

Business Analytics for Business and Economic Sectors: A Review and Bibliometrics Analysis from 2012 to 2022



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Abstract Business Analytics (BA) generally refers to the application of models to analyze the data that is implemented by an organization in supporting decision-making. Currently, the use of business analytics has become a necessity to improve organizational performance and increase added business value. This situation has also attracted researchers to contribute studies in business analytics, mainly looking at current trends. This paper describes business analytics based on a study of the relevant literature, followed by a discussion of the current state of business analytics research and potential future paths. Based on the 1541 reviews and articles gathered from the Web of Science (WoS) between 2012 and 2022, we specifically carried out a bibliometric analysis of the influential studies of BA in terms of various aspects, such as research areas, journals, countries or regions, authors, most cited publications, and author keywords. The findings of the study report that the major research areas related to business analytics were “Management” (926, 60.09%), “Business” (759, 49.25%), and “Information Science and Library Science” (159, 10.32%) with TP and TPR%. The most productive journal was the Journal of Business Research, with a TP of 63. The USA, UK, and China were the top three contributing countries. Furthermore, “big data,” “big data analytics,” “business analytics,” “business intelligence,” and “analytics” were the most popular author keywords in the current ten years since 2012, apart from the author keywords of BA. When combined with the

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most cited articles in recent years, the topics on business intelligence by Chen in 2012 maintain in ten years as the hottest articles with the highest value of total citations, 2395.

1 Introduction

For decades, scholars have used the bibliometric analysis method to explore and examine vast amounts of relevant data in order to identify patterns and trends in publications on a given subject and to ascertain the precise organization of a certain field in the literature at the time [1, 2]. Indeed, the literature on the bibliometric methodology has been studied in a variety of timelines and fields, including a bibliometric review of the key developments in the *European Journal of Marketing* over the past 50 years [3], ten years of social media use in education [4], human resources [5], 16 years of review of the bibliometric analysis methodology publication [2], economic within 13 years [6], a study on sport for ten years [7], business sustainability [8], and consumer behavior in e-commerce [9]. Meanwhile, researchers also contribute a number of studies on business analytics in a variety of fields [10], such as business models [11], healthcare [12], and manufacturing [13].

Business analytics is generally regarded as the use of models, methodologies, and tools to analyze data to support decision-making [14]. The previous study also shows that the implementation of business analytics in an organization is able to improve business process performance and business value to the organization through real-time decision-making at the right time [15]. Moreover, the increase in the amount of huge data, the growth in the use of digital devices and technologies such as big data, artificial intelligence, and the internet of things have driven companies to apply business analytics to improve organizational performance. Accenture and General Electric reported that 89% of global organizations believed that companies that ignored the use of BA applications in business decision-making would be left behind and suffer losses [15].

As a result, this study attempts to provide a bibliometric analysis of business analytics in the business and economics sector using the Web of Science Core Collection database from 2012 to 2022. The purpose of this study is to identify the years that correspond to the most papers produced, important journals, highly referenced publications, most influential authors, and influential nations. Also, keyword co-occurrences are visualized by VOSviewer in this study [7]. The remaining sections of the paper are structured as follows: Section 2 presents the research methodology, with a data collection strategy and analysis method. This is followed by data analysis and results in Sect. 3. Finally, Sect. 4 concludes the paper by highlighting the key findings, limitations, and future research directions.

2 Research Methodology

2.1 Data Collection and Analysis Methods

The analysis was conducted using a bibliometric analytic approach, and it can be summed up in the following sections. The selection of the search query was the first stage. The articles were taken from the Web of Science database. This database was chosen because it provides a wider selection of journals with high-impact publications. The data extracted was from the Web of Science (WoS) core collection on September 27, 2022. Then, the search query Topic (TS) = “business analytics” in Title, Abstract, Author Keywords, and Keywords Plus with Publication Year between 2012 to 2022 was included in the search’s parameters. The search resulted in 6671 articles. For the specific purpose of the current study, the result was then narrowed down to solely the Business Economics research field, producing 1541 papers. The following string was the target of the search utilized for this study:

(TS = (business analytics) AND PY = (2012–2022)) AND ((DT==(“ARTICLE” OR “PROCEEDINGS PAPER” OR “EARLY ACCESS” OR “BOOK CHAPTER”) AND LA==(“ENGLISH”) AND SJ==(“BUSINESS ECONOMICS”)).

The records of 1541 reviews and articles were extracted from WoS to Microsoft Excel to accomplish the data analysis. Microsoft Excel is used to filter the data that has been taken from various aspects. Bar charts were used to more intuitively display the development trends of research areas, journals, author keywords, and authors in BA research. Cross-relationship tables were used to describe the collective relationships between research areas, countries/regions, and those two types of relationships. Next, data is visualized in a suitable shape for the last step. Tables and charts are used to visually display the results of the final analysis. As a result, this research conducted a comprehensive review of the BA field with the goals of identifying the most important works, identifying research topics, and providing insights into current research interests and potential future directions. To aid scholars in better understanding the advancement of BA research and future trends, data quantification and graphical display were applied to prepare a clearer picture of the evolution of BA research and future trends.

3 Results

3.1 Number of Articles Published

The quantity of publications and the patterns are important markers of a discipline’s level of progress. As previously presented, about 1541 articles were published in the business analytics (BA) research area from 2012 to 2022, as retrieved on September 27, 2022. The total number of publications by year was correlated with business analytics (BA) trends from 2012 to 2022 (see Fig. 1). There was an increasing number of articles published from the year 2012 to 2016 (24 to 84). In 2017,

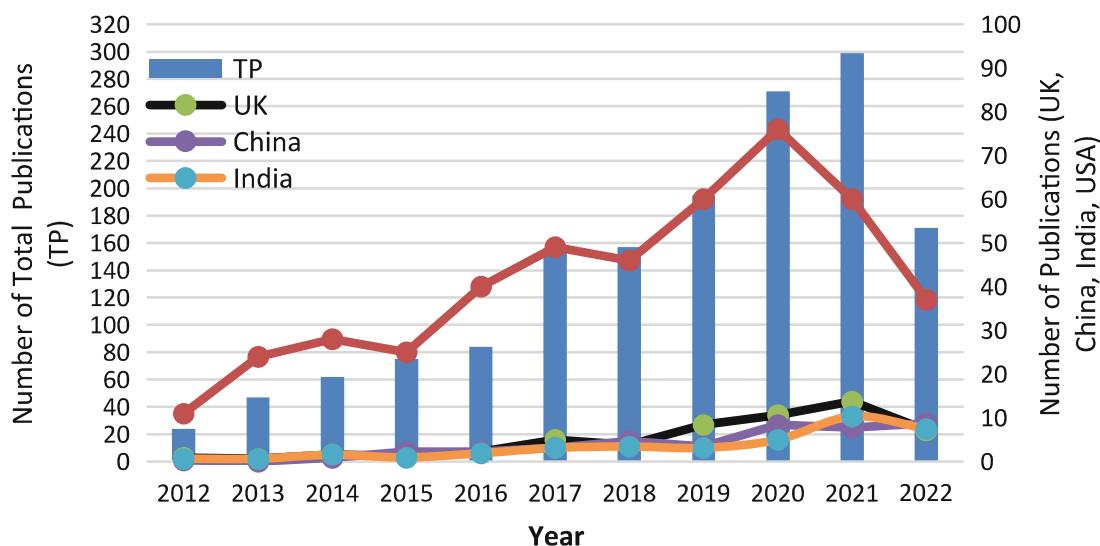


Fig. 1 Number of publications related to business analytics in the business economics area from 2012 to 2022

156 articles were published, and the number of publications continually increased to 299 in 2021, with 171 in September 2022.

The number of publications produced by the USA, the UK, China, and India accounts for more than half of all worldwide publications (889). The USA ranked top with 456 articles published between 2012 and 2022, followed by the UK (177), China (134), and India (122). The number of articles published by the USA every year ranked first from 2012 to 2022. The UK, China, and India remained consistent between 2012 and 2016 with the total number of articles published being 21 and 18, respectively. However, the UK has since surpassed them, with increasing from 2017 until 2022, putting UK in the second position with 177 total publications. From 2012 to 2016, China's and India's publications yearly were under 10, then increased to above 10 in 2018, with 15 and 11, respectively, placing both countries third and fourth in total publications.

3.2 Analysis of Research Areas

One of the pieces of information in every article is the research field, which is categorized by Web of Science (WoS) and also referred to as WoS research categories. The 1541 publications on the business economics research area encompass 41 Web of Science research areas since the study fields denote application ranges of the subject. The top 10 research areas of BA ranked by related total papers (see Table 1). "Management" (926, 60.09%), "Business" (759, 49.25%), and "Information Science Library Science" (159, 10.32%) occupied the top three concerned with total paper (TP) and TPR%. "Business Finance" accounted for 9.93% of total papers in the field (TPR%), "Operations Research Management Science" with 9.73%, and "Computer Science Information Systems" with 9.41%. The remaining research areas made up less than 9% of the total.

Table 1 The top 10 WoS research areas in BA

Rank	WoS research area	TP	TPR
1	Management	926	60.09
2	Business	759	49.25
3	Information Science Library Science	159	10.32
4	Business Finance	153	9.93
5	Operations Research Management Science	150	9.73
6	Computer Science Information Systems	145	9.41
7	Economics	131	8.50
8	Computer Science Interdisciplinary Applications	81	5.26
9	Regional Urban Planning	63	4.09
10	Engineering Industrial	50	3.25

Abbreviations: TP, total papers; TPR%, percentage of total papers in the field

Table 2 The top 10 WoS journals in BA

Rank	Journal title	TP	TPR %	TC	TCR %	IF
1	Journal of Business Research	63	4.09	4107	12.49	10.969
2	Technological Forecasting & Social Change	56	3.63	2429	7.39	10.884
3	Industrial Marketing Management	35	2.27	975	2.96	10.328
4	Business Horizons	28	1.82	991	3.01	10.562
5	European Journal of Operational Research	27	1.75	839	2.55	8.89
6	Information & Management	27	1.75	1124	3.42	6.363
7	Business Process Management Journal	27	1.75	580	1.76	6.172
8	IEEE Transactions on Engineering Management	26	1.69	218	0.66	3.715
9	Management Decision	20	1.30	570	1.73	5.589
10	International Journal of Business Analytics	19	1.23	52	0.16	8.689

Abbreviations: TP, total papers; TPR%, percentage of total papers in the field; TC, total citations; TCR%, percentage of total citations; IF, impact factor

3.3 Most Dominant Journals with Highest Publications

For researchers to acquire information and submit manuscripts, it is helpful to clarify the successful journals publishing articles in BA. The top 10 journals publishing articles on BA were concluded with the number of TP, TPR%, total citations (TC), percentage of the total citations (TCR%), and impact factor (IF) (see Table 2). The Journal of Business Research (63, 4.09%), Technological Forecasting and Social Change (56, 3.63%), and Industrial Marketing Management (35, 2.27%) ranked in the top three in terms of the TP published from 2012 to 2022. The most cited journals were the Journal of Business Research (4107), Technological Forecasting & Social Change (2429), and Information & Management (1124). The highest value of impact factor (IF) was 10.969, contributed by the Journal of Business Research, followed by Technological Forecasting & Social Change (10.884), Business Horizons (10.562),

and Industrial Marketing Management (10.328). The influence of other journals was less than ten.

3.4 *Analysis of Most Dominant Countries/Regions*

The finding from Table 3 shows that the USA was the most productive nation, with the most papers overall (456), showing the most research influence and interest in BA. Additionally, the UK supplied the most papers to the BA's global output (177, 9.57%). Due to the total publications and ratios, China (134, 25%) and India (122, 6.60%) were ranked third and fourth, respectively. Nearly half of the entire proportion was made up by the publications of the top three. Therefore, from America, Europe, and Asia correspondingly, the top three productive nations were the USA, the UK, and China. The only country from Oceania included in Table 3 was Australia, which came in the sixth place with 98 overall publications and 5.30%. The top 10 countries with the most dominant publication production were Asia, America, Europe, and Oceania, and more than half of them were European countries.

3.5 *Most Dominant Authors Who Contributed to the WOS*

The top three most dominant authors in BA research according to the total publications were Gunasekaran A, Oliveira T, and Krogstie J during these periods (see Table 4). Gunasekaran A produced the highest number of publications with 631 TP and influenced the highest value of TC and h-index (24,043, 82), while Oliveira T was responsible for the second most articles with 154 TP. However, Mclean ER contributed to the second-ranked TC with 11,851.

Table 3 The top 10 most productive countries/regions during 2012–2022

Rank	Country	TP	TPR%	Region
1	USA	456	24.66	Americas
2	UK	177	9.57	Europe
3	China	134	7.25	Asia
4	India	122	6.60	Asia
5	Germany	101	5.46	Europe
6	Australia	98	5.30	Oceania
7	Italy	93	5.03	Europe
8	France	80	4.33	Europe
9	Canada	65	3.52	Americas
10	Finland	46	2.49	Europe

Abbreviations: TP, total papers; TPR%, percentage of total papers in the field

Table 4 The top 15 most dominant authors in BA

Rank	Author	WOS ID	TP	TC	H-index
1	Gunasekaran A	EWZ-5866-2022	361	24,043	82
2	Oliveira T	https://orcid.org/0000-0001-6523-0809	154	6490	41
3	Krogstie J	DUW-9434-2022	143	2828	23
4	Khan Z	DTM-6288-2022	126	2324	27
5	Wamba SF	GCP-6293-2022	120	5442	35
6	He W	EYW-1139-2022	116	5499	29
7	Gupta S	https://orcid.org/0000-0002-2714-4958	86	2233	25
8	Hazen B	DXI-2009-2022	84	4308	36
9	Passiante G	GBS-5684-2022	84	1289	21
10	Vasarhelyi MA	DYL-3444-2022	83	1973	23
11	Akter S	https://orcid.org/0000-0002-2050-9985	82	4793	29
12	Mikalef P	CCD-0447-2022	80	2116	21
13	Kumar A	FIS-6700-2022	79	700	15
14	Chatterjee S	GDF-7471-2022	77	562	13
15	McClean ER	DGM-5350-2022	71	11,851	21

Abbreviations: TP, total papers; TC, total citations

3.6 Analysis of Most Cited Articles

Despite the fact that a number of factors affect the citation impact, analyzing a paper's citation frequency might reveal its significance in the research field. The most popular article on BA in business and economics area by year was "Business intelligence and analytics: from big data to big impact" with 2395 total citations, which was published by MIS Quarterly in 2012 (see Table 5). Chen et al. [16] added to the body of knowledge on business analytics in business and economics, which correlated with computer science, information science, and library science. The second most cited paper, "Big data: the management revolution", focused on exploring a new revolution of managing [17]. Sivarajah et al. [18] published "Critical analysis of big data challenges and analytical methods" to review the big data analytics, challenges, and methods in scientific journals, ranking third in TC. The article "Big data analytics and firm performance: effects of dynamic capabilities" ranked fourth with 661 citations. Wamba et al. [19] proposes a big data analytics capability (BDAC) model on firm performance (FPER). According to the study's findings, Elsevier publishers dominated the market in comparison to other publishers.

3.7 Analysis of Author Keywords

The keyword co-occurrence network analysis was considered in this study to identify which keywords have been frequently used in the various articles. The

Table 5 Most cited articles related to business analytics in business and economics

No.	Authors	Title	Year	Source	Publisher	TC
1	Chen, HC et al.	Business intelligence and analytics: from big data to big impact	2012	MIS Quarterly	SOC Inform Manage-MIS Res Cent	2395
2	McAfee, A et al.	Big data: the management revolution	2012	Harvard Business Review	Harvard Business School Publishing Corporation	2012
3	Sivarajah, U et al.	Critical analysis of big data challenges and analytical methods	2017	Journal of Business Research	Elsevier Science Inc	689
4	Wamba, SF et al.	Big data analytics and firm performance: effects of dynamic capabilities	2017	Journal of Business Research	Elsevier Science Inc	661
5	Wang, YC et al.	Big data analytics: understanding its capabilities and potential benefits for healthcare organizations	2018	Technological Forecasting and Social Change	Elsevier Science Inc	497
6	Erevelles, S et al.	Big data consumer analytics and the transformation of marketing	2016	Journal of Business Research	Elsevier Science Inc	472
7	Ghobakhloo, M	The future of manufacturing industry: a strategic roadmap toward industry 4.0	2018	Journal of Manufacturing Technology Management	Emerald Group Publishing Ltd	407
8	Gunasekaran, A et al.	Big data and predictive analytics for supply chain and organizational performance	2017	Journal of Business Research	Elsevier Science Inc	400
9	Muller, JM et al.	Fortune favors the prepared: How SMEs approach business model innovations in industry 4.0	2018	Technological Forecasting and Social Change	Elsevier Science Inc	368
10	Loebbecke, C et al.	Reflections on societal and business model transformation arising from digitization and big data analytics: a research agenda	2015	Journal of Strategic Information Systems	Elsevier	352

Abbreviations: TC, total citations

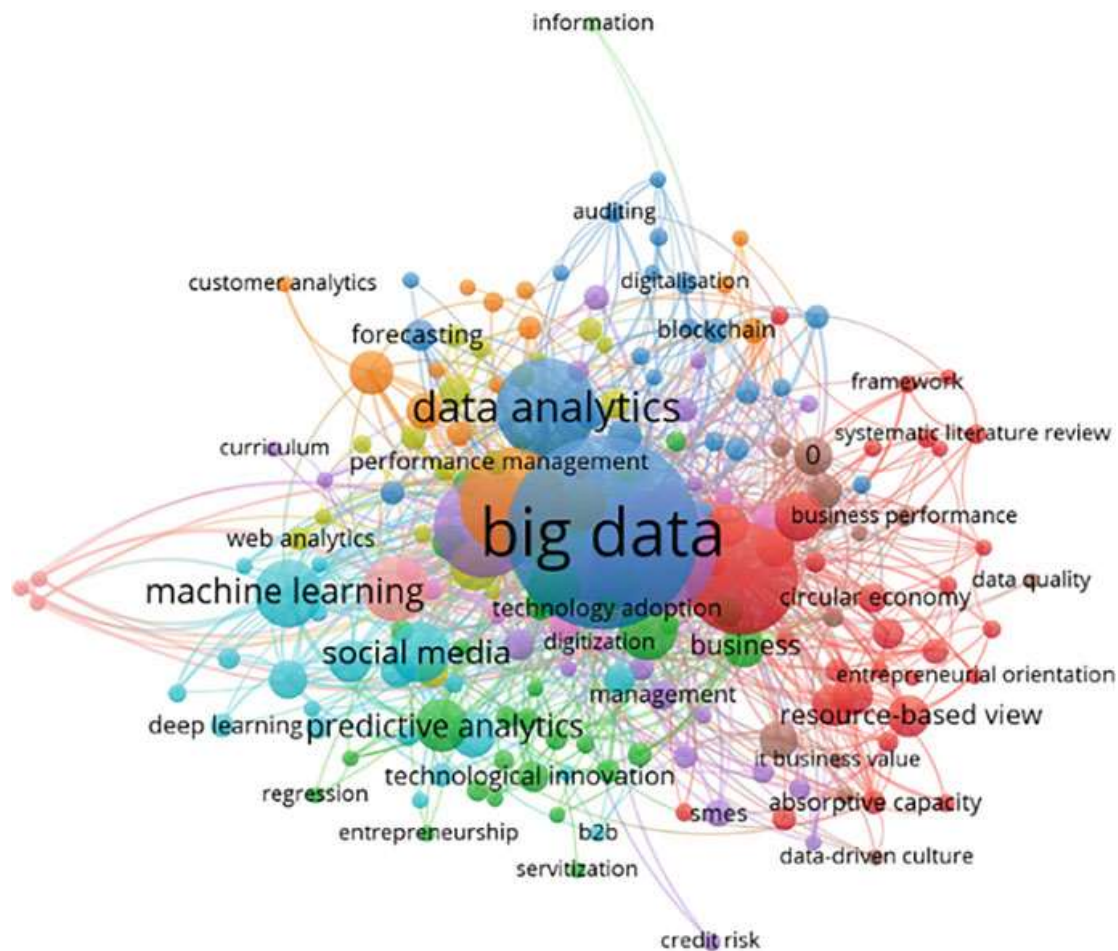


Fig. 2 Co-occurrence of authors' keywords

analysis provides information on methods, topics, and themes that have been mostly focused on by the researchers. There were a total of 4188 keywords in the data set and 200 keywords were selected, which appeared more than five times in the data set used for creating a network map. Figure 2 shows the co-occurrence (author keyword) network map. From the analysis, the five most keywords are “big data,” “big data analytics,” “business analytics,” “business intelligence,” and “analytics.” The keyword such as “supply chain management” and “business” were also significantly focused by the authors in their articles.

4 Conclusion

In this study, business analytics in business and economics were analyzed using the bibliometrics approach. Utilizing the Web of Science database, 1541 papers were examined, and Microsoft Excel was used to display the data. There are a number of restrictions on this study that might be expanded in subsequent research. Only articles published between 2012 and 2022 were included in this analysis by using

the Web of Science database. It is suggested that future research prolong the length of the year in which the articles are published in order to cover more interesting themes. Additionally, a variety of databases, including Scopus, might be used. From 2012 to 2022, there were generally more studies on business analytics in the fields of business and economics. According to the analysis, the Journal of Business Research, published by Elsevier Science Inc., has the most papers on business analytics in the fields of business and economics. The most often cited article on business analytics in business and economics is “Business Intelligence and Analytics: From Big Data to Big Impact.”

It was discovered that the top three countries with the highest number of publications are the USA, the UK, and China, while Europe is the most dominant region productive in a total publication. From the author’s keywords, it was found that most research topics such as data analytics, management, and business appeared. Also, future studies could consider the study of the relationship between management and business toward big data.

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