Guest Paper

Tang, M., Liao, H., Tamasevicius, V. (2020), "15 years in Web of Science of the Transformations in Business & Economics: Bibliometric and Visual analyses", *Transformations in Business & Economics*, Vol. 19, No 1 (49), pp.21-42.

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BUSINESS & ECONOMICS

15 YEARS IN WEB OF SCIENCE OF THE TRANSFORMATIONS IN BUSINESS AND ECONOMICS: BIBLIOMETRIC AND VISUAL ANALYSES[1]

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[1]Acknowledgments: The work was supported by the National Natural Science Foundation of China (71771156, 71971145).

Received: October, 2019
1st Revision: January, 2020
2nd Revision: February, 2020
Accepted: March, 2020

ABSTRACT. ***The Transformations in Business & Economics is an international peer-review journal in the field of business & economics, which was retrieved by Web of Science since 2005. More than 1000 documents have been published in this journal. Motivated by its 15th anniversary, we provide a comprehensive bibliometric review for the journal publications during the period from 2005 to 2019. This study is conducted from two perspectives: performance analyses and graphic analyses. The publication and citation structures, leading countries and institutes are analyzed in performance analysis. Graphic analyses are carried out based on visualization tools such as VOSviewer, CiteSpace, Excel and Circos. The keyword co-occurrence network, co-authorship analysis and co-citation analysis are provided in graphic analyses. It is hoped that this study will have guiding significance for the future development of this journal.***

KEYWORDS: Transformations in Business & Economics, bibliometrics, performance analysis, graphic analysis, business & economics.

JEL classification: C02, C44, D71, D81, R41.

Introduction

The Transformations in Business & Economics (TIBE) (http://www.transformations.knf.vu.lt/) is an international peer-review journal that was created in 2002 in the field of business and economics published by Vilnius University Press. The idea of creating the journal was to provide a platform for scientific research, discussion and evaluation of findings for Central and East Europe countries' economic transition under the background of global economic change. The first editor-in-chief was Prof Vytautas Pranas Pranulis, who remained in charge until 2009. In 2009, a new leading editorial team took over and Prof Dalia Štreimikienė became the editor-in-chief. According to its journal homepage, it focuses on publishing high-quality researches in the ever-expanding area of development economics. In addition, the interdisciplinary approaches such as economic theory, business management and marketing also belong to the scope of TIBE. TIBE published 1 issue in the first year in 2002 and 2 issues between 2003 and 2007. Commencing in 2008, TIBE appeared as a tri-annual publication. It was retrieved by Web of Science (WoS) since 2005. According to the current Journal Citation Reports (JCR), its impact factor is 1.058 and ranks the 215th position out of 363 journals in the category of *Economics* and 126th position out of 147 journals in the category of *Business*. Up to now, TIBE has experienced 15 years in WoS and contributed more than 1,000 publications. There is a need to conduct a bibliometric overview for TIBE publications with the aim of identifying the overall structure and development trend of this journal.

Bibliometrics refers to the field that studies the characteristics of bibliographic materials using quantitative and visualization methods (Broadus, 1987). The objective of bibliometric analysis can be a specific domain (Liao *et al*., 2019), a region (Glänzel, 2000), a journal (Tang *et al*., 2018a), or even a scholar (Hartley, 2019). To reveal the general citation structure and development trend of a journal has become a research hotspot in bibliometrics. For instance, Merigo *et al*. (2015) provided a bibliometric study of the *Journal of Business Research* during the period of 1973 to 2014. Tang *et al.* (2018a) presented the internal

structure of *Sustainability* to celebrate its 10th anniversary. Laengle *et al*. (2017) studied the publications in *European Journal of Operational Research* published in the last four decades.

The aim of this study is to conduct a bibliometric analysis for TIBE publications from two perspectives: performance analyses and graphic analyses. Our study could assist editors and scholars in better understanding the past and current status of TIBE. Furthermore, it is hoped that our study can provide guiding significances for the future development of the journal and engage further research. This study can also help researchers find influential institutes in this field, so as to seek cooperation or academic exchanges in the future.

The rest of this study is organized as follows: Section 1 presents the data used in this study and the necessary methods and tools. Performance analyses of the journal, including annual structures of publications and citations, sources that paid attention to TIBE, highly cited papers and active countries/institutes, are provided in Section 2. The graphic analysis is given in Section 3. Section 4 provides discussions. Concluding remarks are given in Section 5.

1. Data and Methods

To conduct performance and graphic analyses, the documents published in TIBE must be collected and processed. The WoS is the most important and widely used database in analyzing scientific publications (Liao *et al*., 2018; Pan *et al*., 2019; Razminiene, 2019; Pandey *et al*., 2019). Therefore, the documents were downloaded from WoS using the advance query: SO=("TRANSFORMATIONS IN BUSINESS & ECONOMICS"). By 10 October 2019, there are altogether 1066 documents published in TIBE retrieved from WoS. This number reduces to 984 if we only consider articles, reviews, and meetings. We downloaded these 984 documents in the form of plain text. There are 906 articles, accounting for 92.07%. Reviews and meetings occupy a proportion of 7.92% and 1.42%, respectively.

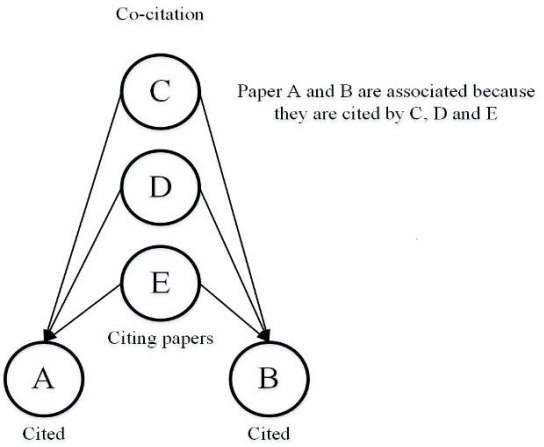
There are two main categories of bibliometric analyses: performance analyses and graphic analyses (Noyons *et al*., 1999). The aim of performance analyses is to present publication and citation structures with regard to countries, institutes, authors, or journals (Noyons *et al*., 1999). There are many indicators regarding performance analysis such as the total numbers of publications and citations, the average numbers of publications and citations and H-index (Hirsch, 2005). H-index is a criterion proposed by Hirsch (2005) to evaluate the scientific outputs of a scholar. A researcher has an index h if h of his/her N papers have at least h citations and other N-h papers have fewer than h citations. This index can reflect the quantity and quality of a researcher's scientific outputs at the same time (Bornmann, Daniel, 2005). Graphic analyses mainly display scientific outputs using some visualization software packages and tools. Various bibliometric methods have been proposed such as keyword co-occurrence analysis, co-authorship analysis and co-citation analysis:

1) Co-occurrence happens when two items exist in a document. Keyword co-occurrence analysis is a kind of bibliometric methods that presents research hotspots and development trend in a domain. Scholars' research interests and emphasis can be identified by keyword co-occurrence analysis (Xie *et al*., 2008).

2) Co-authorship is one of the most popular and extensive ways of scientific cooperation (Newman, 2001). Mainly there are three types of co-authorship: country co-authorship, institute co-authorship and author co-authorship (Tang *et al*., 2018b).

3) Co-citation analysis was introduced by Small (1973). When two documents are cited by the third document simultaneously, then, these two documents have a co-citation relationship. In general, if two documents appeared in the reference list of the third document,

they have some relations more or less. The graphical representation of the co-citation relationship is provided in *Figure 1*. Through co-citation analysis, we can identify the important literature and core authors in a specific domain (Tang *et al*, 2018a).



Source: Boyack, Klavans, 2010.

Figure 1. **Co-Citation Relationship of two Papers**

To carry out graphic analyses, some bibliometric mapping software packages have been developed, including CiteSpace (http://cluster.cis.drexel.edu/~cchen/citespace/; Chen, 2004), VOSviewer (http://www.VOSviewer.com/; van Eck, Waltman, 2010), and Gephi (https://gephi.org/; Bastian *et al*., 2009). This study uses VOSviewer to generate keyword co-occurrence network and co-authorship network, and then utilizes CiteSpace to generate timeline visualization of co-citation network. Additionally, we also use Excel to generate the geographical distribution of national publications. The Circos (http://circos.ca/) is employed to explore the relationships among high-frequency keywords plus.

Table 1. Some bibliometric studies for journals in the field of Business & Economics

Journal	Author	Period
Transportation Research Journals	Modak, N.M., Merigo, J.M., Weber, R., Manzor, F., Ortuzar, J.D.	1967–2016
Journal of Business-to-Business Marketing	Valenzuela-Fernandez, L., Merigo, J.M., Lichtenthal, J.D., Nicolas, C.	1992–2016
Technological and Economic Development of Economy	Yu, D.J., Xu, Z.S., Saparauskas, J.	1994–2018
European Journal of Marketing	Martinez-Lopez, F.J., Merigo, J.M., Valenzuela-Fernandez, L., Nicolas, C.	1967–2018
Journal of Business & Industrial Marketing	Valenzuela, L., Merigo, J.M. Johnston, W.J., Nicolas, C., Jaramillo, J.F.	1986–2015
Journal of Business Research	Merigo, J.M., Mas-Tur, A., Roig-Tierno, N., Ribeiro-Soriano, D.	1973–2014
Strategic Management Journal	Ramos-Rodriguez, A.R., Ruiz-Navarro, J.	1980–2000
Family Business Review	Casillas, J., Acedo, F.	1988–2005
Journal of Product Innovation Management	Durisin, B., Calabretta, G., Parmeggiani, V.	1984–2004

Source: created by the authors.

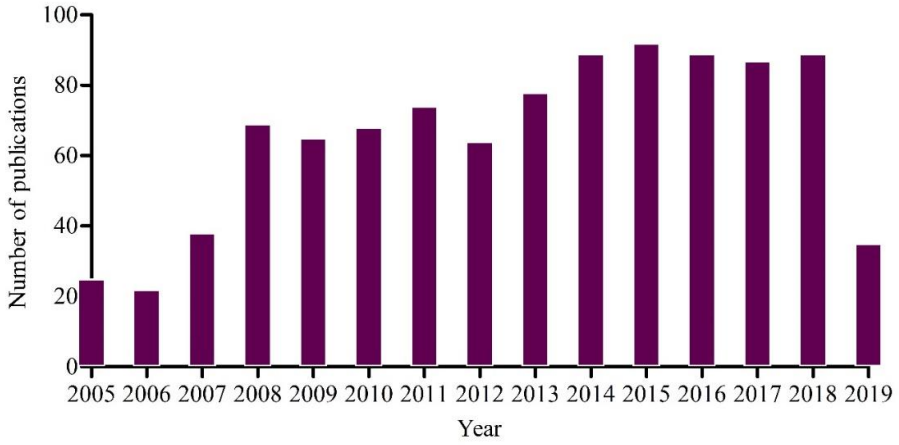
As mentioned in the Introduction, providing a bibliometric overview for a specific journal is an important topic of bibliometric analysis. *Table 1* summarizes some bibliometric studies for journals in the field of Business & Economics.

2. Performance Analyses

This section presents publication and citation distributions of TIBE publications. Next, prolific countries and institutes are further discussed.

2.1 Publication and Citation Structures

TIBE was included in WoS since 2005. In the first three years, it published less than 40 papers (*Figure 2*). There was a significant growth in the number of documents in 2008 since the number of issues was changed from 2 to 3. In the last half-decade, TIBE published around 90 documents per year. Note that up to 10 October 2019, only two issues can be found in WoS. Therefore, the number of papers in 2019 is only 35.



Source: created by the authors.

Figure 2. **Annual Numbers of Publications of TIBE from 2005 to Oct 2019**

To analyze the citation structure of TIBE publications, *Table 2* presents the results of annual numbers of citations received by 984 documents up to October 2019. Furthermore, *Table 2* also provides several thresholds to identify the number of highly cited papers that obtained at least 20, 10, 5, and 1 citation(s). As we can see from Table 2, 1.42% of the papers obtained more than 20 citations. 64.84% of the documents have at least one citation. Papers published in recent years still need time to catch up their majority of citations. The last column of *Table 2* gives the H-index each year. 2007, 2008, and 2009 have a better performance regarding the H-index.

Table 2. Annual citation structure of TIBE from 2005 to Oct 2019

Year	≥ 20	≥ 10	≥ 5	≥ 1	ND	NC	AC	H-index
2005	0	0	5	14	25	56	2.24	5
2006	0	3	5	14	22	80	3.64	5
2007	2	10	16	31	38	259	6.82	10
2008	4	20	40	63	69	494	7.16	12
2009	0	10	32	64	65	362	5.57	10
2010	1	5	17	48	68	213	3.13	7
2011	2	3	9	48	74	187	2.53	6
2012	1	4	10	36	64	153	2.39	7
2013	0	4	11	46	78	171	2.19	6
2014	1	5	15	65	89	231	2.61	7
2015	1	8	16	55	92	237	2.58	9
2016	0	4	15	61	89	220	2.47	7
2017	1	5	11	53	87	201	2.31	7
2018	1	2	3	38	89	112	1.26	4
2019	0	0	0	2	35	2	0.06	1
Total	14	83	205	638	984	2987	3.04	18
Percentage	1.42%	8.43%	20.83%	64.84%	-	-	-	-

Notes: ND: Number of documents; NC: Number of citations; AC: Average number of citations per document.

Source: own calculations.

Next, let us consider the most cited papers published in TIBE. *Table 3* lists the top 20 most cited papers in the journal over the last 15 years in WoS. The author information, publication year, number of citations and average number of citations per year are provided. The most cited paper, written by Brauers *et al*. (2007), received 49 citations. This paper focused on the antagonism of transition economies of Central and Eastern Europe and well-developed countries of Western. The second most cited paper is a highly cited paper in Essential Science Indicators (ESI). The ESI database selected the top 1% of papers according to their citations in different fields. This paper analyzed the motivations and mechanisms of carbon dioxide (CO2) emissions of three major emitters (USA, China, and India) in the world.

Table 3. Top 20 most cited studies in TIBE according to WoS

Rank	Title	Author(s)	Year	Citations	AC
1	The European Union in a transition economy	Brauers, W.K.M., Ginevicius, R. Zavadskas, E.K. Antucheviciene, J.	2007	49	3.77
2	Quo Vadis? Major players in global coal consumption and emissions reduction	Chen, J.D., Cheng, S.L., Nikic, V., Song, M.L.	2018	40	20.00
3	Review of the multiple criteria decision making methods, intelligent and biometric systems applied in modern construction economics	Kaplinski, O., Tupenaite, L.	2011	38	4.22
4	The knowledge-based economy in the European union: Innovations, networking and transformation strategies	Melnikas, B.	2008	35	2.92
5	Model for Lithuanian construction industry development	Zavadskas, E.K., Kaklauskas, A.	2008	29	2.42
6	Social capital and SME internationalization: An empirical examination	Ruzzier, M., Antoncic, B.	2007	27	2.08
7	Robustness in the MULTIMOORA model: The example of Tanzania	Brauers, W.K.M., Zavadskas, E.K.	2010	26	2.60
8	Business influence on the mass media: A case study of 21 countries	Cabelkova, I., Strielkowski, W., Mirvald, M.	2015	23	4.60

Table 3 (continuation). Top 20 most cited studies in TIBE according to WoS

Rank	Title	Author(s)	Year	Citations	AC
9	Modelling new economic approaches for the wholesale energy markets in Russia and the EU	Lisin, E., Strielkowski, W.	2014	23	3.83
10	Saving forests through development? Fuelwood consumption and the energy-ladder hypothesis in rural southern China	Zhao, Q.R., Chen, Q.H., Xiao, Y.T., Tian, G.Q., Chu, X.L., Liu, Q.M.	2017	22	7.33
11	The customer's perspective on the tourism destination brand: A structural equation modeling study	Konecnik, M; Ruzzier, M	2008	22	1.83
12	Multi-objective optimization in location theory a simulation for a department store	Brauers, W.K.M., Zavadskas, E.K.	2008	21	1.75
13	Project portfolio selection using fuzzy AHP and VIKOR techniques	Fouladgar M.M., Yazdani-Chamzini, A., Zavadskas, E.K., Yakhchali, S.H., Ghasempourabadi, M.H.	2012	20	2.50
14	Sustainability assessment of policy scenarios	Streimikiene, D., Mikalauskiene, A., Barakauskaite-Jakubauskiene, N.	2011	20	2.22
15	Assessment of electricity generation technologies based on GHG emission reduction potential and costs	Streimikiene, D., Balezentiene, L.	2012	19	2.38
16	Relationship between organisational learning and organisational performance: The case of Croatia	Hernaus, T., Skerlavaj, M., Dimovski, V.	2008	19	1.58
17	Are current account deficits in Eastern Europe and former Soviet Union too high?	Aristovnik, A.	2007	19	1.46
18	Application of multiple criteria decision making techniques in tourism and hospitability industry: A systematic review	Mardani, A., Jusoh, A., Zavadskas, E.K., Kazemilari, M., Ahmad, U.N.U., Khalifah, Z.	2016	18	4.50
19	Quantitative financial analysis of small and medium food enterprises in a developing country	Mura, L., Buleca, J., Hajduova, Z., Andrejkovic, M.	2015	18	3.60
20	Delineating values, emotions and motives in consumer behaviour: An interdisciplinary approach	Grundey, D.	2006	18	1.29

Notes: AC: Average number of citations by year.

Source: own calculations.

Another interesting topic is to analyze the sources that cite TIBE publications. *Table 4* describes the sources that cite TIBE publications in terms of journals, institutes and countries. As depicted in *Table 4*, TIBE itself leads the ranking of the journal list with 274 studies. It is a common phenomenon that a journal cites its own publications (Tang, Liao, Su, 2018). Most journals that cite TIBE publications are related to economics. Half of the 20 journals have the word "economics" or "economic" in their titles. Regarding institutes, most of them are located at Lithuania and in its surrounding countries in Central and East Europe such as Romania, Poland, Slovakia, Czech Republic, and Slovenia. In addition, several top countries in *Table 4* also come from Central and East Europe such as Lithuania, Poland, Czech Republic, Romania, and Slovakia. According to its journal homepage, this journal was created in Lithuania in 2002 under the background of European economic integration. In 2004, 10 countries including Lithuania, Poland, Czech Republic, Slovakia, and Slovenia joined the Europe Union. Being a union brought many opportunities and challenges. The geographical entities of Central and East Europe need to meet these challenges together. This phenomenon has also been demonstrated in *Table 4*.

Table 4. Top 20 citing sources of TIBE: journals, institutes and countries

Rank	Journal	ND	Institute	ND	Country	ND
1	Transformations in Business & Economics	274	Vilnius Gediminas Technical University	186	Lithuania	637
2	Inzinerine Ekonomika-Engineering Economics	148	Vilnius University	165	Poland	198
3	Sustainability	66	Kaunas University of Technology	124	Czech Republic	178
4	Technological and Economic Development of Economy	49	Lithuanian Institute of Agrarian Economics	72	Romania	175
5	Economics Sociology	46	Bucharest University of Economic Studies	67	China	151
6	Montenegrin Journal of Economics	46	Lithuanian Sports University	52	Slovakia	116
7	Amfiteatru Economic Journal	38	Tomas Bata University	50	Spain	82
8	Journal of Business Economics and Management	34	University of Szczecin	48	USA	76
9	E & M Ekonomie A Management	32	Mykolas Romeris University	42	Russia	75
10	Economic Research-Ekonomska Istraživanja	29	Alexandru Ioan Cuza University	39	Slovenia	63
11	Entrepreneurship and Sustainability	19	Vytautas Magnus University	32	Iran	56
12	Energies	18	University of Ljubljana	31	UK	46
13	Journal of Cleaner Production	18	Alexander Dubcek University of Trencin	24	Malaysia	34
14	Marketing and Management of Innovations	17	Technical University of Kosice	24	Turkey	31
15	Economic Computation and Economic Cybernetics Studies and Research	16	Wroclaw University of Economics	24	Italy	29
16	Journal of Competitiveness	15	Lithuanian Energy Institute	23	Ukraine	28
17	Informatica	15	Aleksandras Stulginskis University	22	Germany	24
18	Renewable & Sustainable Energy Reviews	12	Babes-Bolyai University of Cluj	21	Portugal	24
19	International Journal of Strategic Property Management	11	Islamic Azad University	21	Serbia	24
20	Journal of Civil Engineering and Management	11	Charles University in Prague	20	Estonia	22

Notes: NP: Number of documents.

Source: own calculations.

2.2 Leading Countries and Institutes of TIBE Publications

TIBE is an international journal that receive manuscripts from all the five continents. Scholars from more than 50 countries/regions have publications in TIBE up to now. *Table 5* presents the top 20 most productive countries in the journal with several indicators such as the number of documents, number of citations, average number of citations and H-index. Additionally, the population and number of publications by person multiplied by one million are also provided in the last two columns. Note that if a paper was written in the form of international cooperation, then each country in this paper was counted once.

Corresponding to the results of *Table 4*, countries from Central and East Europe played a vital role in TIBE publications. Lithuania is still the most productive country, followed by Poland and Romania. If we normalize the results per capita, then Lithuania, Slovenia and Estonia are the most influential. In *Table 5*, 16 countries are from Europe, 3 countries from Asia and 1 country from North American. The geographical distribution of

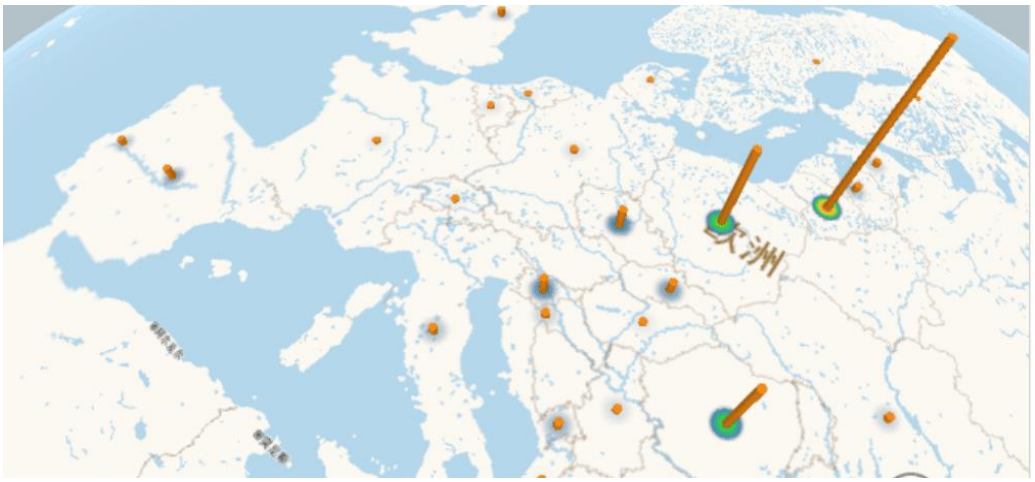
Europe is displayed in *Figure 3* using Excel. In this list, we can find many small countries whose population is not in the top 100 in the world, including Lithuania, Slovenia, Slovakia, Montenegro, Latvia, Estonia, and Croatia. Therefore, TIBE has made some contributions to scientific research work in the economic field for these small countries.

Table 5. Top 20 productive countries in TIBE publications

Rank	Country	ND	NC	AC	H	≥ 10	≥ 5	≥ 1	Pop	ND/Pop
1	Lithuania	378	1426	3.77	15	45	99	262	2876	131.43
2	Poland	182	441	2.42	9	7	29	116	38105	4.79
3	Romania	155	280	1.81	8	3	18	95	19581	7.92
4	China	69	141	2.04	6	4	8	27	1,395,380	0.05
5	Czech Republic	42	186	4.43	8	7	13	32	10,625	3.95
6	Slovenia	35	203	5.80	8	7	14	29	2081	16.82
7	Slovakia	27	90	3.33	6	4	7	18	5450	4.95
8	Spain	25	66	2.64	5	1	6	16	46,397	0.54
9	Montenegro	19	75	3.95	4	1	4	12	629	3.02
10	USA	18	55	3.06	4	1	4	14	326,768	0.06
11	UK	15	44	2.93	4	2	3	11	66,574	0.23
12	Italy	15	43	2.87	3	1	2	12	59,291	0.25
13	Iran	14	84	6.00	6	4	7	11	82,012	0.17
14	Latvia	14	73	5.21	5	4	5	12	1,930	7.25
15	Portugal	13	34	2.62	3	0	3	10	10,291	1.26
16	Malaysia	12	46	3.83	3	2	2	7	32,042	0.37
17	Estonia	11	63	5.73	5	2	7	10	1,307	8.41
18	Ukraine	11	28	2.55	3	1	1	7	44,009	0.25
19	Croatia	10	33	3.30	3	1	1	7	4,165	2.40
20	Russia	9	50	5.56	4	1	4	8	143,965	0.06

Notes: ND: Number of documents; NC: Number of citations; AC: Average number of citations per document; H: H-index; NP/Pop: Total number of publications by person multiplied by one million.

Source: own calculations.



Source: created by the authors.

Figure 3. **Geographical Distribution of TIBE Publications in Europe**

More than 100 institutes from all over the world have publications in TIBE. *Table 6* provides the top 20 productive institutes in the journal. Furthermore, *Table 6* also presents

some indicators including the average number of citations, H-index, and three citation thresholds. The last column is the country that each institute belongs to. As we can see from *Table 6*, Vilnius University from Lithuania is the most productive institute with 205 papers and 704 citations. The journal was created in this university and published by Vilnius University Press. Nearly half of 20 institutes (9/20) are from Lithuania. Note that only one institute (Shanghai University) is not from Europe. Most of these institutes do not belong to the top 100 of world university rankings such as QS (Quacquarelli Symonds) World University Rankings and ARWU (Academic Ranking of World Universities). Therefore, the establishment of TIBE is beneficial to economic research for small universities and institutes in Europe, especially in Central and East Europe.

Table 6. Top 20 productive institutes in TIBE

Rank	Institute	ND	NC	AC	H	≥ 10	≥ 5	≥ 1	Country
1	Vilnius University	205	704	3.43	13	23	55	137	Lithuania
2	Alexandru Ioan Cuza University	61	77	1.26	4	0	4	32	Romania
3	Bucharest University of Economic Studies	61	147	2.41	6	3	9	42	Romania
4	Lithuanian Sports University	47	109	2.32	6	3	6	34	Lithuania
5	University of Szczecin	47	129	2.74	6	2	10	34	Poland
6	Vilnius Gediminas Technical University	47	397	8.45	12	14	23	38	Lithuania
7	Kaunas University of Technology	41	158	3.85	8	4	12	35	Lithuania
8	Wroclaw University of Economics	37	57	1.54	4	0	4	19	Poland
9	West Pomeranian University of Technology	24	85	3.54	7	3	7	13	Poland
10	University of Ljubljana	23	129	5.61	6	4	10	18	Slovenia
11	Mykolas Romeris University	19	27	1.42	3	0	1	10	Lithuania
12	Aleksandras Stulginskis University	18	44	2.44	4	1	2	9	Lithuania
13	Vytautas Magnus University	16	67	4.19	6	2	7	13	Lithuania
14	University Ovidius	15	16	1.14	2	0	1	7	Romania
15	Shanghai University	15	7	0.47	2	0	0	4	China
16	University of Montenegro	14	32	2.29	4	0	3	9	Montenegro
17	Babes Bolyai University	13	42	3.23	4	1	3	10	Romania
18	Tomas Bata University	13	63	4.85	5	3	5	11	Czech Republic
19	ISM University of Management and Economics	12	77	6.42	6	4	7	11	Lithuania
20	Klaipeda University	11	13	1.18	2	0	1	6	Lithuania

Notes: ND: Number of documents; NC: Number of citations; AC: Average number of citations per document.

Source: own calculations.

3. Graphic Analyses

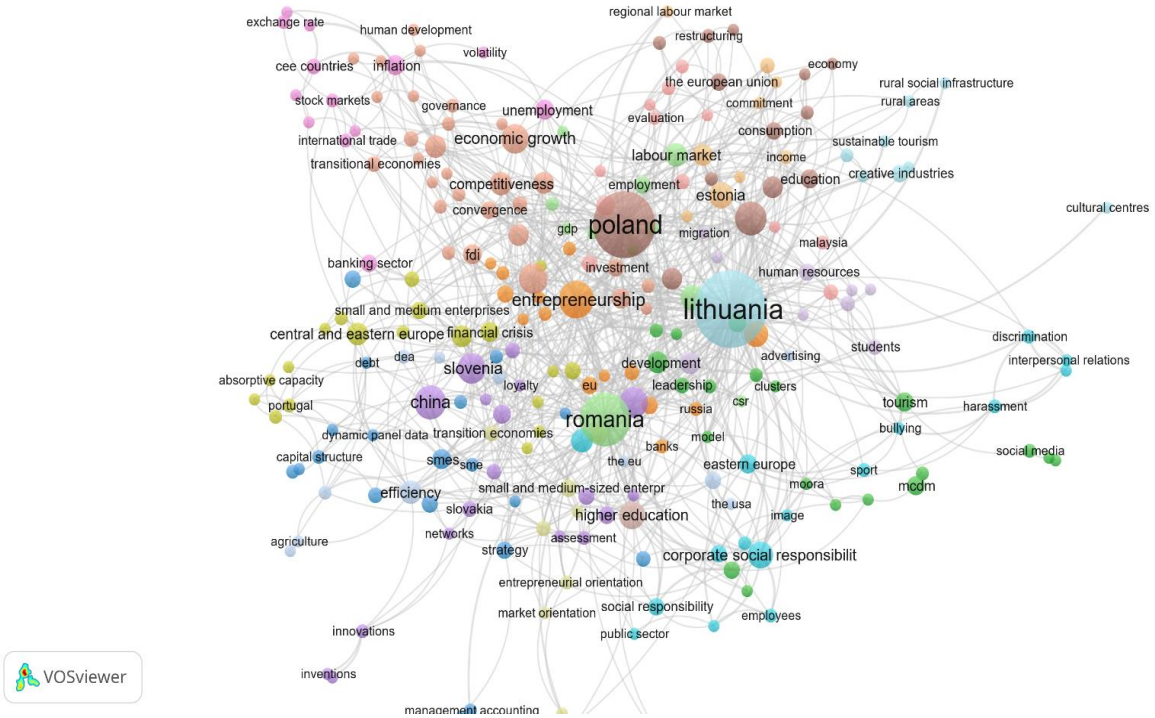
In this section, we conduct graphic analyses in terms of keyword co-occurrence, co-authorship analysis and co-citation analysis to visually present the outputs by some visualization tools.

3.1 Keyword Co-Occurrence Analysis

Author-selected keywords are the refinement of the theme, which can represent the subject matter of an article (Uddin *et al*., 2015). These keywords represent the authors' understanding of their studies. Within a research field, some author-selected keywords are used frequently and some have a low frequency. Those author-selected keywords with high

frequency are usually related to a popular research topic or an important research approach (Uddin, Khan, 2016).

To identify the most popular author-selected keywords, *Figure 4* presents the author-selected keywords co-occurrence network by the VOSviewer software package. In *Figure 4*, a node represents a keyword and its size denotes its frequency. The larger the node is, the higher the frequency of the keyword is. The line connecting two nodes represents that the two keywords have been used in the same document. As depicted in *Figure 4*, the three biggest nodes are "Lithuania", "Poland" and "Romania". These three keywords have been used 113, 85 and 55 times by TIBE authors, respectively. Some other big nodes include "entrepreneurship", "sustainable development, "China", "innovation", and "European Union". These author-selected keywords reflect the emphasis of TIBE publications.



Source: created by the authors.

Figure 4. **Author Keyword Co-Occurrence Network**

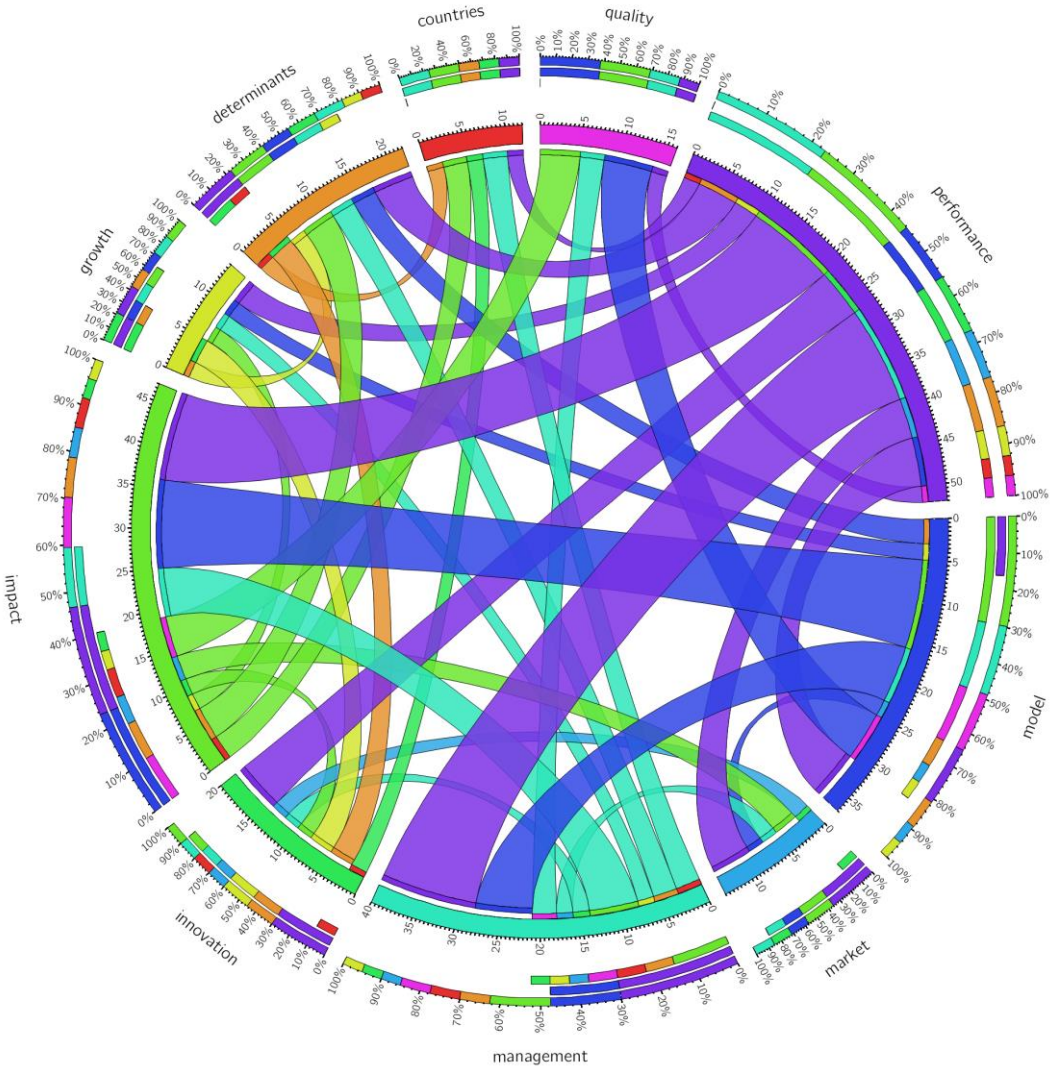
Furthermore, we also provide the authors' preferences for the number of keywords in *Table 7*. All authors have used more than 2,900 different keywords. According to the statistical results, the average number of author keywords for TIBE publications is 4.85. As shown in *Table 7*, authors like to use 4 or 5 keywords. These two types of papers account for about two-thirds of all publications. The last column of *Table 7* presents the average number of citations associated with the number of author keywords. With the increase in the number of author keywords, the average number of citations also increases. One reason for this phenomenon is that if a paper has more keywords, then this paper will be more likely to be retrieved by readers in the database (Uddin, Khan, 2016).

Table 7. Preferences of TIBE authors for the number of keywords

Paper type	Proportion (publications)	Proportion (citations)	AC
<3 author-keyword papers	0.44%	0.17%	1.25
3 author-keyword papers	11.12%	7.59%	2.18
4 author-keyword papers	25.58%	22.32%	2.79
5 author-keyword papers	40.60%	38.41%	3.02
6 author-keyword papers	15.02%	19.67%	4.19
>6 author-keyword papers	7.23%	11.84%	5.23

Notes: AC: Average number of citations per document.

Source: own calculations.



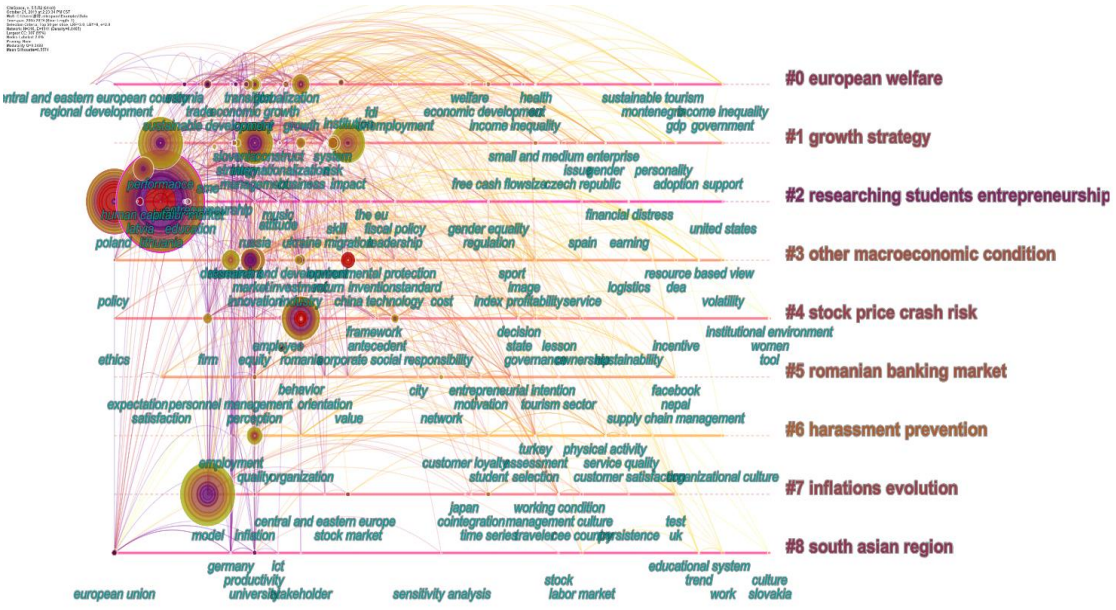
Source: created by the authors.

Figure 5. **Circular Representation of Keywords Plus Co-Occurrence**

Keywords plus are phrases or words extracted by an automatic algorithm from the titles of a paper's reference list in the Institute for Scientific Information (ISI) database (Garfield, 1990). In WoS, keywords plus are under author keywords on the profile page of a paper. To display the co-occurrence status of keywords plus, we use the Circos software package to make a circular map of the top 10 high-frequency keywords plus, which are

illustrated in *Figure 5*. These 10 keywords plus are: "*performance*", "*model*", "*management*", "*impact*", "*growth*", "*determinants*", "*quality*", "*market*", "*innovation*", and "*countries*". As shown in *Figure 5*, there are two rings on the outer layer. The outer ring reflects the frequency distribution between each word and the other 9 words. For instance, about 20% of the word "*impact*" is appeared with the word "*performance*", simultaneously. The inner ring denotes the total number of publications. Note that this total number is the sum of link strength between a word and other 9 words instead of all other keywords plus in TIBE publications. As depicted in *Figure 5*, some important belts include "*impact-performance*", "*impact-model*", and "*management-performance*".

To identify the evolution of journal emphasis and themes, using CiteSpace software package, we generate the timeline visualization of co-occurring author keywords and keywords plus based on keyword co-occurrence network, which is illustrated in *Figure 6*. If a citation burst has occurred for a keyword, then there will be a red tree ring on the timeline. Otherwise, the spectrum of the tree ring will change from purple to yellow. 9 horizontal lines divide the figure into 9 layers, corresponding to 9 clusters. Closer to the left indicates the earlier year. Furthermore, these 9 clusters are arranged from top to bottom according to their size. Each node represents a keyword. The line connecting two nodes indicates that these two keywords have appeared in the same documents. The size of a node denotes the frequency of the keyword. The right of the horizontal line is the label of the cluster. The labels are exacted from titles of citing papers in clusters based on the Log-Likelihood Ratio (LLR) test method (Chen, 2017). The largest cluster (#0) has 57 members. It is labelled as European Welfare by the LLR. The largest node (Lithuania) belongs to the cluster #2. As depicted in *Figure 6*, some big nodes such as "*Lithuania*" and "*Poland*" appear on the left side. Before 2010, the journal mainly concentrated on the economic transition problem of Central and East European countries. In the last few years, some new keywords emerged such as "*sustainable tourism*", "*small and medium enterprise*", "*supply chain management*", "*educational system*", and "*financial distress*".

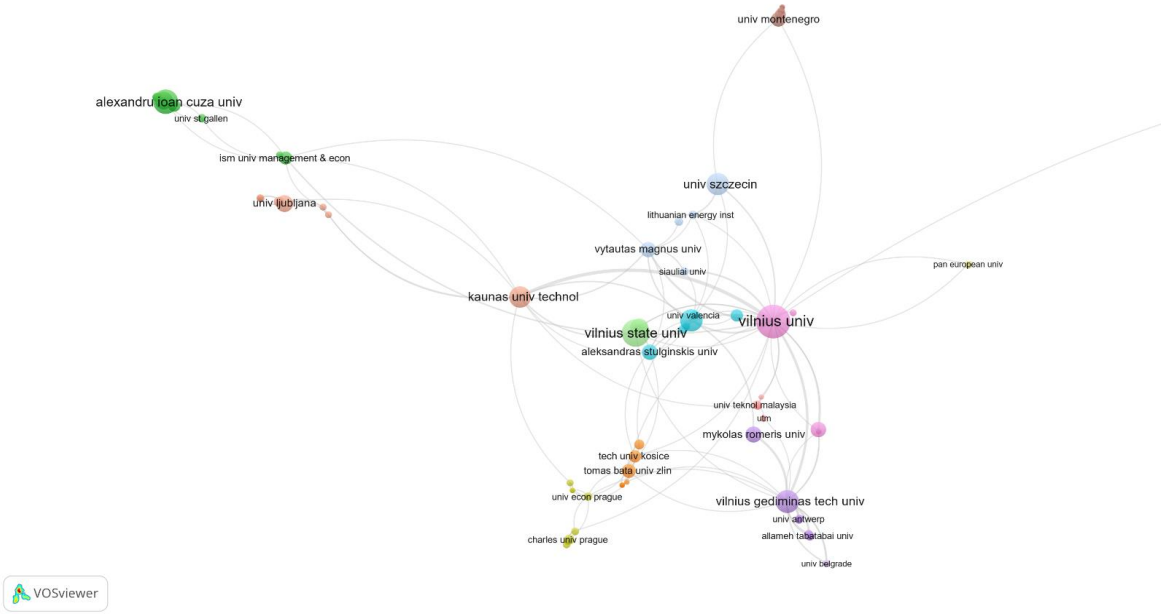


Source: created by the authors.

Figure 6. **A Timeline Visualization of Co-Occurring Author Keywords and Keywords Plus**

3.2 Co-Authorship Analysis

Figure 7 displays the institute co-authorship network. In *Figure 7*, a node represents an institute and its size reflects the degree of activity. The line connecting two nodes denotes the cooperative relationship. The thicker the line is, the more frequent the cooperation between two institutes is. Corresponding to the results of *Table 6*, the top influential institutes include *Vilnius University*, *Alexandru Ioan Cuza University* and *Vilnius Gediminas Technical University*. The main cooperative partners of *Vilnius University* are *Kaunas University of Technology*, *Vilnius Gediminas Technical University*, and *Vytautas Magnus University*. The number of cooperative papers between *Vilnius University* and these universities is 11, 6, and 4, respectively.



Source: created by the authors.

Figure 7. **Institute Co-Authorship Network**

All the 984 TIBE publications were distributed in about 500 institutes. The average number of institutes for each TIBE publication is 1.65. *Table 8* illustrates the proportion of the numbers of publications and citations and the average number of citations associated with the number of institutes. As shown in *Table 8*, 1-institute papers account for 56.91% of the total. The general trend is that as the number of institutes increases, so does the average number of citations. With the rapid progress of modern science and technology, disciplines present a highly differentiated trend and many high-tech pieces of equipment are also emerging. Disciplinary differentiation and lack of resources become the main motivation for scholars to cooperate with each other (Wagner, 2005; Abbasi, Jaafari, 2013).

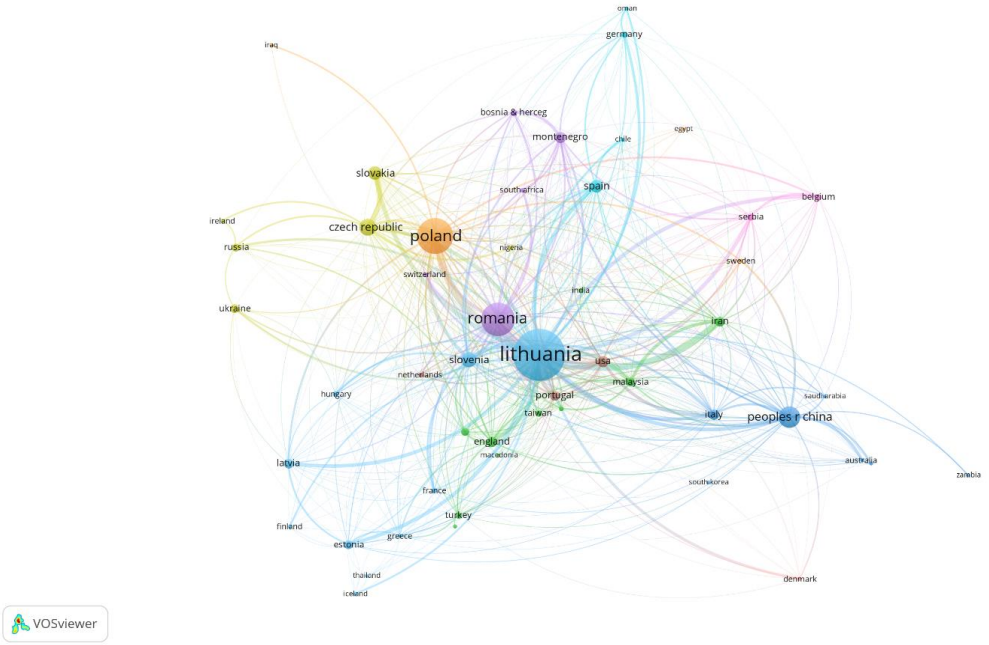
Table 8. Author collaboration distribution

Paper type	Proportion (publications)	Proportion (citations)	AC
1 institute papers	56.91%	51.63%	2.74
2 institute papers	26.93%	26.25%	2.95
3 institute papers	11.38%	14.55%	3.87
4 institute papers	3.66%	5.95%	4.92
>4 institute papers	1.12%	1.61%	4.36

Notes: AC: Average number of citations per document.

Source: own calculations.

Country co-authorship is another important form of scientific collaboration. The country co-authorship network for TIBE publications is displayed in *Figure 8*. As demonstrated in *Figure 8*, Lithuania, Poland, Romania, and China are the most active countries. Some thick lines imply that the main cooperative partners of Lithuania are Poland, Iran, Slovakia, Latvia, China, and the USA. The number of international cooperative papers between Lithuania and these countries are 15, 11, 9, 8, 6, and 6, respectively. This result suggests that geographical location is one of the factors that influence international cooperation.



Source: created by the authors.

Figure 8. **Country Co-Authorship Network**

Next, let us look into the author co-authorship status for TIBE publications. The average number of authors for TIBE publications is 2.33. *Table 9* illustrates the proportion of the numbers of publications and citations and the average number of citations associated with the number of institutes. 1-author papers occupy the largest proportion (29.37%). However, papers with more than 4 authors have the largest number of average citations (3.96). There is a trend that as the number of authors increases, so does the average number of citations per paper, except for the 3-author papers.

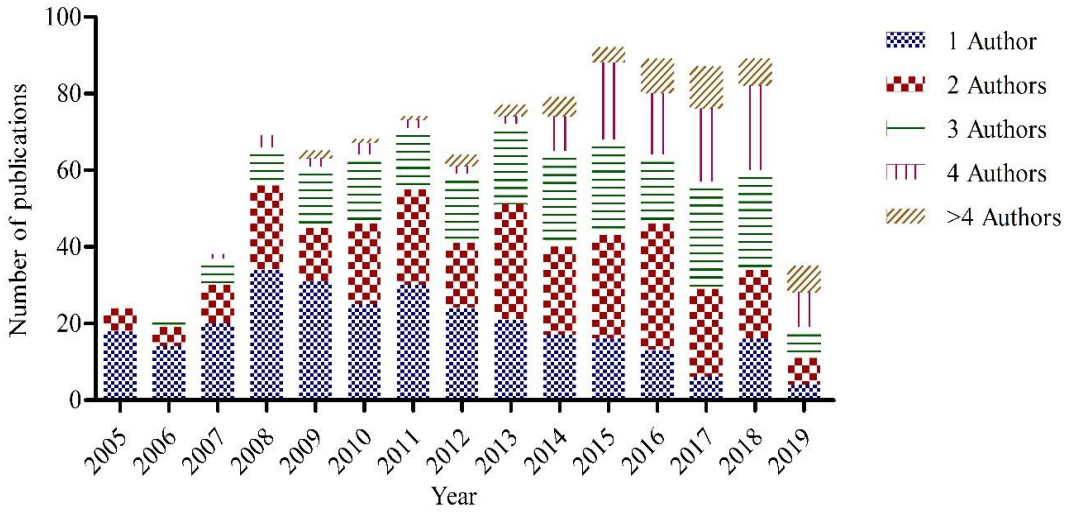
Table 9. Author collaboration distribution

Paper type	Proportion (publications)	Proportion (citations)	AC
1 author papers	29.37%	24.37%	2.51
2 author papers	28.56%	32.83%	3.48
3 author papers	25.51%	22.89%	2.72
4 author papers	10.26%	38.92%	3.79
>4 author papers	5.39%	7.05%	3.96

Notes: AC: Average number of citations per document.

Source: own calculations.

Figure 9 shows the authorship pattern associated with publication year. It can be seen from *Figure 9* that the co-authorship degree is increasing in the last 15 years. In the first four years, there are no >4-author papers. However, with years of growth, 1-author papers show a downward trend. 4-author and >4-author papers become more and more popular. One important reason is that with the development of global science and technology, there are opportunities for researchers to communicate and cooperate with each other.



Source: created by the authors.

Figure 9. **Authorship Pattern in TIBE Publications**

3.3 Co-Citation Analysis

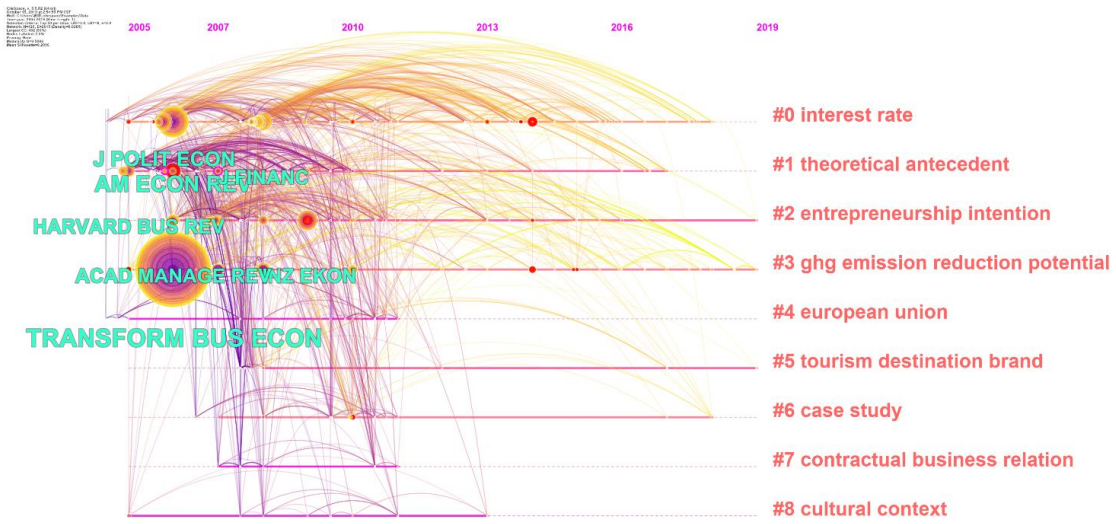
Table 10 shows the top 10 co-cited documents with the strongest frequency. The paper with the strongest frequency was written by Urbonavičius *et al.* (2006), which focused on the measuring levels of marketing orientation of companies and the relationship of each level and manager-related elements. This paper has been cited 13 times by TIBE publications. The second paper was published by Porter (1990). The author analyzed the competitive advantage of nations in the world of increasingly global competition. Grundey from *Vilnius University* contributed 4 papers in the top 10 co-cited document list.

Table 10. Top 10 co-cited documents

Rank	Author	Frequency	Year	Journal
1	Urbonavicius, S., Dikcius, V., Grundey, D.	13	2006	Transformations in Business & Economics
2	Porter, M.E.	13	1990	Harvard Business Review
3	Grundey, D., Varnas, D.	12	2006	Transformations in Business & Economics
4	Fornell, Larcker (1981)	12	1981	Journal of Marketing Research
5	Solow, R.M.	12	1956	Quarterly Journal of Economics
6	Grundey, D.	11	2007	Transformations in Business & Economics
7	Grundey, D.	11	2008	Technological and Economic Development of Economy
8	Arellano, M., Bond, S.	11	1991	Review of Economic Studies
9	Jensen, M.C.	10	1976	Journal of Financial Economics
10	Brauers, W.K.M. Ginevicius, R., Zavadskas, E.K., Antucheviciene, J.	10	2007	Transformations in Business & Economics

Notes: AC: Average number of citations per document.

Source: own calculations.



Source: created by the authors.

Figure 10. **A Timeline Visualization of 7 Co-Citation Clusters**

To identify important journal sources with the development trends for TIBE publications, we generate the timeline visualization of co-citation clusters based on journal co-citation network, which is depicted in *Figure 10*. If a citation burst has occurred for a journal with some references, then there will be a red tree ring on the timeline. Otherwise, the spectrum of the tree ring will change from purple to yellow. 9 horizontal lines divide *Figure 10* into 9 layers, corresponding to 9 co-citation clusters. The line connecting two nodes indicates that the papers of two journals have been co-cited by other documents. The size of the node denotes the frequency of co-citation. The largest cluster (#0) has 103 members. It is labelled as "interest rate" by the LLR and the mean year is 2010. In this cluster, there are important journals including *American Economic Review*, *Journal of Political Economy* and *The Journal of Finance*. The second largest cluster (#1) has 63 members and labelled as "theoretical antecedent" by the LLR. *Harvard Business Review*, *Journal of Business Research* and *Journal of Marketing* belong to this cluster. The top-ranked item by citation counts is

Transformations in Business & Economics in cluster #3, with citation counts of 282. *American Economic Review* in cluster #0 and *Journal of Political Economy* in cluster #0 rank the second and third, respectively. The top 10 co-cited journals are summarized in *Table 11*. All of these 10 journals belong to the field of business and economics.

Table 11. Top 10 co-cited journals

Rank	Citation counts	Journal	Category in JCR	Cluster #
1	282	Transformations in Business & Economics	Business; Economics	3
2	152	American Economic Review	Economics	0
3	92	Journal of Political Economy	Economics	0
4	87	Inzinerine Ekonomika-Engineering Economics	Economics	2
5	85	Harvard Business Review	Business; Management	1
6	84	Journal of Finance	Business, Finance; Economics	0
7	82	Academy of Management Review	Business; Management	2
8	73	Journal of Business Research	Business	1
9	73	Journal of Business Economics and Management	Business; Economics	3
10	73	Technological and Economic Development of Economy	Economics	3

Source: own calculations.

4. Discussions

TIBE has been retrieved by WoS for 15 years and published more than 1000 publications. Motivated by this, we conducted a bibliometric overview for TIBE documents during the period from 2005 to 2019. Through our work, some interesting findings can be yielded as:

1) In the last half-decade, TIBE published around 90 papers per year. In the future, it is important to focus on high-quality manuscripts to publish in this journal. With the acceleration of economic globalization, the relations between countries will become closer. The journal accepts papers prepared by international collaboration. Furthermore, to the manuscripts from other continents such as Asia, North American, and Oceania more attention should be paid.

2) Central and East Europe played a significant role in the development of the journal. The most productive counties include Lithuania, Poland, and Romania. More than half of the 20 most productive countries were from Central and East Europe. The most active institutes were also located in this area.

3) The average number of keywords provided by the author could exert the influence on the citation impact. More keywords provided by the author would have more citations in TIBE. However, most authors liked to use 4 or 5 keywords.

4) Scientific co-authorship with several countries, institutes and authors' documents could improve citation performance. Therefore, there is a need to enhance international exchange and collaboration.

5) In the future, the journal can focus on the new burgeoning and interdisciplinary research fields between economics and other disciplines such as behavioral economics, environmental economics, and energy economics. These crisscrossing fields are gaining increasing attention and can be helpful to the development of TIBE.

Conclusions

In this study, we presented a comprehensive bibliometric review for TIBE publications. First, we provided the data used in this study. Some bibliometric methods and tools were given. The main body of the study was divided into two parts: performance analyses and graphic analyses. In performance analyses, we presented the annual publication and citation structure, most cited papers, sources that cited TIBE publications, and productive countries and institutes. In graphic analyses, we first provided keyword co-occurrence analysis. The impact of author-selected keywords on citation performance was also discussed. Next, co-authorship analysis in terms of country, institute, and author was given. Finally, we provided a co-citation analysis to identify important studies and journals for TIBE documents. Some insights and suggestions for the journal were also given.

References

Abbasi, A., Jaafari, A. (2013), "Research impact and scholars' geographical diversity", *Journal of Informetrics*, Vol. 7, No 3, pp.683-692.

Arellano, M., Bono, S. (1991), "Some tests of specification for panel data-Monte-Carlo evidence and an application to employment equations", *Review of Economic Studies*, Vol. 58, No 2, pp.277-297.

Aristovnik, A. (2007), "Are current account deficits in Eastern Europe and former Soviet Union too high?", *Transformations in Business & Economics*, Vol. 6, No 1, pp.32-52.

Bastian, M., Heymann, S., Jacomy, M. (2009), "Gephi: an open source software for exploring and manipulating networks", *Third International AAAI Conference on Weblogs and Social Media*.

Bornmann, L., Daniel, H.D. (2005), "Does the h-index for ranking of scientists really work?", *Scientometrics*, Vol. 65, No 3, pp.391-392.

Boyack, K.W., Klavans, R. (2010), "Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately?", *Journal of the American Society for Information Science and Technology*, Vol. 61, No 12, pp.2389-2404.

Brauers, W.K.M., Ginevicius, R., Zavadskas, E.K., Antucheviciene, J. (2007), "The European Union in a transition economy", *Transformations in Business & Economics*, Vol. 6, No 2, pp.21-37.

Brauers, W.K.M., Zavadskas, E.K. (2008), "Multi-objective optimization in location theory a simulation for a department store", *Transformations in Business & Economics*, Vol. 7, No 3, pp.163-183.

Brauers, W.K.M., Zavadskas, E.K. (2010), "Robustness in the MULTIMOORA model: The example of Tanzania", *Transformations in Business & Economics*, Vol. 9, No 3, pp.67-83.

Broadus, R.N. (1987), "Toward a definition of 'bibliometrics'", *Scientometrics*, Vol. 12, No 5-6, pp.191-203.

Cabelkova, I., Strielkowski, W., Mirvald, M. (2015), "Business influence on the mass media: A case study of 21 countries", *Transformations in Business & Economics*, Vol. 14, No 1, pp.65-75.

Casillas, J., Acedo, F. (2007), "Evolution of the intellectual structure of family business literature: A bibliometric study of FBR", *Family Business Review*, Vol. 20, No 2, pp.141-162.

Chen, C.M. (2004), "Searching for intellectual turning points: Progressive knowledge domain visualization", *Proceedings of the National Academy of Sciences*, Vol. 101 (Suppl), pp.5303-5310.

Chen, C.M. (2017), "Science mapping: A systematic review of the literature", *Expert Review*, Vol. 2, No 2, pp.1-40.

Chen, J.D., Cheng, S.L., Nikic, V., Song, M.L. (2018), "Quo Vadis? Major players in global coal consumption and emissions reduction", *Transformations in Business & Economics*, Vol. 17, No 1, pp.112-132.

Durisin, B., Calabretta, G., Parmeggiani, V. (2010), "The intellectual structure of product innovation research: A bibliometric study of the Journal of Product Innovation Management, 1984-2004", *Journal of Product Innovation Management*, Vol. 27, No 3, pp.437-451.

Fornell, C., Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement", *Journal of Marketing Research*, Vol. 18, No 1, pp.39-50.

Fouladgar, M.M., Yazdani-Chamzini, A., Zavadskas, E.K., Yakhchali, S.H., Ghasempourabadi, M.H. (2012), "Project portfolio selection using fuzzy AHP and VIKOR techniques", *Transformations in Business & Economics*, Vol. 11, No 1, pp.213-231.

Garfield, E. (1990), "Keywords plus-isi's breakthrough retrieval method. 1. expanding your searching power on current-contents on diskette", *Current Contents*, Vol. 32, pp. 5-9.

Glänzel, W. (2000), "Science in Scandinavia: A bibliometric approach", *Scientometrics*, Vol. 48, No 2, pp.121-150.

Grundey, D. (2006), "Delineating values, emotions and motives in consumer behaviour: An interdisciplinary approach", *Transformations in Business & Economics*, Vol. 5, No 2, pp.21-46.

Grundey, D. (2007), "Internationalization of markets: The internationalization process of Danish companies in Lithuania", *Transformations in Business & Economics*, Vol. 6, No 1, pp.85-108.

Grundey, D. (2008), "Applying sustainability principles in the economy", *Technological and Economic Development of Economy*, Vol. 14, No 2, pp. 101-106.

Grundey, D., Varnas, D. (2006), "Human capital creation, accumulation and management in Lithuania: The case of national and foreign capital enterprises", *Transformations in Business & Economics*, Vol. 5, No 2, pp.81-105.

Hartley, J. (2019), "Some reflections on being cited 10,000 times", *Scientometrics*, Vol. 118, No 1, pp.375-381.

Hernaus, T., Skerlavaj, M., Dimovski, V. (2008), "Relationship between organisational learning and organisational performance: The case of Croatia", *Transformations in Business & Economics*, Vol. 7, No 2, pp.32-48.

Hirsch, J.E. (2005), "An index to quantify an individual's scientific research output", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 102, No 46, pp.16569-16572.

Jensen, M.C., Meckling, W.H. (1976), "Theory of the firm: Managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3, No 4, pp.305-360.

Kaplinski, O., Tupenaite, L. (2011), "Review of the multiple criteria decision making methods, intelligent and biometric systems applied in modern construction economics", *Transformations in Business & Economics*, Vol. 10, No 1, pp.166-181.

Konechik, M., Ruzzier, M. (2008), "The customer's perspective on the tourism destination brand: A structural equation modeling study", *Transformations in Business & Economics*, Vol. 7, No 1, pp.169-184.

Laengle, S., Merigó, J.M., Miranda, J., Słowiński, R., Bomze, I., Borgonovo, E., Dyson, R.G., Oliveira, J.F., Teunter, R. (2017), "Forty years of the European Journal of Operational Research: A bibliometric overview", *European Journal of Operational Research*, Vol. 262, pp.803-816.

Liao, H.C., Tang, M., Luo, L., Li, C.Y., Chiclana, F., Zeng, X.J. (2018), "A bibliometric analysis and visualization of medical big data research", *Sustainability*, Vol. 10, No 1, doi:10.3390/su10010166.

Liao, H.C., Tang, M., Li, Z.M., Lev, B. (2019), "Bibliometric analysis for highly cited papers in operations research and management science from 2008 to 2017 based on Essential Science Indicators", *Omega*, Vol. 88, October, pp.223-236.

Lisin, E., Strielkowski, W. (2014), "Modelling new economic approaches for the wholesale energy markets in Russia and the EU", *Transformations in Business & Economics*, Vol. 13, No 2B, pp.566-580.

Mardani, A., Jusoh, A., Zavadskas, E.K., Kazemilari, M., Ahmad, U.N.U., Khalifah, Z. (2016), "Application of multiple criteria decision making techniques in tourism and hospitability industry: A systematic review", *Transformations in Business & Economics*, Vol. 15, No 1, pp.192-213.

Martinez-Lopez, F.J., Merigo, J.M., Valenzuela-Fernandez, L., Nicolas, C. (2018), "Fifty years of the European Journal of Marketing: a bibliometric analysis", *European Journal of Marketing*, Vol. 52, No 1-2, pp.439-468.

Melnikas, B. (2008), "The knowledge-based economy in the European union: Innovations, networking and transformation strategies", *Transformations in Business & Economics*, Vol. 7. No 3, pp.170-192.

Merigo, J.M., Mas-Tur, A., Roig-Tierno, N., Ribeiro-Soriano, D. (2015), "A bibliometric overview of the Journal of Business Research between 1973 and 2014", *Journal of Business Research*, Vol. 68, No 12, pp.2645-2653.

Modak, N.M., Merigo, J.M., Weber, J.M., Manzor, R., Ortuzar, J. (2019), "Fifty years of Transportation Research journals: A bibliometric overview", *Transportation Research Part A-Policy and Practice*, Vol. 120, February, pp.188-223.

Mura, L., Buleca, J., Hajduova, Z., Andrejkovic, M. (2015), "Quantitative financial analysis of small and medium food enterprises in a developing country", *Transformations in Business & Economics*, Vol. 14, No 1, pp.212-224.

Newman, M.E.J. (2001), "The structure of scientific collaboration networks", *Proceedings of the National Academy of Sciences*, Vol. 98, No 2, pp.404-409.

Noyons, E.C.M., Luwel, M., Mode, H.F. (1999), "Combining mapping and citation analysis for evaluative bibliometric purposes", *Journal of the American Society for Information Science*, Vol. 50, No 2, pp.115-131.

Pan, W.W., Jian, L.R., Liu, T. (2019), "Grey system theory trends from 1991 to 2018: a bibliometric analysis and visualization", *Scientometrics*, in press, DOI: 10.1007/s11192-019-03256-z.

Pandey, B., Bandyopadhyay, P., Kadam, S., Singh, M. (2018), "Bibliometric study on relationship of agricultural credit with farmer distress", *Management of Environmental Quality: An International Journal*, Vol. 29, no 2, pp.278-288, doi/full/10.1108/MEQ-03-2017-0029.

Porter, M.E. (1990), "The competitive advantage of nations", *Harvard Business Review*, Vol. 68, No 2, pp.73-93.

Razminiene, K. (2019), "Circular economy in clusters' performance evaluation. Equilibrium", *Quarterly Journal of Economics and Economic Policy*, Vol. 14, No 3, pp.537-559, doi: 10.24136/eq. 2019.026.

Ramos-Rodriguez, A.R., Ruiz-Navarro, J. (2004), "Changes in the intellectual structure of strategic management research: A bibliometric study of the Strategic Management Journal, 1980-2000", *Strategic Management Journal*, Vol. 25, No 10, pp.981-2004.

Ruzzier, M., Antoncic, B. (2007), "Social capital and SME internationalization: An empirical examination", *Transformations in Business & Economics*, Vol. 6, No 1, pp.122-138.

Small, H. (1973), "Co-citation in scientific literature - New measure of relationship between 2 documents", *Journal of the American Society for Information Sciences*, Vol. 24, No 4, pp.265-269.

Solow, R.M. (1956), "A contribution to the theory of economic-growth", *Quarterly Journal of Economics*, Vol. 70, No 1, pp.65-94.

Streimikiene, D., Balezentiene, L. (2012), "Assessment of electricity generation technologies based on GHG emission reduction potential and costs", *Transformations in Business & Economics*, Vol. 11, No 2A, pp.333-343.

Streimikiene, D., Mikalauskiene, A., Barakauskaite-Jakubauskiene, N. (2011), "Sustainability assessment of policy scenarios", *Transformations in Business & Economics*, Vol. 10, No 2, pp.168-184.

Tang, M., Liao, H.C., Su, S.F. (2018a), "A bibliometric overview and visualization of the International Journal of Fuzzy Systems between 2007 and 2017", *International Journal of Fuzzy Systems*, Vol. 20, No 5, pp.1403-1422.

Tang, M., Liao, H.C., Wang, Z.J., Herrera-Viedma, E., Rosen, M.A. (2018b), "Ten years of Sustainability (2009 to 2018): A bibliometric overview", *Sustainability*, Vol. 10, No 5, doi.org/10.3390/su10051655.

Uddin, S., Khan, A. (2016), "The impact of author-selected keywords on citation counts", *Journal of Informetrics*, Vol. 10, No 4, pp. 1166-1177.

Uddin, S., Khan, A., Baur, L.A. (2015), "A framework to explore the knowledge structure of multidisciplinary research fields", *Public Library of Science*, Vol. 10, No. 4, p. e0123537.

Urbonavicius, S., Dikcius, V., Grundey, D. (2006), "Linking manager-related factors to the level of market orientation in a company", *Transformations in Business & Economics*, Vol. 5, No 1, pp.131-147.

Valenzuela-Fernandez, L., Merigo, J.M., Johnston, W.J., Nicolas, C., Jaramillo, J.F. (2017), "Thirty years of the Journal of Business & Industrial Marketing: a bibliometric analysis", *Journal of Business & Industrial Marketing*, Vol. 32, No 1, pp.1-18.

Valenzuela-Fernandez, L., Merigo, J.M., Lichtenthal, J.D., Nicolas, C. (2019), "A bibliometric analysis of the first 25 years of the Journal of Business-to-Business Marketing", *Journal of Business-to-Business Marketing*, Vol. 26, No 1, pp.75-94.

van Eck, N.J., Waltman, L. (2010), "Software survey: VOSviewer, a computer program for bibliometric mapping", *Scientometics*, Vol. 84, No 2, pp.523-538.

Wagner, C.S. (2005), "Six case studies of international collaboration in science", *Scientometrics*, Vol. 62, No 1, pp.3-26.

Xie, S., Zhang, J., Ho, Y.S. (2008), "Assessment of world aerosol research trends by bibliometric analysis", *Scientometrics*, Vol. 77, No 1, pp.113-130.

Yu, D.J., Xu, Z.S., Saparauskas, J. (2019), "The evolution of Technological and Economic Development of Economy: A bibliometric Analysis", *Technological and Economic Development of Economy*, Vol. 25, No 3, pp.369-385.

Zavadskas, E.K., Kaklauskas, A. (2008), "Model for Lithuanian construction industry development", *Transformations in Business & Economics*, Vol. 7, No 1, pp.152-168.

Zhao, Q.R., Chen, Q.H., Xiao, Y.T., Tian, G.Q., Chu, X.L., Liu, Q.M. (2017), "Saving forests through development? Fuelwood consumption and the energy-ladder hypothesis in rural southern China", *Transformations in Business & Economics*, Vol. 16, No 3, pp.199-219.

VERSLO IR EKONOMIKOS TRANSFORMACIJOS 15 METŲ *WEB OF SCIENCE* DUOMENŲ BAZĖJE: BIBLIOMETRINĖ IR VIZUALINĖ ANALIZĖS

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SANTRAUKA

Verslo ir ekonomikos transformacijos – tarptautinis recenzuojamas žurnalas apie verslą ir ekonomiką, nuo 2005 m. publikuojamas *Web of Science*. Šiame žurnale išleista virš tūkstančio dokumentų. 15-os metų leidimo proga pateikiama išsami 2005–2019 metų bibliometrinė žurnalo leidinių apžvalga. Šis tyrimas vykdytas dviem aspektais: veiklos analizės ir grafinės analizės. Veiklos analizės metodu tirtos publikacijų ir citatų struktūros bei pirmaujančios šalys ir institucijos. Grafinė analizė remiasi vizualizavimo priemonėmis VOSviewer, CiteSpace, Excel ir Circos. Šiuo metodu nustatyti raktinių žodžių ryšių tinklai, atlikta bendraautorystės analizė ir bendro citavimo analizė. Tikimasi, kad šis tyrimas bus reikšmingas tolimesnei žurnalo raidai.

REIKŠMINIAI ŽODŽIAI: „Verslo ir ekonomikos transformacijos“, bibliometrika, veiklos analizė, grafinė analizė, verslas ir ekonomika.