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O. V. Shtovba, Cand. Sc. (Economics.); S. D. Shtovba, Dr. Sc. (Eng.)

GLOBAL BRANDS IN SCIENTIFIC RESEARCH: TRENDS OF THE LAST DECADE

The dynamics of the research support by the global brands and the dynamics of the global brands usage in the research are analyzed over the last decode. The analysis was carried out according to the scientometic approach with the Scopus base data. The support was assessed by the number of publications in which the global brand is mentioned in the section on the research funding. The usage was assessed by the number publications in which the global brand is mentioned in the presentation part of the article, i. e., in the title, key words or in the abstract. The research was carried out for the global brands from the list of top-100 the most expensive brands according to the data of Interbrand company. Twenty-two brands with the unique names were selected: Google, Microsoft, Coca-Cola, Samsung, Toyota, Facebook, IBM, Cisco, Louis Vuitton, Pepsi, Budweiser, Ebay, Hyundai, Accenture, Volkswagen, Adidas, Morgan Stanley, Huawei, Harley-Davidson, Netflix, Johnnie Walker and Lenovo. The selected brands represent ten sectors of the economy. Greater part of brands – 16 out of 22 belong to the cluster with the equivalent levels of support and usage. The most generous and popular are the brands Google, Microsoft, IBM, Samsung, Volkswagen, Toyota and Facebook. All of them are connected with the information systems and services or with automobile construction. All the brands with high and average levels of support are characterized by the considerable growth of the number of the supported articles over the past two years. Among the analyzed brands the scientists use Google in most cases. During 2017 the number of the articles, where Google is mentioned in the presentation part, exceeded 5500. Facebook, Microsoft and IBM are also among the leaders. All the four brands from the high group as well as Samsung and Netflix from the average group demonstrate stable growth of their usage in the scientific research during the past several years.

Key words: *global brands, brands in science, funding of scientific research, time series, scientometrics.*

Introduction

Global brands exercise considerable impact on various processes in the economy, sports, politics, education, etc. Besides the traditional spheres of influence, the global brands rapidly penetrate into new spheres, for instance, digital media [1], and, in particular, in social networks [2, 3]. Global brands infiltrate also into scientific activity. The level of the infiltration can be assessed by the public «reports» of the researches – by the scientific publications. But until now such activity of the global brands has not been investigated.

The impact of the global brands on the scientific research is suggested to be assessed by two indices. The first index is the number of publications, where the global brand is mentioned in the presentation part of the article. This index enables to assess roughly how the global brand is connected with the scientific activity. This connection can be in the form of some brand tools, technologies, recipes datasets. It is possible that the global brand itself acts as the object of scientific research. Unlike the papers [4, 5], where the scientometric analysis of the subject matter of the research on global branding has been made, we will concentrate on the statistics of the usage of each particular global brand in scientific publications. The second index is the number of publications, where the global brand is mentioned in the section containing the information on the funding of the research. This index enables to estimate roughly the financial support of the scientific research by the global brands. Informative figure is not only the number of messages regarding the funding but also the dynamics – change of the index during a certain time interval. The trends of the relations between the global brands and scientific research can be determined by the dynamics. For the automation of the computations scientometric bases with the corresponding search services will be applied.

Studied global brands

To perform the study we will choose the most expensive global brands of 2017 from the Top-100 according to the company Interbrand. From these brands we will discard those brands which do not have the unique names, i. e. they are homonymous. For instance, the word Apple in the scientific papers is used not only as the name of the most expensive brand but also as an ordinary apple. Catepellier – is not only the producer of powerful road construction machinery but also ordinary (biological) caterpillar. Nike – these are not only sportware but one of the species of fish and the name of one of the lasers. Names of the brands Amazon and Honda have the geographical homonyms. Some short names of the brands coincide with the specific abbreviations, widely spread in certain branches of science. For instance, in the cryptology NIKE is used as the abbreviation for Non-Interactive Key Exchange. In case of homonymy automatic computation according to scientometric bases is rather complicated. For the study we have chosen 22 brands with the unique names from 10 sectors of the economy (Table 1).

Table 1

List of the analyzed brands

Name of the brand	Place in Top-100	Sector
Google	2	Technology
Microsoft	3	Technology
Coca-Cola	4	Beverages
Samsung	6	Technology
Toyota	7	Automotive
Facebook	8	Technology
IBM	10	Business Services
Cisco	16	Technology
Louis Vuitton	19	Luxury
Pepsi	22	Beverages
Budweiser	31	Alcohol
Ebay	34	Retail
Hyundai	35	Automotive
Accenture	37	Business Services
Volkswagen	40	Automotive
Adidas	55	Sporting Goods
Morgan Stanley	63	Financial Services
Huawei	70	Technology
Harley-Davidson	77	Automotive
Netflix	78	Media
Johnnie Walker	96	Alcohol
Lenovo	100	Technology

Statistical data

According to the requirements, formulated in the introduction of the paper, the search of the publications can be carried out in scientomentric bases Scopus and Web of Science. We have chosen the Scopus base, taking into account the following reasons. First, Scopus base indexes almost twice as many journals as Web of Science. Secondly, unlike Scopus, Web of Science base does not contain journals on Humanities Research.

Chronologically the scope of the research will be limited by 2008 – 2017. The query will be formulated as the name of the corresponding brand. For obtaining the data regarding the brand usage

in the scientific research the search area will be defined as the presentation part of the paper, i. e., title, abstract and key words of the publication. This enables to reject the greater part of the noise references of the brand. To obtain the data concerting the research funding by the global brand the search is performed in the field «Funding».

In 2017 the analyzed global brands took part in funding of the research, as a result of which 5289 articles were published. The most generous are Google, Samsung, Microsoft, IBM, Volkswagen and Huawei, share of these brands is more than 80% of 5289 articles. This set of the global brands mainly funds the research in the sphere of computer science and engineering (Fig. 1). Authors of approximately half of these papers are the researchers from the USA (Fig. 2).

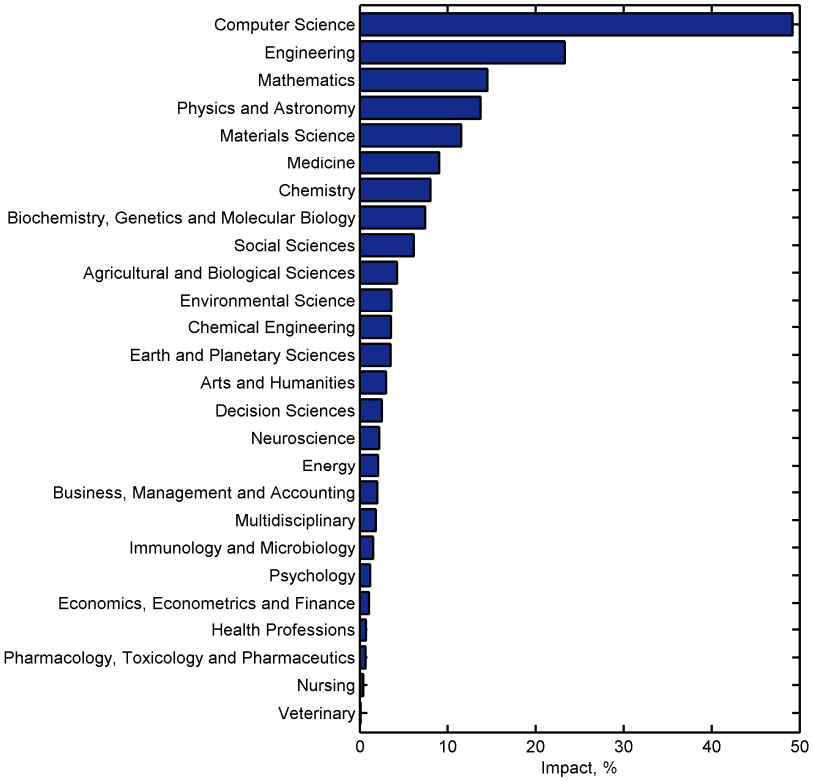

Fig. 1. Distribution of the research s fields of the articles of the year 2017, where studies were funded by the brands Google, Samsung, Microsoft, IBM, Volkswagen and Huawei

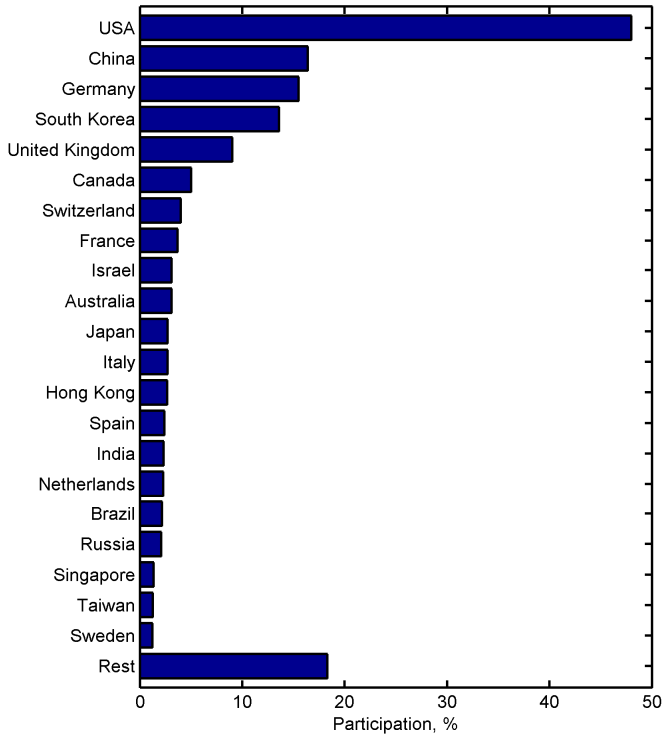

Fig. 2. Geographical distribution of the articles of the year 2017, where studies were funded by the brands Google, Samsung, Microsoft, IBM, Volkswagen and Huawei

Brands classification

For 2D-- distribution of the brands in the axes support – usage» data for the period of 10 years must be aggregated. The simplest method is the usage of the average values for the period of 10 years. But the fresh data – information from the papers of the year 2017 have the greatest impact on the current perception of the brand. The least impact will have the old papers – in our research, the papers of the year 2008. That is why, during the averaging we will normalize the indices, taking into account the various importance of the data. For the normalization of the support and usage the following formulas are suggested:

$$U_N = \frac{1}{10} \sum_{i=2008,\,2017} w_i \cdot U_i ;$$

$$S_N = \frac{1}{10} \sum_{i=2008,\,2017} w_i \cdot S_i ,$$

where S_i – number of the articles of the i^{th} year in which the corresponding global brand is mentioned in the section «Funding»; U_i – number of the articles of the i^{th} year, in which the corresponding global brand in mentioned in the presentation part of the article; w_i – weight coefficient of the i^{th} year.

We will use linearly distributed weight coefficients, namely: $w_{2017} = 1$; $w_{2016} = 0.9$; $w_{2015} = 0.8$, ..., $w_{2008} = 0.1$. Thus, the impact of the events of the year 2008 is 10 times less than the events of the year 2017.

2D --distribution of the brands according to the normalized indices is shown in Fig. 3. By the ordinal scale (Tiny, Low, Average, High) 8 clusters are allocated. For instance, the leader cluster High-High, the cluster with High Normalized Support and High Normalized Usage comprises the

brands Google, Microsoft and IBM. In Fig. 3 all the brands are located within the vicinity of the diagonal – each brand has similar or neighboring linguistic values of the normalized support and usage indices. Brands, having High Support level but Low Usage level or vice versa, Low Support level and High Usage level are missing. Greater part of the brands – 16 out of 22 are in the clusters with the equivalent levels of the normalized support and normalized usage. Eleven brand have not less than average values of support and usage, i. e., they are in the clusters High-High, High-Average, Average-High or Average-Average. Ten out of eleven of these brands are referred to technologies, business-services, automobile and only one brand – Coca-Cola – is from the food industry. The most generous and popular brands are located in the right upper corner of the Fig. 3. These brands are Google, Microsoft, IBM, Samsung, Volkswagen, Toyota and Facebook.

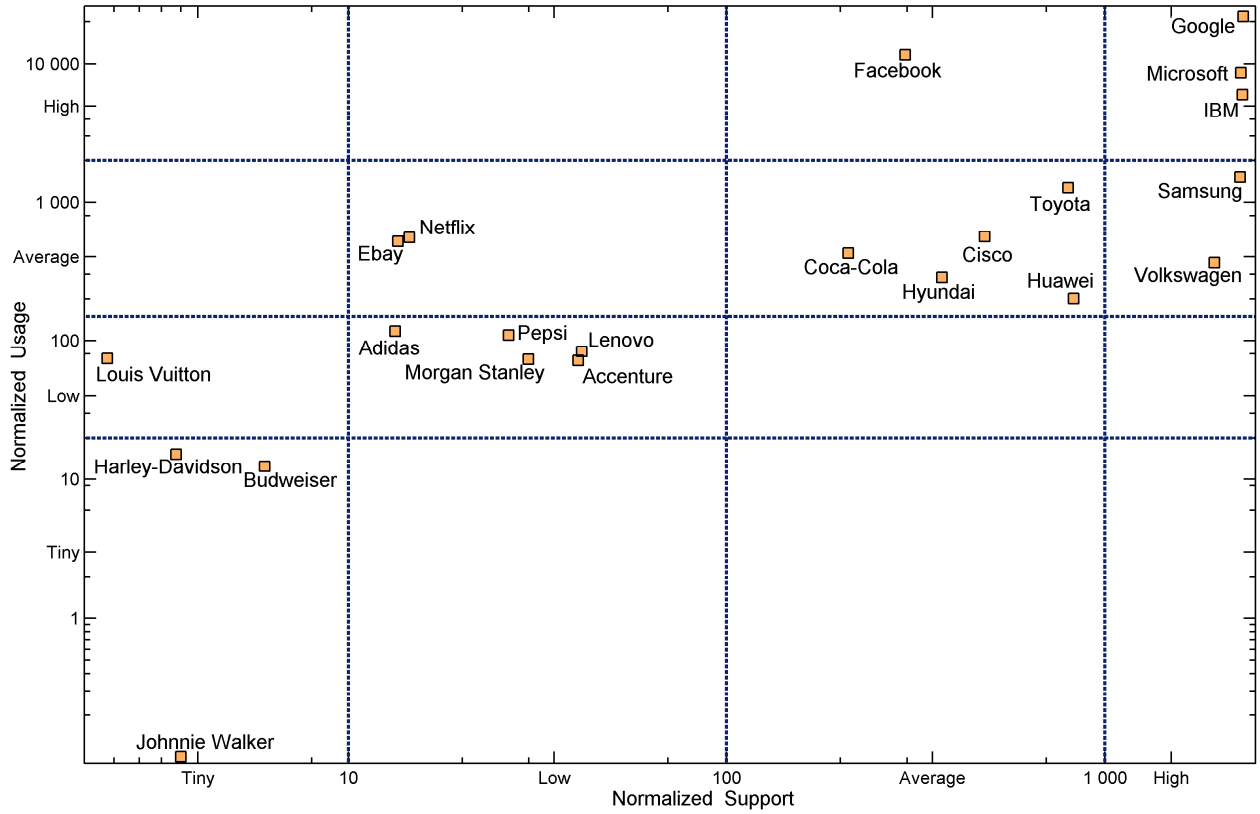

Fig. 3. Classification of the global brands (logarithmic scale)

Dynamics of support

Time series of scientific research support by the global brands are shown in Fig. 4. The studied brands are divided into 4 groups according to normalized support index. Five brands Google, Microsoft, Samsung, IBM and Volkswagen are in the group with high support level, there is no evident leader among these brands. Six brands are in the group with the average level of support. Annually they support 100 – 250 publications, i. e., 2 – 4 times less than the brands from the High Support group. Seven brands formed the group with low support level, and the other five brands were in the group with tiny support level. The averaged time series by each group are given in Fig. 5.

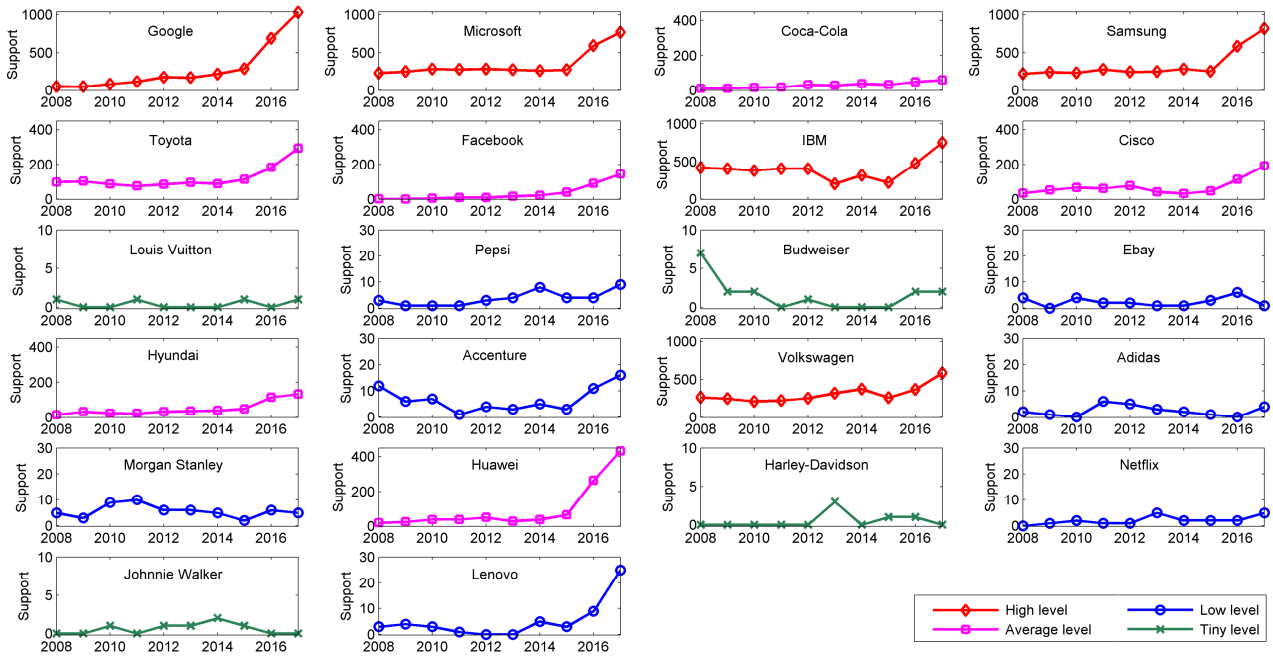

Fig. 4. Dynamics of the scientific research funding by the global brands

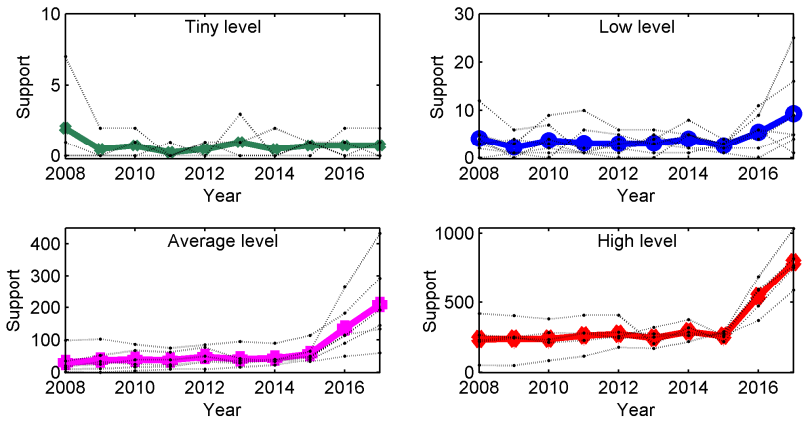

Fig. 5. Average dynamics of the scientific research funding by the global brands

It is seen from Fig. 4 and Fig. 5 that all the brands from the High group considerably increased their support of the research during last two years. In 2017 Volkswagen supported two times more articles than in 2015, Microsoft – 2.8 times, other brands – more than three times.

All the brands from the average group also increased the support of the scientific research in 2016 and 2017 but did it very unevenly. The slowest rate demonstrates Coca-Cola – 1.8 times, the most rapid Huawei – 6.7 times. On average, the brands of this group increased considerably the support of scientific research during the last two years. We draw the attention to the brand Coca-Cola, which during 2009 – 2017 shows reliable positive trends. This is the only brand from the sectors of light industry, food industry and trade which started to increase the support of the science. But the level of such support is far less than IT, telecommunication and automobile brands.

The greater part of the brands from the Low group has zero dynamic, i.e. the number of supported articles remains approximately the same during ten years. The exception is Accenture and, especially, Lenovo, which during the last two years increased considerably the support of scientific research. These two brands provided weak positive dynamics of funding for this group during two last year (see Fig. 4).

The dynamics of the brands from the group of the tiny support is not analyzed due to statistically

insignificant number of cases that makes impossible the obtaining of the reliable conclusions.

The dynamics of usage

Among the analyzed brands the researchers often use Google. During 2017 the number of articles, in the presentation part of which Google is mentioned, exceeded 5500. Facebook, Microsoft and IBM are also among the leaders. All four brands from the high group as well as Samsung and Netflix from the average group demonstrate stable growth of their usage in scientific research during the last several years. Thus, positive dynamics of the usage is demonstrated only by the brands, connected with the information technologies and information resources .

The group with the average level of usage comprises eight brands. In the average group only one brand – Ebay has reliably negative dynamics. Probably, Ebay phenomenon as the object of scientific research looses the attractiveness. Usage of the rest of the brands of the average group during 10 years is more or less stable.

Six brands form the low group. During the analyzed period the usage of each of these brands is either stable of slightly decreases. The dynamics of the brands from the group of the tiny usage will not be analyzed due to a small number of cases.

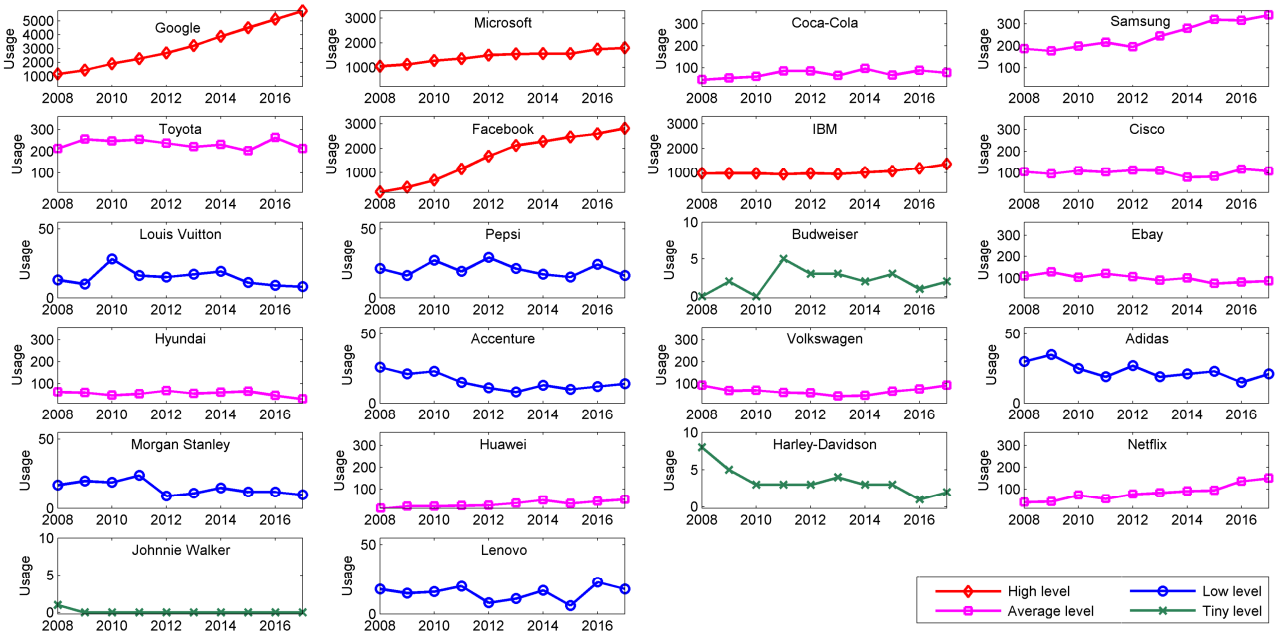

Fig. 6. Dynamics of the global brands usage in scientific research

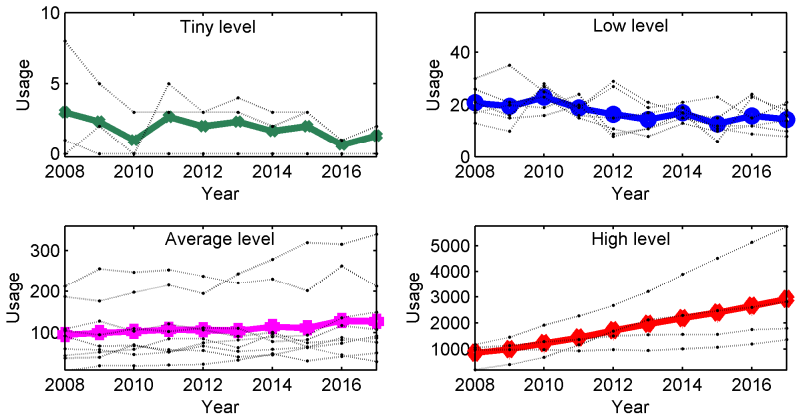

Fig. 6. Average dynamics of the global brands usage in scientific research

Conclusions

The dynamics of the scientific research support by the global brands as well as the dynamics of the global brands usage in the scientific research during the last 10 years has been studied. The assessment is performed according to the scientometric approach in accordance with the data of the Scopus base. The support was assessed by the number of publications, where the global brand is mentioned in the presentation part of the paper. The usage was assessed by the number of publications where the global brand is mentioned in the section, containing the information regarding the funding of the research. Twenty two global brands from ten sectors of economy have been analyzed.

According to the level of support, normalized during ten years, all the brands are divided into four groups – with high, average, low and tiny levels. All the brands with high and average levels are characterized by the considerable growth of the number of the supported articles during two last years. This can be explained by the increase of funding and (or) growth of the requirements to the grant recipients, concerning the obligation to mention the source of funding in the corresponding section of the article.

According to the level of usage, normalized during ten years, all the brands are divided into four groups – with high, average low and tiny levels. For the group with high level stable considerable growth of the brand usage in the articles during all ten year is characteristic. For the brands with the average level minor growth of the usage is characteristic, the rate of the growth is less than the annual increment of the articles in the Scopus base. The growth of the average usage index in this group is provided by the high rate of only two brands – Samsung and Netflix.

It is revealed that the most generous and popular brands are Google, Microsoft, IBM, Samsung, Volkswagen, Toyota and Facebook. All these seven top brands are connected with the information systems and services or with automobile In the last two years the dynamics of the support and the dynamics of usage is mainly positive. This enables to put forward the hypothesis that the strong connection of the brand with scientific research stimulates further strengthening of these relations. That is, the effect that «strong becomes stronger» is observed also in the relations between global brands and science. For the verification of this hypothesis the additional statistics for several future years is required.

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Shtovba Olena – Associate Professor, PhD, Associate Professor with the Department of Management, Marketing, and Economics, e-mail: olena.shtovba@yahoo.com.

Shtovba Serhiy – Dr. Sc. (Eng.), Professor, Professor with Computer Control Systems Department, e-mail: shtovba@vntu.edu.ua.

Vinnytsia National Technical University.