

The Bibliometric and Citation Analyses of the *SPATIUM* Journal

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ABSTRACT: The paper gives the bibliometric and citation analyses of the *SPATIUM* journal for the period 2009-2015. In the subject period, *Spatium* was published twice or three times a year, from the issues 19-34, so that this study comprises 16 volumes, or 145 papers. The bibliometric analysis of the Journal was made *de visu* (with the publication in hand), thus ensuring the authenticity of the given results. The analysis shows the number of papers, categorization of papers, number of authors, affiliation of authors, representation of authors from different countries, average number of references per paper, length of texts, keyword frequency, total number of reviewers and their international representation. The citation count was based on the data taken from the citation databases of SCIndex (Serbian Citation Index), Google scholar and Scopus. The paper shows the differences in the citation analysis of the *SPATIUM* journal at the example of one paper.

KEYWORDS: scientific journal, Spatium, bibliometric analysis, citation analysis, Serbia

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1 Introduction

One of the main conditions for continuity and advances in each field of science in the contemporary conditions includes a reliable, high-quality and regularly published scientific journal. Such journal provides timely information about the latest achievements in a specific scientific field.

And, while the printed publications (first the books, then also journals) were dominant sources of scientific information, and the research results were recorded on paper, with the development of modern technologies since the end of the 20th century, the electronic publications have been increasingly represented, both those published in electronic form as a separate physical entity (floppy disc, CD, DVD etc.) and those available on the Internet.¹

In the contemporary world, the scientific information is not considered relevant unless published. Hence, the scientific journals in either print or electronic format will have the role of universal communication channels and mediators in the relevant scientific community for many years. In order for a paper to be published in a scientific journal, it should be positively assessed by reviewers, which implies that it must meet the previously set criteria related to the originality and quality of the text. The reviewers from the relevant scientific fields that correspond to the theme of the paper are chosen by the journal's editorial board and based on the scientific reputation the reviewers enjoy in the scientific community.

A scientific journal is a medium for preserving the scientific information and it has an important role in the formation of scientific authority, presentation of the research results and evaluation of professional and scientific contributions and scientific research quality. The papers published in scientific journals are the most important scientific communication channels. Hence, the role of scientific articles is not only to convey scientific information about the definite and unchangeable knowledge, but also to encourage the scientists by their contents to exchange ideas, as well as to encourage them to further research (Вучковић, 2009).

2 *SPATIUM* Journal

The *SPATIUM* journal² has been published by the Institute of Architecture and Urban & Spatial Planning of Serbia (hereinafter referred as “the Institute”) over 19 years. In the period from 1997 to 2015, 34 issues were published within 31 volumes, containing 261 papers and 23 contributions (book overviews, conference overviews,

¹ The Law on the Obligatory Copy of Publications defines an electronic publication as “a publication published in electronic form as a separate physical entity (diskette, CD, DVD, etc.), a publication available on the Internet and a publication prepared for printing in a format which is in accordance with international standards of universal availability of information” (Закон о обавезном примерку публикација („Службени гласник РС”, бр. 52/2011), accessed 15.02.2015, <http://bds.rs/dokumenti/Zakon%20obavezni%20primerak%202011.pdf>).

² *Spatium* / editor in chief Miodrag Vujošević. (Belgrade: Institute of Architecture and Urban & Spatial Planning of Serbia, 1997-), br. 1–34 (1997–2015)

obituaries, information about symposiums, translations of previously published papers, etc.). Out of the total number of volumes, 28 were single volumes, while the remaining 3 were double volumes (Table 1).

Year	Issue	Year	Issue
1997	1, 2	1998	3, 4
1999	5	2000	6
2001	7	2002	8
2003	9	2004	10, 11
2005	12	2006	13/14
2007	15/16	2008	17/18
2009	19, 20, 21	2010	22, 23
2011	24, 25, 26	2012	27, 28
2013	29, 30	2014	31, 32
2015	33, 34		

Table 1. Periodicity of Publication

Until 2009, all papers got only one positive review each and were not classified in any of the categories. Since 2009, when the *Act on Scientific Journal Editing*³ entered into force, the criteria for journal editing have become significantly stricter. The Editorial Board has begun to strictly implement the *Rules of Procedure and the Manner of Evaluation and Quantitative Presentation of Scientific-research Results of Researchers*⁴ (hereinafter referred to as “The Rules”) and since then, the criteria for publication of scientific papers include the positive opinions of two reviewers for scientific papers and one positive review for professional papers. The mutual anonymity of authors and reviewers is taken into account, while reviews are performed by the most eminent experts in the specific scientific fields, both from the country and abroad.

³ The Ministry of Education, Science and Technological Development adopted the Act on Scientific Journal Editing (Record No.: 110-00-17/2009-01, of 09.07.2009) with the aim to assist editorial boards in improving the quality and national scientific periodicals, thus ensuring greater inclusion of journals into the Scientific Information System both at the national and international levels. Accessed 19.01.2016, http://kobson.nb.rs/upload/documents/MNTR/Dokumenti/akt_oredjivanju_casopisa.pdf

⁴ Правилник о поступку и начину вредновања, и квантитативном искаживању научноистраживачких резултата истраживача („Сл. гласник РС“, бр. 38/2008)

At the time when the Journal was started in 1997, it was conceived as a scientific organ primarily for the scientific workers of the Institute and their associates. Given that the cooperation with the colleagues from abroad was hampered during the period of international isolation of Serbia, the starting of such scientific journal should have enabled the overcoming of this problem and the establishment of an easier communication and exchange of the scientific and professional thought.

The papers in the Journal are represented across different fields: spatial planning, urban planning, architecture, landscape architecture, geodesy, sustainable development and environmental protection, housing, urban renewal, urban development, issues related to the public utilities and housing, cultural and natural heritage, capital construction, information systems, strategic management, etc.

The *SPATIUM* journal is published in English language and classified into the M24 category (national journal of international importance) according to the classification of national scientific journals into the category of Transport, Urban Planning and Civil Engineering. The confirmation of the quality and international importance of the Journal lies in the fact that in October 2010 the Ministry of Education, Science and Technological Development of the Republic of Serbia included the Journal in the DOI⁵ (Digital Object Identifier) system that enables the identification of documents in electronic format and creation of a persistent link to the location of the original document on the Internet. The DOI names have been assigned to all papers since 2002. Precisely thanks to DOI names, the papers, their authors and journals in which they are published have become „visible“ to the professionals and scientific community, which significantly contributes to the international affirmation of authors and the Journal itself.

In 2012, the Institute was under contractual obligations with *Versita* as co-publisher of *SPATIUM*. *Versita* is actually an electronic database on the European scientific and profession journal publishers (Central European Science Publishers)⁶ offering an online technology for surveying the contents of journals, paper summaries, cited references, papers in the full-text format, assistance in the evaluation and global promotion of journals, which should result in a significantly greater visibil-

⁵ A digital object identifier (DOI) is a serial code used to uniquely identify electronic documents. The DOI for a document is permanent and thus more stable method for referring to an online document than the URL.

⁶ “Since its foundation, the *Versita* company, owned by Mr. Jacek Ciesielski, with registered seat in Warsaw, has strived to be the leading commercial Central European publisher of scientific journals. It has strived to achieve this by launching new Central European journals, on the one hand, and by converting already renowned Central European journals to online versions provided that journals are published in English language, in which they have succeeded to a great extent, primarily in Poland, and then also in Slovakia, Serbia, Czech Republic and Croatia” (Tóth, 2007)

ity, greater readership and increased citation impact. Only in 2013, *Versita* published 15,000 open access articles. From the beginning of 2014, De Gruyter is a new owner of *Versita* and the company changed its name into *De Gruyter Open*⁷ with a plan to additionally extend its activities outside Europe, to the USA and Asia, in the forthcoming period.

The ultimate goal of the Editorial Board is to enter the SPATIUM journal in the Thomson Reuters List. Each year Thomson Reuters assesses approximately 2,000 new journals on which it sends its report to the Web of Science⁸ (WoS), and the pass rate is up to 10–12 percent. The evaluation is free of charge and the evaluation criteria are strictly defined. After applying for evaluation, it is necessary to send the next three volumes immediately after their publication. After three consecutive issues have been received, the editors of corresponding database evaluate the publications.

The papers published in the *SPATIUM* journal are available in the full-text format through the following databases, catalogues and services:

- DOI Serbia⁹ – for the papers published in the period 2002–2015.¹⁰

⁷ <http://www.degruyter.com/view/j/spat>. Taken on 02.09.2014

⁸ “Web of Science[®], to which the Serbian academic community is subscribed, contains three main citation indexes: Science Citation Index Expanded (SCIE) – the database in the fields of natural, biomedical and technical sciences; Social Sciences Citation Index (SSCI) – the database encompassing the journals in the fields of social sciences; Arts & Humanities Citation Index (AHCI) – the database of journals in the fields of art and humanistic sciences. Since October 2008, it also contains the conference proceedings databases: Conference Proceedings Citation Index Science (CPCIS) since 2001, the citation index for the natural and technical sciences; Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH), the citation index for the social and humanistic sciences since 2001. The Journal Citation Report (JCR) is a specific database within the Web of KnowledgeSM platform. It was created by processing the results from the mentioned citation indexes. The JCR contains data on journals classified into thematic categories, within which they are ranked according to their impact factors (IF)” (Антовић et al., 2009)

⁹ “The DOI Serbia is a collection of scientific journals published in Serbia. The full-text digital archive encompasses the period from 2002 onwards. The journals are processed from cover to cover. All reported journals are published by professional associations, and some of them are also indexed in WoS and CA. The megadata, as well as the full texts, are processed according to the OAI-PMH, and the megadata download is free.” Taken on 21.01.2016 from <http://www.digitallibrary.eu/tel4/collection/a0155?locale=sr>

¹⁰ Taken on 01.02.2016 from <http://www.doiserbia.nb.rs/journal.aspx?issn=1450-569X>

- Academic Journals Database¹¹ – for the papers published in the period 2002–2013.
- Serbian Citation Index¹² – for the papers published in the period 2000–2013.
- Google Scholar¹³ (mostly cited papers are available) – for the papers published in the period 2002–2015.
- DOAJ¹⁴ – Directory of Open Access Journals – for the papers published in the period 2002–2015.

2.1 Editors

The twelve-year period of its publication (1997–2015) was marked by the engagement of two guest editors. The double issue 17/18 and issue number 19 had guest editors in 2008 and in the first half of 2009. The position of deputy editor-

¹¹ The survey of contents, summaries, as well as full text papers, published in the SPATIUM journal is available on the website of the Academic Journals Database, the catalogue of scientific publications in different fields. Taken on 01.02.2016 from <http://journaldatabase.info/journal/issn1450-569X>

¹² “The SCI is a Serbian national citation index developed to serve as a supplement to the international citation indexes. It indexes national journals categorized as periodical scientific publications. The SCI currently contains 1,009,058 references from 67,657 articles, out of which 30,924 in the full text, which have been published in 199 national journals since 2000, in the field of humanistic sciences since 1996, while in the field of social sciences since 1991 onwards.” Taken on 17.03.2016 from <http://scindeks.ceon.rs/>

¹³ “Compared to the WOS and Scopus, the Google Scholar is a database freely accessible to anyone online. This database encompasses the data on the contents of journals and other publications that publishers placed on their sites, as well as the data from digital repositories, personal web pages, blogs of prominent professionals, preprints, etc. The citations are automatically extracted from the open access texts. The greatest advantage of this database lies in the fact that it is available for free to everyone, while the greatest disadvantage regarding the bibliometric investigation lies in the fact that the database scope is not known. The Google does not provide information about where from it collects the citation data. The errors also occur given that the data are collected automatically. If there is a full-text paper in several places online and in several versions, it also appears in this database so that it is not clear to which of the versions the quoted citations refer to.” (Raičević, 2013)

¹⁴ “The Directory of Open Access Journals is a service that provides access to the quality controlled Open Access Journals, namely to the free electronic journals that have met specific scientific and academic criteria. The articles of a great number of journals are available in full text. The Directory covers a plenty of scientific fields, while the ultimate goal is that all scientific disciplines, in all important languages, are represented”. Taken on 21.01.2016 from <https://doaj.org/toc/1450-569X>

in-chief was introduced in 2009 from the issue number 20, the same issue when the Editor-in-Chief was relieved (Table 2).

Editors	Year	Journal issue
Nada Milašin, Editor-in-Chief	1997	1, 2
	1998	3, 4
	1999	5
	2000	6
	2001	7
	2002	8
	2003	9
	2004	10, 11
	2005	12
	2006	13/14
Nada Milašin, Editor-in-Chief; Miodrag Vujošević, Jasna Petrić - Guest editors	2007	15/16
	2008	17/18
Miodrag Vujošević, Editor-in-Chief; Jasna Petrić, Deputy Editor-in-Chief	2009	19
	2009	20, 21
	2010	22, 23
	2011	24, 25, 26
	2012	27, 28
	2013	29, 30
Miodrag Vujošević, Editor-in-Chief; Tamara Maričić, Deputy Editor-in-Chief	2014	31, 32
	2015	33, 34

Table 2. Journal Editors

With the change of Editorial Board members and, later, the entry into force of the *Act on Scientific Journal Editing*, the criteria for journal editing were significantly tightened. From March 2009 (since the issue number 19), all professional and scientific papers have contained abstracts, keywords, introduction, illustrations and tables that follow the text, and the references.

The articles are regularly classified into appropriate categories and reviewed by competent professionals with scientific knowledge.

The mentioned change of Editorial Board members, tightened editing criteria and strict implementation of the *Act on Scientific Journal Editing* present a turning point in the editing policy, this being the reason why this analysis covers exactly the period of time spanning from 2009 to 2015.

3 The Sample and Methodological Approach

As already mentioned, the sample for bibliometric analysis comprises all papers published in the period from 2009 to 2015. In this seven-year period, the journal issues 19–34 were published and they contained the total of 145 papers. The data necessary for this investigation were collected using the inductive method, while the bibliometric analysis of the Journal was performed *de visu* (with the publication in hand), thus ensuring the authenticity of the quoted data.

The citation analysis was done based on the citation data taken from the citation databases of Google Scholar, SCIndex and Scopus. The citation count for each individual volume was taken from the Google Scholar citation database and from the citation database of the SCIndex for the period 2009–2015, while from the Scopus citation database for the period from 2011, when the *SPATIUM* indexing in this database started, to 2015. In order to more easily notice the difference in the number of citations in dependence on the database, as well as to also indicate a need for consulting all available sources in the evaluation and ranking of the journal, but also in the evaluation of author impact factor, this paper shows the differences in the citation analysis of the *SPATIUM* scientific journal at an example of the paper entitled *Modelling the spatial distribution of Vojvodina's population by using dasy-metric method* by Nikola Krunić, Branislav Bajat, Milan Kilibarda and Dragutin Tošić, published in 2011 in the issue number 24.

4 Bibliometric Analysis

The models, types of analyses and tables used for the bibliometric analysis of *SPATIUM* journal were taken from the literature that deals with the evaluation of scientific journals and bibliometric investigations in different fields of science. The paper shows the results related to the presented number of papers (Martek and Šute, 2010; Tella and Aisha Olabooye, 2014), categorization of papers (Martek and Šute, 2010), number of authors (Thanuskodi, 2010; Hussain et al., 2011; Jena et al., 2012), affiliation of authors (Thanuskodi, 2010; Hussain et al., 2011; Jokić and Zauder, 2013), representation of authors from different countries (Jena et al., 2012), average number of references per paper, text lengths (Thanuskodi, 2010; Tella and Aisha Olabooye, 2014) and the total number of peer-reviewers and their international representation.

4.1 Number of Papers per Volume

The total of 145 papers was published in the covered period. The number of published papers per journal issue ranges from 7 to 13. Seven papers were published four times, in issues 19, 23, 26 and 27, and the largest number of papers within a volume (13) were published in issues 31 and 33 (Table 3).

Year	Journal issue	Number of published papers per volume	Total number of papers per year
2009	19	7	25
	20	10	
	21	8	
2010	22	8	15
	23	8	
2011	24	10	25
	25	8	
	26	7	
2012	27	7	17
	28	10	
2013	29	12	22
	30	10	
2014	31	13	20
	32	7	
2015	33	13	21
	34	8	
Total		145	145

Table 3. Number of papers per volume

4.2 Categorization of Papers

Out of 145 papers that were published in the period 2009-2015, all the papers were reviewed, 144 articles were classified into the category of scientific and professional papers, while one of the papers was not categorized. According to *The Rules*, the articles published in journals are classified into the following categories:

Category of scientific papers

1. Original scientific paper;

2. Review scientific paper;
3. Short or preliminary communication;
4. Scientific critique or polemics.

Professional papers

1. Scientific paper;
2. Informative contribution;
3. Survey papers.

Exceptionally, the papers in certain areas of science that are published in journals can be monographic studies or critical editions.

Out of the total number of papers, 116 are in the category of scientific papers, 27 in the category of professional papers, 1 paper is classified as “Monographic study” and 1 article is not categorized but published as a technical report. The survey papers (69) account for the largest number of papers in the category of scientific papers, followed by the original scientific papers (30), while 9 papers are classified into the category of short or preliminary communication. Finally, 8 papers are classified into the category of scientific critique or polemics. Three contributions were published in issues 26, 27 and 32. The first contribution contains an information about the TURaS international scientific project, the second one contains an information about the conference RESPAG that was organized by the Institute of Architecture and Urban & Spatial Planning of Serbia, while the third contribution is a translation of the paper entitled *Social space as the subject of scientific research – Spatium*, by Milorad Macura, published in 1965 in the journal *Savremene urbanističke teme*, Issue 2, by the Institute of Architecture and Urban & Spatial Planning of Serbia (pp. 43–63), (Table 4).

4.3 Lengths of Papers

Figure 1 shows the representation of papers of different lengths in each of the analysed issues of the *SPATIUM* journal herein. The largest number of published papers, 110 (75.86%), are papers published on 5–8 pages, less than one fourth of the total number of papers, 26 (17.93%) were published on 9–12 pages, while the number of texts published on less than 4, or more than 13 pages is negligible.

4.4 Authorship Analysis

The authorship analysis of papers published in the period 2009–2014 shows that there were 48 single-authored papers and 97 co-authored papers (Table 5) out of which 45 were two-authored papers, 38 three-authored papers, 9 four-authored papers and 8 papers were written by five- and more authors (Table 6). Regarding the

SPATIUM	Categorized papers						NP*	Contributions**	
	OSP	RSP	SPC	SCP	MS	PP	TR		
19 (2009)	4	2			1				
20 (2009)	1	5	1	2		1			
21 (2009)	3	5							
22 (2010)		5	1	1		1			
23 (2010)	1	5	1						
24 (2011)	1	5	2			2			
25 (2011)	1	4		1		2			
26 (2011)	1	3				3		1	
27 (2012)		3	1			3		1	
28 (2012)	4	6							
29 (2013)	2	4	1	4		1			
30 (2013)	4	3	1			2			
31 (2014)	5	5				2	1		
32 (2014)	1	3				3		1	
33 (2015)	2	3	1			7			
34 (2015)		8							
Total	30	69	9	8	1	27	1	3	
Percentage	20.69	47.59	6.21	5.52	0.68	18.62	0.68		
Total	145 papers (100%)								3

Table 4. Categorized and non-categorized papers

*NP – Noncategorized papers;

**Contributions – Contributions (information on the projects and conferences, translations of previously published papers);

OSP – Original scientific paper; RSP – Review scientific paper; SPC – Short or preliminary communication; SCP – Scientific critique or polemics; MS – Monographic study; PP – Professional papers; TR – Technical report

multi-authored papers, the two- and three-authored papers prevail, while the number of four- and five-authored papers is negligible. What can be concluded from the authorship analysis is that there were no significant oscillations in the number of single-authored papers, neither were there significant oscillations in the number of co-authored papers in the period 2010–2014, as well as that the relationship between them is approximately the same, while it may be observed that there is a difference as regards the papers published in 2009 and in the last three journal issues (32, 33 and 34). In the issues number 19, 20 and 21 published in 2009, the number of co-authored papers was four times greater relative to the number of single-authored papers, while

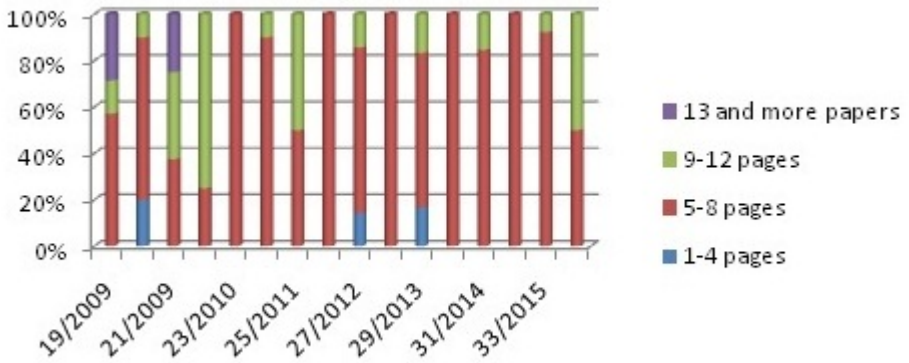


Figure 1. Representation of papers of different lengths

in issues 32, 33 and 34, out of 28 papers, only three were single-authored papers. The number of authors per paper is important because, in ranking authors for the election into the academic ranks, the maximum points are awarded to theoretical papers written by maximum three co-authors, to numerical simulations by five co-authors and to experimental papers by seven co-authors (Ковачевић, 2009).

Authorship	Year							Total	Percentage
	2009	2010	2011	2012	2013	2014	2015		
Single author	5	6	12	6	10	8	1	48	33.90
Co-authorship	20	9	13	11	12	12	20	97	66.90
Total	25	15	25	17	22	20	21	145	100.00

Table 5. Relationship between single- and co-authored papers

4.5 Institutional Affiliation of Authors

The investigation into the affiliation of authors was carried out for three institutions: Institute of Architecture and Urban & Spatial Planning of Serbia (IAUS), which is a publisher of the journal, the Faculty of Architecture (FA), University of

SPATIUM	Number of authors per paper					Total
	1 author	2 authors	3 authors	4 authors	5 and more authors	
19 (2009)	3		4			
20 (2009)	1	4	3	2		
21 (2009)	1	2	5			
22 (2010)	3	2	3			
23 (2010)	31	4				
24 (2011)	3	6		1		
25 (2011)	6	1			1	
26 (2011)	3	3	1			
27 (2012)	3	3	1			
28 (2012)	3	4	3			
29 (2013)	6	3	3			
30 (2013)	4	2	2	1	1	
31 (2014)	6	1	4	1	1	
32 (2014)	2	2	2	1		
33 (2015)	1	5	4	1	2	
34 (2015)		3	3	2		
Total	48	45	38	9	5	145
Percentage	33.10	31.03	26.21	6.21	3.45	100.00

Table 6. Number of single- and co-authored papers per volume

Belgrade, and the Faculty of Geography (FG), University of Belgrade, with its Department of Spatial Planning, which were interesting for this study because of the nature of the Institute's activities, while the number of authors from other institutions in Serbia and from abroad are given in Table 7 in the aggregate.

The total of 320 authors, out of which 226 authors from Serbia and 94 authors from abroad, published their papers in the 16 analysed volumes. In the subject period, 66 authors were from the Institute, 52 authors were from the Faculty of Architecture, while only 2 authors were from the Faculty of Geography. The remaining 106 authors from Serbia were either employed in some of the institutions (99) or individuals associated with some of the institutions (7).

SPATIUM	IAUS	FG	FA	Other institutions in Serbia	Institutions from abroad	Individuals (from Serbia)	Total no. of authors from different institutions
19 (2009)	7	1	4	1	2		15
20 (2009)	1		9	12	4		26
21 (2009)	6			6	8		20
22 (2010)	7		6	1	2		16
23 (2010)	2		2	1	6		11
24 (2011)	4	1	5	3	4	2	19
25 (2011)			5	9	2		16
26 (2011)	5		3	1	2	1	12
27 (2012)			2	4	3	3	12
28 (2012)	9		3	6	2		20
29 (2013)			3	4	14		21
30 (2013)	2		1	12	10		25
31 (2014)	7		4	10	8	1	30
32 (2014)	4		1	10	1		16
33 (2015)	7		1	7	23		38
34 (2015)	5		3	12	3		23
Total	66	2	52	99	94	7	320
Percentage	20.63	0.63	16.25	30.94	29.38	2.19	100.00

Table 7. Institutional affiliation of authors

4.6 Number of National and International Papers

As shown in Figure 2, there are 96 (66.21%) papers written by national authors, while the remaining 49 (33.79%) papers by international authors¹⁵. This confirms the fact that rather many international papers were published in the journal.

Further investigation indicates that papers were sent by authors from different countries of the world, out of which the most represented authors were from Europe, but there were also authors from Africa, Asia and North and South America. The papers written by authors from Serbia were the most numerous (96), followed by papers written by authors from Greece (13) and papers by authors from Slovenia, Great Britain and Germany (4). What is important for the journal itself, its popularity and reputation is the fact that the number of authors from abroad is growing.

4.7 References Overview

The list of cited and used literature given at the end of the text is one of the main conditions for the categorization of each paper. Such list is important for the quality

¹⁵ All papers by international authors were taken into account, as well as co-authored papers by national and international authors.

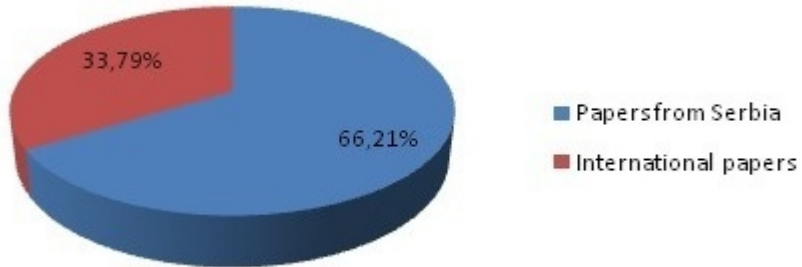


Figure 2. Number of national and international papers

of an article because it provides an insight into the material an author used during his/her research and which directly instigated and encouraged him/her to undertake a specific research, as well as which affected the course of his/her research. But the list is also equally important for those scientific workers who will use the research in future. By tracing the references in historical sequence, from the used literature, the literature referred to and so on backward, it is possible to comprehend the field covered by the paper and become familiar with the specific research (Đurđević, 2010).

The most cited scientific papers have the greatest impact on the development of a particular science. The greatest number of the most cited authors of such papers are the authors who have published important results obtained from their research, and which their colleagues recognize as something original and stimulating, as something that stands out for its scientific importance and contribution.

Table 8 depicts the number of the categorized papers with references per volume and the total number of the categorized papers with references in the period from 2009 to 2015, the total number of references per journal issue and total number of references for all papers published in the seven-year period. Finally, it depicts the average number of literature referred to in each volume and average number of references for all papers in the *SPATIUM* journal in the covered period of time.

The published 144 professional and scientific papers have 4,158 references, which makes an average of 28.88 references per published paper. This analysis did not include the average age of references, neither did it include kind of referred literature or exclude the self-citation by authors. This opens a possibility for further investigation, but also indicates the fact that authors used literature to a large extent, which is an important precondition for a serious and comprehensive research work.

SPATIUM	Year																Total	
	2009			2010			2011			2012		2013		2014		2015		
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
A*	7	10	8	8	7	10	8	7	7	10	12	10	12	7	13	8	144	
B*	113	163	311	220	142	274	313	191	220	314	408	293	323	197	352	324	4158	
C*	16.14	16.3	38.88	27.5	20.29	27.4	39.13	27.29	31.43	31.4	34	29.3	26.92	28.14	27.08	40.5	28.88	

Table 8. Number of references of the categorized papers

A* Total number of categorized papers with list of references

B* Total number of references

C* Average number of references per paper

Figure 3 shows the relationship between the number of papers and the average number of references for each volume of the analysed journal, in the period 2009–2015. It can be observed that the pattern of reduction or increase in the number of references relative to the number of papers published in issues 21–33 is almost identical and, with some oscillations, this number is around the average number of references counted for the entire period (28.88). More significant deviations are observed in issues 19 and 20 when the average number of the pieces of literature referred to was smaller (16.14 and 16.3 respectively) and in the last analysed volume (34) in which the number of the pieces of literature referred to significant increased to an average of 40.5 references per paper.

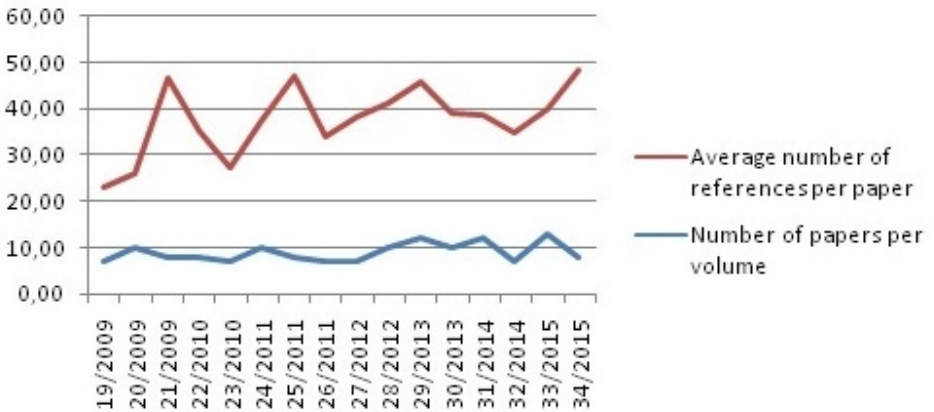


Figure 3. Relationship between the number of papers and the average number of references per volume

4.8 Keyword Analysis

Defining the right keywords is of importance for a summarized presentation of contents of a scientific paper (Jevremov, 2009). They are a basis for the classification of documents and their indexing in different databases.

The sample used for the keyword analysis comprised the papers published in the period 2009–2015. Out of 145 published papers, 3 papers did not have the keywords (one paper was published in 2009 in issue 20, and one was published in issue 22 and one in issue 23, both in 2010), which is a high-level representation of keywords in the subject body (Table 9). It was found that there were 673 keywords in the remaining 142 papers, out of which 627 keywords were used only once, while the number of repeated keywords in the remaining 46 differed: 28 keywords were repeated twice, 9 keywords were repeated three times, 3 keywords were repeated four times and 4 keywords were repeated five times, while out of 2 keywords, 1 was repeated eight times and 1 was repeated ten times. The two most repeated keywords were: *Serbia* (10) and *sustainable development* (8). *The environment*, *identity*, *spatial planning* and *sustainability* were four terms that were used five times as keywords. The following keywords were repeated three times: *Belgrade*, *climate change* and *planning* (Figure 4).

The authors determined the keywords in their papers by themselves and, given that there is no a controlled glossary in the domain of spatial planning, the non-standardized use of terms was observed.

Year	Number of keywords	Number of papers with keywords	Number of papers without keywords
2009	125	24	1 (20)
2010	66	13	1 (22) 1 (23)
2011	117	25	
2012	73	17	
2013	104	22	
2014	90	20	
2015	98	21	
Total	673	142	3

Table 9. Keywords

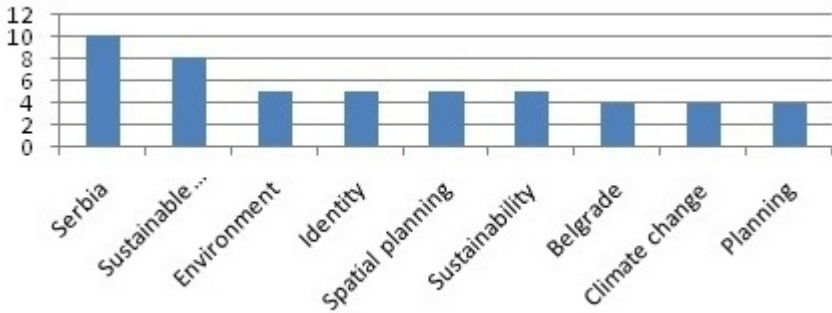


Figure 4. The most frequently repeated keywords

4.9 Reviewers

Prior to publishing, the quality and validity of the presented scientific paper must be confirmed by an expert who is competent in the specific field of paper. The Editorial Board of *SPATIUM* takes care that reviews are entrusted to the most eminent experts from the country and abroad, also taking into account the mutual anonymity of both the authors and the reviewers. The constant advocacy of Editor-in-Chief and Deputy Editor-in-Chief for attracting as many reviewers as possible contributes to a higher status of the Journal. Table 10 depicts the number of reviewers from Serbia and abroad per each of the sixteen issues covered by this investigation, in the period from 2009 to 2015.

SPATIUM	Year																Total	Percentage
	2009		2010		2011		2012		2013		2014		2015					
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
Reviewers for Serbia	7	11	11	11	8	17	9	11	8	15	17	15	23	14	18	7	202	71.13
Reviewers from abroad	0	6	1	4	5	2	6	1	5	6	3	4	6	4	14	15	82	28.87
Total	7	17	12	15	13	19	15	12	13	21	20	19	29	18	32	22	284	100

Table 10. Reviewers

5 Citation Analysis

The citation counts for the published papers in which final results of certain phases of scientific research are presented is one of the main criteria in evaluating the scientific manuscripts. The citation analysis can be used for evaluating an individual researcher, universities and scientific institutions as a whole, as well as for evaluating the journals in which scientific papers are published (Raičević, 2013).

This type of evaluation can be applied to each field of science. The creation of a citation index has resulted from a desire and need to create a database that would enable keeping the track of scientific research, scientific ideas and advancement and development of a particular science. Each scientific worker uses literature relevant for his/her research. Citing the papers, the scientists link the research results to the previously published results (Filipi Matutinović, 2013).

The promotion of researchers and their election into the higher academic ranks is largely dependent on the number of times their papers were cited. Despite the shortcomings in the evaluation of scientific papers based on the citation data, such as great number of self-citations¹⁶ and co-citations, citation manipulation within the scientific circles, lack of an adequate link between the specific paper and the cited papers, motives to cite or not to cite that do not have to be, as a rule, the scientific ones, etc., there are also positive sides because frequent citation of an author is a recognition that the author’s paper had a great impact on subsequent research. Furthermore, the citations are publicly available and confidential, and the citation collection and citation analysis are greatly facilitated by the citation databases.

5.1 Data Sources for the Citation of Papers Published in the *SPATIUM* Journal

The data on the citation of papers published in the *SPATIUM* journal were taken from the following citation databases:

- SCIndex (Serbian Citation Index) – the citation database and search engine for accessing scientific journals published in Serbia;

¹⁶ In the citation count, the relationship between citations and self-citations is important. The data that the number of self-citations is greater than the usual 20 percent relative to the total number of citations can indicate an attempt of manipulation. “The high self-citation rate is typical for the leading scientific journals both because of permanently high quality of papers published in them and because of the unique or thematic proliferation... However, there are journals that have a high self-citation rate so that they deform the overall perception of citation of such journals...in case of significant deviations...ISI checks whether it is a matter of self-citation which is done for the purpose of raising the impact factor of the journal.” (Vukasović, 2009)

- Google Scholar – the largest citation search engine;
- Scopus – owned by Elsevier international publishing company.

The time span within which the citation data for the papers published in the *SPATIUM* journal are available:

- Serbian Citation Index – for papers published in the period from 2000 to 2013;
- Google Scholar – for papers published in the period from 2000 to 2015;
- Scopus¹⁷ – for papers published in the period from 2011 to 2015.

Table 11 gives the citation data on the *SPATIUM* journal in the period from 2009 to 2015, for issues 19–34. The total number of citations in the SCIndex and Google scholar citation databases is given first for the period from 2009 to 2015, and then, in parentheses, for the period from 2011 to 2015, which corresponds to the total number of citations in the Scopus citation database, for the purpose of allowing the comparisons between these three citation sources. It can be observed that each of the citation sources contains a different number of citations for a specific journal issue in a certain year, and thereby the number of citations of a particular paper in an issue is different. So it is important to perform the citation analysis for a scientist from Serbia on the basis of all available sources and to never make a comparison between the data obtained for this scientist from a particular database and the data obtained from other database for some other scientists (Filipi Matutinović, 2013).

SPATIUM	Year																Total	
	2009		2010		2011		2012		2013		2014		2015					
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
Total number of papers	7	10	8	8	7	10	8	7	7	10	12	10	12	1	7	13	8	145
SCIndex	12	8	23	10	14	19	8	8	3	1	1	0	-	-	-	-	107 (40)	
Scopus	-	-	-	-	-	13	13	9	8	8	4	9	4	5	0	0	73 (73)	
Google Scholar	17	31	62	34	36	32	18	15	16	12	10	9	4	2	1	-	299 (119)	

Table 11. Citation count

¹⁷ This database provides the possibility to authors to see the citation counts for their own papers using the Citation Tracker. It is very important that there is the possibility to exclude self-citations using the option Exclude Self-Citations. The citation data for a particular article are given in the Excel table showing the number of citations for a particular article for each year, starting from 1996, as well as the total number of citations.

5.2 Differences in the Number of Citations at the Example of One Paper

At the example of the paper entitled *Modelling the spatial distribution of Vojvodina's population by using dasymetric method*, by co-authors Nikola Krunić, Branislav Bajat, Milan Kilibarda and Dragutin Tošić, we will show the difference in the number of times the paper was cited and where and when it was cited based on the data taken from three different sources. The paper was published in 2011 in the issue number 24. The data were taken on the same day (19 January, 2016) from three citation databases: SCIndex, Google Scholar and Scopus.

SCIndex Citation Overview As it can be seen, the paper was cited three times in the SCIndex database. In 2011, it was cited in the *Collection of Papers of the Faculty of Geography, University of Belgrade*. In 2012, the paper was cited in the *SPATIUM* journal and in 2014 in the *Geonauka* journal. All three papers were also shown as results in the Google Scholar citation database, while out of the above mentioned papers, the paper entitled *Spatial-functional organization of settlements in Vojvodina*, 2012, was shown as a result in the Scopus citation database. In all three cases, the paper was cited by national authors, out of which one is a citation and two are self-citations (Figure 5)¹⁸.

Google Scholar Citation Overview The paper was cited 9 times in the Google Scholar citation database. The papers are neither listed in historical sequence nor in an alphabetical order, but in order in which the search engine has pulled the data from the world networks. The papers were published in the period from 2011 to 2015. According to the Google Scholar citation database, the paper *Modelling the spatial distribution of Vojvodina's population by using dasymetric method* was cited twice in 2011, and once in the *Collection of Papers* and once in the *Journal* in 2012. In 2015, it was cited once in a doctoral dissertation and once in a chapter of a monographic publication. All three papers are found amongst these nine papers and they are also shown as results in the SCIndex citation database. Out of the total number of citations, the paper *Modelling the spatial distribution of Vojvodina's population by using dasymetric method* was cited in the Google Scholar citation database, 7 times by national authors 7 and twice by international authors, out of which 6 were self-citations and 3 were citations (Figure 6)¹⁹.

¹⁸ <http://scindeks.ceon.rs/Related.aspx?artcit=1450-569X1124045K>

¹⁹ http://scholar.google.com/scholar?cites=1285848406558262205&as_sdt=2005&scioldt=0,5&hl=sr



Figure 5. SCIndex Citation Overview

Scopus's Citation Overview By getting an insight into the results obtained from the Scopus citation database, we can see that the paper entitled *Modelling the spatial distribution of Vojvodina's population by using dasymetric method* was cited four times in the Scopus citation database, one time each year of the period from 2012 to 2015. In all three cases, this paper was cited in the papers written by national authors and all three were self-citations, while in the fourth case, the paper was cited in the paper by an international author (Figure 7)²⁰.

Further analysis shows that the paper entitled *Spatial-functional organization of settlements in Vojvodina*, 2012, was cited in three citation databases. The paper entitled *Dasymetric modelling of population dynamic in urban areas*, 2013, was obtained as the result only from the Scopus citation database. The papers entitled *A fine-scale spatial population distribution on the High-resolution Gridded Population Surface and application in Alachua County, Florida* and the *Dasymetric Mapping of Population Distribution in Serbia Based on Soil Sealing Degrees Layer* were obtained as results in the Scopus citation database and in the Google Scholar search engine.

²⁰ <http://www.scopus.com/results/citedbyresults.url?sort=plf-f&cite=2-s2.0-84857317689&src=s&imp=t&sid=0B17A6BC49186401A0CD58721DF71637.CnvcAmOODVwpVrjSeqQ%3a280&sot=cite&sdt=a&sl=0&origin=resultslist&txGid=0B17A6BC49186401A0CD58721DF71637.CnvcAmOODVwpVrjSeqQ%3a28>

The image shows a Google Scholar search result for the article "Modelling the spatial distribution of Vojvodina's population by using dasymetric method" by N. Krunic, B. Bajaj, and M. Kilibarda. The search bar contains the article title. Below the search bar, the article title is repeated, followed by the authors and the journal name "Spatium, 2011". A short abstract is provided, along with a list of links for citation analysis: "9 puta naведен", "Сродни чланци", "Све верзије (6)", "Цитирај", "Сачувај", and "Више".

Below the main result, there are several related articles, each with a PDF icon and a citation count:

- [PDF]** Dasymetric mapping of spatial distribution of population in Timok Region. B. Bajaj, N. Krunic, M. Kilibarda. - Proceedings of international ... , 2011 - e-science.amres.ac.rs. Summary: Dasymetric mapping of population distribution represents very functional visualization method used in spatial demographic analysis. The main advantage of dasymetric mapping over standardized cartographic methods (choropleth maps) used for ... 5 puta naведен Сродни чланци Све верзије (2) Цитирај Сачувај Више
- [PDF]** Spatial modelling of population concentration using geographically weighted regression method. B. Bajaj, N. Krunic, M. Kilibarda. - Journal of the ... , 2011 - doiserbia.nb.rs. This paper presents possibilities of applying the geographically weighted regression method in mapping population change index. During the last decade, this contemporary spatial modeling method has been increasingly used in geographical analyses. On the example ... 2 puta naведен Сродни чланци Све верзије (10) Цитирај Сачувај
- [PDF]** Laboratory for development of open source geospatial technologies—role in education and research. M. Kilibarda, B. Bajaj, N. Branisavljević. - Geonauka, 2014 - researchgate.net. Abstract. International Cartographic CBOs (International Cartographic Association-ICA) in partnership with the Open Source Geospatial Foundation-OSGeo has started the initiative ICA-OSGeo Labs to promote and use open source technologies in education and ... Сродни чланци Све верзије (5) Цитирај Сачувај Више
- [PDF]** MODELAGEM ESPACIAL DINÂMICA DOS DETERMINANTES SOCIAIS E AMBIENTAIS DA MALÁRIA E SIMULAÇÃO DE CENÁRIOS 2020 PARA MUNICÍPIO ... TD do Curso - mtc-m21b.sid.inpe.br. RESUMO Em pleno século XXI a malária continua sendo uma das endemias de maior magnitude no mundo. Segundo a Organização Mundial da Saúde, no ano de 2013 ocorreram 132 milhões de novos casos, concentrados em países periféricos, sobretudo, ... Цитирај Сачувај Више
- [PDF]** Spatial-functional organization of settlements in Vojvodina. N. Krunic. - Spatium, 2012 - doiserbia.nb.rs. This paper summarizes the results of recent exploration of spatial and functional organization of Autonomous Province of Vojvodina in the Republic of Serbia (hereinafter referred to as "Vojvodina") based on identification of the level of development of spatial ... 1 puta naведен Сродни чланци Све верзије (5) Цитирај Сачувај Више
- [HTML]** A fine-scale spatial population distribution on the High-resolution Gridded Population Surface and application in Alachua County, Florida. P. Jia, Y. Qiu, A. E. Gaughan. - Applied Geography, 2014 - Elsevier. Abstract Geospatial techniques, using Geographic Information Systems and remote sensing data, have become more commonly used with dasymetric modeling of fine-scale demographic data. In this study, we apply a dasymetric approach using the Heuristic ... 4 puta naведен Сродни чланци Све верзије (2) Web of Science: 2 Цитирај Сачувај
- [PDF]** Промене у дистрибуцији руралног становништва Србије. В. Глигорјевић, М. Девеџић, У. Глигорјевић. - zbornik.ggf.bg.ac.rs. Вера Глигорјевић* 1, Мирјана Девеџић** Универзитет у Београду—Географски факултет Изаода: Циљ овог рада је допринети дискусији о урбано-руралној дистрибуцији становништва у Србији. У контексту европске регионалне политике, рад се посебно ... Сродни чланци Цитирај Сачувај Више

Figure 6. Google Scholar Citation Overview

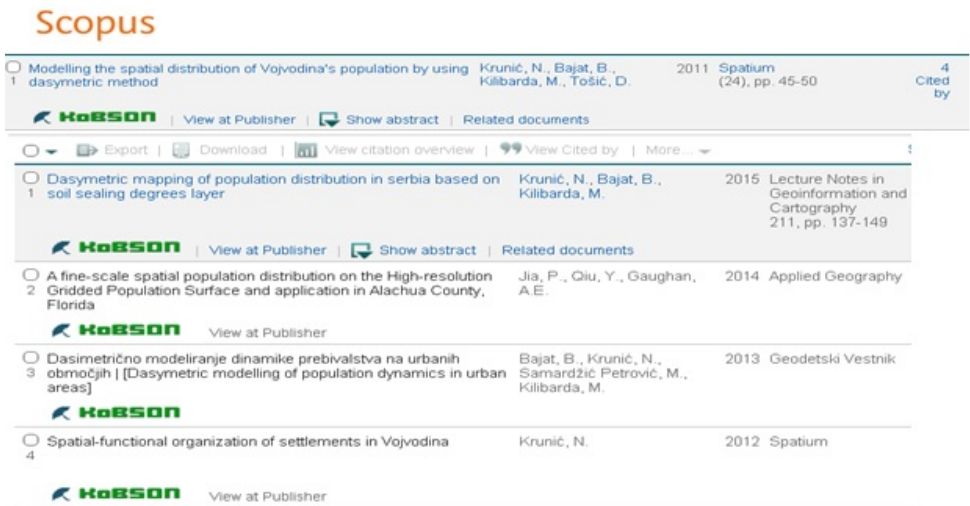


Figure 7. Scopus's Citation Overview

Considering these examples, it can be concluded that, for the evaluation of the Journal and its ranking, it would be necessary to consult the results obtained from all available sources so that neither the journal itself nor the authors of papers published in it would be harmed by inadequate classification.

6 Categorization of National Journals into the Category of Transport, Urban Planning and Civil Engineering

After having considered the objections to the categorization of national journals for 2013 and pursuant to Article 27 paragraph 1 point 4) and Article 25 paragraph 1 point 5) of the Law on Scientific Research Activities,²¹ the Ministry of Education, Science and Technological Development adopted the final list of categorized scientific journals for 2013. The *SPATIUM* journal is the first on the list for the category of Transport, Urban Planning and Civil Engineering for 2013, in the M24 category. The 2013 List is the last official list of categorized national scientific journals that was adopted by the Ministry. The latest proposal of categorization for 2014 is placed on the website of the Ministry of Education, Science and Technological Development.

²¹ Закон о научноистраживачкој делатности („Службени гласник РС", бр. 110/05, 50/06-испр. и 18/10))

On the latest, preliminary list of journals, the *SPATIUM* journal is also in the M24 category.

7 Conclusions

The *SPATIUM* journal has been published for 19 years. This analysis covers only a short period from 2009 to 2015 that approximately corresponds to the change of the Editorial Board members and adoption of the *Act on Scientific Journal Editing* 2009 by the Ministry of Education, Science and Technological Development of the Republic of Serbia. The aim of this investigation is to show the role and importance of the *SPATIUM* journal, its multidisciplinary approach to the investigation and publishing of papers in different areas of science.

The analysis of the published texts shows that the number of scientific papers was four times greater than the number of professional papers. Out of the total number of papers, the published scientific papers account for 80 percent, while the professional papers account for 18.62 percent. This supports the fact that *SPATIUM* is primarily oriented towards the scientific communication, although none of its roles in exchanging the experiences among professionals should be neglected.

By constantly struggling for the journal’s quality and impact, the Editorial Board of *SPATIUM* contributes to a higher status of the journal. The goal of the Editorial Board is to register the journal for evaluation in the forthcoming period in order to be listed in the Thomson Reuters Master Journal List. By possible entering into the List, the journal would acquire a higher affirmation in the international scientific and professional circles in the fields of spatial and urban planning, architectural design and other related fields, thus also increasing the impact factor of *SPATIUM* as a quantitative measure of its success.

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