Accounting Information System – A Quantitative Analyse of the Bibliometric Elements

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Abstract

The present study presents an overview of Accounting Information System (AIS) research applied in Accounting System field by a quantitative analyse of the bibliometric elements provided by Scopus database on the scientific articles published in the last decade regarding the role and the importance of AIS, as a part of the accounting informational system at the company level and establishes the links of dependence and variability between their various elements type. It provides knowledges about methodologies used in accounting research, research documents, accounting area studied and emerging technologies examined in scholarship accounting information system. A set of 649 published articles was selected in this research because of their appropriate fit with the research question. The analysis emphasizes the need to support the continuation of research in the field of AIS in concordance with the changes and trends of evolution of the international academic fields.

Key word: accounting information system, accounting research, bibliometric research, quantitative research, Scopus database
J.E.L. classification: M41

1. Introduction

The present study carries out a quantitative analysis of the bibliometric elements provided by the Scopus database in the field of accounting, of the research area of accounting information systems, in the last 10 years. It can be useful both to researchers in their making decisions about the next submission, as well as to Academics when they need information in order to updating and establishing the study topics in their annual study program.

Bibliometric analyses are the key to the process of discovering and innovating new scientific research tools, cultivating new skills and improving the performance of all those involved directly or indirectly in scientific research activities in any field, implicitly in that of accounting.

In the last decades, the scientific community in the states with a tradition in research activity supported the direct link between research activity, professional, organizational and educational efficiency and the coherent evolution of the scientific field. Accounting science, as a part of the social sciences, must be constantly synchronized with the needs of professional practitioners and Stakeholders. Modelling the future of accounting on the structure of the technological and IT evolution of recent years, represents an interesting and, at the same time, extremely necessary perspective. The motivation for choosing this topic is justified by the fact that the AIS has experienced a complex dynamic in recent years and the issue of studying this topic is an extremely interesting one.

The work aims to contribute to deepening the knowledge of research in the AIS field, becoming a point of interest both for professional practitioners in the implementation and development of new trend in the organization of accounting activity, but also to serve as one of the resource necessary for emerging scientific research, through a deep X-ray for the works of all types of specialty (articles,

conference paper, book chapter, projects, periodical publication). The novelty and originality of this study are given by the fact that it carries out a deep investigation of the bibliometric elements of the articles published in the field of accounting, on the topic of AIS, aiming to find out not only "WHO" is researching – who are the subjects most interested in this topic -, but also "HOW" is researched – which are the research methods used - , "WHAT" is researched – which are the most used keywords -, "WHERE" are they published – were are published the most papers with selected theme -, "WHEN" were published – the years when the most articles were published- but "TO HOW MANY" paper are addressed – how many citation every works recorded during the time.

The analysis period begins in 2013, the first year that generated result with works on the subject of AIS in the field of accounting, and continues with the research of emerging works in the domain of artificial intelligence and the research of information technologies applicable to accounting appearing until 2022. The studied articles are interested in the technologies emerging accounting either as a central focus or as part of a broad view of AIS. The Scopus database was chosen due to its size, being considered the most extensive database with a friendly interface, containing abstracts and citations of peer-reviewed literature with over 5,5 million works (20,000 journal) from over 5,000 publishers.

The first part of the paper reveals a brief introduction of the work and justification of the choice of the topic and the working methodology. The second part, summarizes the relevant literature review. The third section describes the research methodology of this study and defines the specific terms but also the limitations of the paper. Section four provides the results of the qualitative analysis of the bibliometric data of published papers in the field of AIS. Finally, section number five provides a synthesis of the results as well as future opportunities.

2. Literature review

Science is a form of observation, understanding, explanation and transposition made from man's desire to understand the universal in which we live. As society evolved and developed, access to research activity became permissible for a growing number of researchers from increasingly varied field and different geographical areas, modern science becoming an attractive field. So, science can be seen as a process that generates new information, but also new point of research, having a consecutive and collective character: a scientific research work has at its starting point certain ideas taken from previous works and appears as a result of their development or reinterpretation. So, an informational model of science was outlined, a model compared by Nalimov and Mul'chenko (1969) with a biological process that cannot be stopped, starting from idea that the development of the organism is determinate by the hereditary informational flow. Thus, the speed of development of the organism may vary depending on the external environment, but the environment cannot change the organism development to a direction foreign to the organism.

At the global level, science is treated as a world information process. This basic model motivates the creation of various international databases such as Scopus, Web of Science, Google Scholar, etc., databases wich allow the evaluation and the ranking of contribution in the development of modern science for individuals or group researchers, laboratories and other different institution, and also the performance of various types of interdependecies between certain fields and groups of researchers and identification of new research trends and perspectives (Harzing, 2022). Along with the emergence of informatics in all fields of research, the speed of growth of scientific publication is determinated by the level of development of science. As early as 1951, Derek Price (1951) emphasized the fact that the rate of society evolution in general, but also of the science, in particular, leads to an exponential increase in scientific research work and, as a result, in the last decade, were edited hundred of new magazines. From this rapid society evolution, but also from the responsability of the researchers to carry out quality studies and to add value to science, arose the need for an analysis of the scientific publication perfomance.

Looking into the research history, the origins of bibliometric analysis can be found in West of Europe and it refes to the bibliography study that is using a series of analysis techniques and statistical indicators (Egghe and Rousseau, 1990). In some Eastern European countries, it is used the notion of „*Scientometry*" (Bookstein, 1995). In the year of 1923, the term „*statistical bibliography*" appears for the first time in the works of Hulme (Hulme, 1923), refering to the methods of counting various

scientific publication. However, the method was consecreated by Pritchard in 1969 when he proposed the therm „bibliometric" de define de application of statistical methods and mathematical analysis in the ranking of various publications. Potter (1981) summarized the characteristics of bibliometrics, defining it as „the study and measurement of the publication patterns of all forms of written communication as well as their authors".

Therefore, the bibliometric study of scientific works does not represent a research inovation, and it is a quatitative research method of various fields of interest from specialized literature. The purpose of using this analysis is to provide information about the structure and the dynamics of the scientific field (sceince mapping) on the hand, but also about the authors and publishing house performance (performance analysis).

3. Research methodology

This research began by identifying articles in the fields of accounting in the Scopus database, using "Accounting Information System" and "AIS" as searching keys. The result was generated on 11 December, 2022, at 06:16 pm with the following selection criteria:

Table no. 1. Selected criteria on Scopus database

SEARCHING KEY	Accounting Information System
	AIS
	Accounting System
ARTICLES TYPE	Review Articles
	Research Articles
	Encyclopedia
	Book Chapters
YEARS	2007 - 2024
SUBJECT AREA	Computer Science
	Social Sciences
	Neuroscience
	Environmental Science
	Business, Management and Accounting

Source: Authors' contribution

A total number of 7,650 titles of published articles since 2013 was generate. Those were saved into an Excel worksheet and were manually sorted and selected in order to remove duplicate works caused by the use of two searching key and those that were referred to other field than accounting (AIS abbreviation is also used for health – Adolescent Idiopathic Scoliosis/Artificial Immune System, engineering Artificial Intelligent System, shipping - Automatic Identification System, education - Asian International Students).

In the end, resulted a number of 656 papers, with which the research was continued. During the analysis, were identified and removed from the study a number of five works published in the years of 2013, 2014, 2016 and 2018 whose title referred to the effects of the Covid-19 pandemic. Other two works were excluded because their publication year were 2014, respectively 2017 and their Title and conclusions were made to an analysis carried out in the interval of 1923-2022, respectively 1923-2021.

All this selection procedure and the analysis of the resulting papers was done manually, the resulting fields from the Scopus database (Table no. 2) being saved and processed in Excel, resulting in the final database that was submitted.

Table no. 2. Fields saved from Scopus database

Authors	Authors ID	Title	Year	Source Title	Volume	Issue	Art. No	Page Start	Page End
Page count	Cited By	DOI	Link	Document Type	Publication Stage	Open Access	Source	EID	

Source: Authors' contribution

The bibliometric analysis was carried out with EViews software on a final number of 649 works from Scopus database with the research key "Accounting Information System (AIS)", in the period of years 2013-2022, saved in Excel and completed with a number of eight additional.

Table no. 3. Additional fields completed in data base

Citation Group	Cited By	Research Methods	No. Of Authors	First Author Affilation Country	First Author Affiliation Geographic Region	Publisher Country	Publisher Geographic Region

Source: Authors' contribution

The articles were grouped into seven geographical areas: Africa (1), Asia-Pacific (2), Australia (3), Europe (4), Middle East (5), North America (6), South America (7) by the country of sole/first author affiliation. The same geographical areas were used to identify the geographical areas within the articles were published.

There were created five groups where articles were ranges by number of citations.

Table no. 4. Groups by number of citations

Group 1	Group 2	Group 3	Group 4	Group 5
0 – 5 citations	6-10 citations	11 - 20 citations	21- 40 citations	More than 41 citations

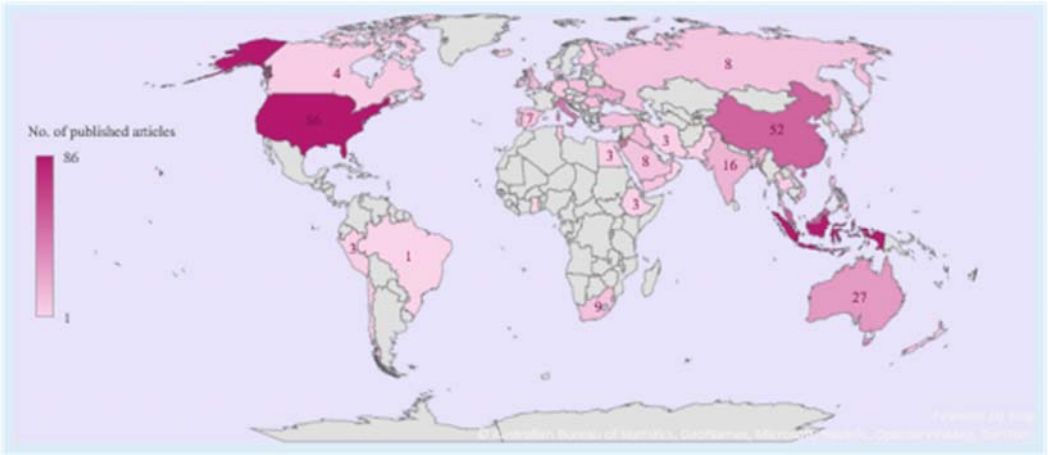
Source: Authors' contribution

The final Excel database was saved in EViews and there were calculate the frequencies, distributions and dependency relationships between the different bibliometric fields.

4. Findings

Analysing the affiliation of the first author/single author, it turned that those 649 articles can be associated with 55 national states spread all over the world, with an average of 12 papers per state.

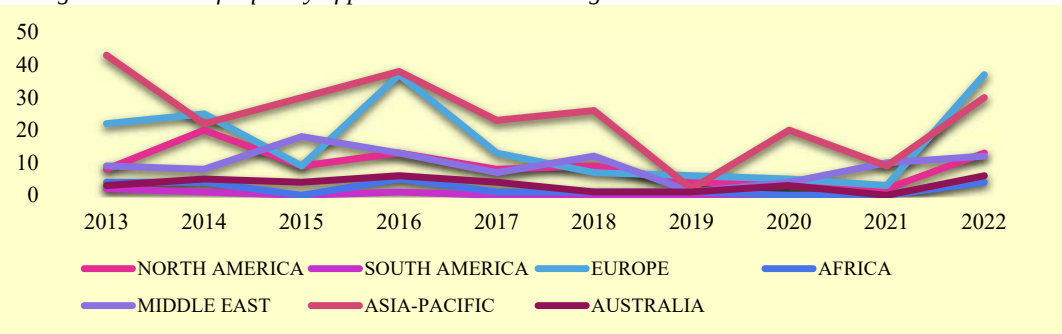
Figure no. 1 Geographical distribution of the analyzed articles



Source: Authors' contribution

Figure no. 2 indicate the frequency of publication number during the analized period in those seven geographical regions defined at the beginning of the research: North America, South America, Europe, Africa, Middle East, Asia-Pacific and Australia.

Figure no. 2. The frequency of published articles during 2013 - 2022



Source: Authors' contribution

The results of the research highlighted the fact that in the states of the Asia-Pacific area and in those of Europe, there is an increased research interest in the subject of AIS compared to other geographical areas. Unfortunately, in Africa and South America, the interest in this topic is extremely low.

This bibliometric analyse shows that although the articles with authors affiliated to countries in the Middle East and Asia-Pacific hold together more than 52 percent from all the articles of this study, only 11% of them were published in the same geographic area and most of them (42.8%) were published in Europe followed by United States (21.4%), situation that shows the increase interest of European publishers in accounting information system subject. Most of European researchers choose to publish their research wok in European area (76.22%), 15.85% of them were accepted in north America publication and only 6.1% were published in Asia-Pacific and Middle East. Regarding North America authors, 51.69% of them were published in the same area and 47.19% in Europe, so the interest in publishing information about accounting information system from North America is very hight in Europe. The same situation is recorded with regard to the Australian author, 78.79% of them were published in Europe, 18.18 % in North America and only 3.03 in Australia.

Figure no. 3. First author affiliation ratio

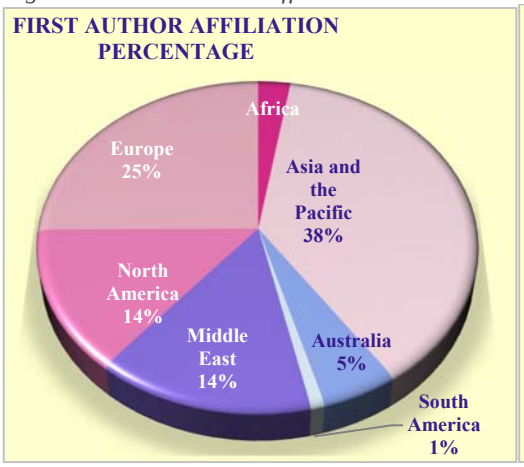
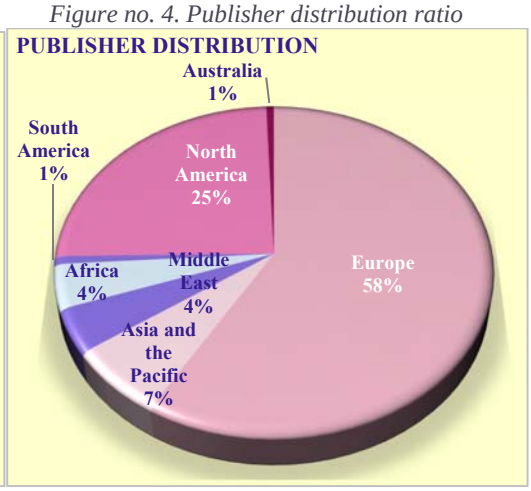
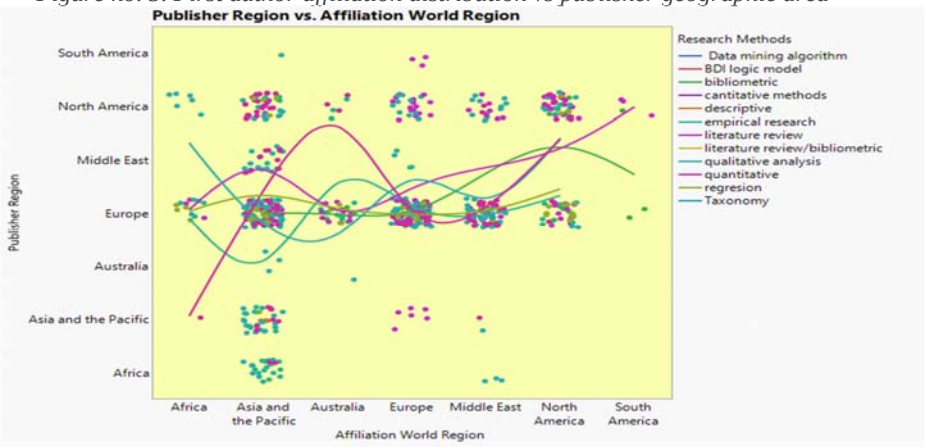


Figure no. 4. Publisher distribution ratio



Source: Authors' contribution

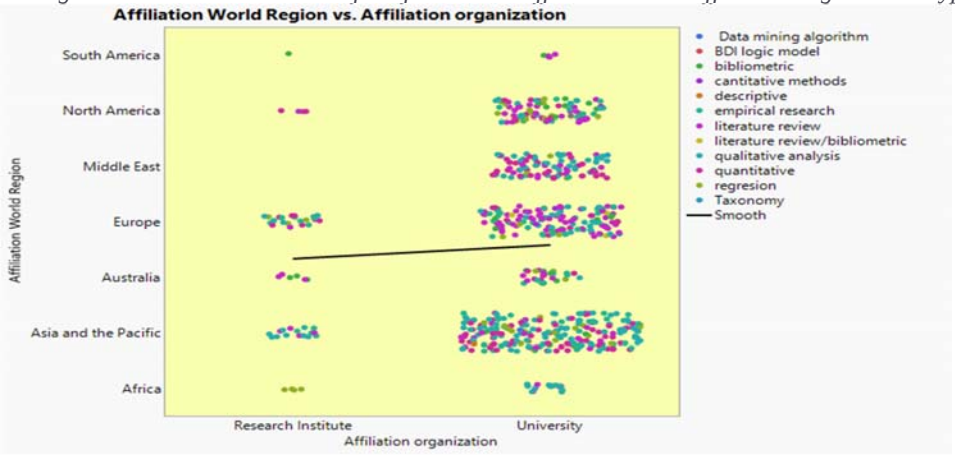
Figure no. 5. First author affiliation distribution vs publisher geographic area



Source: Authors' contribution

Analysing the articles where at least one of the authors is affiliated to a Research/Consultancy/Science and Innovation Institute, other than university/education, the results shows that only 8.47% from all 649 articles has such affiliate. There are 2,095 of authors for those articles, which means that only 2.62% are involved in research project and that means that their interest in researching the issue of accounting information system is not extremely high but it represents an increased interest in the university environment. Twenty-tree authors are affiliated to an European institution, other than educational ones (41.81 of the authors who meet this condition), showing that there is an increased interest in researching the topic compared to counterparts from areas with developed accounting system such as North America (9.09%) or Australia (10.9%).

Figure no. 6. The distribution of the first author affiliation vs the affiliation organization type



Source: Authors' contribution

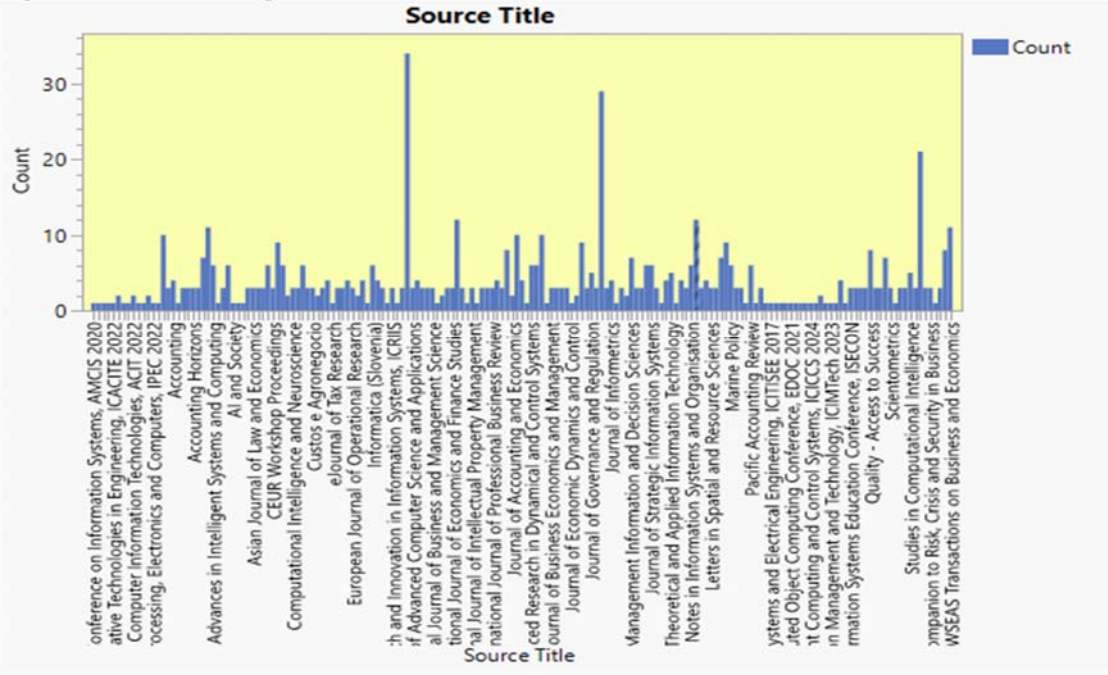
Figure no.7 represents all the sources for those 649 articles. The three sources most interested in publishing AIS articles are:

Table no. 5. Top tree sourses interested in publishing AIS articles

Source name	Count	%
International Journal of Accounting Information System	34	0.05239
Journal of Information System	29	0.04468
Sustainability (Switzerland)	21	0.03236

Source: Authors' contribution

Figure no. 7. Sourses that published AIS articles



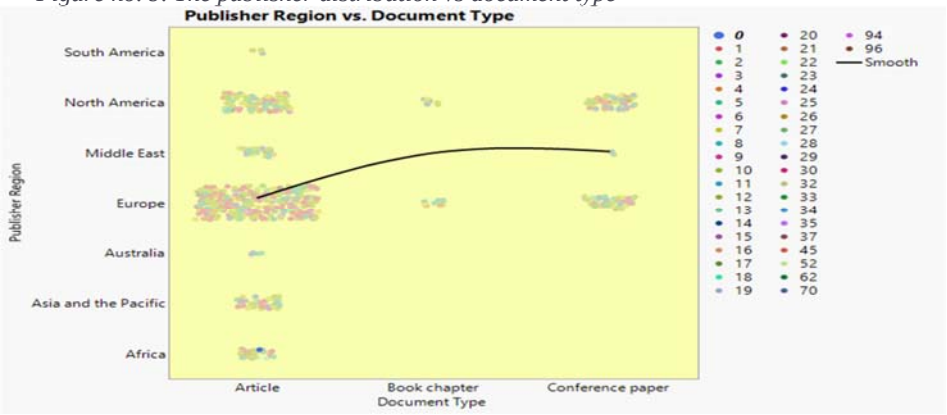
Source: Authors' contribution

Researchers prefer qualitative methods, followed by literature review methods. Bibliometric and descriptive analyzes are the least addressed in AIS research. Except for Europe and North America, in the other geographical areas, exclusive articles are published, not Book Chapters or Conference Papers. So, research articles on AIS are the most published.

Figure no. 8. Research Methods that were used by those 649 selected articles

Source: Authors' contribution

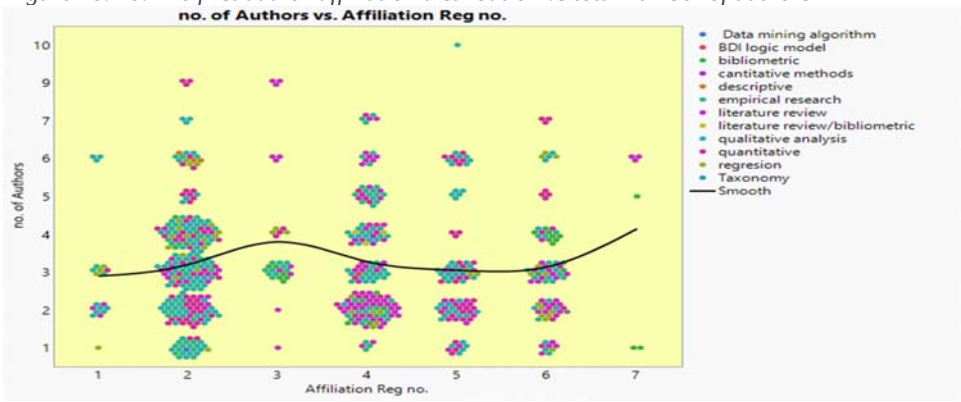
Figure no. 9. The publisher distribution vs document type



Source: Authors' contribution

The average number of authors is three, with the trend being higher in Asia-Pacific, while in Europe most of the articles have two authors. The paper with the most authors (9) belongs to a first author affiliated in the Middle East.

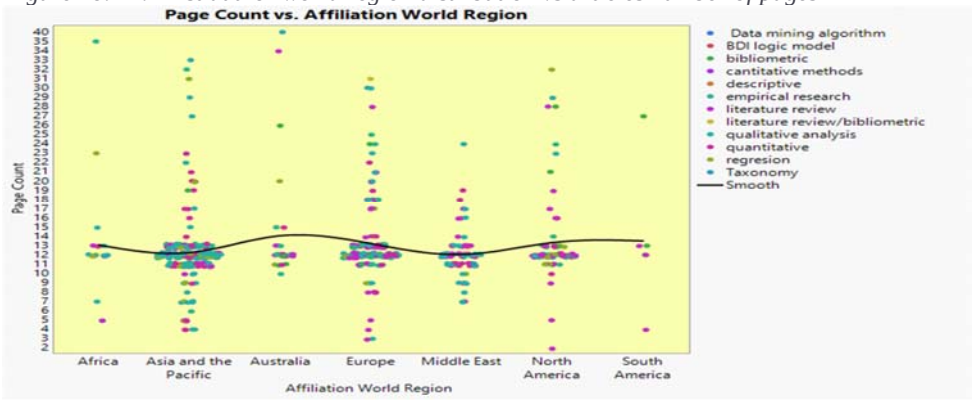
Figure no. 10. The first author affiliation distribution vs total number of authors



Source: Authors' contribution

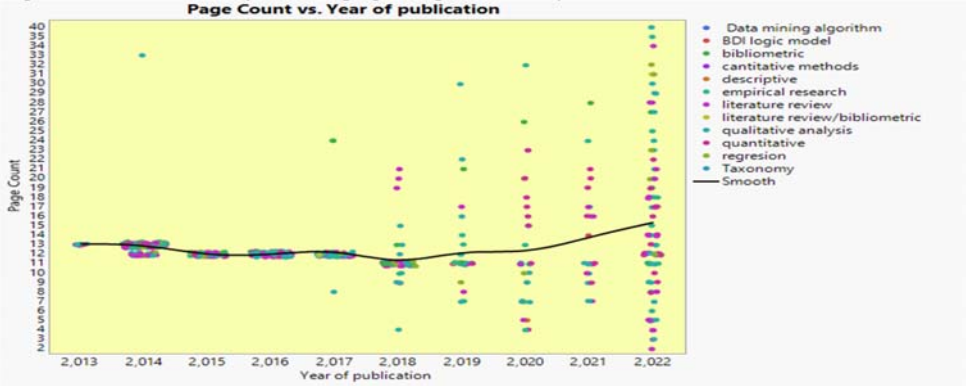
Analyzing the number of pages, a preference for publishing papers with an average number of pages between 10-14 was found in all seven geographical areas. The median trend is maintained until the year 2019 when an increasing trend in the length of the works is observed, in 2022 publications with a number of up to 40 pages appear.

Figure no. 11. First author world region distribution vs articles number of pages



Source: Authors' contribution

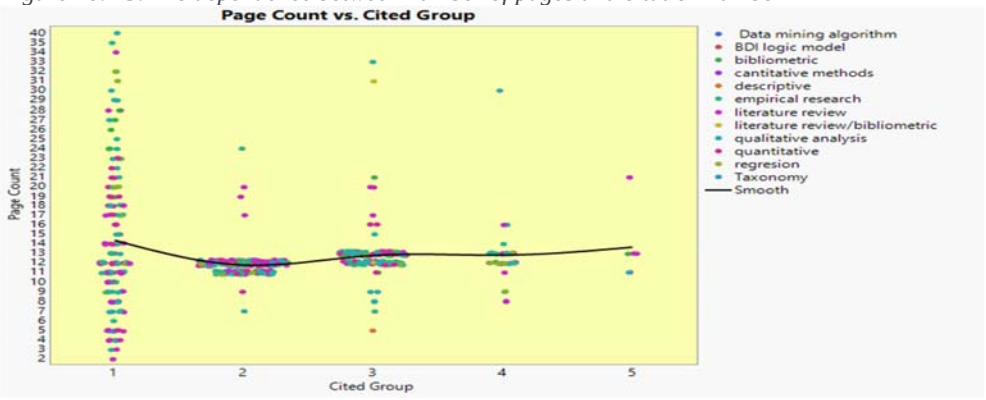
Figure no. 12. Number of articles pages vs publication year



Source: Authors' contribution

Graphic no. 13 shows that there is a strong dependence between the number of article pages and number of citations. Authors prefer to cite works that have a number of pages between eight and fifteen. Papers with less than five pages ore more than thirty recorded less than five citations.

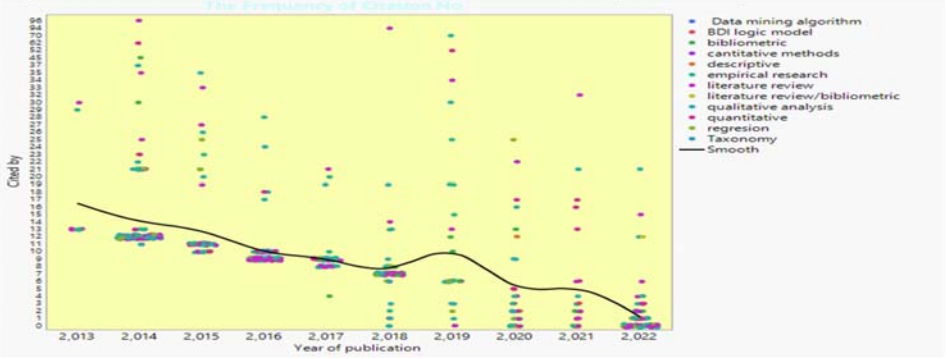
Figure no. 13. The dependence between number of pages and citation number



Source: Authors' contribution

Regarding the frequency of citations, a tendency to decrease their number over time is observed, so it is advisable to analyze another type of citation index, related to the unit of time.

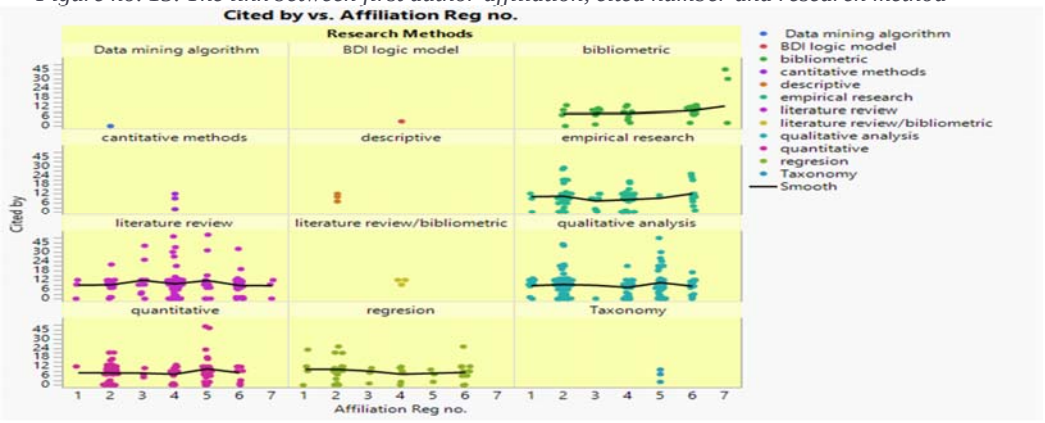
Figure no. 14. The dependence between citation number and publication year



Source: Authors' contribution

The papers with the greatest impact in the scientific community were those that used literature review and quantitative methods as research methods. If we refer to the geographical distribution of the authors, a linearity is observed in terms of the number of citations and the research methods approached.

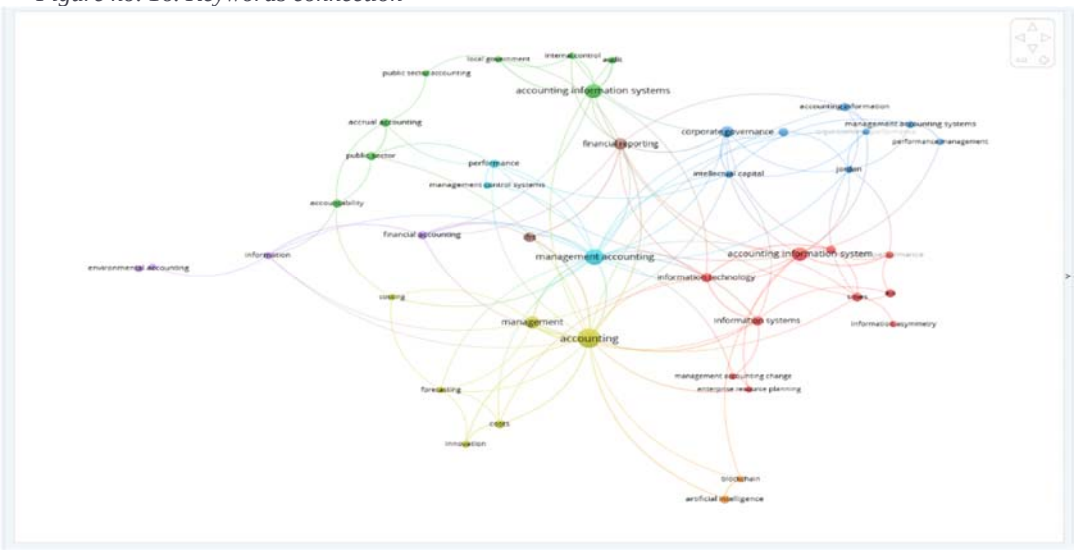
Figure no. 15. The link between first author affiliation, cited number and research method



Source: Authors' contribution

The following mapping diagram shows the connections between the authors most used keywords.

Figure no. 16. Keywords connection



Source: made by authors based on Scopus Database

5. Conclusions

The bibliometric analysis carried out in the present study generated a series of interesting information. Although the subject of the accounting information system was of equal interest to researchers from Europe, North America, Asia-Pacific and the Middle East, the bibliometric analysis showed that European publishing houses showed the greatest openness in publishing research articles on the subject accounting information systems. The results of the research highlighted the incresead interest of authors from Asia-Pacific area and Europein researching Accounting Information Systems. Their highest interest was manifested at the beginig of the researched period and the lowest was showed in the Pandemic year, 2019.

No direct connection can be established between the number of citation and the research methodology adopted within the article or author affiliation but there is a strong dependence between number of pages and number of citations. Most cited articles were based on qualitative research and literature review.

The works with the same theme and the same research methodology register different numbers of citations, not being able to establish any dependence between the research method and the number of citations.

The most appreciated scientific journals with papers about AIS are International Journal of Accounting Information System, Journal of Information System and Sustainability from Switzerland.

The number of bibliometric studies with the Accounting Information Systems as their subject is limited in the specialized literature, which is why we believe that this analysis contributes to the research in the field of accounting by providing some starting points for future research but also by providing relevant bibliographic sources on the analyzed topic. Bibliometric analysis in the field of accounting was successfully used in 2017 by Merigó and Yang [10] and the results indicated that the American centers in the field of accounting were the most influential and the most appreciated scientific accounting journals were the Journal of Accounting and Economics, Journal of Accounting Research, The Accounting Review and Accounting, Organization and Society.

The limit of this study is represented by database consisting only of the articles present in Scopus. In the future, the research can be estended to others databases in order to compare the results. The study describes the evolution and research trends in the field of IT accounting systems but does not offer the possibility to explain the links between AIS and their computerization or to make predictions about the trends in the field. For those reasons, we believe that it is opportune in the future to deepen the factors that determine these trends, so that the research results also meet the conditions of applicability in accounting practice.

"Not everything that counts can be counted, and not everything that can be counted counts" – William Bruce Cameron

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