Metaphorical modelling of the concept “Technology”

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Abstract

The article explores the metaphorical models Russian researchers (the authors of scientific papers) employ in the presentation of technology. A cognitive approach to the metaphor is emphasized. The study is focused on different types of metaphors which are crucial in the corpus-based analysis and defines particular characteristics of the concept “Technology”. The analysis is based on various sources (online, journals, conference proceedings) on information technologies. The present investigation should be seen as a part of the project “Metaphorical conceptualization in the process of terminological system formation: epistemological universals of the Russian scientific worldview” supported by the Russian Foundation for Humanities.

Keywords: Scientific discourse; metaphorical model; source domain; target domain; conceptual metaphor

1. Main text

Scientific texts on information technologies (hereafter referred to as scientific IT discourse) are full of metaphors, so the purpose of our investigation is to elicit metaphors out of the corpus, classify them into metaphorical models and show how they structure our understanding of complex scientific processes.

The question at issue is that the traditional linguistics excludes linguistic means with ambiguous semantics from the language of science. Investigations in the language of science in Russian linguistics started not so long ago and its study within the aspects of stylistics (Gvishiani, 1986; Kozhina, 1993; Kotyurova, 2001) discovered its peculiarities such as abstractness (notionality), logic nature, monosemy, neutrality. The studies of scientific discourse (Karasik, 2004; Makarov, 2003; Mishankina, 2010; Tchernyavskaya, 2006) allow us to define that the

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primary objective of scientific activity – the search for scientific truth – determines objectivity, systematicity, methodicalness attitude and also the fullest and direct express of information in scientific text, what in the researchers’ opinion makes the usage of metaphorical expressions in scientific text and discourse impossible. However, we consider that the above mentioned parameters do not contradict the widespread of metaphorical models in scientific discourse and there is some evidence (Ankersmit, 1983, 1994; Vodolina, 2000; Dudetskaya, 2007; D’yachenko, 2003; Kuhn, 1979; Mishankina, 2010; Mishankina and Deeva, 2015; Rakhimova, 2015; Ovsyannikova, 2010; Ortega-y-Gasset, 1966; Panasenko, 2015; Rezanova, 2007; Silant’ev, 2012) with the idea that scientific texts and term systems of various scientific fields contain a great deal of metaphors. We believe that use of metaphorical models in the realm of science and correspondingly in scientific text is caused by the factor that conceptual metaphor like mental operation based on analogy tends to be one of general cognitive models, thus meeting the requirements of “gnosiological harmony” which is directly connected with simplification of research object representation (Boyd, 1979; Petrov, 1985). Verbal expression of new knowledge in the course of cognitive processes and then in the scientific text must meet at the same time two significant requirements: be based on wide-ranging representation and maximally reflect properties of a described object (from the author’s point of view). Therefore, its hypothetic model open to dialog is formed. In this regard the most effective mechanism is metaphorization allowing us to cover up large amounts of information in succinct language structures.

This fact is particularly significant for new scientific fields, so to say in their infancy, and the information technologies (IT) are qualified in our understanding as a new one. We assume that research of conceptual metaphor in the mentioned sphere hasn’t been yet presented to the full extent and our investigation will allow making the processes of forming new scientific beliefs clearer.

2. Methods

The theory of conceptual metaphor (Lakoff and Johnson, 2004) is designated as a methodological paradigm because the process of metaphorical conceptualization while forming IT terms is defined by us as a complex mental operation that involves general metaphorical models. According to Lakoff and Johnson, the conceptual metaphor in our investigation should be understood as “under-standing and experiencing one kind of thing in terms of another; in a metaphor; there are two domains: the target, which is constituted by the immediate subject matter, and the source, in which important metaphorical reasoning takes place and that provides the source concepts used in that reasoning” (Lakoff and Johnson, 2004). So, the procedure consists of knowledge structure processing by means of implicit analogy of two unlike things (ibid). The mentioned mechanism has neurophysiological nature and is founded on interrelated activation of neural zones (Lakoff, 2008). The system of conceptual metaphors is described in a number of foreign and Russian linguistic studies (Aksan, 2012; Kovecses, 2005; Rezanova, 2003, 2011; Chudinov, 2001; Yu, 2008).

In foreign and then in Russian linguistics there are two basic lines of conceptual metaphor research: in text and discourse (Kovecses, 2010) with the particular focus on functional aspect of metaphor, its role in textual and discourse meaning formation. The approach was developed into conceptual blending theory (Fauconnier, 2002) - the mechanism of forming new meanings, including scientific, within formation and functioning of new metaphorical structure in the text (Lakoff, 2009). Nevertheless, it is believed that from the methodological point of view interpretation of the meaning formation mechanism should be developed from the procedure of description of functioning metaphorical models. Such a procedure hasn’t been earlier explicated, thus arousing criticism (Kovecses, 2005). The Russian linguistic researches in metaphorology have come up with the procedure of revealing and description of metaphorical models (Rezanova, 2010; Rezanova, Mishankina, and Katunin, 2003; Chudinov, 2001). The conceptual metaphor is realized in the system of metaphorical models which organize textual and moreover discursive space. The system of metaphorical models is based on the system of lexical textual metaphors which are the objects of analysis. The analysis procedure is the following:

1) a distributive analysis of text passages allowing us to reveal lexical items with non-standard collocations;

2) a componential analysis of revealed lexical items which means comparison of literal meaning and figurative meaning in order to define conceptual fields in relation to literal and figurative meanings;

3) a conceptual modeling method to reveal metaphorical models and also pattern knowledge structures (frames) which are key for the object conceptualization;
4) a quantitative analysis to reveal dominant metaphorical models.


For example, in our analysis we identify a metaphor Internet market:

1) the literal meaning of the lexical item market is ‘a regular gathering of people for the purchase and sale of provisions, livestock, and other commodities’, so it means that a word is used in its figurative meaning in relation to the Internet, thus allowing us to conclude that it is a metaphor;

2) as the lexical item market is understood by us as a special place for purchasing, so we can fix this metaphor as a part of the metaphorical model INTERNET IS SPACE which is further classified by us as some type of social place;

3) the quantitative analysis has shown that a number of such metaphors in our corpus is great, thus allowing us to conclude that the metaphorical model INTERNET IS SPACE is a dominant one in our investigation.

It should be pointed out that our research is based on the scientific text materials on cloud computing, supercomputing, mobile technology, Internet technology chosen by continuous sampling method out of the online source http://elibrary.ru – scientific electronic web-resource, various scientific magazines in Russian (“Computerra”, “Otkrytye sistemy” (Open systems), “Mir PK” (World of PC), “Programmye produkty i sistemy” (Software and systems), a great number of conference proceedings and etc. The total number of analyzed materials is more than 3,000 pages, the number of selected metaphorical expressions is more than 2,500.

3. Results and discussion

The corpus-based analysis has shown the following distribution of metaphorical models in the field of IT (see Fig. 1).

![Fig. 1. Numerical data of metaphorical models in the scientific IT-discourse.](image_url)

Analyzing the source domain «space» in the scientific IT discourse, we reached the conclusion that the given metaphorical model is represented by diversified framing structure. The lexical items which allow us to reveal the spatial metaphorical model emphasize the universal representation of space:

1) visually perceptible vertical and horizontal extension in space;

2) space adaptation to personal needs: space segmentation into various borders, transformation including building of different structures for comfortable living, functional differentiation of different parts of space;

3) ability of any space to contain something.

The dictionary definitions (The Dictionary of the Russian language ed. by A.P. Evgen’eva) have shown that human experience shares physical space into different categories and types, and in each case space is understood variously.
In conceptualization of technology as space, different target and source domains become acute. Thus, as separate space we represent the Internet-technology. First of all, we imagine the Internet as parallel virtual universe: nedostatok Interneta kak informatsionnogo prostranstva (the drawback of the Internet as informational space); v internet-srede (in the Internet medium); the second is the image of a socially adapted territory, special place for interaction of different parts: vse structure i organy vlasti imeyat sobstvennoe predstavitel’stvo v Internete – sajt (all power structures and authorities have their own office in the Internet – web-site); thirdly, the Internet is conceptualized as social medium – community of people: Internet-soobschestvo (the Internet community).

Within the integral space of the Internet-technology, some new specific technology becoming acute today is also conceptualized. For example, cloud computing. Thus, in the process of its modelling the image of atmospheric condensation (cloud) localized in some part of space is actualized: na neboskloone oblacnych vychislenij nachinayut sgušchat’ya chyornye tuchi (in the sky of cloud computing there are black thunderclouds); mesto vstreči – v oblakakh (meeting place is in the clouds); or architectural structures and types of houses: mnozhestvo variantov arkhitektury oblachnoj infrastrukturny (many various variants of architecture of cloud computing infrastructure); kommunal’nye oblaka (multifamily (communal) clouds).

Among others supercomputing is metaphorically presented as construction projects: arkhitektura superkomp’yuterov (supercomputer architecture); vvod ego v ekspluatatsiyu (its putting into commission).

Mobile technologies are metaphorically represented both as architecture structures and marketplace: Dynabook byl postroen (Dynabook was built); osnovnye igroki mobil’nogo rynka obespokoyeni postroeniem dorogostoyaschikh LTE-setej (the stakeholders of mobile market worry about building expensive LTE-networks).

The second dominant metaphorical model according to our analysis is “Technology is a human being”. Anthropomorphic metaphor is to a greater extent developed by means of the image of human being as an active doer. In this respect the social characteristics, skills and abilities, social functions of a man in society become actual, among which the most proactive are the following:

1) age distinctions and peculiarities of a human body: ustarevshaya tekhnologiya (old technology); sleduyuschee pokoleniye superkomp’yuterov (next generation of supercomputers);
2) family ties and relationships, in particular intergenerational continuity: sobrat superkomp’yutera (supercomputer’s co-brother); “usynoviti” LTE (LTE adoptive parents);
3) intellectual abilities, herewith the abilities to solve problems, difficult tasks and find the way out of deadlocks are of special importance: problema, kotoruyu reshayut mobilnye tehnologii (the problem solved by mobile technologies);
4) different types of relationships and interaction in society, such as friendship, confidence, unity, massive participation and so on: doverit’sya oblakam (to trust clouds); publika nachinaet okhledevat’ k “oblakam” i “mobil’nost’” (the public begins to cool down to the clouds and mobility);
5) ability to self-organization, so that great attention is payed to human ability to interact in different organizations and groupings: oblachnye konsortsiy (cloud consortiums); “Oblachnaya demokratiya” (Cloud democracy);
6) public duties: “Teatr oblachnykh vychislenij” (cloud computing theatre); oblaka-ubijtsy (clouds-killers).

Despite the fact that source domain “Wild life” in different discourses is regarded as basic, dominant and very productive, in our research we designate it as a group of metaphors with low productivity. The correlation with the sphere of wild life is confirmed by individual cases of technology and its concepts adaptation to flora and fauna representatives. Thus, the metaphorical model “Technology is wild life” becomes actual due to the images of life forms possessing some specific characters like the presence of life cycle, growth function, ability to move, necessity to feed and so on: “zhiznedeyatel’nost’” oblaka (life activities of the cloud); mobil’naya ekosistema (mobile ecosystem); oblachnye tehnologii pozhirayut (cloud computing eats out).

The source domain “Artifacts” is the most numerically insignificant group of metaphors which is represented by the following concepts:

1) “Instrument”: Internet stal osnovnym instrumentom (the Internet has become the basic tool);
2) “Mechanism”: prikrutit’ oblako (to fasten the cloud);
3) “Food”: oblaka s kofejnym aromatom (clouds with coffee aroma);
4) “Transport”: cherez neskol’ko let “obkatki” (in several years after running-in);  
5) “Package”: upakovat’ oblaka (to pack clouds); oblako razvyornuto (the cloud has been rolled out).
Thus, technology conceptualization is based on the objects created by human labour.

4. Conclusion

The results of corpus-based analysis which objects of description were different types of IT, allow us to conclude that metaphorical modelling is the basic tool for their representation. Well-known and universal source domains also act as basic source domains for representing the concept “Technology”: “space”, “human being”, “living being”, and “artifact”. The spatial metaphorical model numerically exceeds the others and is considered as a dominant one in our investigation, what’s in our opinion is quite natural: it was Fauconnier (2007) who introduced the cognitive model “research is mental space” taking into consideration the scientific sphere as certain space. Herewith, different aspect of space are revealed: space as territory, ways of space organization, formation of spatial objects, etc. According to the analysis the source domain “space” is interpreted in all its semantic meanings, thus realizing the technology as space from various perspectives. Anthropomorphic model is actualized in a significantly less degree, with a special focus on some social aspects of human life. The notions connected with biological parameters of living beings as well as with artifacts are also involved in the process of IT conceptual modelling but only in individual cases. The knowledge structures associated with life cycle understanding are often used. For artefactual metaphor, the image of instrument is more important. In general, metaphorical models functioning in that scientific field allow us to refer to high level of “gnoseologic harmony” because for understanding and interpretation of processes and events which take place within IT scientific discourse, well-known knowledge structures are used. The spatial metaphor being a key one for the Internet understanding turns out to be the most productive and defines modelling of other technologies in respect of the spatial aspect.

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