DYNA
ISSN: 0012-7353
ISSN: 2346-2183
Universidad Nacional de Colombia

Velásquez-Henao, Juan David; Arango-Londoño, Adriana; Contreras-Hernandez, Alex Santiago
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DYNA, vol. 87, no. 215, 2020, October-December, pp. 90-101
Universidad Nacional de Colombia

DOI: https://doi.org/10.15446/dyna.v87n215.86505

UNIVERSIDAD NACIONAL DE COLOMBIA
SEDE MEDELLÍN
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Towards to author's analytics: the case of DYNA journal

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Received: April 21th, 2020. Received in revised form: July 27th, 2020. Accepted: August 31th, 2020.

Abstract
In this article, systematic mapping of literature, business intelligence, descriptive analytics and tech mining techniques are used to generate insights to made data-driven editorial decisions and to formulate editorial policies. The proposed methodology is called author analytics in this work, and it has the aim of providing an integral view of the authors and topics of the journal and the authors, topics, documents, and journals citing the journal under review. The proposed methodology is applied to the DYNA (Colombia) journal. The proposed analysis reveals different and complementary points of view of the analyzed journal.

Keywords: systematic mapping; tech mining; bibliographic analysis; citation analysis.

Hacia la analítica del autor: el caso de la revista DYNA

Resumen
En este artículo, el mapeo sistemático de la literatura, la inteligencia empresarial, el análisis descriptivo y las técnicas de minería de tecnología se utilizan para generar información para tomar decisiones editoriales basadas en datos y formular políticas editoriales. La metodología propuesta se llama analítica del autor en este trabajo, y tiene el objetivo de proporcionar una visión integral de los autores y temas de la revista y los autores, temas, documentos y revistas citando la revista en revisión. La metodología propuesta se aplica a la revista DYNA (Colombia). El análisis propuesto revela puntos de vista diferentes y complementarios sobre la revista analizada.

Palabras clave: mapeo sistemático; minería de tecnología; análisis bibliográfico; análisis de citaciones.

1. Introduction

In this document, analyzes of the documents published by the DYNA (Colombia) journal between January 2010 and September 2019, and of the documents citing DYNA available in April 2020 are presented. This article combines different techniques commonly used in technology mining, biblometrics, systematic literature mapping, business intelligence, and scientometrics with the aim of building a methodological framework for analyzing peer-reviewed and indexed scholarly journals. The aim of this work is to lay the foundations of the term *author's analytics*.

Although the main functions and responsibilities of the scientific editor are related to operative decisions as the assignment of papers to reviewers, manuscript evaluation and editorial decisions [1], other editorial decisions include tactical and strategic aspects that impact the indicators of the journal. In this sense, a deep knowledge of all aspects of the journal are mandatory. However, in practice it seems difficult to characterize the authors who submit their contributions to the journal, and it is even more difficult to characterize the authors and journals in which the citations are given. Furthermore, in the search for greater journal reputation, it is vital to understand who the authors and journals they cite are, in order to establish policies and strategies to increase the impact factor, or any other measure of scientific reputation.

There are several approaches that can be used for the editor to gain insights, and a deep knowledge of the authors and journals, including systematic literature reviews, bibliometrics, science mapping analysis, and tech-mining. The objective of systematic mapping studies is to understand, organize and summarize the main data and findings from a

How to cite: Velásquez-Henao, J.D, Arango-Londoño, A, and Contreras-Hernandez, A.S, Towards to author's analytics: the case of DYNA journal. DYNA, 87(215), pp. 90-101, October - December, 2020.

wide field of knowledge, with the aim of extracting key information as the main journals, authors or topics in the knowledge area. The starting point of a systematic mapping study is to define the research questions that will be answered in the research; in [2], a list of the most frequently asked research questions in systematic mapping studies is presented. These questions include:

- What are the most cited documents in the area of research?
- What is the most cited recent research?
- Who are the most important authors?
- What are the most important journals and conferences in the area of research?
- What are the main topics in the area of research?

Ultimately, the research results of systematic mapping studies are used to formulate systematic review projects in order to study in deep the selected main topics of interest for the researcher. As can be inferred, this methodology is commonly used in the academic sector.

Bibliometrics provides to the editor with systematic and reproducible statistical methods to analyze and review a large body of information [3], composed of the published articles of the own journal and the external citing documents. Bibliometrics shared many points with the metric analysis of information [4], such that, many statistical metrics are commonly used for both approaches.

In a broad definition, tech-mining refers to exploit information about emerging technologies with the aim of improving decision-making using text mining and summarization techniques [5]. Although systematic mapping methodology is focused on results, leaving aside the use of technology, tech mining emphasizes the use of computational tools to analyze and derive conclusions. The main sources of information in technological mining include, but are not limited to, research documents and patents. In [5], the analyses are divided in two categories: basic and advanced. Basic analysis groups all the analyzes of individual columns in a bibliographic information dataset; therefore, the answers to the most common research questions in systematic literature reviews are considered in the basic analysis proposed by the tech-mining methodology. This kind of analysis takes into account the occurrence and relationships of different terms in the bibliographical dataset as authors, journals, citations, etc., and their occurrence by year. Advanced analysis covers all analyzes of relationships between terms that appear in two columns of a bibliographic dataset, for example, author-journal relationships. Thus, the systematic mapping of literature and tech-mining can be used to provide a complementary and unified point of view of a body of scientific documents.

On the other hand, if it is accepted that the definition of customer analytics refers to the processes and technologies that massively use data to provide information about customer to improve key decision-making, then the process proposed in this paper it can be defined as *author analytics* by extrapolation of the definition. Thus, the aim of this work is to define the term of *author analytics* and propose their methodological aspects; furthermore, the DYNA journal is analyzed with the proposed methodology.

The rest of this papers is organized as following: Section 2 defines the concept of *author analytics* and describes its methodological aspects. Section 3 presents the analysis of the papers published in the DYNA journal. Section 4 presents the analysis of papers citing the DYNA journal. Finally, the main conclusions are described in Section 5.

2. Towards a definition of author analytics

2. 1. Definition

In this article, author analytics is defined as the use of data to provide information about authors, journals, institutions, countries, and concepts to improve strategic and tactical editorial decision-making related to improving the academic standing of a journal. Here, the term author refers to authors of the papers published by the journal and the authors citing these papers. The use of bibliographic data implies that *author analytics* is carried out through the use of text mining and statistical summarization techniques.

2.2. Objective of research and study design

The objective of the research is to obtain a vision and in-depth knowledge of the current journal, by analyzing the authors who publish in the journal and the authors who cite the journal's publications. The aim of the study design is answering research questions related to:

- Characterize the authors, journals, institutions, and countries, and their relationships
- Identify the knowledge base of the authors.

Thus, the main research questions proposed to analyze the journal are the following:

- What is the number of papers published?
- What are the most cited articles?
- How many different authors does the journal have?
- What is the number of authors per country of affiliation?
- Who are the authors with the most publications?
- Who are the authors most cited?
- Which authors usually publish together?
- What is the publication pattern of the main authors per year?
- What institutions have the most publications?
- Which institutions have the most citations?
- What are the most used keywords in the journal?
- What are the most used keywords by most cited authors?
- What are the keywords that are frequently used together?
- What are the keywords with the most citations?

To analyze the body of literature that cites the journal under review, many of the above questions can be used. In addition, the following questions can be added:

- What are the sources that are most cite the journal under analysis?
- Who are the authors that are most cite the journal under analysis?
- Are the authors who are citing the journal also authors of the analyzed journal?

- How many authors who cite the magazine have never published in it?
- What is the citation pattern for the journals citing the journal under study?
- What is the citation pattern for the authors citing the journal under study?

Additionally, the study can be enriched by adding descriptive statistics of the different terms of the bibliographic base.

2.3. Workflow

The following workflow is adapted from the general science mapping workflow based on [3,5-8]:

1. Data collection.
2. Data analysis.
3. Data visualization.
4. Data interpretation.

Data collection refers to the process of build a database with the core documents published by the journal, and other database with the documents citing the analyzed journal. This process is common to all methodologies used to analyze bibliographic data [9]. This step includes tasks related to data preparation and cleaning. Usually, text mining techniques are used for manipulating strings. Mainly, they are necessary to:

- Detect and delete duplicate entries in the bibliographical dataset.
- Unify keywords, for example, plural and singular.
- Detect different keywords referring the same concept and unify terms, for example, forecast and predict.

Data analysis involves the use of software tools for analyzing the bibliographic dataset using descriptive statistical techniques with the aim of gain knowledge about the data. Advances analyzes include co-word analysis to produce semantic maps [10], co-author analysis to analyze social structure and collaboration networks [11], and citation analysis.

Visualization refers to the selection of most appropriated graphs for revealing insight and facts about the journal and the citing papers. Many techniques can be used to present the results obtained, but particularly, statistical graphs and tables are especially useful. In this paper, heatmaps and bar plots are used to summarize and highlight patterns and relationships, but chord diagrams, pie plots and many other graphs can be used.

Finally, insights and facts are reviewed and interpreted.

2.4. Relationship of the author analytics to other approaches

Author analytics shares with the systematic mapping of literature, the methodological aspects related to the formulation and answer of the research questions used to analyze a body of literature; and with business intelligence and tech mining, the use of different strategies and tools to summarize key insights from the data.

In other words, author analytics can be understood as the union of systematic mapping of literature, scientometrics, business intelligence, descriptive analytics and tech mining techniques to make data-driven editorial decisions and to formulate policies.

Author analytics shares with the previous methodologies the necessity to define research questions that guide the analysis, the use of specialized software to clean and manipulate text and numeric data, and the use of statistical graphs and tables to provide insights

3. Analysis of the publications of the DYNA Journal

3. 1. Used information

We apply the proposed methodology to the DYNA (Colombia) journal, edited by Facultad de Minas, Universidad Nacional de Colombia, Medellín Campus. The information was download from Scopus in August 2020. The information available for the journal covers the period from 2010 to December 2019. Citing information is updated to August 2020.

In the data preparation phase, records corresponding to documents summarizing conferences, proceedings, workshops and congresses were deleted. In addition, duplicated documents with the same title of other documents in the bibliographic dataset were deleted. Author keywords differing in plural and singular were unified to the same string.

The extraction of the affiliations of the authors was a challenge, due to the many problems that were found in the text strings. Many texts were bad formatted without a separator character or inconsistent separation. A detailed revision was made of hand with aim of recover errors.

3.2. Descriptive statistics of the journal

In this section, we analyze a total of 1702 research papers written by 4,156 authors for the period since January 2010 to December 2019, with an average of 2.44 authors per document. and 0.41 documents per author. Editorials, Letters to the Editor, and Notes were discarded in this analysis. There are 1,615 multi-authored documents, and 87 single-authored documents; thus, for multi-authored documents, there are an average of 3.31 co-authors per document. Authors are associated to 2,602 affiliations in 44 countries. There is an average of 26 references per article.

There are 6,033 different author keywords, 22,809 abstract words, and 4,682 title words. Word extraction from abstracts and titles was made using text-processing techniques: first, we split texts in minimal context units by dividing paragraphs using commas, semi-colons and dots as splitting characters; second, we create a list composed of all author keywords present in the database; third, we search for author keywords in the minimal context units and mark for extraction. Four, text-mining techniques were used to form 2-grams and eliminate stop-words.

3.3. Analysis by year

Fig. 1 presents the number of papers published by year; this figure shows that the number of documents by year is approximately constant, with the maximum of 189 published documents in 2014. In Fig. 1, darkness of bars is proportional to the number of citations for the year.

Fig. 2, presents the number of average citations by year; this indicator is calculated as the ratio between the number of citations and documents published in each year. The maximum value is reached in 2012 with 3.85 citations per document, and a total of 597 citations. From 2014 onwards, an annual decrease in citations is observed, reaching only 37 citations for documents published in the year 2019. This is normal behavior as older documents have more citations than younger documents.

Table 1 summarize the main impact indicators for the journal, published by Scimago web site. These indicators are calculated over all published documents. The table shows that from 2014 onwards, the number of cites per document (in a 4-year basis) is approximately constant; however, during the same period of time, the number of self-cites per document has dropped to practically zero. This is an important fact, because it shows an increase in external citations. However, the SJR indicator, which it is a prestige indicator that accounts the importance of the citing journals, presents a decreasing trend since 2014.

3.4. Term analysis

In this section, different fields of the bibliographic dataset are analyzed. These 4,156 authors belong to 2,602 institutions in 44 countries. Table 2 shows that the journal mainly published articles originating in Colombia (69.5%), Spain (14.5%), Brazil (9.5%), and Mexico (8,1%). In terms of total citations, articles with authors affiliated with institutions in Portugal and Chile have a higher average number of citations.

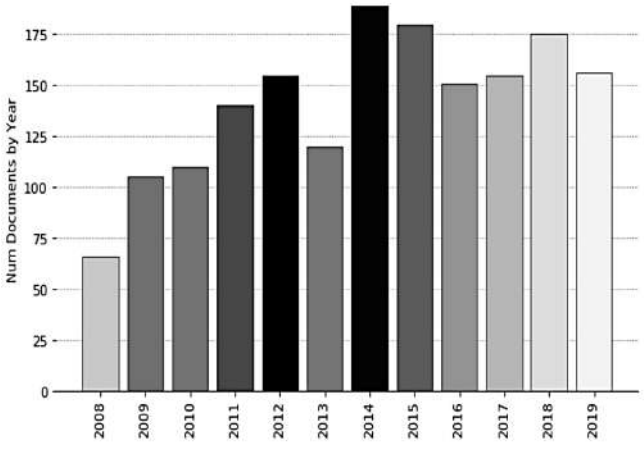

Figure 1. Number of papers published by year. Darkness is proportional to the number of citations.
Source: The Authors.

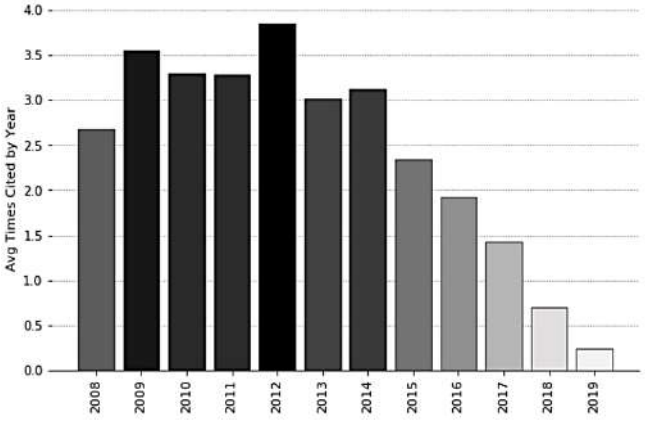

Figure 2. Average times cited by year. Darkness is proportional to the value of the bar
Source: The Authors.

Table 3 presents the ten institutions with the highest number of published documents and the total of citations for the analyzed time period; thus, DYNA-Colombia mainly published documents from Universidad Nacional de Colombia (33.4%), Universidad del Valle (8.1%), Universidad de Antioquia (6.3%), and Universidad Industrial de Santander (4.6%). To analyze the quality of the publications, we compute the ratio between the total number of citations and the total number of documents published; we found that, for the ten institutions with the highest number of documents published, the institution with highest impact is the Universitat Politecnica de Valencia with a ratio of 3.84, followed by Universidad del Norte (3.13) in second place, and Universidad Pedagógica y Tecnológica de Colombia (2.77) in third place.

Table 4 presents the authors with ten or more documents published, total citations for the author in the journal, and Scopus H Index as a measure of quality for the author; however, we found that several authors have more than one profile and, thus, it is not possible to use this indicator for comparisons and quality assessment. This table shows that no author participates with more than 1% of the total articles of the journal for the analyzed time period. It is necessary to note that the authors with more documents published in the journal there are not, necessarily, the authors with more total citations, as the case, for example, of Arango-Serna MD, Correa R, or Restrepo OJ. Several authors in the table belong to the group of then most cited authors of the journal; they are marked with an asterisk in Table 4. The most cited author is Tinoco IF cited by 62, followed by Garcia-Alcaraz JL (with 52 total citations) and Osorio JA (cited by 50). Ten most cited papers appear in Table 5; none of the most cited papers was written for the most important authors of the journal. As previously indicated, the journal has 4156 authors, of which 3367 authors (81%) have written a single article.

Table 1.
Number of documents and citations by country for the first ten countries.

Year	Cites per document (4 years)	Self-Cites	Total Cites*	SJR	Cites per doc	External cites per doc
2009	0.075	2	5	0.132	0.075	0.045
2010	0.162	8	28	0.171	0.162	0.116
2011	0.246	24	70	0.192	0.246	0.161
2012	0.410	81	150	0.224	0.417	0.192
2013	0.367	72	149	0.235	0.362	0.187
2014	0.500	96	216	0.239	0.512	0.284
2015	0.514	114	242	0.238	0.516	0.273
2016	0.453	72	213	0.244	0.434	0.287
2017	0.416	14	223	0.167	0.429	0.402
2018	0.451	13	209	0.157	0.427	0.401
2019	0.498	4	222	0.154	0.458	0.449

Source: Adapted from scimagojr by the authors.

Table 2.
Number of documents and citations by country for the first ten countries.

Country	Number of documents	Times Cited	Citations per document
Colombia	1,183	2,763	2.29
Spain	247	687	2.78
Brazil	162	305	1.88
Mexico	138	353	2.56
Chile	53	196	3.70
Cuba	53	58	1.09
United States	43	122	2.83
Argentina	32	51	1.59
Ecuador	31	32	1.03
Portugal	26	100	3.84

Source: The Authors

Table 3.
Number of documents and citations by institution for the first ten institutions.

Country	Number of documents	Cited by	Citations per document
Universidad Nacional de Colombia	569	1,417	2.49
Universidad del Valle	138	348	2.52
Universidad de Antioquia	108	290	2.69
Universidad Industrial de Santander	79	161	2.04
Universidad Tecnológica de Pereira	44	96	2.18
Universidad Pedagógica y Tecnológica de Colombia	39	108	2.77
Universidad Militar de Nueva Granada	35	83	2.37
Universidad del Norte	31	97	3.13
Universidad Pontificia Bolivariana	30	54	1.80
Universitat Politecnica de Valencia	29	93	3.21

Source: The Authors

Table 4.
Authors with ten or more documents published in the journal.

Author	Scopus H Index	Number of documents	Cited by	Average citations
Osorio JA*	7	13	50	3.84
Branch Bedoya JW*	8	13	37	2.84
Adarme-Jaimes W*	5	12	49	4.08
Correa R.	7	12	31	2.58
Restrepo OJ	9	12	29	2.42
Alberto Palacio C*	5	11	39	3.55
Arango-Serna MD	5	11	18	1.63
Ticono IF*	14	10	62	6.20
Arezes PMFM	18	10	30	3.00
Zapata CM	4	10	19	1.90

* These authors belong to the group of ten most cited authors of the journal.
Source: The Authors

Table 5.
Most cited papers.

Article	Cited by
Ayala G, Agudelo A, Vargas RA. 2012. Effect of glycerol on the electrical properties and phase behavior of cassava starch biopolymers.	31
Rojas D, Cipriano A. 2011. Model based predictive control of a rougher flotation circuit considering grade estimation in intermediate cells.	27
Cabral P, Zamyatin A. 2009. Markov processes in modeling land use and land cover changes in Sintra-Cascais, Portugal	27
Pozo-Antonio JS, Puente I, Laguela S, Veiga-Rios M. 2014. Techniques to correct and prevent acid mine drainage: A review	24
Parra ER, Arango PJA, Palacio VJB. 2010. XPS structure analysis of TiN/TiC bilayers produced by pulsed vacuum arc discharge	24
Hincapie CMB, Cardenas MJP, Orjuela JEA, Parra ER, Olaya Florez JJ. 2012. Physical-chemical properties of bismuth and bismuth oxides: Synthesis, characterization and applications	21
Blanco AM, Yanchenko S, Meyer J, Schegner P. 2015. The impact of supply voltage distortion on the harmonic current emission of non-linear loads	21
Pardo HQ, Rolle JLC, Romero OF. 2012. Application of a low cost commercial robot in tasks of tracking of objects	21
Korber M, Weißgerber T, Kalb L, Blaschke C, Farid M. 2015. Prediction of take-over time in highly automated driving by two psychometric tests	20
Gonzalez-Feliu J, Cedillo-Campo MG, Garcia-Alcaraz JL. 2014. An emission model as an alternative to O-D matrix in urban goods transport modeling	20

Source: The Authors

Also, the authors in Table 4 written the 5.93% of documents published by the journal.

For analyzing author's keywords, we use text-processing techniques to unify words and reduce the dataset; most part of the process was devoted to unifying words in plural and singular. There are 35 keywords used in nine or more documents, which are presented in Fig. 3. The most cited keyword of the figure is supply chain followed by model, mathematical model and power quality. By analyzing the frequency of occurrence, it can be said that journal presents regularly documents related to computational intelligence (artificial neural networks, fuzzy logic and genetic algorithms), management (management, supply chain, logistic, sustainability), modeling (modeling, and mathematical model) and mechanical engineering (wear, corrosion, characterization, mechanical properties), and energy (power quality, renewable energies, biofuel, hydrogen, energy efficiency).

3.5. Analysis of terms by year

Fig. 4 presents the number of documents published by year for authors with the most documents published in the journal. The authors present a production of articles approximately constant over time; however, Arezes PMFM and Adarme-Jaimes W present an exceptional case with ten and seven articles published in a single year.

The number of documents published by institution for the ten institutions with most documents published is presented in Fig. 5. This figure allows us to conclude that the mean participation of the institutions is approximately constant over time.

In Fig. 6, we present the occurrence by year of the most frequent author keywords in the journal. Most of the keywords appear in most of the years. However, the number of appearances seems to be low in comparison with the number of articles published yearly by the journal. This can be explained by the wide spectrum of engineering topics that is addressed by the journal, preventing specialization.

Also, It is also plausible to think that the most frequent words per year have a direct relationship with the number of published articles per year by the most frequent authors, such the case of Adarme-James W, who published seven articles in 2014 in supply chain.

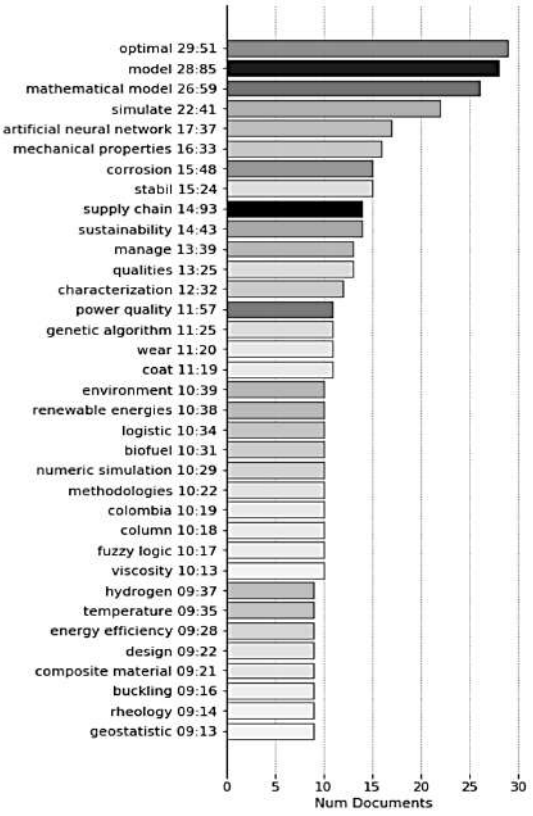

Figure 3. Author keywords ordered by the number of appearances. Darkness is proportional to the number of times cited.
Source: The Authors.

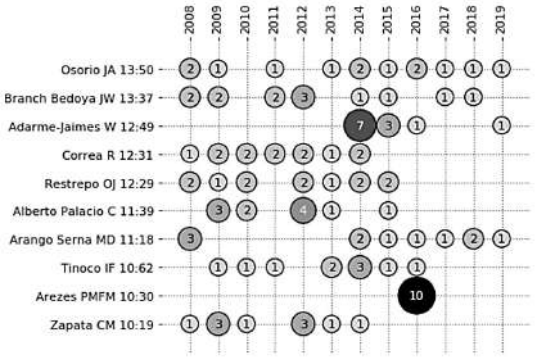

Figure 4. Number of documents published by year for the authors with most documents published in the journal.
Source: The Authors.

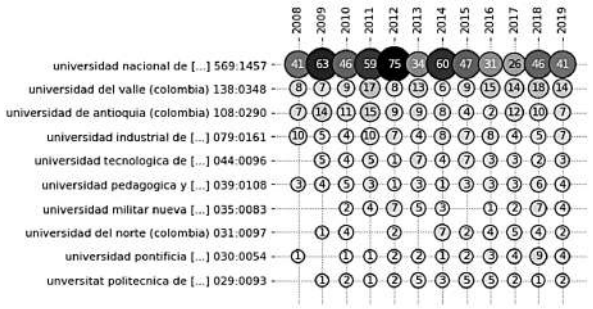

Figure 5. Number of documents published by year for the institutions with most documents published in the journal.
Source: The Authors.

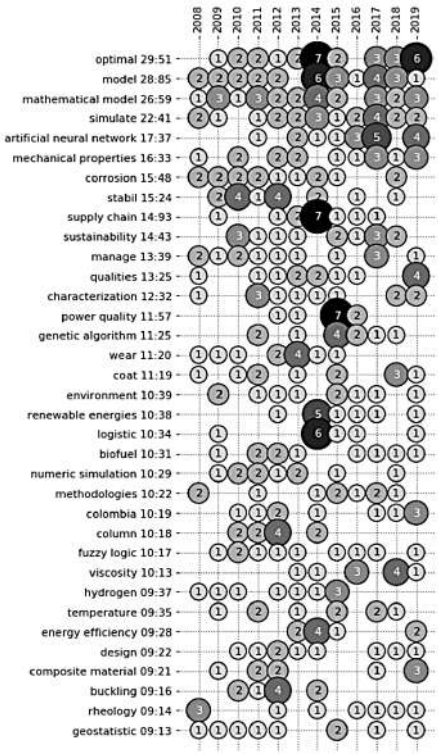

Figure 6. Number of appearances of keyword by year for most frequent author keywords in the journal
Source: The Authors.

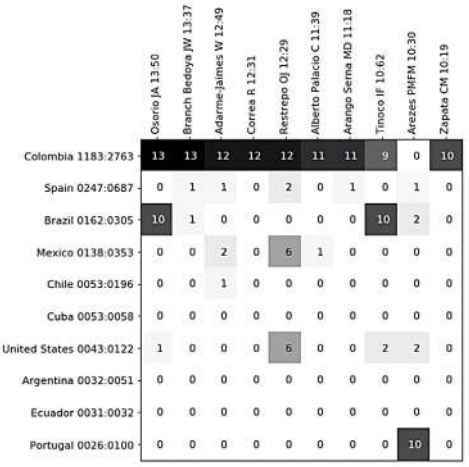

Figure 7. Co-occurrence between countries and authors
Source: The Authors.

The participation per year of the countries listed in Table 2 is approximately constant, except for Ecuador, which only has publications since 2015

3.6. Bigraph analysis

In this section, we analyze the co-occurrence between the terms in two different columns of the bibliographic dataset. Fig. 8 shows that the association of the most frequent authors and the most frequent countries in the affiliation of articles. The matrix shows that author publish most frequently with authors of institutions of the same country, with exception of Restrepo OJ, Tinoco IF, and Osorio JA. Moreover, Fig. 8 presents the matrix of co-occurrence between authors and institutions, and it shows that the most frequent authors publish articles with co-authors that belongs to the same institution. In terms of international collaboration, Universidad Nacional de Colombia is the institution with largest and most varied participation in publishing with international institutions, as presented in Fig. 9.

Fig. 10 and Fig. 11 present the ratio between single-authored (SD) and multi-authored (MD) articles for institutions and countries respectively. Fig. 10 shows that it is more common for articles to be written by authors from different institutions than by authors from the same institution. However, it is more common that articles be written for authors from institutions in the same country (Fig. 11).

We also analyze the co-occurrence between author keywords and institutions, and author keywords and countries; no important relationships were found.

3.7. Term by term analysis

In this section, the relationships among between terms in the same column of the bibliographic dataset are analyzed. Fig. 12 shows the co-authorship relationships; the radius of the circle is proportional to the number of documents, and the

darkness is proportional to the number of citations. This plot shows that Arango Serna MD publishes with Adarme-Jaimes W and Branch Bedoya W, and Tinoco IF with Osorio JA.

Fig. 13 presents the matrix of co-occurrence between institutions. The matrix was analyzed using graph theory with the aim of finding clusters of collaboration; by using the association index and the Louvain clustering algorithm, two clusters of collaboration were found: the first correspond to the Universidad Tecnológica de Pereira and Universidad Pontificia Bolivariana; and the second is formed by Universidad Pedagogica y Tecnologica de Colombia and Universidad Militar Nueva Granada. In addition, Fig. 13 shows that Universidad Nacional de Colombia writes articles with the rest of most frequent universities.

The previous analysis was also carried out for the most frequent countries and four clusters were found; the first cluster groups Brazil, Chile, Cuba and Ecuador; the second, Mexico, United States, Argentina and Portugal; the third and four clusters correspond to Colombia and Spain respectively.

Also, the co-occurrence of the keywords presented in Fig. 6 was analyzed. The clustering analysis of the co-occurrence matrix of co-author keywords using the Louvain algorithm allow us to find the nine clusters of clusters presented in Table 6. Practical experiences on using this methodology, shows that the Louvain algorithm tends to join clusters of different thematic that share common terms. Thus, cluster 1 mixes supply chain related problems with energy. Cluster 2 is related to materials engineering; cluster 3 is related to energy efficiency and renewable energies; cluster 4 to structural engineering; cluster 5 to management; cluster 6 to mathematical models and optimization. Clusters 7 and 8 are related to the application of computational intelligence to solve engineering problems; finally, cluster 9 to geostatistics. These topics will not be deepened, and the characterization of the thematic areas of the magazine is considered future work.

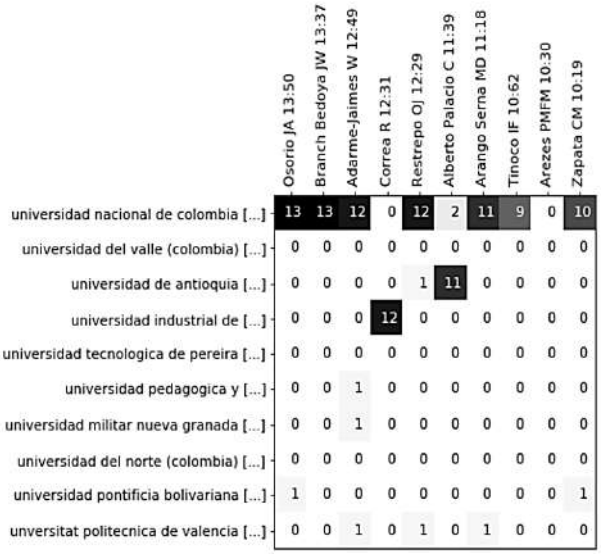

Figure 8. Co-occurrence matrix between authors and institutions.
Source: The Authors.

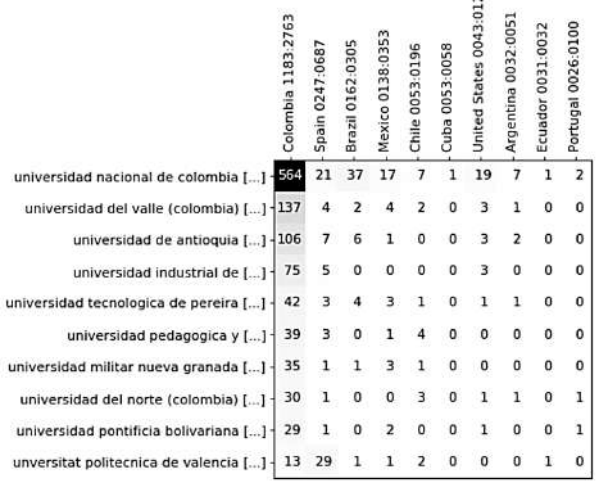

Figure 9. Co-occurrence matrix between countries and institutions.
Source: The Authors.

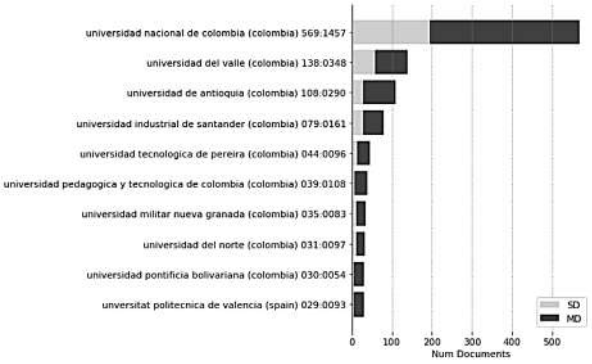

Figure 10. Multi-authored documents (MD) versus single-authored documents (SD) for the ten most productive institutions.
Source: The Authors.

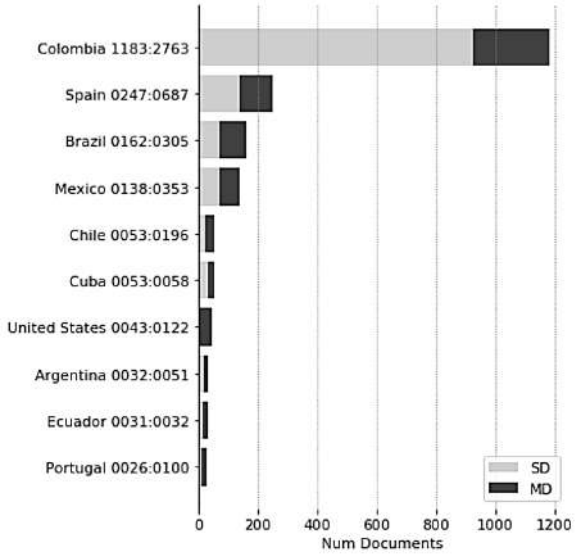

Figure 11. Multi-authored documents (MD) versus single-authored documents (SD) for the ten most productive countries.
Source: The Authors.

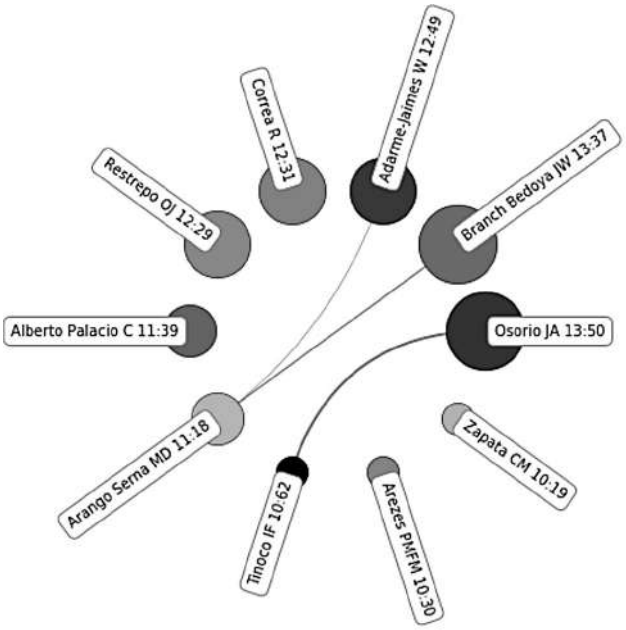

Figure 12. Chord diagram showing co-authorship among most frequent authors.
Source: The Authors.

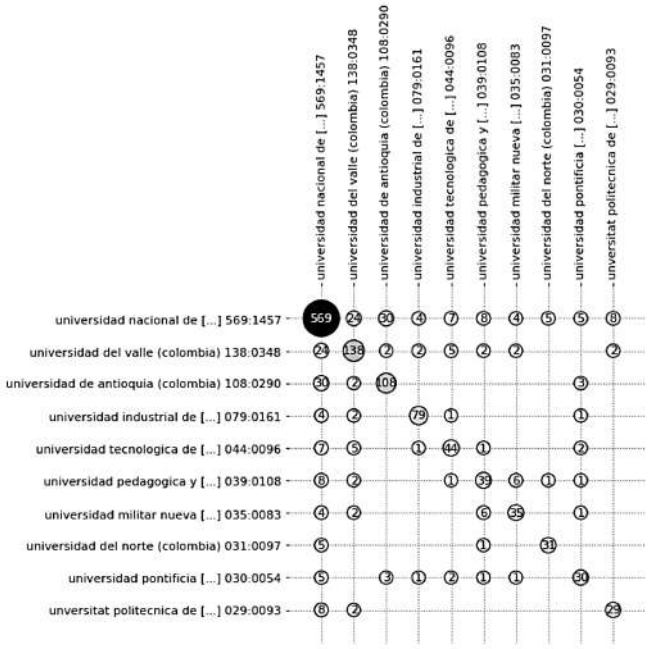

Figure 13. Co-occurrence matrix among institutions
Source: The Authors.

4. Analysis of documents citing the DYNA journal

4.1. Descriptive statistics

In this section, a bibliographical analysis of documents citing the DYNA Colombia journal is realized. Only documents belonging to the categories of Article, Article in Press, Book, Book Chapter, Review, and Short Survey were considered. According to Scopus information, there are 3083 different documents citing DYNA (Colombia), written by 10,974 authors, and an average of 2.98 authors per document. Authors are affiliated to 2.853 institutions in 97 countries. There are 3.525 multi-authored documents and 158 single-authored documents. Citing documents have an average of 43 references per document. Fig. 14 shows the number of documents citing DYNA by type of document. Most bibliographic citations come from articles (~ 91.5%).

4.2. Analysis by term

Fig. 15 presents the number of documents citing DYNA by source title for source titles with fifteen or more documents in the bibliographic dataset. The journal presents an important percentage of self-citing as discussed previously. DYNA is cited by 1.560 different source titles.

The most frequent authors citing DYNA (Colombia) are presented in Table 7. Table 8 present the ten most frequent countries citing DYNA (Colombia); the first four places are occupied by the most frequent countries in documents published by DYNA (Colombia).

Table 6.
Clusters of author keywords using the Louvain Algorithms.

Cluster	Keywords
1	Optimal; simulate; supply chain; power quality; logistic; biofuel; methodologies; Colombia.
2	Mechanical properties; corrosion; characterization; coat; viscosity; temperature; composite material; rheology.
3	Model; wear; renewable energies; hydrogen; energy efficiency
4	Stabil; column; design; buckling.
5	Sustainability; manage; qualities; environment.
6	Mathematical model; genetic algorithm; numeric simulation
7	Artificial neural network;
8	Fuzzy logic.
9	Geostatistic.

Source: The Authors.

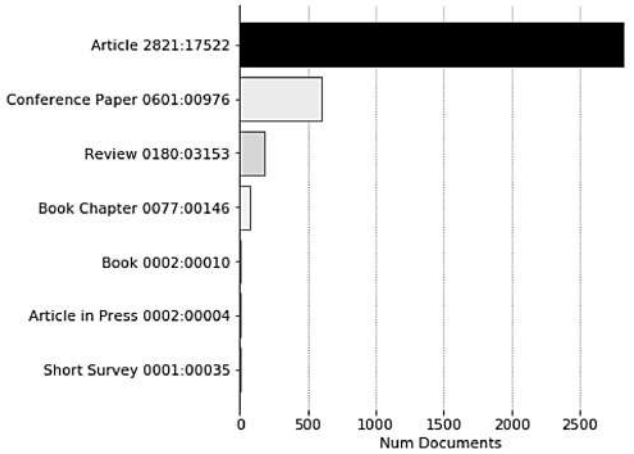

Figure 14. Number of documents and total citations by document type.
Source: The Authors.

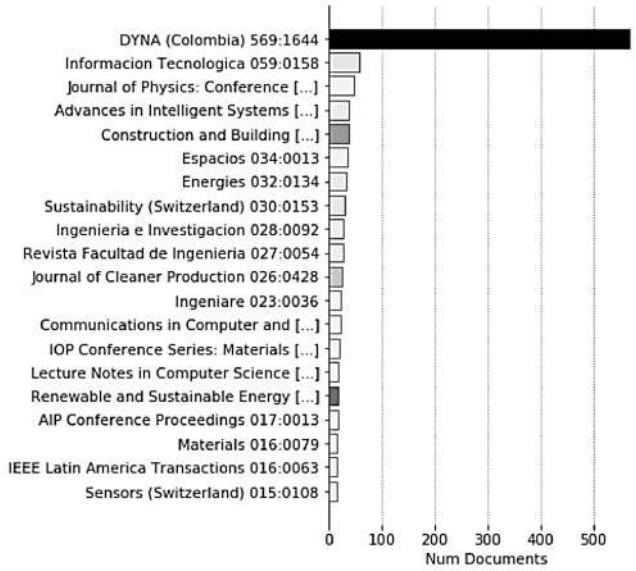

Figure 15. Number of documents by source title for source titles with 15 or more documents citing Dyna-Colombia.
Source: The Authors.

4.3. Analysis of term by year

Fig. 16 presents the number of documents by year per source title citing the DYNA journal. Note that a strong self-citation of the analyzed journal occurs from 2012 to 2016. Also, most of citations (23) in the Journal of Physics: Conference Series appears in 2019; finally, there are 15 citations from the Advances in Intelligent Systems and Computing journal in a period of three months (January to April of 2020), that it is a very high number for a quarter in comparison with an average of three citations by year for the most citing journals.

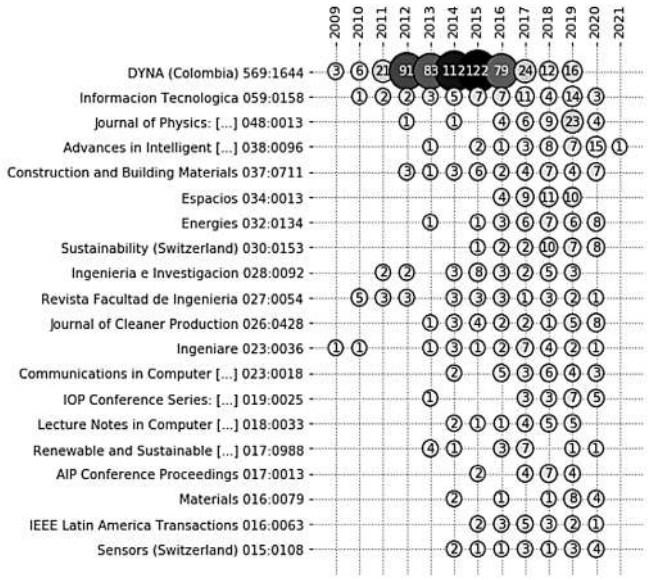

Figure 16. Documents per year citing Dyna-Colombia for source titles with fifteen or more documents.
Source: The Authors.

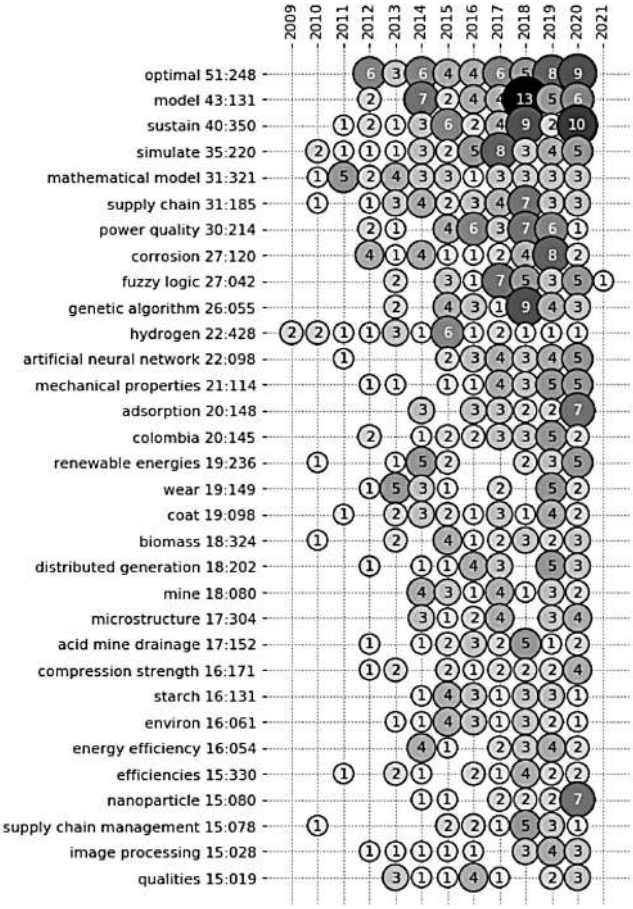

Figure 17. Documents per author keyword per year citing Dyna-Colombia for source titles with fifteen or more documents.
Source: The Authors.

Table 7.
Authors citing DYNA in twelve or more times documents.

Author	Number of documents	Cited by
Ferreira-Tinoco IDF	22	75
Calvo-Rolle JL	21	118
Garcia-Alcaraz J	19	147
Manzano-agugliaro F**	18	457
Cortes F	18	231
Casteleiro-Roca J-L	17	97
Franco C(1)	16	223
Gonzalez-Feliu J	15	87
Fan J-L	14	303
Bernabeu JP	14	218
Mejia de Gutierrez R	14	131
Rojas-sola JI	14	48
Escobar JW	13	51
Arguello H	13	41
Arango Serna MD*	13	37
Ramos-Paja CA	12	149
Olaya J	12	99
Sarache W	12	56
Osorio Saraz JA 12:046	12	46
Aguilar J	12	32

* Authors with most published papers in the DYNA journal.
** Authors with most citations in the DYNA journal.
Source: The Authors.

Table 8.
Number of documents and citations by country for the first ten countries citing DYNA (Colombia).

Country	Number of documents	Times Cited
Colombia	1,278	4,682
Spain	493	3,278
Brazil	319	1,157
Mexico	304	1,395
China	254	2575
United States	215	2090
India	141	988
Chile	115	569
United Kingdom	107	1248
France	106	862

Source: The Authors.

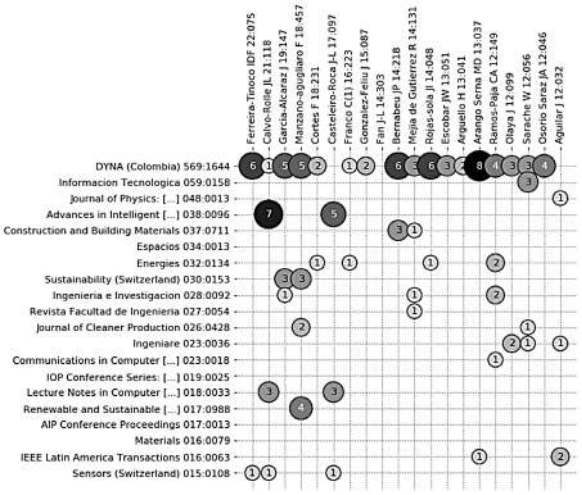

Figure 18. Documents by source title per author citing Dyna-Colombia.
Source: The Authors.

Fig. 17 presents the number of documents by author keyword per year in the citing journals. Note that the group of most frequent author keywords are very similar to the group of author keywords in Fig. 6.

4.4. Bigraph analysis

Fig. 18 presents the number of documents citing Dyna-Colombia by source title per author; most frequent authors citing Dyna-Colombia are authors publishing in Dyna (self-citing phenomena).

5. Conclusions

In this article, a methodology, called author analytics, is proposed to generate insight to made data-driven editorial decisions and to formulate editorial policies. The methodology is based on well-known methodologies and techniques used in systematic mapping of literature, business intelligence, descriptive analytics and tech mining. Insight are obtained by the integral analysis of authors and topics of the journal and the authors, topics, documents, and journals citing the journal under review. The proposed methodology is applied to the DYNA (Colombia) journal with the aim of obtaining an integral view of the scientific production published by the journal.

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