of bile*... [The Financial Times, Oct 4<sup>th</sup>, 2008]
- Why not go further with the *homeostasis* and make tax rates float automatically with the ten-year average of expenditures? [The Economist, Dec 7<sup>th</sup>, 2010]
- Management appears open to value creation through the *disposal* of underperforming assets. [The Financial Times, Sep 17<sup>th</sup>, 2014]
- Such a plan would be less a healthy *purgative*, and more an acid bath. Businesses can, and should, still fail. [The Financial Times, Jan 3<sup>rd</sup>, 2009]
- Loan ‘may be used to fund ongoing working capital requirements and other general corporate purposes’ and to amend or “*discharge*” company debentures due to mature in 2023. [The Financial Times, Apr 29<sup>th</sup>, 2013]
- A full crash seems unlikely. But the autumn brings a series of risks, any one of which could dump a full load of *manure* on the market. [The Financial Times, Sep 2<sup>nd</sup>, 2013]
- So, when Greece’s debt *constipation* ends the particulate that hits the fan will land upon taxpayer checkbooks. [The Economist, Sep 9<sup>th</sup>, 2011]

## 2.5. Growth

Cell division and cell enlargement enable an increase in the dry weight or volume of a living thing. Growth may be continuous, as in woody plants, or may cease at the maturity of an organism, as in mammals. The process of change is also referred to as development. In economics, development means increasing the amount of business activity which, consequently, leads to improving the economy of a country or region. The more – the merrier!

Going from extreme poverty to wealth, as Jeffrey Sachs explained, economies go through three transformations involving a restructuring of the economy at different levels of development: the commercial stage, the industrial stage, and the knowledge-based stage (Sachs, 2004). Since, among other definitions, economics is ‘a social science concerning behaviour in the fields of production, consumption, distribution and exchange’ (Isaacs et al 1990, 125), the point is to change the behaviour of economic entities going through these changes. Accordingly, growth metaphors are simply implemented into the economic discourse and put down roots easily. The following examples may be considered scant

evidence, but the fact is that bold italic expressions, as countless others, have been deeply entrenched in everyday business-related communication.

- This is a way to *grow* as the business remains *lean*. [The Financial Times, Oct 7<sup>th</sup>, 2014]
- And it will *nip in the bud* any further complaints from investors that boards ignore them. [The Financial Times, May 27<sup>th</sup>, 2010]
- *Mature* economies probably need less in the way of reserves, but it will be a considerable time before today's emergers have sufficient *maturity*. [The Economist, Jul 23<sup>rd</sup>, 2010]
- Crucially, however, VW's sales in China, the world's biggest car market, have continued to *flourish*, jumping 18 per cent in the first half of the year. [The Financial Times, Jul 31<sup>st</sup>, 2014]
- Prof. Muhammad Yunus, the Nobel Peace Laureate who is widely regarded as the *father* of microfinance, is floating a fund to provide seed capital to promising social ventures in India. [The Guardian, Feb 22<sup>nd</sup>, 2012]
- The *developing* world offers particularly *fertile ground* for these ideas to *germinate*. [The Financial Times, Aug 27<sup>th</sup>, 2009]
- The Morgan Stanley team says the *average maturity*, or *lifespan*, of European high-yield bonds is a lot less than similar bonds in the US. [The Financial Times, Dec 5<sup>th</sup>, 2013]
- Under a rhetorical veneer of progress, this was a budget *rooted* in evidence-free, deficit-slashing superstition that will hit the poor hardest. [The Guardian, Jun 22<sup>nd</sup>, 2010]
- The rest of the investments have to be in UK companies or UK bonds, and cannot be in businesses focused on property *development*. [The Financial Times, Oct 10<sup>th</sup>, 2014]
- *Births, deaths and resurrection*: Start-ups will help restart America's economy. [The Economist, Nov 22<sup>nd</sup>, 2010]

## 2.6. Reproduction

The process of reproduction means the production of new individuals of an animal or plant. Such giving rise to offspring actually means making a copy and thereby providing for the perpetual existence or increase of species. Not only has the concept of giving birth and further development been employed in economic discourse, but it is also absolutely essential for business entities to have the ability to make likenesses of themselves and to merge with others, as well as to follow the laws of nature from tossing seeds to harvest gathering. Within a business organizational unit it is not uncommon that the entire hierarchy of parent and daughter companies is involved into a single business activity in a manner of a herd of elephants or a flock of birds. The following sentences contain some reproduction-related metaphors:

- When a wave of payday lenders set up in the UK in the late-2000s they were hoping for *fertile ground*. [The Financial Times, Oct 3<sup>rd</sup>, 2014]
- The event remains one of the biggest networking events of the year and as much the place to cultivate contacts and *fertilize* deals as ever. Business rubbed shoulders with politics ... [The Financial Times, May 23<sup>rd</sup>, 2006]

- Yesterday, the chancellor sounded as if he intends to direct our lives from the *womb* (the new starting point for the payment of child tax credit) to the grave. [The Financial Times, Dec 7<sup>th</sup>, 2006]
- Monetary policy lost its *potency* around the middle of QE2. [The Economist, Jan 7<sup>th</sup>, 2012]
- The Economist covered Airbnb this August in a story about internet “*clone*” companies. [The Economist, Oct 3<sup>rd</sup>, 2011]
- With equity and bond markets either volatile or failing *to deliver* expected returns, there is every chance that this new *breed* of funds will not only make more headlines in the coming months, but potentially become the next bubble. [The Financial Times, Oct 12<sup>th</sup>, 2014]
- ... shaking up the industry fee model could offer their best chance *to hatch* long-term relationships. [The Financial Times, May 11<sup>th</sup>, 2014]
- WeWork’s buildings serve as more of a club and *incubator* for *fledgling companies* that may later *hatch* into big space grabbers. [The Financial Times, Mar 11<sup>th</sup>, 2014]
- The internationalisation of banking means that financial shocks *propagate* quickly, and these are much more dangerous than trade shocks. [The Financial Times, Jan 3<sup>rd</sup>, 2011]
- The mix of strong academic institutions, plentiful government funding for scientific research and a vibrant private financing and entrepreneurial culture has proved hard *to reproduce* in new environments. [The Financial Times, Jan 3<sup>rd</sup>, 2014]

## 2.7. Sensitivity

And last but not least, sensitivity – being the one of the fundamental properties of living things, i.e. the capacity to recognize and respond to changes coming from the environment. The stimuli of light, touch, smell, etc. related to biological systems may be of internal or external origin. If transferred to the world of business, stimuli affect the behaviour of entities and have been particularly interesting in recent years when lame economies were stimulated by their governments through fiscal and monetary measures following the recession. Of course, they may also come from different subjects other than governments – from the competitors, force majeure, markets both at home and abroad, etc.

This concept of inner and outer context, the entity and its environment, also presumes the existence of differentially permeable boundaries between them. In both biological and economic systems such boundaries endeavour to prevent harmful effects – self-protection against water loss, energy distribution, vitalising effect in the world of flora and fauna, and, on the other hand, the degree of market openness, listed and non-listed securities, lower exports due to meagre harvest, etc. in the business world. Sensitivity-related metaphors employed in economic discourse are also based on voluminous biological vocabulary, which is shown in the following examples:

- As an exporting powerhouse, Germany is highly *sensitive* to small changes in foreign demand. [The Financial Times, Oct 12<sup>th</sup>, 2014]
- House prices in Europe are losing *touch* with reality again. [The Economist, Aug 30<sup>th</sup>, 2014]



- The country *has been hurt* in recent months by *softening* export markets, *depressed* domestic property values and stockmarkets, and declining consumer and investor confidence. [The Economist, Nov 10<sup>th</sup>, 2008]
- A \$586 billion *stimulus* plan for China's economy: China seeks *stimulation* [The Economist, Nov 10<sup>th</sup>, 2008]
- Central banks should be ready to *respond* if growth falls. [The Economist, Mar 19<sup>th</sup>, 2011]
- But rather than being the passive *receptor* of IT system requirements, IT needs to be the proactive adviser on business process engineering. [The Financial Times, Jul 9<sup>th</sup>, 2008]
- Meanwhile, pension providers can *smell* the money rolling in. [The Financial Times, Aug 15<sup>th</sup>, 2014]
- Markets react *nervously* to war. [The Guardian, Mar 20<sup>th</sup>, 2003]
- This news has created a little rupture across markets and our *impulse* was to reduce duration and exposure to sectors we feel will be most *impacted* by liquidity constraints. [The Financial Times, Sep 26<sup>th</sup>, 2014]
- ‘Apple’ is no longer an outsider with an *urge* to shake up the status quo. [The Financial Times, Oct 3<sup>rd</sup>, 2014]

### 3. ANIMALS AND PLANTS IN THE WORLD OF BUSINESS

The capacity of metaphor has been valued differently – from the Aristotelian belief that it brought ‘clarity and charm’, to the consideration of metaphor as ‘primarily a linguistic phenomenon, processed by the brain as language’ (Searle 1979, 98). Based on Reddy’s communication theory, Lakoff went further and showed that ‘the locus of metaphor is thought, not language’ (Lakoff 1992, 417).

The cultural dimension of metaphors is brought into focus especially when the differences in metaphors exist between different languages. Then, conventionalized metaphor is not the issue, but dynamic metaphor – is. As Hanks suggested, dynamic metaphors have no place in a dictionary (Hanks 2004, 272), and they present a kind of *exploitation*. On the other hand, conventionalized metaphor is a kind of *norm*. Conceptual systems entrenched in different languages may be compared owing to semantic universals (Goddard 1996, 146), such as the foundation metaphor in this paper: BUSINESS IS AN ORGANISM which may be accompanied by complementary metaphors related to the aforementioned biological processes.

Understanding economics as an evolutionary system and following the principles of biological evolution, it is even possible to explain ‘how future economic environment is derived from the existing and past environment’ (Vass 2014). Thus, companies may be classified into a sort of economic flora and fauna, bearing in mind that external incidence may be fruitful – allowing the system to swirl and provide further enhancement. Of course, the faculty to operate rationally allows that the entities within the business world to evaluate circumstances and conclude in a logical way, but, on the other hand, particular properties exhibited in the world of animals have been exploited while creating some metaphors. ‘As such, metaphor constitutes a crucial link between bodily experience and abstract reasoning’. (Broers 1995, 3)

To start with birds and fish – animals that *fly, build nests, lay eggs, migrate* or *swim* and sometimes unwillingly – *be caught*. All these expressions with birds and fish have been and are used in business metaphors. There are also a lot of expressions in the form of ‘animal metaphors’ in business which are based on a cat or dog behaviour: cats *purr, scratch, catch mice*, and dogs *bark, bite, attack* and sometimes are *on a leash*. Horses also may be led – by the bridle – but also they may *be harnessed, hobbled* or *saddled*, particularly if used as *workhorses*, and if they are born and raised under a lucky star, as *thoroughbreds*, give full vent to their characters *galloping* around, just as inflation sometimes endeavours to emulate, more or less successfully.

However, not only do pets and domestic animals play roles in business metaphors, but they are very often accompanied by the living things of sharp instincts and hidden agenda. In a world of *predators* and *prey*, both deep and shallow waters are shared between *fishes* and *sharks*. The owners of extraordinary wealth tremble with fear of being cheated and robbed and feed their *watchdogs* hoping that their clenched staring eyes and rapid response may protect their property. Thus, natural competition between *the weaker* and *the stronger* is reflected in everyday life and business world, too. Some species emerge, some others diminish in numbers and, eventually disappear – the same rules repeat with companies, markets, industries, products, securities and raw materials.

In addition, free market metaphors often suggest the idea of a battlefield where financial authorities and market practitioners fight for their shares and segments. At places where billions of shares, bonds and goods change hands every second, two probably unexpected animals make the world go round – a *bull* and *bear*. The *bull market* has got its name from the way the bulls attack their opponents – thrusting horns up into the air which means that it brings optimism and investors’ confidence. On the contrary, the term *bear market* relates to a prolonged period in which investment prices fall and widespread pessimism prevails. Since a bear swipes its paws down attacking an enemy, it has been used to commonly define the situation when an economy is slow and perhaps even in a recession – *bear market*.

Another situation which is also related to a wild animal is a so-called *wildcat strike* – ‘untamed and unruly’ creature is used to label the group of workers going on strike without any planning, organization, or vote. Being spontaneous or unannounced, such strike may lead to firing the offenders. An adversative situation is when an employer actively searches for new professionals or executives, which often means persuading already employed people to leave their job by offering more pay and a higher position. It is so-called *headhunting*, which, of course, has something to do with savages who cut off the heads of enemies and preserve them as trophies. In business world competition never ends, keeping the actors constantly on the lookout.

In addition to animals and verbs related to their activities in sustaining life, the world of flora has also made contributions to economic discourse in the form of a wide range of metaphors. *Root, stem, flowers, leaves, branches, fruit* and a lot of words normally associated with farming – to start with *sow, plough, sprout, weed out, reap, fertile*, etc. – are often terms used metaphorically in business. We have shed light only on some commonly used metaphors, but we also point out that the use of figurative language cannot be restricted to limited vocabulary and novel metaphors occur incessantly.

However, subjects in the business world, as in the world of nature, may feel *pain*, fight *viruses*, or suffer from various *diseases*. Computer *viruses* and Internet *worms* may result in fateful network disruptions and consequently astounding economic losses. Intruders inflict harm in both nature and business. Remedies, cures, treatments and therapies may help

living things, but may be applied in business as well since BUSINESS IS AN ORGANISM. Moreover, the danger of predators as a group may be minimized, as shown in some experiments, by using movement patterns followed by a flock of birds or a school of fish (Barrett et al 2011, 126). Thus, using a bio-inspired paradigm, measured and measuring entities may be represented as dynamic ones and predictions may become reality.

What should be emphasized here is that all the metaphors mentioned above and many more other examples have arisen from our ability to detect and construct analogies. On the same grounds are also based general intelligence tests designed to measure various mental functions, such as perceiving, reasoning, comprehension, judgment, etc. Analogies between biological and economic systems, in the light of cognitive and emotional functioning, may be both descriptive and functional, the former being related to the field of semantics and the latter being not simply a form of linguistic convenience. However, even ‘molecular biologists would have tremendous difficulty understanding what is happening inside the cell, planning experiments and interpreting the meaning of the results of experiments’ (Gene 2007, 45) without considering the purposeful activities and functions of man-made systems.

Economic journals often tend to attract the widest possible audience. Since economic terms are often vague and incomprehensible, the authors often resort to vocabulary and expressions that seem familiar and even mundane. The following examples may support such a claim.

- Banks also fear that many customers may opt out of conventional banking and *migrate* to what are known as peer-to-peer services – online sites that match them directly with borrowers or lenders. [The Financial Times, Oct 10<sup>th</sup>, 2014]
- A decade ago, Alibaba’s founder Jack Ma declared: “eBay may be a *shark* in the ocean, but I am a *crocodile* in the Yangtze...” [The Financial Times, Sep 18<sup>th</sup>, 2014]
- Each of those three great *bear markets* saw enormous global problems—world wars, depressions and stagflation. [The Economist, Jun 8<sup>th</sup>, 2008]
- Deng Xiaoping said that “it doesn’t matter if a *cat* is black or white, so long as it catches *mice*”. Surprisingly for many, the *cat* still catches them. [The Financial Times, Mar 23<sup>rd</sup>, 2012]
- It is here that India poses a special threat, not least because of its *prowling, hungry* home-grown *tiger companies*. [The Economist, Apr 4<sup>th</sup>, 2007]
- The *bees* get busy. In the months before leadership change, the battle over economic reform is heating up. [The Economist, Mar 3<sup>rd</sup>, 2012]
- Otherwise, the impression remains that illiquid markets, new ways of trading equities and constraints faced by banks and brokers have scared entrepreneurial companies off IPOs. The market is not yet *roaring*. [The Financial Times, Mar 20<sup>th</sup>, 2014]
- The capital markets *watchdog*, which had declared the debentures illegal, ordered the investors be refunded. [The Financial Times, Oct 2<sup>nd</sup>, 2014]
- Friendly *Tigers*: Peace talks begin with a *purr*. [The Economist, Sep 19<sup>th</sup>, 2002]
- The popular image of the entrepreneur is of a *lone wolf*. [The Financial Times, Feb 8<sup>th</sup>, 2007]
- And once deflation has an economy in its *jaws*, it is very hard *to shake off*. [The Economist, Oct 25<sup>th</sup>, 2014]

However, business world may also be used in a reverse procedure to explain the relationships and functioning in a biological entity, from a single cell to a complex environmental system.

Table 1

| Cell organelle | Metaphor: Company                      |
|----------------|----------------------------------------|
| Nucleus        | Headquarters                           |
| Cell wall      | Outer walls of the premises            |
| Cell membrane  | Security guards                        |
| DNA            | Data bases, all sources of information |
| Ribosomes      | Employees                              |
| Mitochondria   | Canteen                                |

The metaphors in the table above suggest a suitable and convenient way to comprehend how cells are organized. The concept is based on rational behaviour of the subjects in a company where the allocation of resources, division of labour (tasks), cooperation and performing actions in just-in-time manner provide the functioning of the whole system, just like inside a single cell. Market concentration, penetration and competition have something to do with life itself, natural selection, survival and further development or – death of a living thing. Weighing cost and benefit is present in both worlds – business and nature – and determines future actions.

Of course, the concept of distribution or, better to say, the need for a distributary system is realized through networks in both natural world and business. There are circulatory systems in living organisms (blood circulation, leaf venation, fungal mycelia network, insect wing venation, etc.) and in business networking that enables employee collaboration. Dendritic form of natural networks – multi-branching tree-like form – has been adopted in different fields of research, not only in economics, but in the conventional presentations of language structures as well.

Of course, environmental pressures affect both biological and economic entities. Wellbeing of certain parts depends on the wellbeing of the others and thus cooperation between the cells, organs or organisms within an eco-system as well as cooperation between the employees, companies, industries or markets is definitely critical for their viability. Analogies between nature and business world also enable biology-based market modelling where predictions are not based on pure mathematics but on tuning into non-linear realities. All in all, companies, markets and stock-exchanges are seen more organically, which should have been expected since their driving force is in employees – human beings – and their interconnections and impetus for change.

#### 4. CONCLUSION

Back to 1992, we encounter Anne Eisenberg words: ‘Once metaphors were the stuff of poetry not proteins - but no more. You are just as likely these days to run across them in a scientific review as in a sonnet. Despite the 300-year effort by Hobbes, Locke and a legion of logical positivists to confine them to the English classroom, metaphors are suddenly inescapable in technical prose. From chemical scissors and solvent cage to optical molasses and squeezed light, from DNA fingerprints to read-only memory, metaphor is out of the scientific closet’ (Eisenberg 1992, 144).

The research on metaphors in the fields outside fiction and poetry has never ceased. Some ‘traditional views of figurative language tended to regard metaphors as substitutable for or translatable into direct literal language’ (Ritchie and Dyhouse 2008,

97), but more recent developments in cognitive linguistics suggest that metaphors may result from a change in perception and pucky combinations of words and phrases. So, in the use and understanding metaphors in business not only do we need simply general knowledge and everyday experience in economics, but a playful approach to language, too. 'Metaphor is the device which animates a living language'. (Cohen 1976, 251)

Interestingly enough, some investigations resulted in surprising findings. Using the Wall Street Journal corpus, Gedigian and associates annotated all the verbal targets associated with the frames of spatial motion, manipulation, and health. It was found that 'over 90% of targets from these frames are used metaphorically, underscoring the importance of processing figurative language' (Gedigian et al 2006, 41). Since they started from their computational definition of metaphor and used the FrameNet lexical database and PropBank as a verb-oriented source, they inferred that the argument of a verb is the factor determining whether that verb is being used literally or metaphorically. For instance, selectional preferences of verbs have been used to identify metaphors and thus the object of the verb *treat* in the MEDICAL domain is usually a pathological condition, while in the FINANCE domain it is an economic problem. To wit, all problems have something in common, suggesting a metaphorical mapping between the two domains in which they occur – health and economics.

Generally speaking, the nature of pragmatic processes is the central issue for language comprehension in general and for metaphor comprehension in particular (Glucksberg and Haught 2006, 376). Since cognitive semantic tools enable understanding and reasoning, it seems justifiable to conclude that metaphors may have a significant role in the construction of knowledge and reasoning. From that point of view, biological metaphors in business may enhance the understanding of complicated relationships between the entities in the economic world, but at the same time they may attract the attention of laypeople to learn more about business operations and functioning. Nowadays, when both nature and business face severely threatening dangers from GMOs, artificially created diseases, and laboratory-produced viruses to monopolies, directed exchange rates, state intervention and globalization, it is of utmost importance.

Biological metaphors bring into the world of business a sort of openness of living systems to their environments. Even entire books have discussed business systems and their networks in the light and with a little help of biological metaphors – *Corporate Lifecycles* (Adizes, 1989), *Corporate DNA* (Baskin, 1998), *Digital Nervous System* (Gates, 1999), *Strategy as Ecology* (Iansiti and Levien, 2004), *DNA Profiling: The Innovative Company* (Denervaud and Chatin, 2011), *Living with non-elephants* (Moyen, 2012), *Sharkonomics: How to Attack Market Leaders* (Engeseth, 2012) and many more – due to their capacity to encourage shifts in the established thought patterns. Consequently, the language is evolving. Since 'more than 99.9 percent of all evolutionary lines that once existed on earth have become extinct' (Mayr 1998, 198), scientists in different fields have pursued the laws that govern the behaviour of all systems adaptable to their environment. But, it should be seen rather as co-evolution than mere adaptation and the aim is to explore new combinations not to survive but to find what is possible. Just to mention, the colonies of organisms, flocks, herds, etc., and clusters of businesses, mergers and acquisitions as self-organized pliable systems all result from the need to create the structures that fit the moment. Such an approach is applicable not only to business and nature, but to language as well.

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