

The Importance of Internal Audit In Public Sector Research - A Bibliometric Study -

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Abstract

The scope of our research is to present the current development stage of the public sector internal audit research worldwide; the examined database is Web of Science Core Collection. This choice is due to the database representativity and importance in indexing high profile publication, either journals, books, or Conference proceedings. This bibliometric study incorporates two main objectives, firstly we have undertaken the objective of achieving the performance analysis, presenting the results of our research in terms of performance for different parameters such as: authors, research domains, institutions, journals, and countries; secondly, we have assumed the objective of realizing a scientific mapping of the outcome of the public sector internal audit research in relations to research topic, research teams and research facilities; based on the occurrence or co-occurrence of a term. The main results shows that there are four points of inflexion in the chronological evolution of the public sector internal audit research publication and the science mapping undergone identified certain networks and behaviour as well as identified four research clusters.

Key words: Internal audit in public sector, research, performance analysis, mapping

J.E.L. classification: H83, M42

1. Introduction

The interest of the academic community and professionals in the study of internal audit is on an upward trend. An unassuming search on the specialized online databases on the Internet such as google academic, results an astonishing number of results (2.270.000 in 0,07 seconds), the abovementioned number composed of papers, articles, and studies in academic journals and not only. For this research, we choose to investigate a specific part, namely the function of internal audit in public sector, so being, the aim of our research is to present the current development stage of the public sector internal audit research worldwide.

We chose to examine the Web of Science Core Collection database, due to its representativity, longevity (the indexing of journals starting with 1900, and the indexing process of books starting with 2005), and importance. According to the official website the Web of Science Core Collection database includes 21.894 items, comprised of journals that have over 82 million records (with an acceptance rate of "10-12% for the three core indices - Science Citation Index Expanded, Social Science Citation Index and Arts & Humanities Citation Index - rates for the Emerging Sources Citation Index are generally higher"); over 126.00 books and finally, above one fifth million conferences covered.

The environment in which internal auditors operate worldwide and at European Union level is constantly evolving. Since the beginning of the appearance of the internal audit in the offices of the managers of enterprises and institutions with a certain training in accounting and other related fields such as engineering, mathematics, information technology, it has been outlined the idea that the audit is addressed in its entirety to the entire organization, by accepting all the internal components, which

work together, are a unitary whole, which in the end will be integrated into the decisions of the management.

At the Romanian national level, the approaches of the internal public audit came as a response to the traditional methodologies of financial accounting in accordance with the Policies and Strategies of the European Union in the major areas of interest. They are oriented towards a clear and rigorous planning, which, however, have sometimes encountered certain obstacles in the implementation in the case of public institutions as well as private firms. Thus, audit missions were carried out in accordance with the legislative framework and appropriate to the concrete, current possibilities of internal development in each economic entity. The common characteristics of the internal audit activity adapted to the policies and strategies of the European Union can be found in a set of harmonized principles and legislative documents, issued by the Romanian Parliament and the Ministry of Public Finance.

The universality of the internal audit function applied to the spectrum of each organisation, regardless of its field of activity and performance, monitors most of the activities carried out. Incipient, internal control is its main object of activity. Given that the internal audit aims to improve the internal control system through the recommendations made, it has a universal character hence the characteristic of universality. Consequently, internal audit is a function of assisting management factors through which auditors effectively support the monitoring of the activities carried out to contribute to the increase in performance. Given that in each entity there is and applies the function of "top management" and the assistance provided to it by the internal audit has expanded in all areas.

In this context, the internal audit practitioners of most European states note its rapid and pertinent development, clearly perceived by everyone, even in the situation of inherent confusions and dysfunctions that sometimes occur; audit objectives are achieved, and it becomes an uneasy aid to managers and management structures. The internal audit will achieve its objectives if there is an organized, formalized internal control system of management, consisting of: adequate operational procedures, development and application of standards and professional system rules, clear deontological codes, which would efficiently contribute to the independence of the internal auditor and his activity. That is why internal auditors and management structures must be seen as partners and not as adversaries, having the same objectives, to effectively achieve the act of management and corporate governance by achieving the assumed performance indicators. The management teams, through their role and attributions, must assume and apply the recommendations formulated by the internal auditors, to perceive the support they receive for the identification and evaluation of risks. The synergy of the audit process has an increased entropy determined by societal changes, these are reflected in the first instance in the external systems and then in the internal ones of the European Union.

2. Literature review

Regarding the internal audit in the public sector, we have identified in the literature several topics of study and consequently research directions regarding the importance of this field of study and the support provided to management at all levels, in the content of the four major study directions.

The first area of interest that we chose to present refers to the review of the work of internal auditors from a practical point of view, several authors recognized the *major roles that the internal auditors* perform two key roles: a) a role of protector, further subdivided into two roles, protective shield and keeper of secrets and b) a helping role, also subdivided into two roles, namely supporting organizational performance and guide in the work carried out (Roussy, 2013), some other authors allocated the role of internal auditors similarly (Ferry et al, 2017).

In the research carried out by M. Roussy (2013), the authors develop an innovative model that describes the roles of internal auditors in public sector organizations in the corporate governance process. Through 42 semi-structured interviews that have been addressed to experienced internal auditors working in Quebec public administration are described and analyzed.

The author therefore presented an expert opinion on the independence of internal auditors in the public sector in Quebec. The findings generally suggest that the internal audit, now, is not the supervisory body of the governance envisaged by the regulation given the subjectivity, transparency, and methodological rigor of the internal auditors. The conclusion of the specialists is associated with

the determinants of the organizational change in the public sector, which results from the conduct of the internal audit and the way in which the internal auditors carry it out according to the legal regulations.

As public sector reform continues, some authors such as Omoteso & all (2012) it is considered that a deepening of this area is needed, namely in the second direction of study identified: the increasing use of information *technology is also generating a study interest* in the modern business world while also creating increased pressure on auditors to play an increasingly effective role in the governance and control of firms.

This paper aims to review the main research efforts and current debates on the use by auditors of expert management systems and expert databases, to forecast future directions of software research and development. The process of developing artificial intelligence systems in audit emphasizing the identified advantages and disadvantages are exposed and critically analyzed. It also reviews previous research advances on the use of expert systems and neural networks in auditing and their implications.

In this second research area identified there are several authors (Cangemi M., 2016) who consider that the use of automated monitoring and data analytics has been a major expansion, but as the internal audit process continues to raise, there is room for enhancement. They advocate for the use of these technologies to increase the efficiency of internal audits and their impact to the entities activity towards a more important role of the internal audit.

The summaries of previous studies have revealed certain research vacuums that in the light of future research should be restated: achieving a balance between the use of artificial intelligence versus the related costs, assessing the impact of artificial intelligence on the design and monitoring of internal control systems, as well as on audit committees, the efficiency of committees and the implications of the use of such systems for the operations of audit firms small and medium-sized, the survival of audit firms, audit education, audit of public sector organizations, the independence of auditors, gaps between expectations and performance achieved.

The third research area identified focuses on *internal audit quality*; if so far in the specialized literature most of the studies have focused mainly on a single perspective on Internal Audit Quality (IAQ), Roussy M, Brivit M,(2016) respectively highlighting the qualitative contrast existing between the way in which those who, according to the normative acts in force in each country, fulfill an internal audit mission (internal auditors) and those who mandate (members of the audit committee), those who use the results of audit missions (members of the audit committee and external auditors) and normalization of the audit function (Institute of Internal Auditors). The study is based on in-depth analysis of the existing literature on the 'quality of internal audit' (IAQ) by compiling results from interviews with internal auditors and members of the public sector audit committee or organizations in Canada and archival documents published by the Institute of Internal Auditors (IIA) because so far research has mainly focused on a single perspective on the IAQ, that of the external auditors. They suggest radically different perspectives on how internal audit quality (IAQs) should be defined and controlled (through input, exit, related costs and training controls).

The final research area identified presents the *uncertainties specific to the analysis of the internal audit in the public sector*, who were also analyzed by Van Dooren W. & all (2015). Starting from the premise that public institutions are the basic elements of governments, through their formal and informal role, it is the easiest to observe and quantify in the public bureaucracy. Their performance may also be since some of them have hierarchical subordinations that can be controlled less or on the contrary, they can have an extended autonomy. Therefore, if researchers want to understand how governments work, a very good place to start studying this book is the level of public institutions that are service providers. In their work re expressed opinions and points of view based on research that refer to various levels of organization in the public sector such as: the autonomy of the public sector, information networks and their analysis; bureaucratic policy; staff rotation and management; methodologies for studying their operation.

At national level, we appreciate that regarding the management of the internal audit activity in the public sector in Romania, by adopting the Code of internal management control of public entities (Order of the General Secretariat of the Government no. 600/2018) a hierarchical organizational model is established, within which the head of each public entity is at the first decision-making level, being responsible for ensuring performance monitoring for each activity, by means of indices and

performance indicators. Beyond their value as people, internal auditors must be and act as a team of professionals extremely involved in the work they carry out. Consequently, internal audit in the public sector is a function of assisting management factors through which auditors effectively support the monitoring of the activities carried out for them to contribute to the increase in performance. By continuously/periodically identifying certain malfunctions that have occurred (which are obviously inherent), several elements necessary for the continuous improvement of the monitoring of the performance of the public internal audit activity in the public sector in Romania can be quantified.

3. Research methodology

As mentioned beforehand, we have undergone research on the main dedicated database, google academic, our query about “internal audit in public sector” with an astounding number of results (2.270.000 in 0,07 seconds), the abovementioned number composed of papers, articles, and studies in academic journals and not only. Furthermore, we choose to investigate a specific part, namely the internal audit in public sector, in another database Web of Science Core Collection, with the main characteristics presented beforehand in our article.

In order to reach the aim of our study, we have established two main objectives:

- (1) the **performance analysis**, presenting the results of our research in terms of performance for different parameters such as: authors, research domains, institutions, journals, and countries.
- (2) secondly, we have assumed the objective of realizing a **scientific mapping** of the outcome of the public sector internal audit research in relations to research topic, research teams and research facilities; based on the occurrence or co-occurrence of a term.

The research plan employed for carrying out our bibliometric research involved several steps, firstly we have retrieved the necessary data, secondly, we examined the bulk data and prepared for processing, thirdly we have processed the data through VOSviewer software, analysed it and realized the mapping and finally visualisation.

The research plan assumed firstly the retrieval of data, and so the query of Web of Science Core Collection on the 20th of November 2021 and followed the protocol:

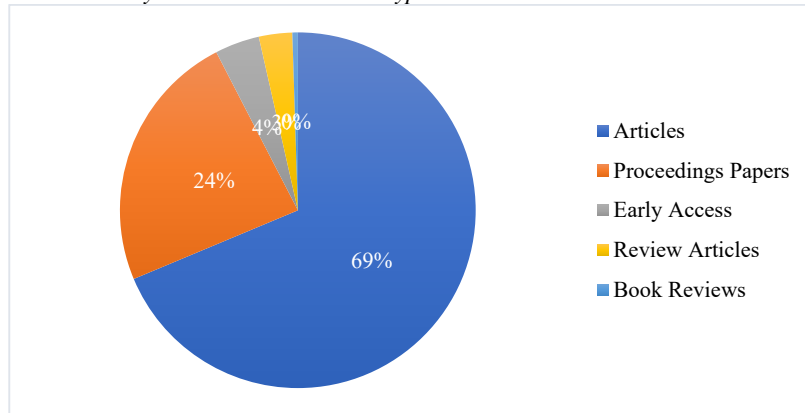
1. Database: Web of Science Core Collection
2. Search on group of word – advanced search: (“public sector internal audit” in Topic **OR** “internal audit in public sector” in Topic **OR** “internal auditing” + “public sector ” in Topic **OR** “internal auditing”+ “local governments” in Topic **OR** “internal auditing” + “central governments”
3. Timespan: All years

The indexed scientific literature about the public sector internal auditing research emerges in 1978 with the article: *Public-sector auditing - new opportunities for CPAS* – author Pomeranz, F. in *Journal of accountancy* 145 (3) , pp.48-54, the final search query counted 189 publications.

4. Findings

The identified research papers, as it is shown in Fig.1 include 136 articles (71,96%), 47 proceedings papers (24,87%), 8 early access papers (4,23%), and 6 review article and also 1 book review. Thus, we can identify as main source for dissemination for the internal auditing in public sector research WOS indexed is research articles, either published in journals or in conference’s proceedings, and unexpectedly just one book.

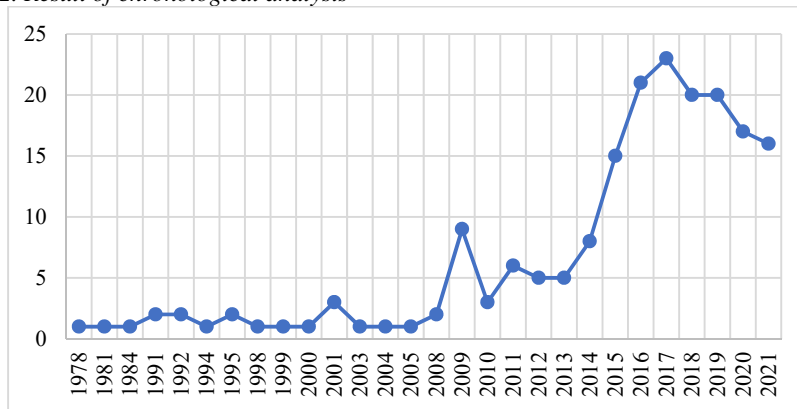
Figure no.1. Result analysis based on document type



Source: own generation based on WOS database

The research undertaken, in terms of chronological performance analysis, as shown in Figure no.2, has result in identifying four inflexion points, namely 2001, as that year the number of publications surged, just beforehand the publication in 2002 of SOX Act, the second inflexion point is 2008, because in 2009, the number of publications quadrupled and it can be attributed to the international crisis, but also to the publication of International Standards for the Professional Practice of Internal Auditing (Standards), the revised edition of the aforementioned standards published in 2012 generates in our opinion the third inflexion point and the fourth and final inflexion point is in 2017, in the smooth evolution of publications regarding the topic of internal auditing in public sector research.

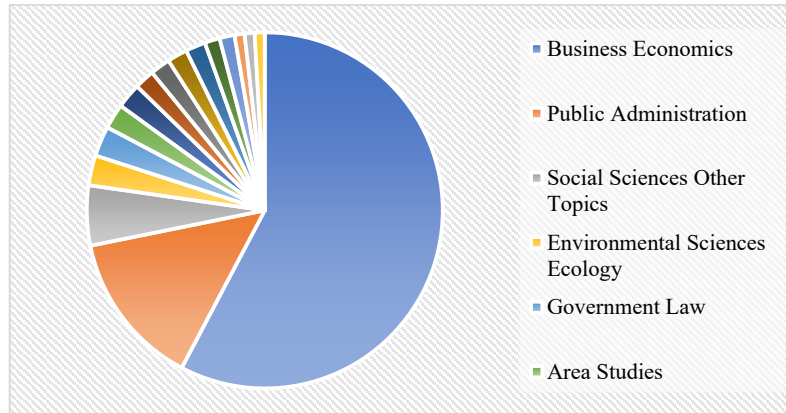
Figure no.2. Result of chronological analysis



Source: own generation based on WOS database

We were also interested in presenting the research areas for the publications topic of internal auditing in public sector research, as shown in Figure no.3. Research areas, the main with 127 publications, being Business Economics, followed by Public Administration with a quarter of publications (31), Social Sciences other topics (12), and the following research areas publication numbers being a single digit one.

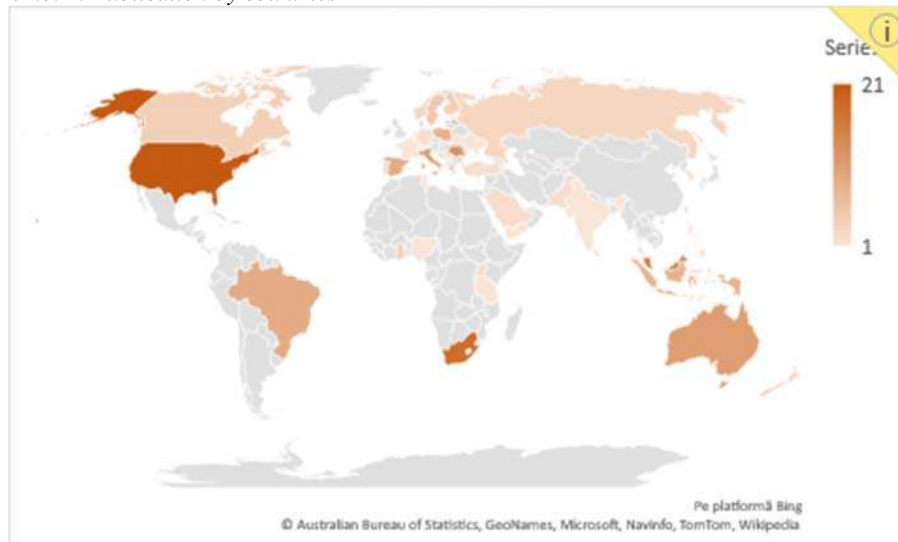
Figure no. 3. Research areas



Source: own generation based on WOS database

The publication analyzed by country or region, shown in Figure 4. Publication by countries is one that it shows accurately two main trends in research, firstly the unbiased conclusions that anglo-saxon system that originated the internal audit still leads in the field of the internal auditing in public sector research (USA- 21 publications, South Africa – 18 publications, Australia - 11), however there can be identified a raising interest in European countries as well, and in the latest entries within the European Union mainly an increased number, due, mostly to the new introduction of internal audit function (Romania – 13, Latvia-9, Poland-8).

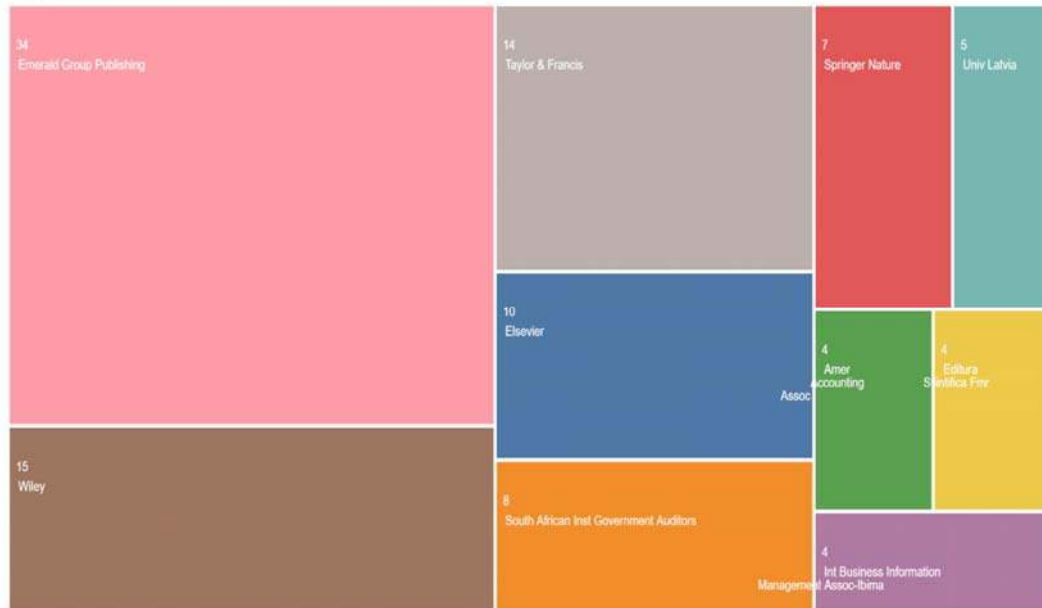
Figure no. 4. Publication by countries



Source: own generation based on WOS database

Finalizing our performance analysis, we will present the main publishers of the research undertaken in the internal auditing in public sector area (Figure 5), the main publisher with 17% of the total number of publication is Emerald Group Publishing through several journal, second in line comes the Wiley and Taylor&Francis with 7,40%/7,93% publishing houses, Elsevier coming thirdly. In the first ten publisher we can identify two main Professional Bodies, namely: South African Inst Government Auditors with 8 publications, and American Accounting Association- AAA (4 publications).

Figure no. 5 Publishers



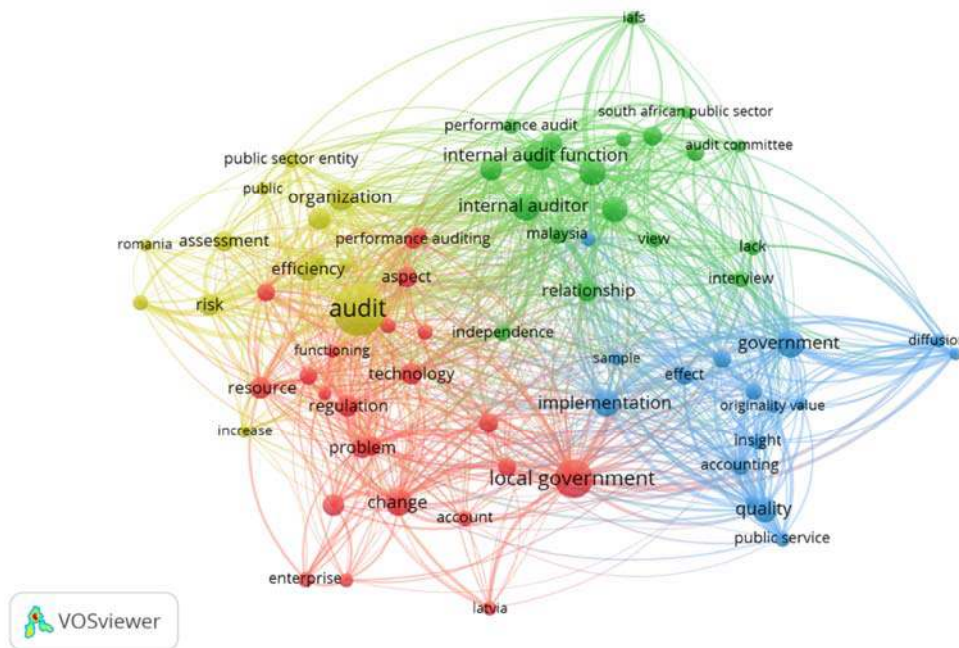
Source: own generation based on WOS database

In order to accomplish the second objective of realizing a *scientific mapping* of the outcome of the public sector internal audit research in relations to research topic, research teams and research facilities; based on the occurrence or co-occurrence of a term, we have proceeded to a bibliometric analysis using singular technics for science mapping (co-word analysis) and bibliometric analysis augmentation technics (clustering, network system of measurement and finally visualisation) within the VOSviewer software (version 1.16.17), by Nees Jan van Eck and Ludo Waltman

As it is presented by its authors: “VOSviewer allows the analysis of the keywords in the documents existing in the WOS database, one of the purposes of this analysis being to highlight the links between these keywords. VOSviewer offers the possibility of making a map that graphically represents the links between the words that appear most frequently in the documents for which the query was made in the WOS database”. We have followed the workflow as described by (Cobo et al., 2011) examined the bulk data and prepared for processing, thirdly we have processed the data through VOSviewer software, analysed it and realized the mapping and finally visualisation.

The search query counted 189 publications, following this we have exported both in *Other reference software* - RIS file and in plain text format- TXT file, *Full records and cited references*, for all 189 items to be processed with the VOSviewer software. Using the VOSviewer software we have processed the exported data and we created a co-occurrence map, based on text data, the counting method was *full counting*, the minimum number of occurrences of a word was 10 and out of 3620 terms, 125 meet the threshold. Furthermore, for each of the 125 terms, a relevance score was calculated. Based on this score, the most relevant terms were selected, and we took into consideration the recommended 60% most relevant ones. The number of terms finally selected was 75, afterwards out of the 75 - 6 terms were eliminated due to their status of unbiased commonness for this topic of research: concept, field, term, aspect, article, author, the final result is shown in figure no. 6.

Figure no. 6 VOSviewer network visualization map – internal audit in public sector research Association strength of on WOS platform.



Source: own generation based on VOSviewer processing

As shown above - figure number 6 - VOSviewer network visualization map – internal audit in public sector research -association strength of on WOS platform, it is a co-word network visualization map using VOSviewer; according to the Manual of the software: “each node in network represent an entity, respectively in this case a keyword, where (i) *the size of the node* represents the occurrence of the keyword (the number of times that the keyword occurs), (ii) *the link between the nodes* represents the co-occurrence between keywords (keyword that co-occur together in multiple situations in different settings (studies), (iii) *the width of the link* indicates the occurrence of co-occurrence between keywords (namely the number of times that co-occur or occur together), (iv) *the bigger the node* the bigger the larger the occurrence of the keyword, and (v) *the thicker the link between the nodes* the greater the occurrence of the co-occurrence between keywords. Each colour represents a thematic cluster, wherein the nodes and links in that cluster can be used to explain the them’s (cluster) coverage of topics (nodes) and the relationships (links) between the topics (nodes-keywords) manifesting under that theme (cluster)”.

The processing of the data through VOSviewer showed that internal audit in public sector in terms of co-occurrence is linked with the following concepts: local government (83), change (43), internal audit function (50), value (43), implementation (43), government (45), quality (38), organization (40), efficiency (31) as shown in table number 1.

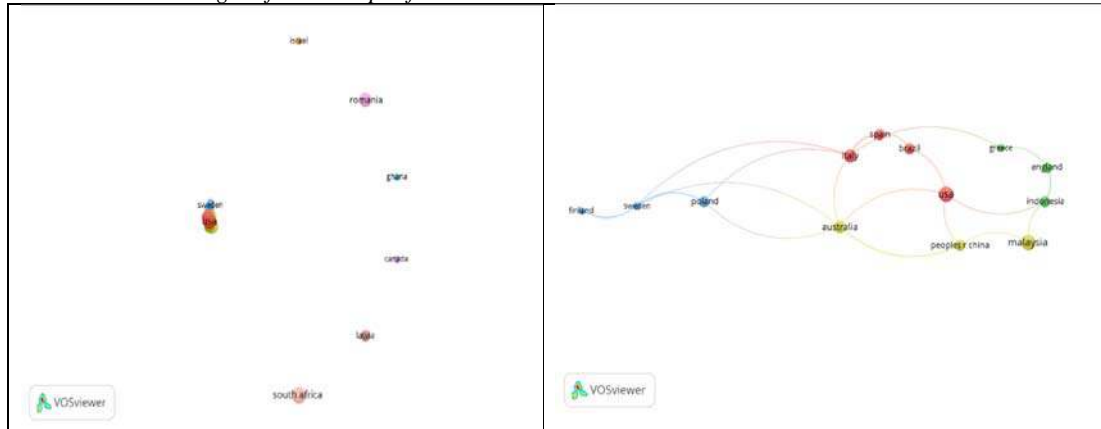
Table no.1 Co- occurrence terms – clusters

No	Term	cluster	No. Occ	No	Term	cluster	No. Occ
1	local government	1	83	41	government	3	45
2	change	1	43	42	implementation	3	43
3	resource	1	29	43	quality	3	38
4	corruption	1	27	44	effect	3	22
5	regulation	1	27	45	accounting	3	20
6	technology	1	26	46	adoption	3	20
7	problem	1	23	47	recommendation	3	17
8	public sector auditing	1	21	48	public service	3	15
9	state	1	21	49	insight	3	14
10	number	1	19	50	diffusion	3	11
11	evaluation	1	18	51	respondent	3	11
12	performance auditing	1	18	52	sample	3	11
13	outcome	1	14	53	accrual accounting	3	10
14	supreme audit institution	1	14	54	indonesia	3	10
15	account	1	13	55	originality value	3	9
16	enterprise	1	13	56	design methodology approach	3	8
17	latvia	1	12	57	audit	4	153
18	scope	1	12	58	organization	4	40
19	china	1	11	59	efficiency	4	31
20	functioning	1	10	60	entity	4	28
21	time	1	10	61	risk	4	28
22	internal audit function	2	50	62	assessment	4	24
23	internal auditor	2	46	63	public sector entity	4	16
24	value	2	43	64	internal control	4	15
25	internal auditing	2	37	65	public	4	12
26	function	2	28	66	poland	4	11
27	relationship	2	26	67	increase	4	10
28	difference	2	25	68	public sector organization	4	10
29	perception	2	21	69	romania	4	10
30	internal audit effectiveness	2	18				
31	malaysia	2	18				
32	independence	2	17				
33	interview	2	17				
34	performance audit	2	15				
35	south africa	2	14				
36	view	2	14				
37	lack	2	13				
38	iafs	2	12				
39	audit committee	2	10				
40	south african public sector	2	9				

Source: own generation based on VOSviewer processing

We have used all the utensil at our disposal from the VOSviewer software and we consider interesting in terms of mapping the science to underline the networking of the researchers, namely, in Figure no. 7, from the 17 countries with more than 5 publications, only 11 countries as presented in the next figure pertain to a network.

Figure no. 7 VOSviewer network visualization map – internal audit in public sector research- countries Association strength of on WOS platform



Source: own generation based on VOSviewer processing

The next enquiry lead by the former analysis output, was whether this type of networking is relevant within the authors occurrences network; and at a science mapping analysis, we could observe that the authors laid within the countries behavior, moreover, even then, we could identify some of them singled out as lonely researchers, as the case of Romania (Hlaciuc E.), or a group of researchers without connections abroad (Neamtu E., Stefanescu A., Mocanu M., Dudian M.).

5. Conclusions

The research undertaken, in terms of chronological performance analysis, has resulted in identifying of four inflexion points, namely 2001, 2008, 2011, and 2017 in the smooth evolution of publications regarding the topic of internal auditing in public sector research. In terms of research areas, the publication is clearly dominated by those who pertain to Business Economics one. The analysis of publication by countries is one that it shows accurately two main trends in research, firstly the unbiased conclusions that anglo-saxon system that originated the internal audit still leads in the field of the internal auditing in public sector research (USA- 21 publications, South Africa – 18 publications, Australia - 11), however there can be identified a raising interest in European countries as well, and in the latest entries within the European Union mainly an increased number, due, mostly to the novelty of the internal audit function (Romania – 13, Latvia-9, Poland-8)

After performing a bibliometric analysis on the material retrieved from the WOS platform (189 records) on the most frequently used terms in internal audit in public sector, the co-occurrences map of terms generated in VOSviewer revealed that there are four main topics of research (clusters). The first one centres around the public sector auditing its performance in local governments mainly, the second one is focused on the link between the audit committee, the independence of internal auditor in terms of internal audit effectiveness, the third clusters identified showed the intercorrelation in the research of implementation of internal audit, government, quality effect and accrual accounting, and finally the fourth one emphasis on internal control in public sector organization through risk assessment and efficiency. One of the limits of our research is further detailed analysis necessary, in connection with other terms proven to be relevant, as: internal audit effectiveness risk assessment and independence.

6. Acknowledgment

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