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Dissertation

by

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“Bibliometric analysis on Intelligence Agencies; 2012-2022”

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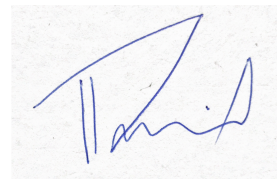
June 2023

Plagiarism declaration

I hereby declare that this thesis is my own and autonomous work. All sources and aids used have been indicated as such. All texts either quoted directly or paraphrased have been indicated by in-text citations. Full bibliographic details are given in the reference list which also contains internet sources containing URL and access date. This work has not been submitted to any other examination authority. (Vetmeduni, n.d.)

Thessaloniki, 08/06/2023

Chrysoula Papadopoulou,

A handwritten signature in blue ink, appearing to read 'Chrysoula Papadopoulou', is written on a light-colored background.

Abstract

This study carries out a bibliographic analysis on the phenomenon of Intelligence Agencies for the period 2012-2022.

Specifically, the paper is divided into four individual parts. The first part, refers to the theoretical framework of intelligence agencies and intelligence studies as well as, from the side of bibliometric analysis as a research method. The second part of the paper, covers the methodology used to collect, process and evaluate the data. Regarding the third component, the results of the analysis are listed in detail, especially in the form of graphs and tables. Lastly, critical explanations and reflections on the results are presented, accompanied by the limitations of the research and recommendations for its future effective implementation.

In the end, the conclusions of the work in question, the appendix as well as the relevant bibliography follows.

Key words: Bibliometric analysis, Intelligence Agencies, Scopus, R, Bibliometrix, Biblioshiny

Περίληψη

Η συγκεκριμένη εργασία πραγματοποιεί μία βιβλιογραφική ανάλυση του φαινομένου των μυστικών υπηρεσιών για την περίοδο 2012-2022.

Πιο συγκεκριμένα, η εργασία διαιρείται σε τέσσερα επιμέρους μέρη. Το πρώτο κομμάτι αναφέρεται στο θεωρητικό πλαίσιο της εργασίας, τόσο από την πλευρά του πεδίου των μυστικών υπηρεσιών, όσο κι από τη μεριά της βιβλιομετρικής ανάλυσης ως ερευνητικής μεθόδου. Το δεύτερο μέρος της εργασίας πραγματεύεται τη μεθοδολογία που χρησιμοποιήθηκε για την συλλογή, επεξεργασία και αξιολόγηση των δεδομένων. Όσον αφορά τη τρίτη θεματική, εκεί παρατίθενται αναλυτικά τα αποτελέσματα της ανάλυσης, και ειδικότερα σε μορφή γραφημάτων και πινάκων, ενώ έπειτα ακολουθούν κριτικές επεξηγήσεις και στοχασμοί πάνω σε αυτά, συνοδευόμενοι με τους περιορισμούς της έρευνας και τοποθετήσεις για μελλοντική αξιοποίηση της.

Στο τέλος, ακολουθούν τα συμπεράσματα της εν λόγω εργασίας, τα παραρτήματα καθώς και η βιβλιογραφία που χρησιμοποιήθηκε.

Λέξεις κλειδιά: Βιβλιομετρική ανάλυση, Μυστικές υπηρεσίες, Scopus, R, Bibliometrix, Biblioshiny

-Dedicated to Tommy, Sofi, Billy & friends...

*...without you I would have finished it
3 months earlier.*

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1. Introduction

It is often being argued that, social sciences lack the subjectivity factor, since the study of qualitative data is heavily dependant on the researchers' interpretations. Moreover, the amount of scientific production is on the rise, making it difficult to keep up with, especially without the utilisation of modern solutions (Horlings, 2023).

In today's Information Era, mass amount of data is being created not only from academia but, from other outlets as well, such as social media, blogs, news agencies etc.. In consequence, a new need for methods that, can categorise and transform unstructured mass of textual information into manageable and measurable results, is born.

Data analysis introduces a broad array of quantitative techniques that, if merged with qualitative data, can generate a multidisciplinary approach in research. In that context, it is of social scientists responsibility to understand the power of those tools and get familiarised with them, to further develop their academic discipline (Fakis et al., 2013).

Under no circumstances, can this computational analysis replace the traditional literature review and critique, fashioned by social scientists, notwithstanding, it may prove to be a complimentary method. By converting qualitative data into a friendly form/type for the available softwares and programs to process them, the amount of researchable resources will increase multifold, further propelling the evolution of the social science's academic scholarship.

This paper aims to accelerate the above mentioned effort, by conducting a bibliometric analysis on intelligence agencies and therefore, introducing a snapshot of Intelligence Studies into the map of academic resources.

2. Theoretical framework

2.1 Intelligence Agencies

It is widely accepted, that the existence of espionage as a profession can be traced back in the ancient times (Deutsches Spionage Museum, n.d.). Fear and economic incentives were key components, in order to extract an agent's loyalty (The History Press, n.d.). Ancient Egypt, Greece and Rome made use of clandestine operations and incorporated other espionage tradecraft, so as to acquire information that eventually could be useful to gain military edge over their rivals (Lerner, n.d.).

The term intelligence includes both the collection, analysis and distribution of information, as well as the covert operations that help to gain insight into the activities of other actors, allies or not (Ransom and Pringle, 2023). Consequently, Intelligence Agencies are bureaucratic structures, that represent the centralised effort from states to organise and handle the total of the intelligence activities. Intelligence agencies, often referred also as Secret Services, share the same main mission, independently from their state that they originate, and that is to warn the decision makers of potential threats to the nation's interests (Office of the Director of National Intelligence, 2018). Military, civil intelligence and counterintelligence agencies are some of the organisations that the Intelligence Community (IC) of a state consist of (Office of the Director of National Intelligence, 2009).

The agencies don't restrict themselves in one branch, yet they delve into different types of intelligence acquisition. Some of those types are but not limited to the following (Office of the Director of National Intelligence, 2018);

1. Signals intelligence or SIGINT, that collects data through the interception of signals
2. Imagery intelligence or IMINT, is the exploitation of imagery produced from photography, radars and other means.
3. Measurement and Signature Intelligence or MASINT, employs technical methods and measurements, in order to get informed about the characteristics of a physical target.
4. Human Intelligence or HUMINT, is the oldest way for intel collection and it differs from its more technical counterparts, because the information gathered, derives solely from human sources.
5. Open Source Intelligence or OSINT, is the data that can be acquired through open sources, meaning that are publicly available, for instance media outlets, the Internet, government official or academic reports etc.

6. Geospatial Intelligence also known as GEOINT, is a discipline that analyses images and data for a specific geographical location.

The final intelligence product is to be consumed by decision makers for various reasons (Vitkauskas, 1999). For starters, diplomats are being informed and that helps them make the most suitable and possibly effective decisions. The monitoring of agreements, the support to military operations, and to defence planning are some other important sectors that get benefitted by intelligence (irp.fas.org, 1996). Apart from the military and political realm, intelligence analyses are helpful, so as to strategically decide on economic, environmental and health related matters (irp.fas.org, 1996).

Depending on the country of study the national intelligence system poses significant differences regarding its centralisation, structure, hierarchy or oversight. Contrasts are not limited only when comparing a country with a democratic political system to an authoritarian one, but they can also be found between states with similar systems. This exact statement can be proved through the familiarisation with some of the most well known intelligence bureaucracies of the world today.

The United States of America spent annually extraordinary amounts of money for the operation of its intelligence activities (Office of the Director of National Intelligence, 2022). According to the Office of the Director of National Intelligence (2009), the American IC consists of eighteen (18) different organisations. Each one of them is responsible for a distinct aspect of the intelligence procedure. For instance, the Central Intelligence Agency, founded in 1947, is in charge of the HUMINT procedure, the National Security Agency manages the cryptologic and SIGINT missions and the FBI handles the internal counterintelligence operations (Central Intelligence Agency, n.d.; National Security Agency, n.d.; Federal Bureau of Investigation, 2019). As far as centralisation goes, in 2004, and after the September 11 attacks, through the 'Intelligence Reform and Terrorism Prevention Act' reforms to the IC were conducted. The Director of National Intelligence was created and now oversees the other seventeen (17) intelligence agencies (CIA, n.d.).

Apart of the structural attributes, the oversight of the IC enacts a significant role too. The President, the President's Intelligence Advisory Board, The Intelligence Oversight Board, the Office of Management and Budget and other legislative groups, courts and committees are all accountable to ensure that the IC works within the law and for the nations interests (Office of the Director of National Intelligence, 2009). Lastly, for the USA's system, it is acceptable and sought after to partner up with external groups and organisations to achieve optimised results.

Such actors include the U.S and foreign military, Foreign Intelligence Agency Counterparts, the Federal, State, and Local Law Enforcement in addition to the private sector (Office of the Director of National Intelligence, 2009).

The United Kingdom is also inclusive of an alliance of several intelligence agencies, similar to the USA (service.gov.uk, 2010).

Israel is renowned for its intelligence capabilities and the fact that it operates in a highly secretive manner. Its system consists of autonomous organisations, with Mossad being the most popular among them, for the covert espionage operations that it conducts in foreign terrain and it reports directly to the Prime Minister (Ransom and Pringle, 2023). It is severely smaller in structure in contrast to the two previous systems presented above. The General Security Services or Shin Bet, was established for domestic counterintelligence activities, and the third main pillar of the Israeli system is concluded with the Intelligence Corps of the Defense Forces or Aman, responsible for the military intelligence (Ransom and Pringle, 2023). This decentralised approach is what made Israel's IC highly effective, since it lacked the external pressure and time consuming bureaucratic processes (Center for Strategic and International Studies, 2019). Nevertheless, conflict in the IC community of Israel has been reported, especially because of this approach that creates different priorities for each organisation. A restructure towards a more open Mossad was made, in order to increase the level of oversight on its actions and to establish ties and some level of cooperation with other foreign intelligence agencies (Center for Strategic and International Studies, 2019).

The Russian IC after the dissolution of KGB got divided into five (5) main organisations. The Federal Security Service for counterintelligence and the Main Intelligence Directorate, known as GRU for military intelligence are the two most important agencies (Ransom and Pringle, 2023). A significant fact about the Russian system is that all intelligence agencies are overseen by the President of the Russian Federation (The Russian Government, n.d.).

The Chinese system thrives on undercover action, in view of the fact, that operations are conducted under the diplomatic, scholarly or business cover. The MSS and the armed forces handle foreign intelligence as well as counterintelligence and military intelligence respectively (Ransom and Pringle, 2023). Something unusual for the other non authoritarian systems that were discussed above and it applies for the Chinese, is that the Chinese Communist Party directly collects intelligence outside of the IC community (Ransom and Pringle, 2023).

Having acquired a brief overview of some of the most influential intelligence agencies around the globe, it is necessary to take a look into their problems and the criticism that those

organisations face. This is of essence, for the purpose of understanding the reasons behind their failures and to predict the adaptations and reforms that should be performed in the future.

Many analysts from different ICs complain about the overstretch of their agencies. A large amount of organisations working towards the same cases can place obstacles, such as non manageable number of intelligence products and potential leaks (Aftergood, 2013). This also translates into competitiveness among domestic agencies, undermining their own mission (Aftergood, 2013). In reference to analysts, it is often being argued that they lack imagination, resulting into missing important parts of a case or emerging challenges (Byman, 2016). The element of surprise should be incorporated into the intelligence analysis, but without overdoing it and activating false alarms. Another major setback that produced intelligence failures is the miscommunication of the certainty around the intel between the IC and the decision makers (Byman, 2016). Last but not least, the Snowden leaks about mass surveillance programs opened up a can of worms, that have put ever since in the spotlight the ethical perspective (France 24, 2023). When the agencies operate they shall be considerate of their citizens rights, from which they also draw legitimation (Wicaksana, 2019).

2.2 Intelligence Studies

Intelligence Studies stands as a multidisciplinary field, under the auspices of political science. Intelligence agencies can be identified as the main actor in this discipline. Their role may be influential in terms of public policy crafting, yet intelligence agencies and their activities remain highly hidden and misunderstood by the common people (Lomas and Ward, 2022). Public perceptions vary, with reference to the occupation of the intelligence community, and it is especially affected by fiction, including spy novels and films (McCarry, 2008). The vast amount of primary sources is considered classified, and only after some years¹, do governments provide access to bits and pieces of information. This indicates that, most of the academics in intelligence studies, base their research on secondary sources, namely autobiographies, books and interviews, written or given by former intelligence operatives/officers. Further to this statement, the interfering nature of the agencies and the filtration of information regarding the said agency, which is going to be published, is a typical procedure.

¹ When there is a substantial distance from the historic event or operation that have taken place, and it will not interfere or disrupt the course of decisions and policies.

In the past, only a minuscule quota of historians could acquire clearance of a limited archived material (Hughes, 2022). In more recent years, governments and intelligence agencies, loosened their policy in light of an undergoing reform that, allowed for more historic material to be published. Despite this new open culture, secrecy remains at the heart of the intelligence agencies. The vacuum in official and trustworthy research material fabricates a distortion worthy of attention in the progress of Intelligence Studies.

The incorporation of data analysis could be proposed for further investigation in the field, not only from the aspect of intelligence analysis (Horlings, 2023) but also from the augmentation of available material and improvement of intelligence studies as an academic discipline. The second important takeaway from the mesh of the two is that depending on the type of analysis applied, it allows the public to become more acquainted with the Intelligence Community (IC) and learn their scope of their duties since intelligence agencies relish on the legitimacy and trust provided by the public's opinion.

Finally, this paper touches upon both arguments. By conducting a bibliometric analysis on intelligence agencies related material, it contributes to the illustration of the field over the last decade. It additionally, reveals the path that scholars have followed in the past, while forecasting a possible future route that, the intelligence studies could embark on, while at the same time delivers new resources² for the scholars to research on.

2.3 Bibliometric analysis as a tool for scientific research

The term 'bibliometric analysis' was first introduced in 1969 by Alan Pritchard and it represented the use of statistical methods to study published material (Chellappandi and Vijayakumar, 2018). Bibliometric tools are applied in order to investigate the structure and impact of a certain discipline (Kokol, 2018). By shedding light into the details of a academic domain and sketching a map of it, it is possible to introduce a number of newcomer researchers on the under study area. Apart from enhancing any scholarship, bibliometrics are useful for journals and publishers too, in the view of the fact that, they can assess the performance of authors, trend topics and disciplines, and thus make better informed decisions (Zupic and Čater, 2014).

The foundation of bibliometrics is the data that the analysis is supported on. Those are, among others, the keywords, titles, details of authors, abstracts, institutions, citation numbers, journals etc. The techniques used, vary from main to enrichment (Donthu et al., 2021), with

² Referring to the plots presented in the 'Results' section below.

performance analysis and science mapping referring to the former technique and network analysis to the latter (Büyükkıdık, 2022). Authors Durieux and Gevenois (2010) posited that, three types of bibliometric indicators exist. The first constitute the ‘quantity’ indicators that, signal the efficiency of each author, the second group considers the ‘quality’, meaning the performance-impact of the publication and lastly, the ‘structural’ indicators, which associate the *publications, authors and research area*.

A positive key characteristic that can be attributed to Bibliometric method, is its versatility that, allows it to be applied in every scientific field (Büyükkıdık, 2022). Additionally, the technical part of this kind of analysis is simplified, via user-friendly interfaces that, contemporary softwares provide. This and the free of charge policy that these programs enact, make them easily accessible to the median student and researcher and therefore a possible popular academic tool.

3. Data and methods

3.1 Dataset: Source, inclusion and exclusion of articles

The data exploited for the purpose of this paper's research was extracted from Scopus (www.scopus.com, n.d.). Scopus constitutes an article database that, includes abstracts and citations of scientific papers (Smith, Densmore and Lener, 2016) and was highlighted by the Bibliometrix tool authors as the better option, as the topic of analysis revolves around Art and Humanities (Aria and Cuccurullo, 2017). Since Intelligence Agencies were the field of interest for this study, the key word that the author utilised was that of "secret intelligence". The exported excel file that comprised the Scopus bibliometric data was restricted at 133 articles. Apart from the small amount of documents available for analysis, another problem surfaced. The results were limited to the British Secret Service, also known as Secret Intelligence Service or SIS, due to the similarity with the key word.

The response to overcome the aforementioned obstacle, was the enrichment of the key terms that were employed in the search bar of Scopus repository. The updated terms consisted of the below words and phrases; 'intelligence activities' or 'intelligence service' or 'intelligence agency' or 'spying' or 'espionage'. The total number of articles was calculated in one thousand nine hundred thirty-nine (1939) for a selected time period from 2012 to 2022. The next step was to filter through these articles, in order to eventually have the final excel file, inclusive only of pertinent article entries. The detection and marginalisation of the unrelated documents became a hand picked process, in the basis of the critical thinking of the author. The logic behind the elimination procedure, occurred through the suitability of the title, then the abstract and lastly the journal that was published on. As fitting were seen the articles that involved any intelligence activity from a state security apparatus, mostly intelligence agencies, without taking into consideration the perspective that those activities were researched upon. Namely, the documents could have been studied from a historical, strategic, political etc. aspect, and weren't restricted to a certain theoretical framework. The total amount of ill-suited papers were seven hundred ninety-three (793), most of which were affiliated with the field of artificial intelligence or another non relevant topic or lastly, they may have been double entries.

After "cleaning" out the data, a new and final dataset was created in accordance to the Bibliometrix standards, meaning it included the columns with the necessary metadata for the analysis to function properly.

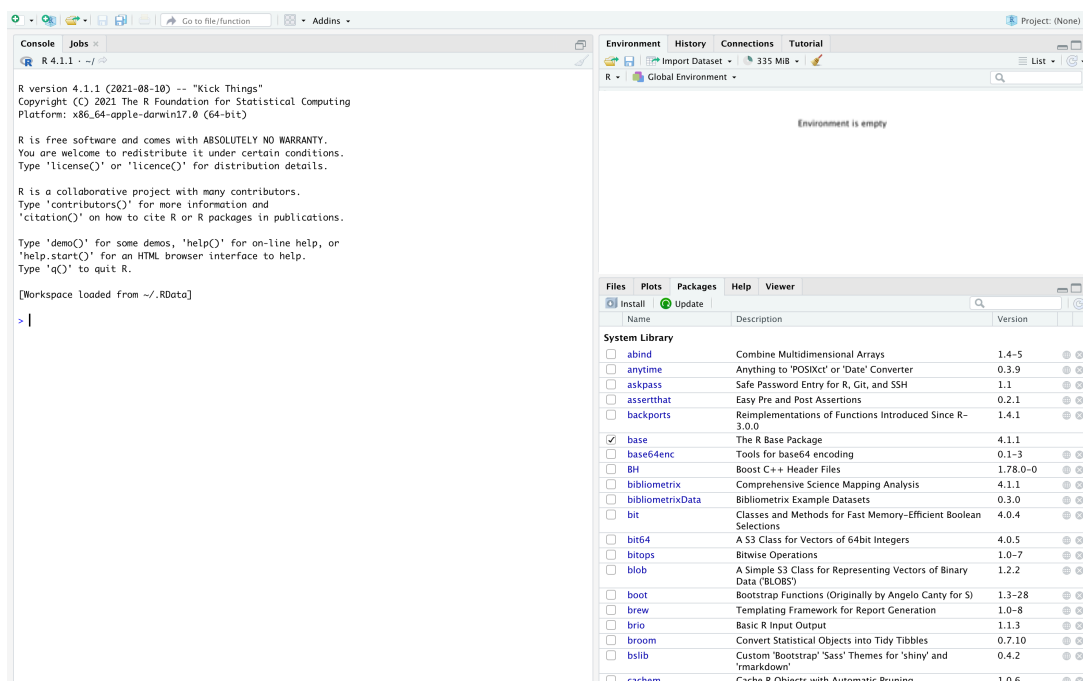
3.2 Method; RStudio and Bibliometrix package

It can confidently be said that, there are multiple tools that can be taken advantage of, so as to perform a bibliometric analysis. Softwares such as Bibexcel, SciMAT, CiteSpace and other belong to this category. All things considered, the preferred method for this paper is Biblioshiny, a relatively new solution having being developed in 2019, activated through Bibliometrix package found in R (Moral-Muñoz et al., 2020). Although R is a programming language, the Biblioshiny software enjoys a user friendly interface that requires no coding skills. This fact alone, promotes the use of the tool to a broader target group that cares to conduct bibliometric analysis without having a programming background, for instance scholars from social science disciplines.

Having established the basic reasoning behind the choice of software, it is essential to continue describing the methodology that has been applied. After having collected and processed the data, the next step is to load it into the Biblioshiny software. To accomplish this task, the R environment is needed for the activation of the Bibliometrix package. The procedure of that and the rest of the process, is depicted in a visually and concise manner below.

The first step is to open the R environment. In this case, RStudio for desktops is portrayed in Image 1 (Posit software, n.d.).

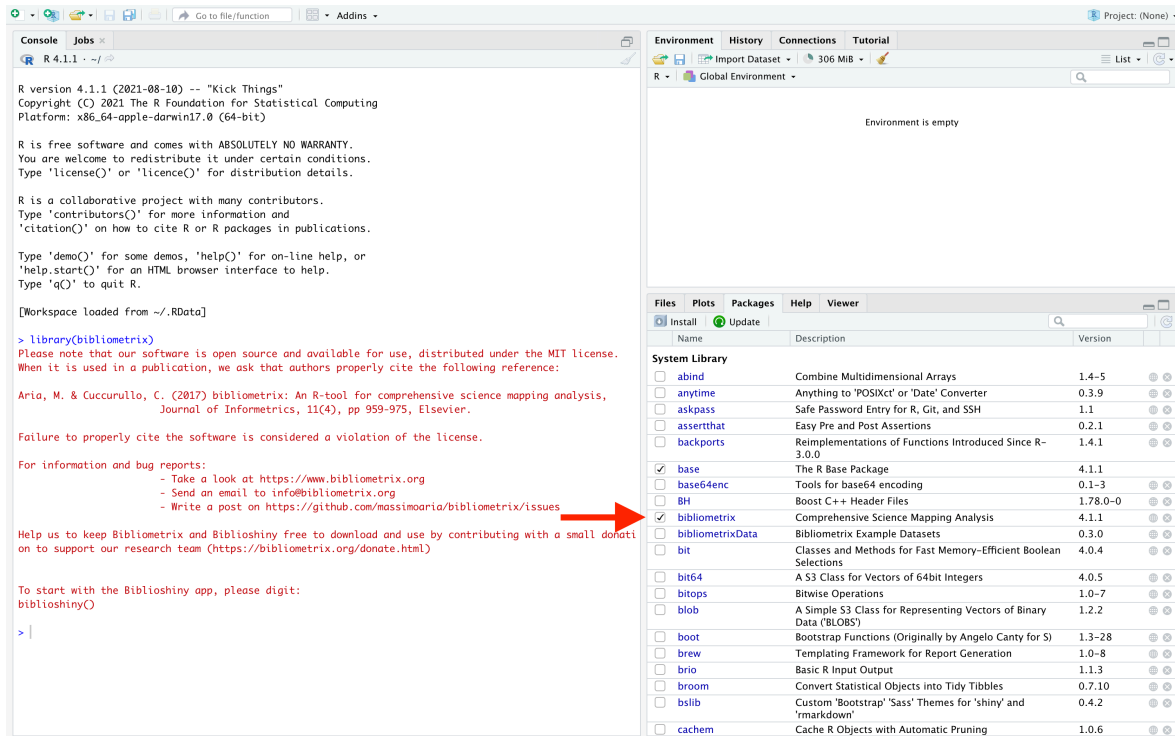
Image 1. Opening RStudio³



³ Source; Author's desktop.

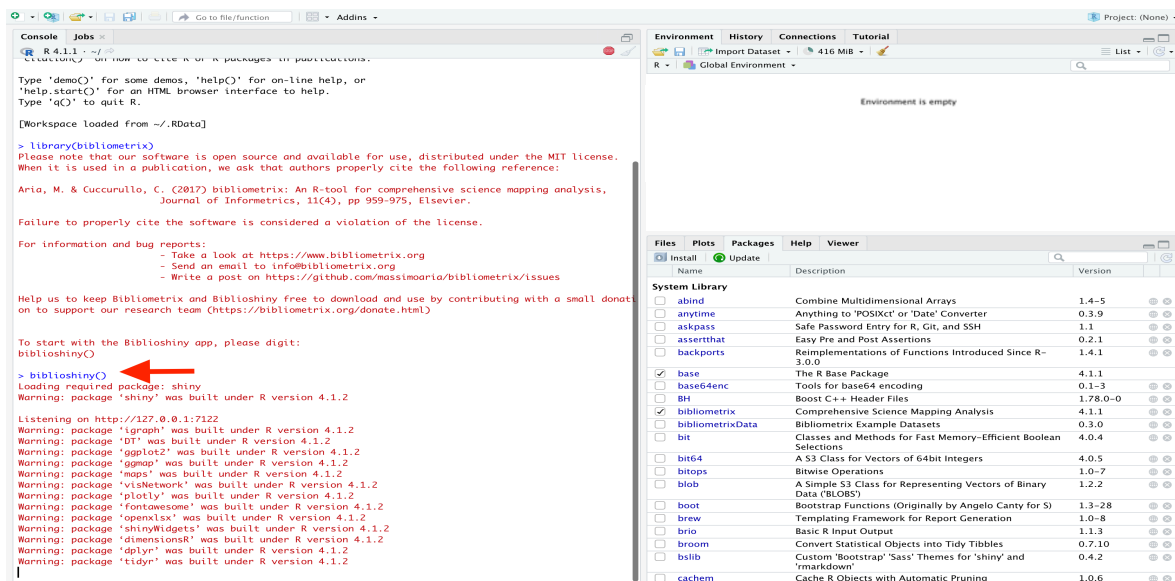
The next move needs to be the instalment of bibliometrix package, by checking the box indicated by the arrow (Image 2).

Image 2. Installing bibliometrix⁴



Having done that, it is in order to power the biblioshiny app, just by writing in the console “>biblioshiny()”, as seen in Image 3.

Image 3. Activation of biblioshiny app⁵

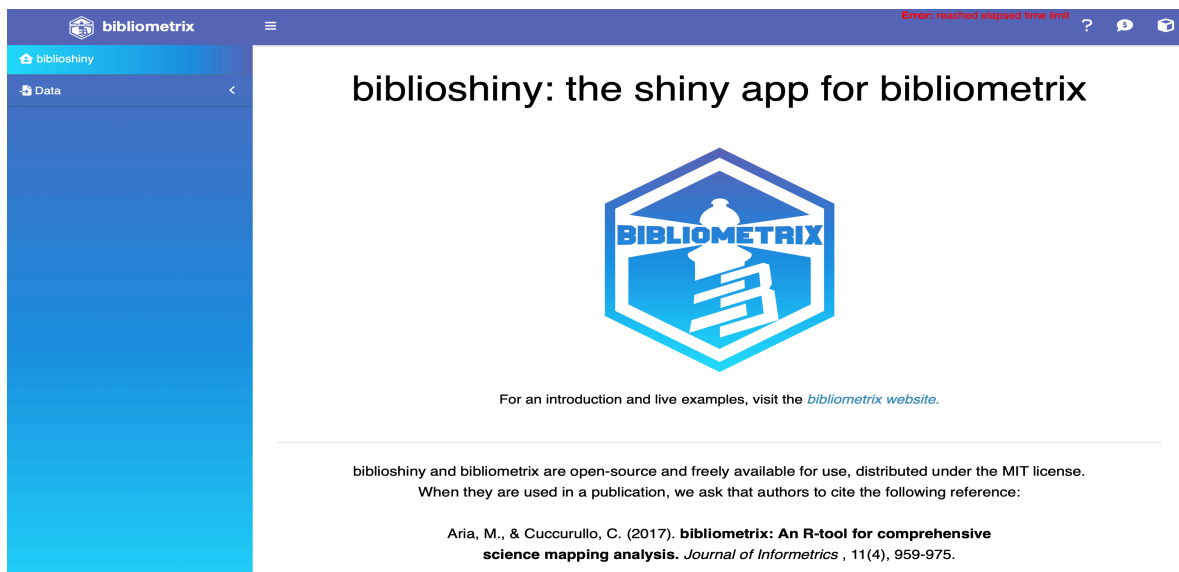


⁴ Source; Author’s desktop.

⁵ Source; Author’s desktop.

The third step allowed the app to open on the computer's browser and the outcome shall bear resemblance to Image 4.

Image 4. Loading of Biblioshiny interface⁶



As presented on the following Image 5, regarding the data import, it is of need to click on the Load data button, then choose the right type of file the dataset is converted into, select it and begin the loading by pressing the start button.

Image 5. Data import⁷



⁶ Source; Author's desktop.

⁷ Source; Author's desktop.

To conclude for the final step, on the left side of the screen the eight plot categories are shown and by clicking on the desired one, the plotting of the graphs is one more click away (Image 6).

Image 6. Graph categories/plotting⁸

DOI	AU	Author.s..ID	TI	PY	SO	VL	IS	Art..No.
10.1140/epds/s13688-022-00323-z	MUSCIOTTO F.MICCHICHES	57220265702;12784590000;	EFFECTIVE STRATEGIES FOR TARGETED ATTACKS TO THE NETWORK OF COSA NOSTRA AFFILIATES	2022	EPJ DATA SCIENCE	11	1	11
10.1177/15562646221096188	MATAR A.SILVERMAN HJ	55627493900;7102951499;	ETHICAL ANALYSIS OF EGYPT'S LAW REGULATING CLINICAL RESEARCH	2022	JOURNAL OF EMPIRICAL RESEARCH ON HUMAN RESEARCH ETHICS	17	4	
10.18254/S207987840021686-3	BEGLOV A.BELYAKOVA N	55531443600;57219050288;	SPECIAL SERVICES AND RELIGIOUS ORGANIZATIONS IN THE SOVIET STATE: COLLABORATION MECHANISMS, SURVIVAL STRATEGIES, SOURCES (СПЕЦСЛУЖБЫ И РЕЛИГИОЗНЫЕ ОРГ	2022	ISTORIYA	13	6	

3.3 Quality of dataset

The outcome of bibliometric analysis is heavily dependant on the quality of the dataset. The term quality describes the amount of metadata that are missing from the dataset. The more sufficient the metadata the more accurate and feasible the computation of the plots will eventually be (Aria and Cuccurullo, 2017).

When finish uploading the dataset onto the Biblioshiny app, a picture like the below Image 7, will be produced. Image 7, represents this paper's dataset quality classification. As illustrated, the metadata regarding to columns such as, Abstract, Author, Document type, Journal. Language, Publication year, Title and Total Citation are completely present. At Tier 2, the Affiliations, DOI, Corresponding Author and Keywords can be found. While at the same time, Keywords plus, Cited References and their number, as well as Science Categories of the entries are seriously deficient.

⁸ Source; Author's desktop.

Image 7. Dataset Quality⁹

Metadata	Description	Missing Counts	Missing %	Status
AB	Abstract	0	0.00	Excellent
AU	Author	0	0.00	Excellent
DT	Document Type	0	0.00	Excellent
SO	Journal	0	0.00	Excellent
LA	Language	0	0.00	Excellent
PY	Publication Year	0	0.00	Excellent
TI	Title	0	0.00	Excellent
TC	Total Citation	0	0.00	Excellent
C1	Affiliation	20	1.75	Good
DI	DOI	119	10.38	Acceptable
RP	Corresponding Author	142	12.39	Acceptable
DE	Keywords	432	37.70	Poor
ID	Keywords Plus	1004	87.61	Critical
CR	Cited References	1146	100.00	Completely missing
NR	Number of Cited References	1146	100.00	Completely missing
WC	Science Categories	1146	100.00	Completely missing

⁹ Source; Author's desktop.

4. Results

4.1 Overview plots

The first plots that are presented fall under the category *Overview*. Those are the diagrams and tables that sum up and visually present an introductory and brief overview of the main information of the dataset.

In this case, the key points, included in Table 1¹⁰, contain the timespan of the documents that, amount up to eleven years, specifically from 2012 to 2022. In the before mentioned period, the total number of articles that refer to the keywords¹¹ for the subject ‘Intelligence agencies’, add up to one thousand one hundred forty-six (1146). The sources were totally five hundred ninety-five (595) -in the form of books, journals, newspaper articles, etc.- and the annual growth rate of article production was calculated with an increase of 10.66%.

The primary details for the authors, indicated the entirety of one thousand three hundred seventy-eight (1378) authors. From all the documents, almost 52,39% of them were the single authored ones, translating into a total of seven hundred twenty-two (722) independent authors. Consequently, per one document corresponds 1.4 authors. Lastly, the rate for the international research collaboration, measured as co-authorship, equals 6.1%.

One thousand three hundred seventy eight of these authors expanded their research by mobilising two thousand eight hundred two (2802) unique keywords. The document average age was measured at 5.04 years old. Whereas the average citations per paper were 3.103, which could be an indication of the impact the author or the journal has in the field, notwithstanding that this metric could also be inaccurate and steer to misleading assessments, since it does not take into account the quality of the papers.

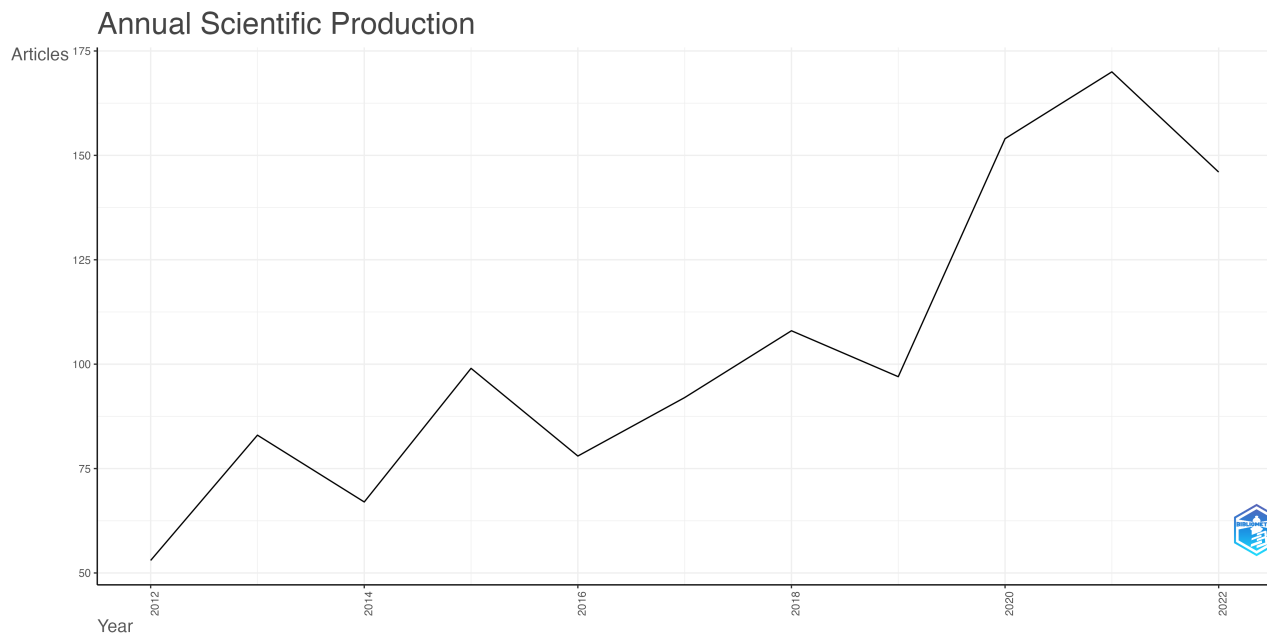
The second result that, derives from the *Overview* category, computes the Annual Scientific Production and is illustrated in below Figure 1. This metric calculates the document production with the time per year being the unit of analysis. As seen in Figure 1, this graph can be attributed with a constant growth, coupled with fluctuations. Nevertheless, ultimately the writing of new articles for 2022, for the theme ‘Intelligence agencies’, was almost three times up the amount of documents produced on the first and most unproductive year, meaning 2012.

A noteworthy remark comes from the yearly change from 2019 to 2020, where the production increased noticeably from ninety-six (96) to one hundred fifty-four (154) articles.

¹⁰ As shown on the Appendix section, page 45.

¹¹ Those mentioned in section 3.1 Dataset; Source, inclusion and exclusion of articles, page 13.

Figure 1. Annual Scientific Production



The next graph that, can be seen below in Figure 2, represents the Average citations per year. This metric is calculated based on the mean number of citations divided by the number of years that have past since the author published the said paper, which can be described as the citable years. So, from one point of view, it makes sense to face a decreasing plot, considering that the years that this article exists and can be circulated, read and therefore cited, are less, compared to a decade old, and maybe already well established in the academic field, articles. On the contrary, taking into account the same thought process, the dividend for the more recent articles, is inevitably a smaller number, suggesting that the mean citations per article doesn't necessarily need to be as high as the for the older documents.

In any case, the results indicate a consistent decline from 0.89 in 2012 to 0.12 in 2022 average citations per year.

Figure 2. Average Citations per Year

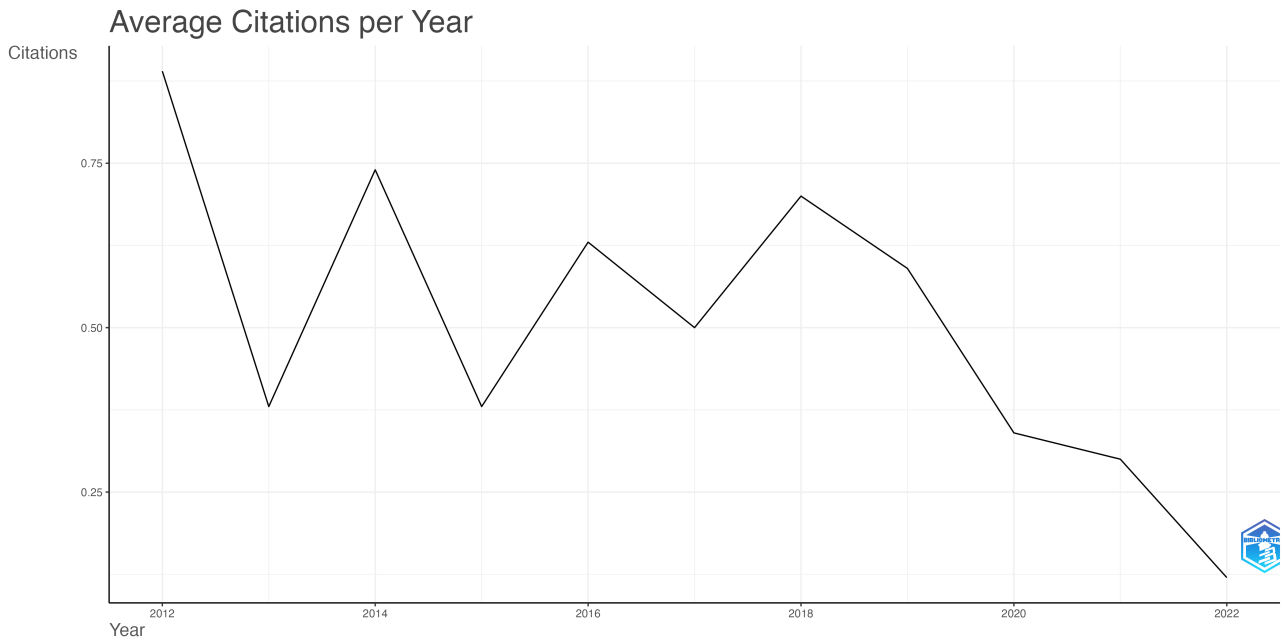
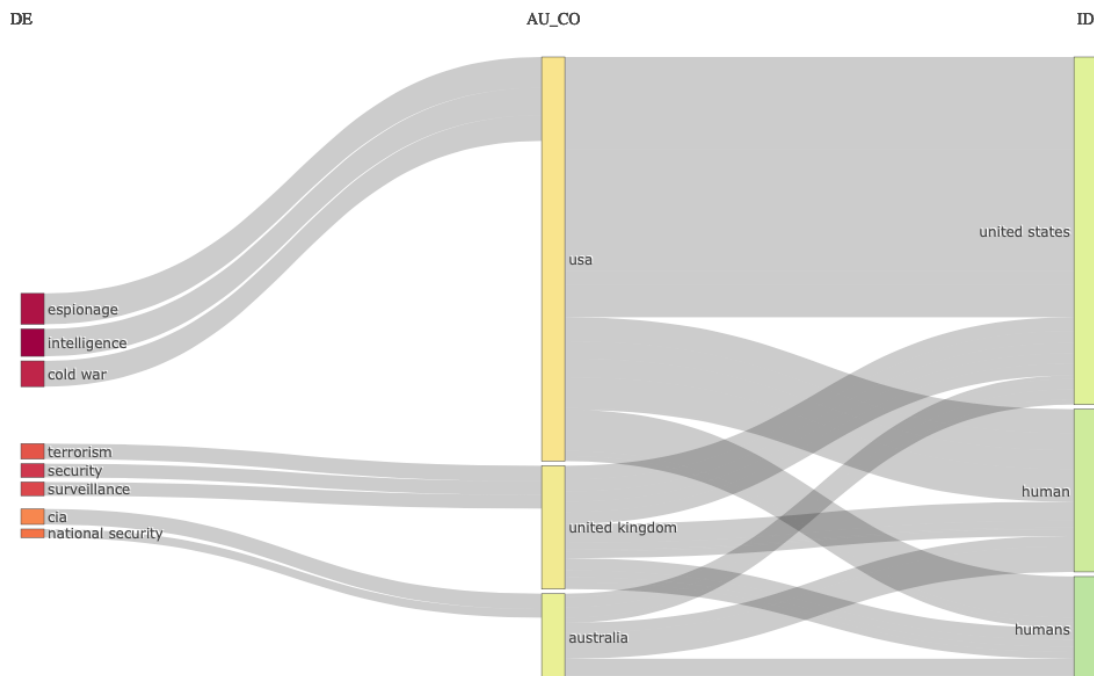


Figure 3. Three field plot



The last *Overview* plot depicted in Figure 3, encompasses three parameters in one plot. As shown in Figure 3 the chosen parameters are the author's keywords on the left, the countries

in the middle and the keywords plus¹² on the right side. The number of items were selected as three (3) for the middle field and fifteen (15) for each left and right field. This interactive plot, could possibly show signs of the fields or even schools of thought that the authors from a specific country are being influenced from or a specific matter or phenomenon relevant to the field or foreign policy of the specific country.

The quality status of Keywords and Keywords Plus, based on Image 7, is considered 'poor' and 'critical' respectively. So, it is necessary to mention, that, due to the fact that a significant amount of data is missing, the resulting Figure 3 can not be considered as trustworthy. This plot's presentation only serves the purpose of highlighting the application's capabilities.

Having said that, the results¹³ include the following; the authors from the USA mainly wrote articles, regarding the sphere of intelligence, about the 'cold war', 'espionage', 'intelligence', whereas the terms that was found mostly in their reference list referred to the 'united states', 'human(s)'. The writers from the United Kingdom used as keywords the words 'terrorism', 'security', 'surveillance'. From the other hand, the keywords plus were 'united states', 'human(s)'. The incoming flow for Australia relates to the terms; 'national security' and 'cia'. In comparison, the keywords plus that the Australian authors used were; 'united states', 'human(s)'.

4.2 Sources' plots

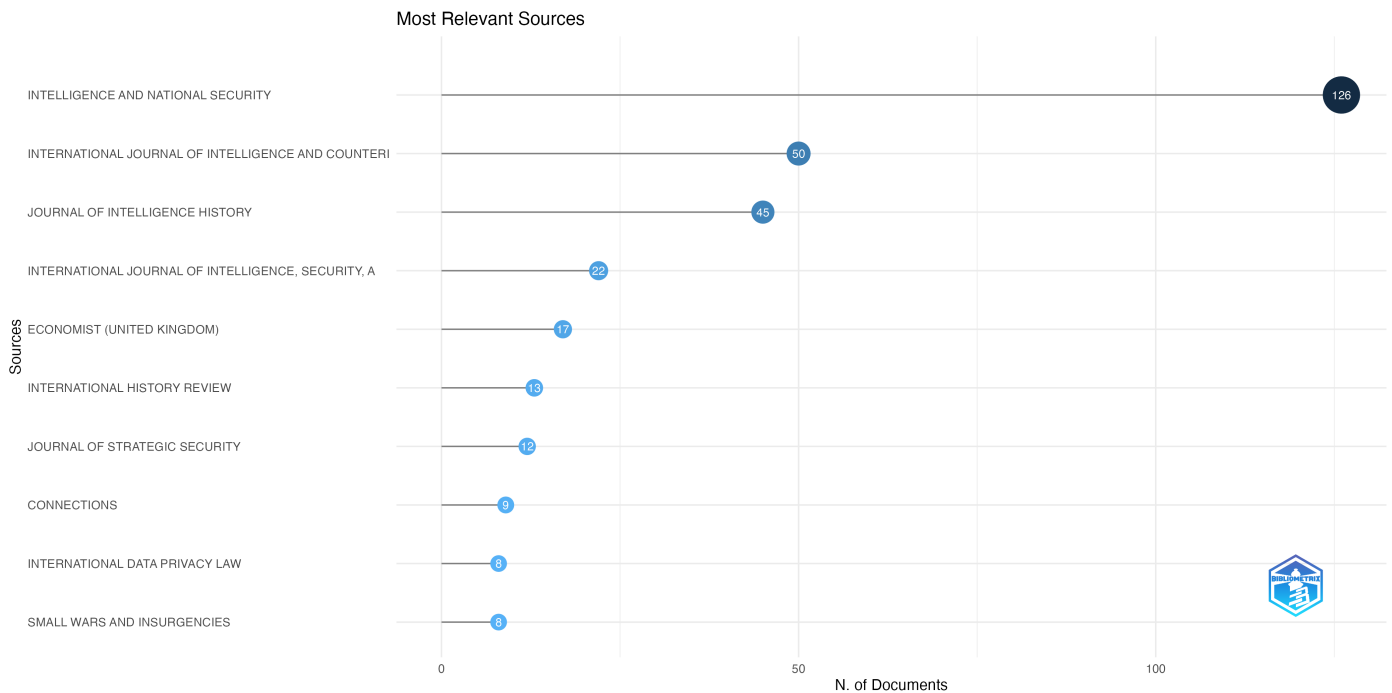
The second category touches upon the sources. For the first out of this kind of plots, the most relevant sources are being presented. According to those results, the most relevant journal in regards to intelligence agencies and their activities, is the peer reviewed academic journal *Intelligence and National Security* published by Routledge, since one hundred twenty-six (126) of the articles of the dataset were published on this journal's issues. The second most relevant source is another Routledge published periodical, the *International Journal of Intelligence and Counterintelligence*, with fifty pertinent articles. The list of the top three (3) sources concludes with the *Journal of Intelligence History*, a Taylor & Francis academic magazine with forty-five

¹² Keywords plus are words or phrases that frequently appear in the titles of an article's references, but do not appear in the title of the article itself (Clarivate, 2022).

¹³ The word 'article' was excluded from the presentation of the terms for each country, seeing as this was a term with no relevant substance, for the field of intelligence.

(45) documents from this paper’s dataset. The rest can be seen on the below Figure 4. Those journals are more broad with regard to the subject they focus on -which as noticed is economics, law, strategic and war studies,-but they still are apropos of the intelligence context.

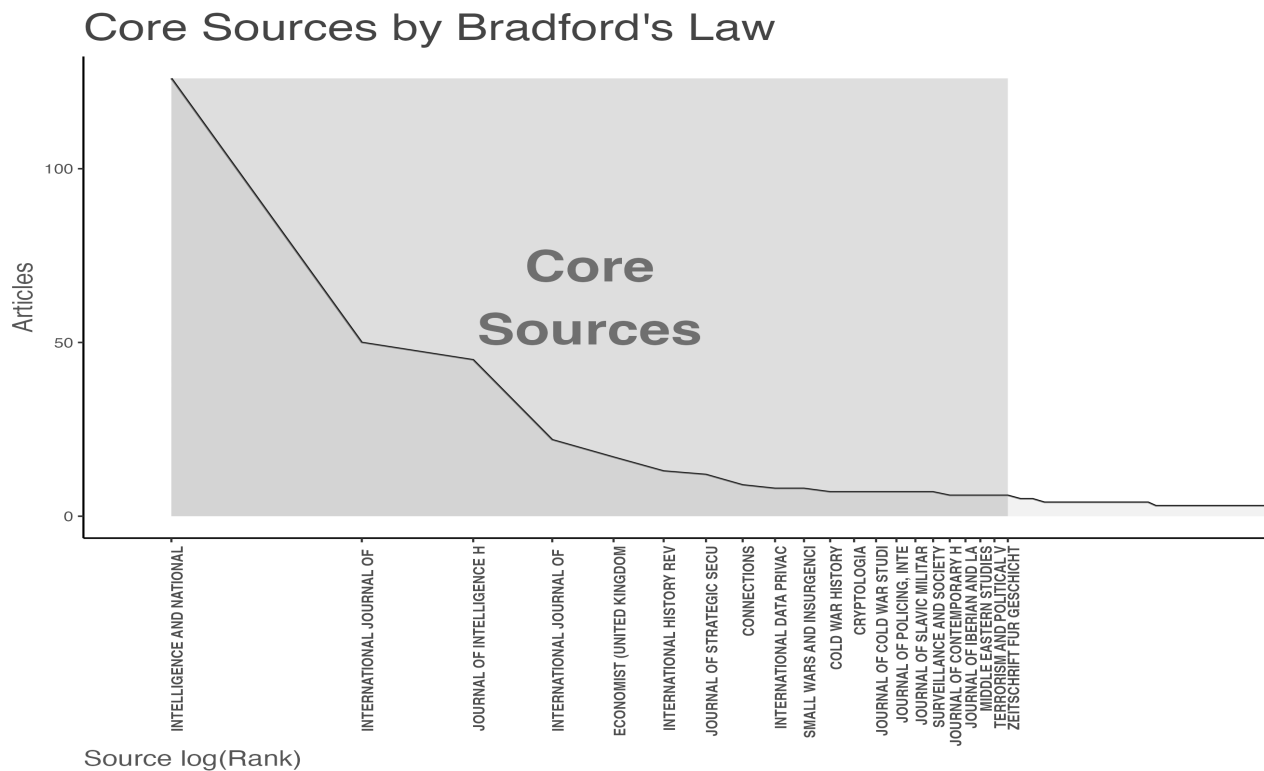
Figure 4. Most relevant Sources



Continuing on the sources’ analysis, the next graph depicts the Bradford’s law. Bradford’s law demonstrates the phenomenon of scattering in sources, based on their productivity. This means that there are sources that are high, average and low in terms of production of articles in the field of study that we are researching (Nash-Stewart CE et al., 2012). So as to present the Bradford’s law, the results get divided in zones, where Zone 1 equals high rates of article production, Zone 2 is similar to medium rates of production and so on.

From Figure 5, we conclude that the most fruitful periodical is the *Intelligence and national security*, with frequency in publications at one hundred twenty-six (126). Next in line is the *International Journal of Intelligence and Counterintelligence*, with half the documents at fifty (50). The rest (Zone 2) are journals with more broad context that include papers on the field of history, area studies, strategic and security studies. Last on this list (Zone 3) are journals containing only one paper and usually are in a foreign language as well. On this case, on rank five hundred ninety-six (596) is the *Zeitschrift fur Historische Forschung*.

Figure 5. Bradford's law



Another source metric is the Sources' Local Impact that, it is calculated based on the h-index. The Hirsch's or h index measures the maximum amount of h papers that have received at least h citations each (Bornmann and Daniel, 2007). In Table 2 are presented the first most impactful journals in terms of quantity and visibility from the documents included in this dataset.

Table 2. Sources' Local Impact

Journal	H-Index
Intelligence and National Security	9
International Data Privacy Law	5
International History Review	4
International Journal of Intelligence and Counterintelligence	4
Media and Communication	4
Policing and Society	4
History	3
Journal of Cold War Studies	3
Journal of Contemporary Asia	3
Journal of Contemporary History	3

Source; Author based on Biblioshiny results

Figure 6. Sources' Production over Time

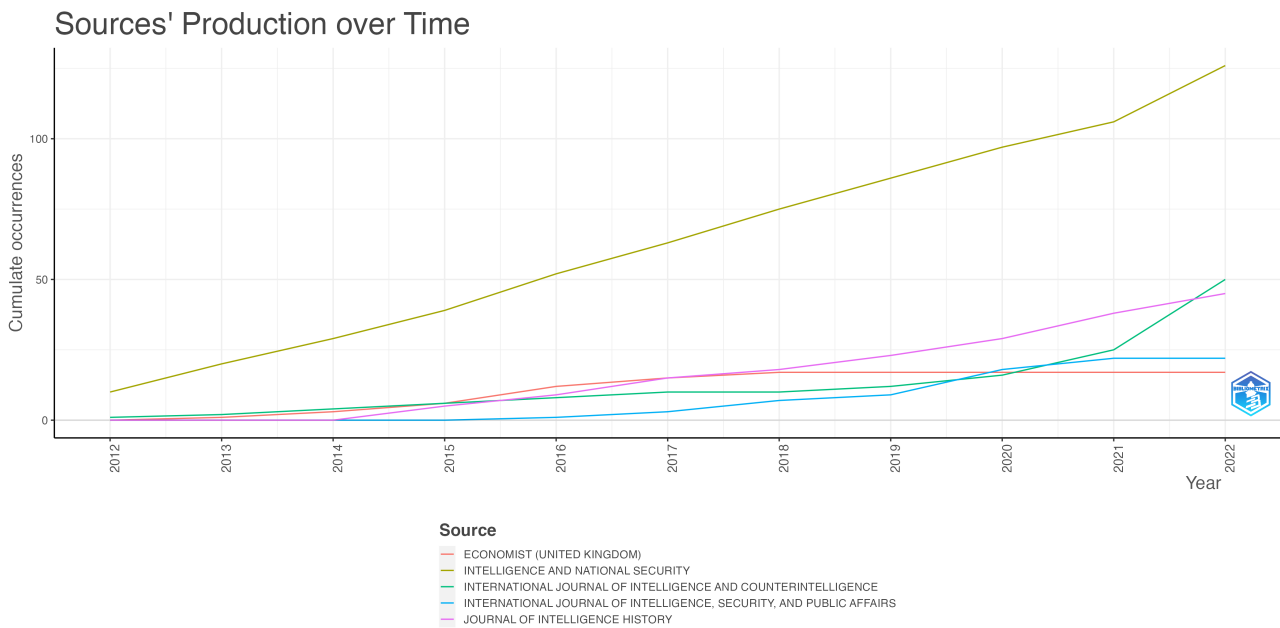


Figure 6 describes the dynamic development of the sources for each year. Once again the *Intelligence and National Security* journal leads the way with a steady increase every year, in comparison to the fifth periodical the *Economist (United Kingdom)*, which didn't grow in publications relevant to intelligence agencies since 2019.

4.3 Authors' plots

Findings related to authors on the field of intelligence agencies are presented on the following tables and figures.

Specifically, in Table 3 the top ten most relevant authors are presented, based solely on their number of articles, with Gentry JA being on top of the list.

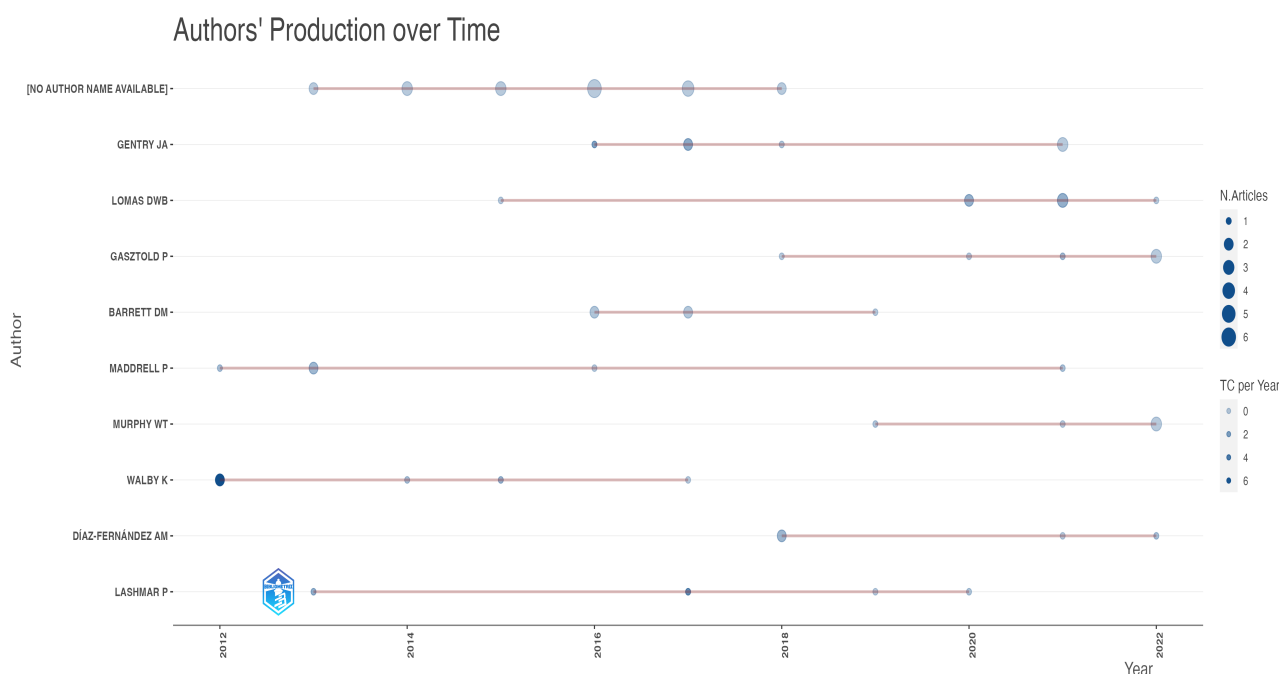
Table 3. Most Relevant Authors

Author	Articles
[No author name available]	20
Gentry JA	7
Lomas DWB	7
Gasztold P	6
Barrett DM	5
Maddrell P	5
Murphy WT	5
Walby K	5
Diaz-Fernandez AM	4
Lashmar P	4

Source; Author based on Biblioshiny results

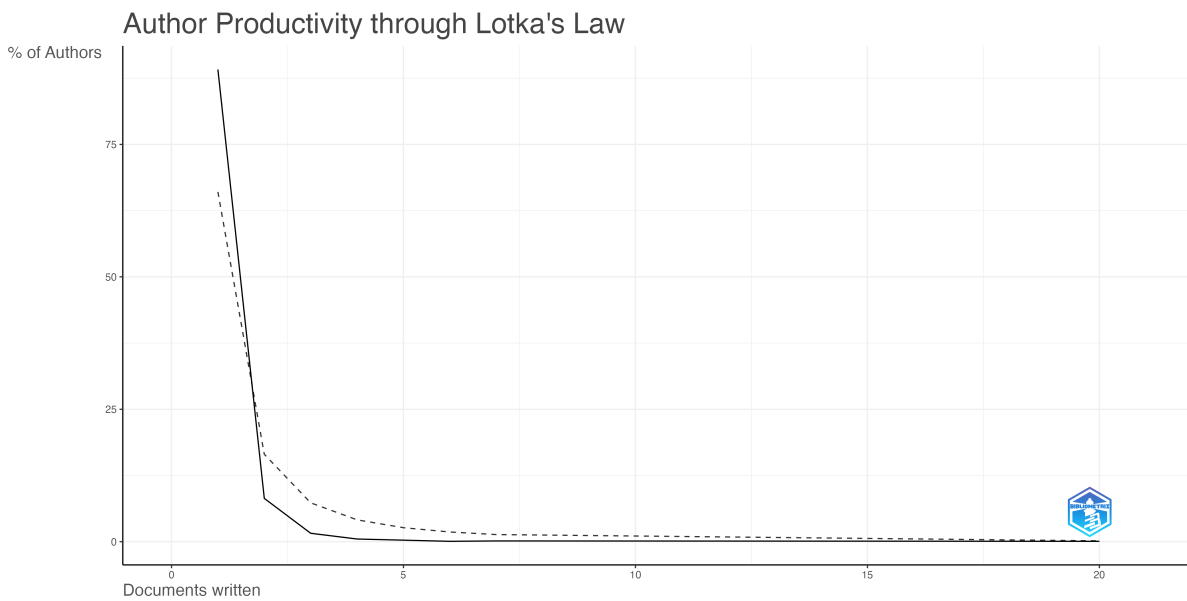
Figure 7 can be characterised as complementary to the above Table 3, since it shows the scattering of the articles of the most productive authors over time, a measurement that indicates the timeless relevance and diachronic quality of each author. Where the dots are more blue and large, the number of articles, the citations per year or both, account for a rise. For example, Lomas DWB in 2021 published three (3) articles and the total number of citations for this year were 1.33, demonstrating his best period in terms of production and in comparison with the rest of the years.

Figure 7. Authors' Production over Time



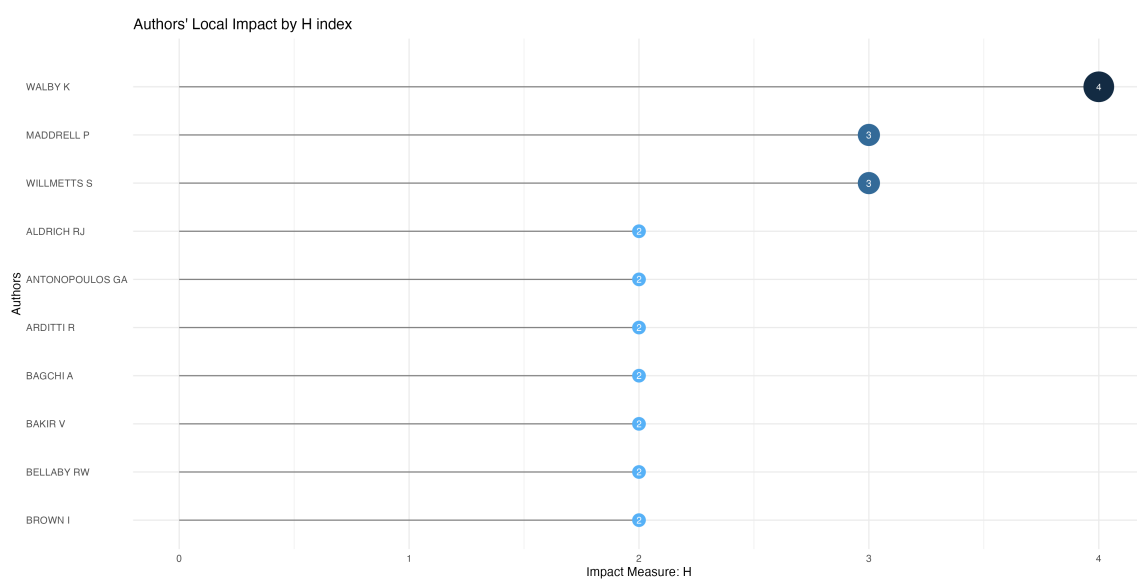
When it comes to the proportion of author's in correlation with their number of publications, the Lotka's Law is utilised. According to this principle, when the number of written articles increases, the percentage of authors that produce them become less frequent (Kawamura et al, 2000). In Figure 8, this occurrence is demonstrated and validated. Namely, 89,1% of the authors (N= 1232) have written one (1) article, whereas 8,2% of authors account for two (2) published documents, in comparison to 0,1% (N=2) of them that, are responsible for the production of seven (7) articles in total.

Figure 8. Lotka's law



The depiction of the author's local impact is required, in order to conclude the author's bibliometric measurements. The same principle that was used in Table 2 will be applied, with the twist being on the unit of analysis, from sources to authors. The aforementioned are shown on Figure 9, in which the productivity of the author entangles with the h-index, meaning how often he/she has been cited locally¹⁴ (Εθνικό Κέντρο Τεκμηρίωσης, n.d.). Walby is considered to be among the most influential authors with a score of four (4) as well as Maddrell P with H=3.

Figure 9. Author's Local Impact



¹⁴ According to Aria and Cuccurullo (2017), local citations are citations received by a reference article "internally in the collection", where collection means the dataset under research.

4.4 Affiliations' plots

The affiliations of an article play a meaningful role in bibliometric analysis. Table 4 below indicates the most relevant affiliations, that is the top ten (10) organisations -mainly universities- in regards of the number of papers published.

Higher on the list leads the University of Oxford with fourteen (14) relevant documents and three (3) other England based universities belonging on the top ten (10). Universities of Georgetown, California and Michigan state, represent the three (3) most pertinent institutions from the U.S., including Deakin University which appears for Australia.

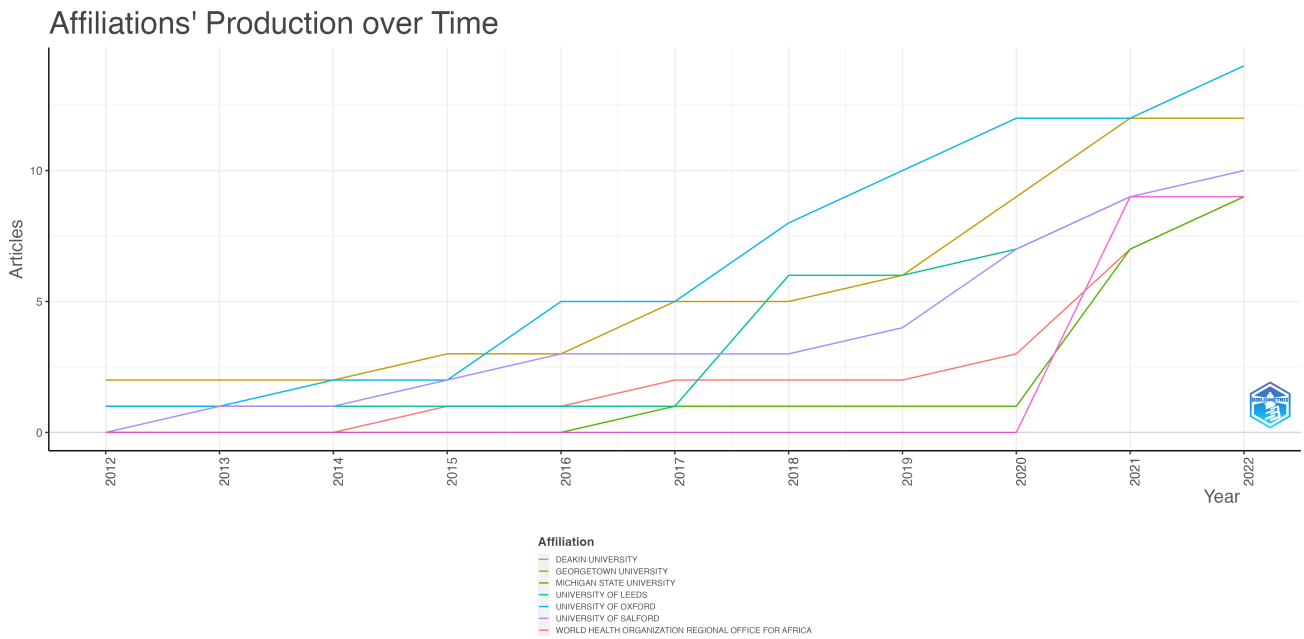
Table 4. Most Relevant Affiliations

Organisation	Articles
University of Oxford	14
Georgetown University	12
University of Salford	10
Deakin University	9
Michigan State University	9
University of Leeds	9
World Health Organisation Regional Office for Africa	9
Not Reported	8
University of Warwick	8
University of California	7

Source; Author based on Biblioshiny results

Figure 10 below is interrelated to the above Table 4, since it displays the leader institution at any given year regarding their dynamic and interest on the intelligence agencies field. For instance, from 2017 until 2020 Oxford University was undeniably the leader in intelligence paper production, nevertheless in 2021 Georgetown University matched the amount of documents which Oxford published. Another noteworthy feature of the below diagram is the amount of total papers that these institutions produced. Namely in 2020 the total number amounted at thirty-nine (39) documents, in comparison to 2022 when the sum total almost doubled at seventy-two (72).

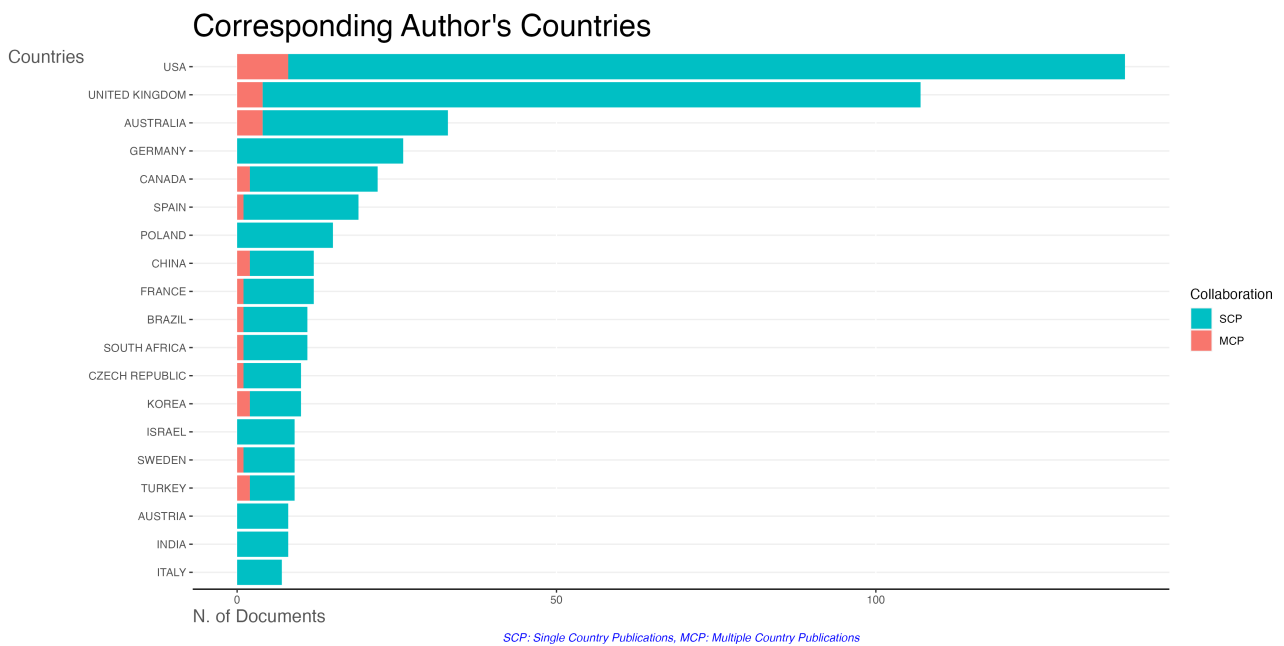
Figure 10. Affiliations' Production over Time



4.5 Countries' plots

Another enlightening field in bibliometric analysis, refers to the scientific production while having as an unit of analysis the partaking countries.

Figure 11. Corresponding Author's Countries



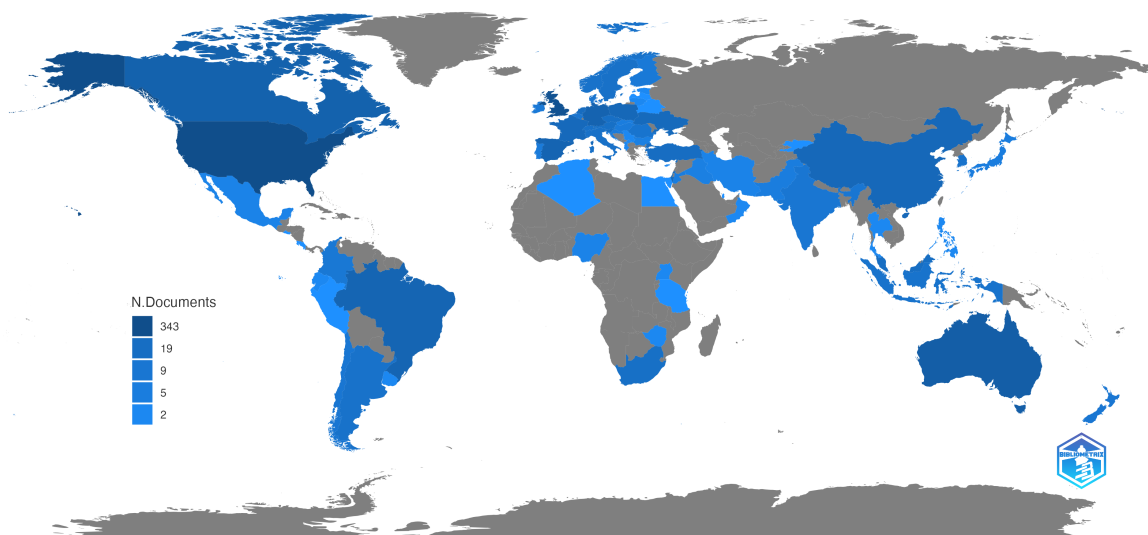
One way to research that, is by utilising the corresponding author's countries graph. In that direction, if we examine Figure 11, we can establish the amount of articles *that are associated with a single country on the basis of the affiliation of the corresponding author* (Aria and Curuccullo, 2017), so as to realise the epicentre of the -in our case- intelligence discipline. The red bar denotes the articles that are written with the collaboration of multiple countries (MCP), while at the same time the blue bar designates the single country publications (SCP). Meaning that if at least one of the authors originates from a different country than the corresponding author, then the MCP index will apply.

The lead in Figure 11 belongs to the USA, with a total of 138 articles from which eight (8) indicated multiple country collaboration. Not far behind, the United Kingdom (N=107), Australia (N=33), Germany (N=26), Canada (N=22) and Spain (N=19). China the first non-western country is ranked in the eighth (8th) place with a sum of twelve (12) articles (two of them are considered MCP).

A more general depiction is given on the map chart below which visualises the number of articles per country, on the basis of the origin of all contributing authors. Namely, if an article is written by an Australian and a Canadian author, then both countries (Australia and Canada) will increase the number of papers published by one.

Figure 12. Country Scientific Production

Country Scientific Production



As seen on the above Figure 12, the results don't vary much in terms of ranking -at least the top five (5)-, with the exception of the number of documents that seem to almost double. For

example, the top five (5) countries are configured as follows; USA (N=343), UK (N=231), Australia (N=78), Canada (N=57), Germany (N=49).

In line with year over year change that can be seen in Figure 13, it can be concluded that from 2013 and onwards there is a steady increase in scientific production on the intelligence studies. Moreover, it may be said that from 2020 and on, a more notable growth has been marked.

Figure 13. Country Production over Time

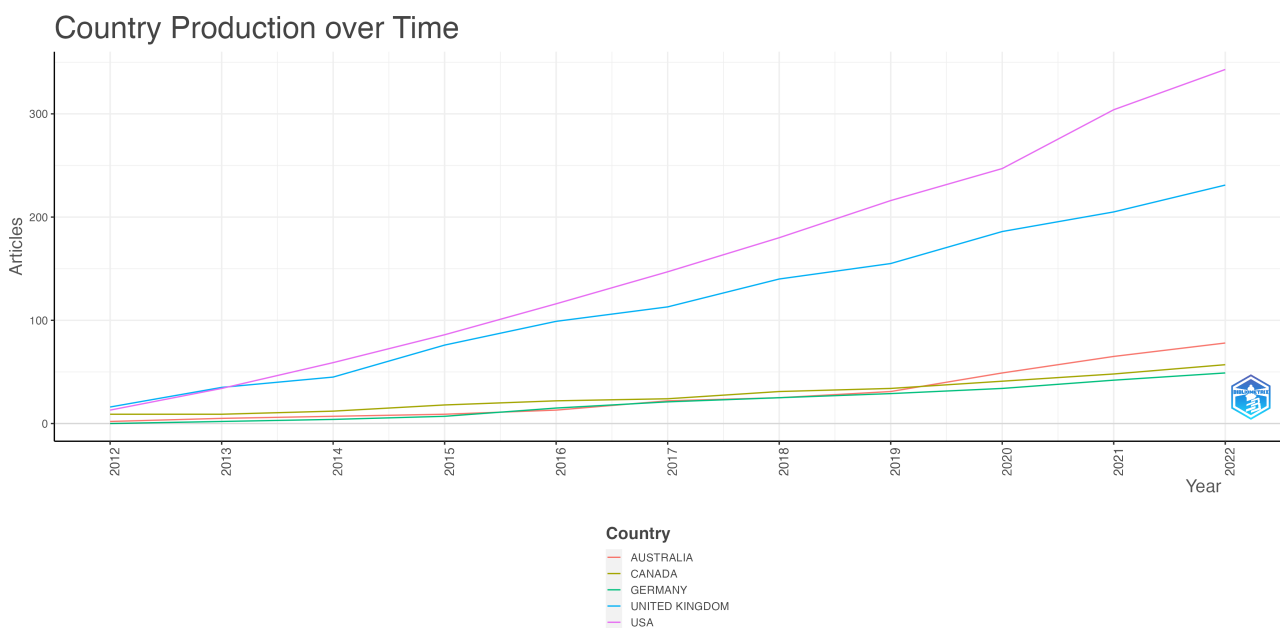


Table 5 shows the most cited articles. Those belonged to the USA, with a total number of citations at five hundred ninety-six (596) and an average citation per article at 4.30. The UK collected five hundred twenty-five (525) citations totally, but also had a better average article citation number at 4.90. Finally, the Netherlands, although they accumulated at the sixth (6th) place total nos of fifty-four (54) citations managed to have the best average result at 10.80 per article.

Table 5. Most Cited Countries

Country	Total citations	Average article citations
USA	551	4.00
UK	525	4.90
Canada	197	9
Australia	142	4.30
Germany	77	3

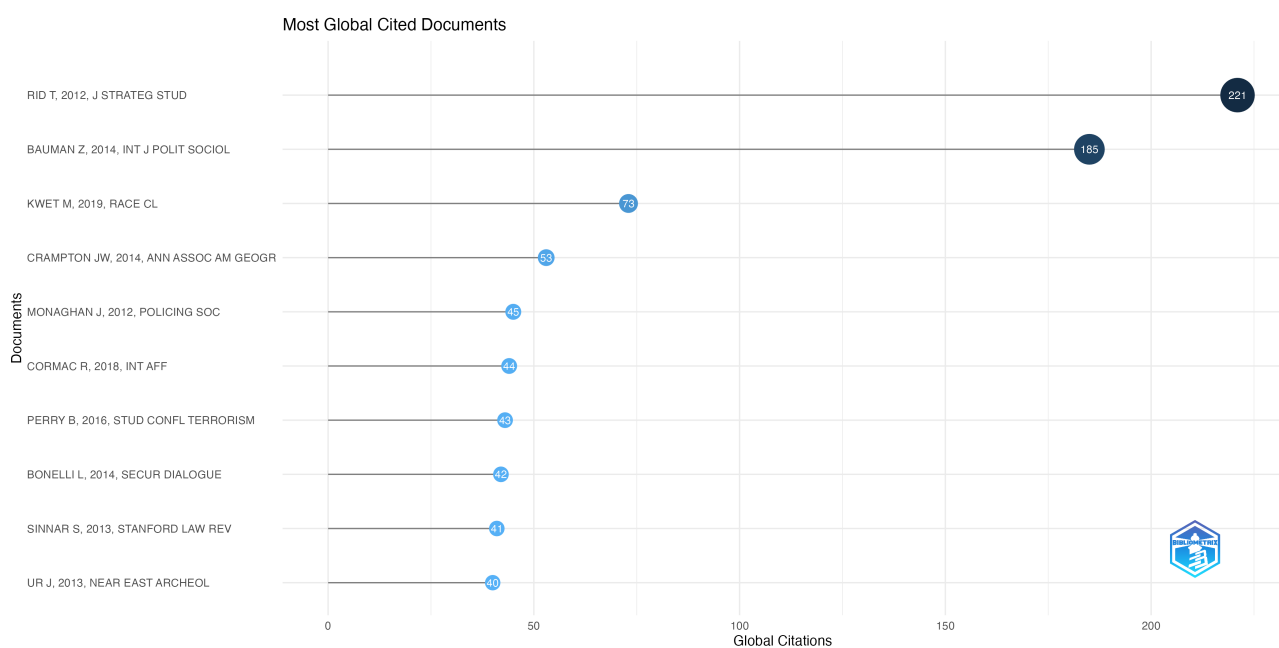
Netherlands	54	10.80
Brasil	44	4
Sweden	32	3.60
Spain	26	1.40
China	23	1.90

Source; Author based on Biblioshiny results

4.6 Documents' plots

In the documents' realm the Most Global Cited Documents are provided in Figure 14. The term global translates into the total amount of citations from the Scopus database, namely not only from the articles that are being studied in this paper, but from all over the world (Aria and Cuccurullo, 2017).

Figure 14. Most Global Cited Documents



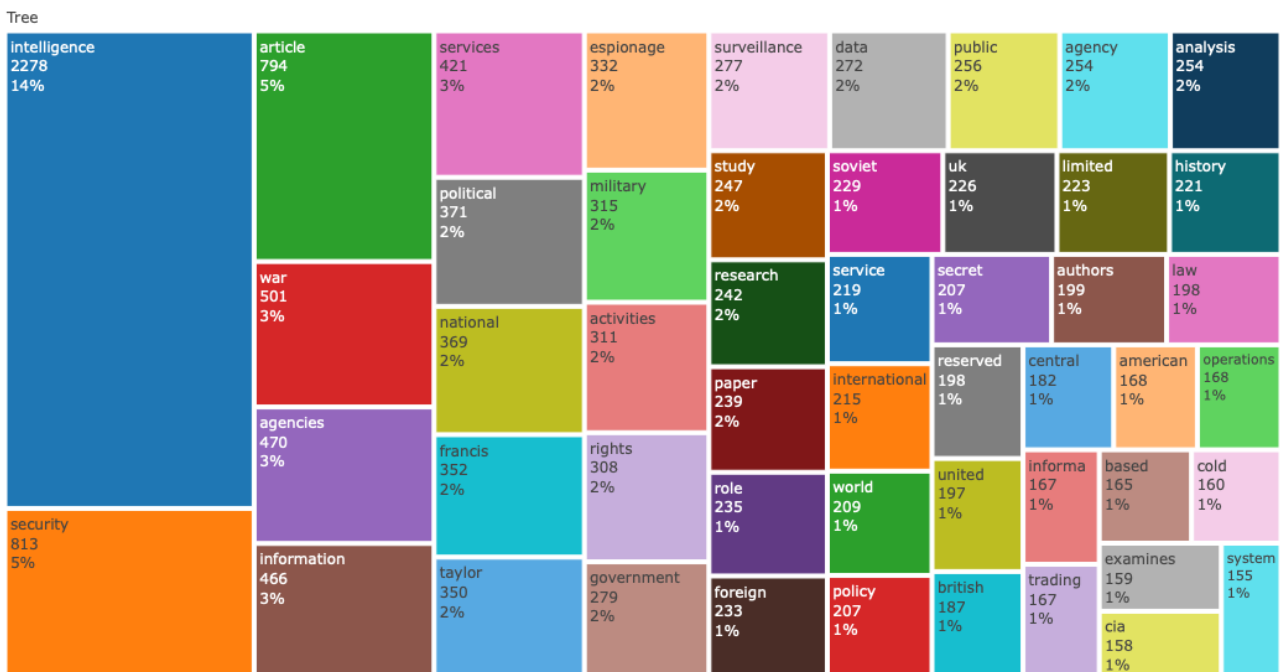
Those documents are mainly older in publication years, going back to the beginning of the decade of 2010. The first two documents that enjoy a three digit number of citations are the following: Rid's Thomas article published in 2012 titled 'Cyber War Will Not Take Place', had an amount of two hundred twenty-one (221) citations in the *Journal of Strategic Studies*. Second place in regards to citations is Zygmunt Bauman's 'After Snowden; Rethinking the Impact of Surveillance' paper, submitted in 2014 to the periodical *International Political Sociology*.

4.7 Words' plots

For a more insightful view on the content of all the articles, it is in order to examine the most frequently appeared words. This depiction can be done in various forms, such as a typical line graph¹⁵, a World-cloud¹⁶ or tree map. In this paper, the tree map option prevailed, due to the simple fact that it was the most visually appealing and easy/simple to read. The other two options are also included in the Appendix section.

As far as the below tree map (Figure 15) goes, the filters that were selected are the fifty (50) most recurring words that derive from the given Abstracts, so as to understand the main concepts that the authors explored.

Figure 15. Tree map



As a matter of fact, from the above graph, it is comprehended that, in the heart of the focal topics that were commonly investigated are¹⁷: intelligence (14%), security (5%), war (3%), agencies (3%), information (3%) etc..

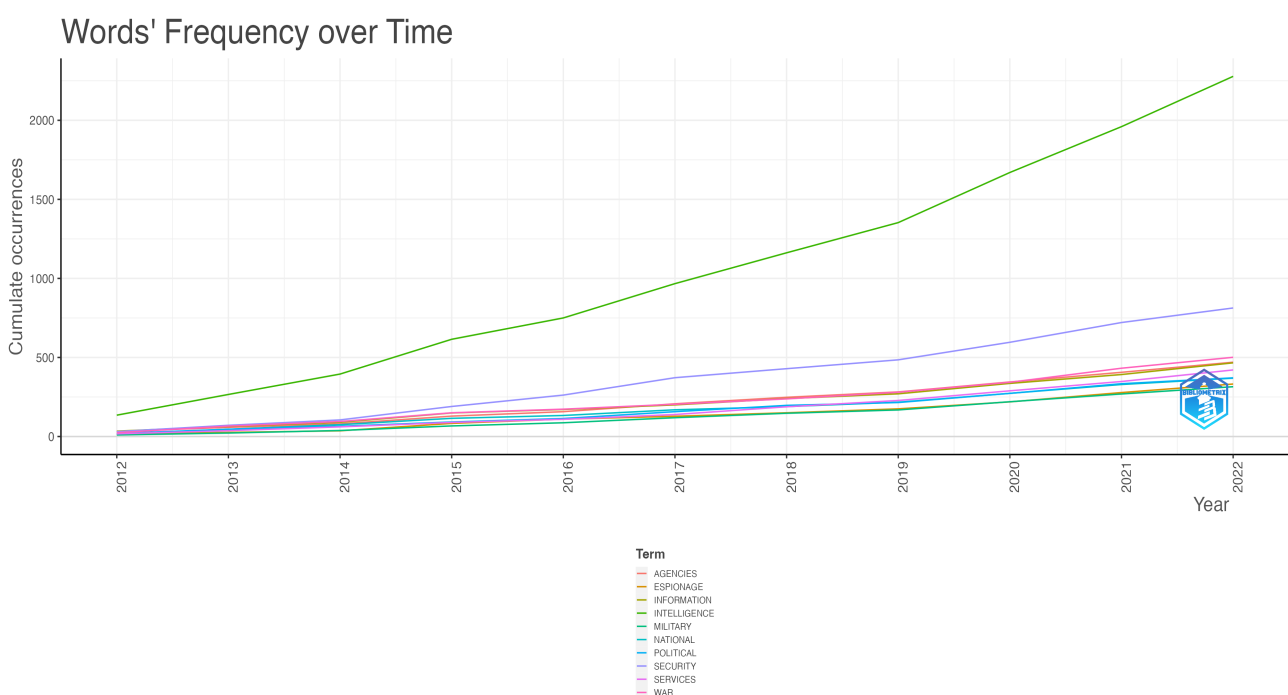
¹⁵ Appendix; Figure 16, page 46.

¹⁶ Appendix; Figure 17, page 46.

¹⁷ This paper shall not take into consideration, terms that are obviously not related to the intelligence topic, for instance, ‘article’, ‘francis’, ‘Taylor’ etc..

The above Figure 15 is better appreciated when with the complementary Figure 18. This plot (Figure 18), portrays the yearly change of the most frequent terms¹⁸. In more detail, all terms significantly grew from 2012 till 2022, for instance, the concept of *intelligence* was deployed one hundred thirty-five (135) times on the first year, and in 2022 ended up being two thousand two hundred seventy-eight (2278) times present. Another relevant word, *espionage*, was counted from fifteen (15) to three hundred thirty-two (332) times, respectively. Last but not least, the idea of *war* rose the last couple of years, from 2020 till 2022, and resulted in outnumbering the terms *agencies* and *information*.

Figure 18. Words' Frequency over Time



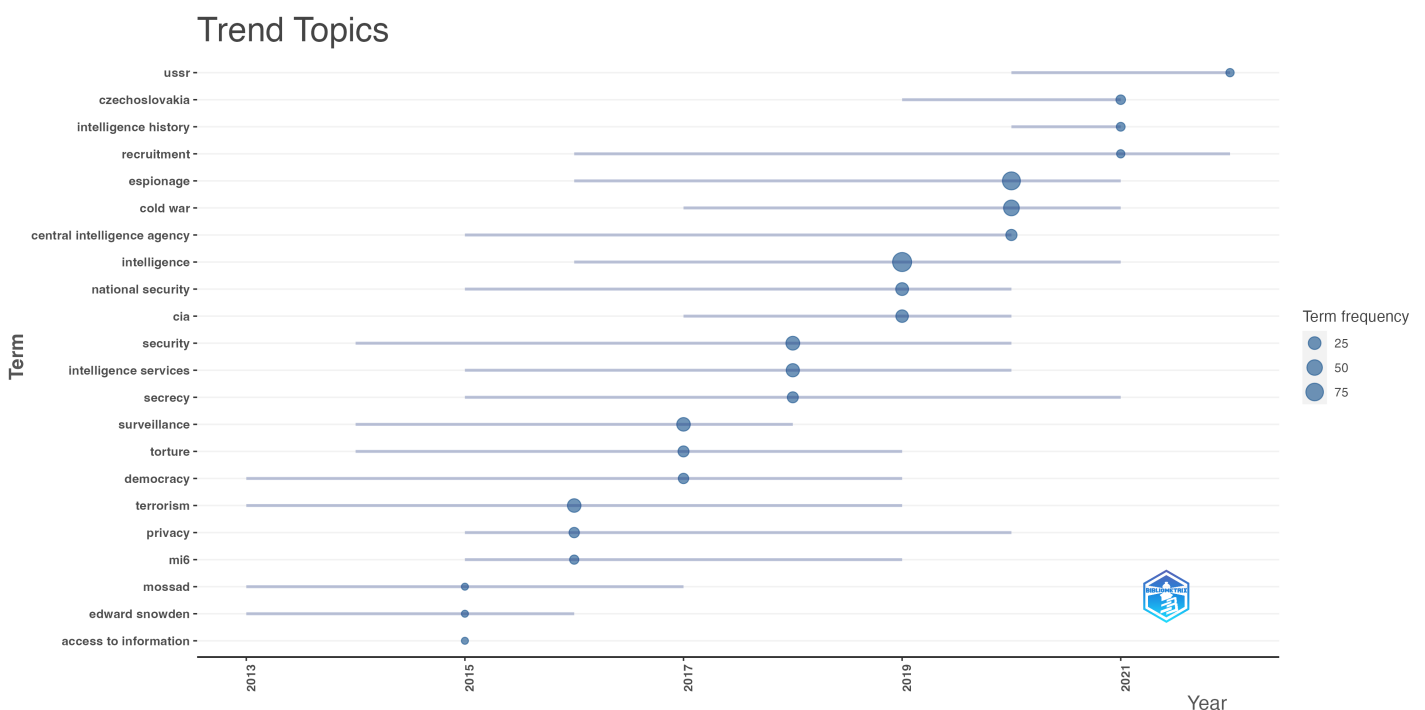
For a broader view of the topics of interest, figure 19 provides a list of trend topics throughout the years, based on the author's keywords¹⁹. The selected parameters are at least word frequency of five (5) and three (3) number of words per year. Lastly, the length of the line indicates the time in years that the topic remains relevant and the largest the dot the bigger the calculation is of the frequency of the word.

¹⁸ Top ten words that come from Abstract, with the exclusion of irrelevant terms, such as 'Article', 'Taylor', 'Francis'.

¹⁹ Once again an exclusion of the three irrelevant words; 'Taylor', 'francis', 'article' has been applied.

Therefore, as seen below the most diachronically resilient topics are ‘security’ (2014-2020) with a peak in frequency at 2018, ‘democracy’ (from 2013 till 2019), with most prominent year 2017 and ‘terrorism’ (2013-2019) with a frequency of thirty-two (32) at 2016, the term ‘secrecy’ has also a time span of seven (7) consecutive years from 2015 to 2021. From the other aspect, the most frequent topics are obviously ‘intelligence’ with a presence of ninety-six (96) times in year 2019, ‘espionage’ (eighty (80) times in 2020), ‘cold war’ (fifty-three (53) times in 2020) and ‘surveillance’ (thirty-two (32) times in 2017).

Figure 19. Trend Topics



4.8 Clustering by coupling plot

Another relatively new concept is that of clustering by coupling. This computational method, allows to distinguish the analogies between subsets and highlight deeper configurations, automating a time consuming process, if done by human experts (Marx et al., 2002). Below Table 6, presents thematic groups of three based on commonalities, with units of analysis being a total of one thousand one hundred forty-six (1146) documents, and coupling being measured based on author’s keywords.

Table 6. Clustering by coupling

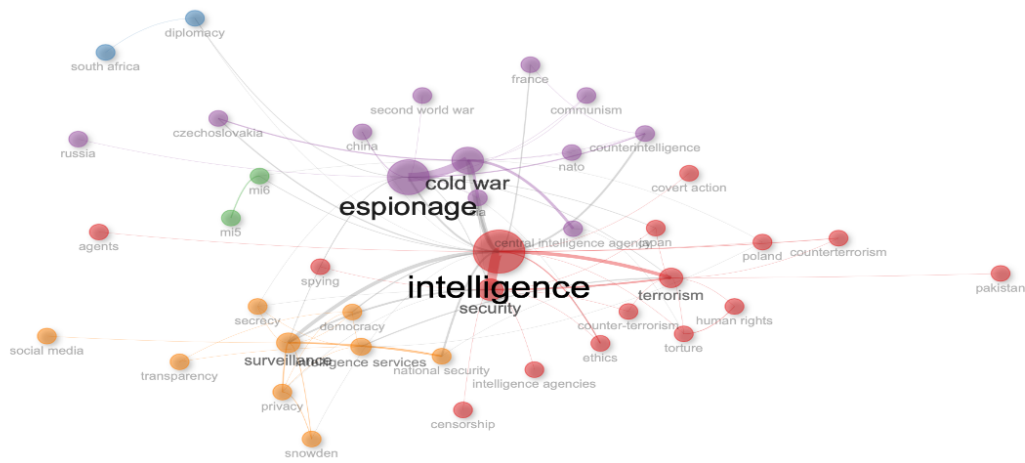
label	group	freq	centrality	impact	color
security - conf 55.9% surveillance - conf 59.4% terrorism - conf 53.1%	6	119	0.120313683266875	1	#A6562880
intelligence - conf 100% security - conf 35.3% surveillance - conf 28.1%	7	111	0.289571289730588	1	#F781BF80
espionage - conf 93.7% cold war - conf 17% spying - conf 63.6%	9	89	0.24090645445835	1	#66C2A580
cold war - conf 67.9% central intelligence agency - conf 37.5% cia - conf 21.7%	1	46	0.171175211590361	1	#E41A1C80
intelligence services - conf 93.1% terrorism - conf 12.5% national security - conf 11.5%	28	31	0.159145130510264	1	#BEBADA80
torture - conf 80% human rights - conf 53.8% guantánamo - conf 100%	14	23	0.0954205341246163	1	#FFD92F80
diplomacy - conf 50% south africa - conf 66.7% russia - conf 62.5%	8	22	0.0857840287518473	1	#99999980
national security - conf 61.5% cybersecurity - conf 83.3% defence - conf 100%	5	19	0.114161865934663	1	#FF7F0080
second world war - conf 71.4% abwehr - conf 100% bletchley park - conf 100%	4	12	0.101111191169508	1	#984EA380
recruitment - conf 83.3% ussr - conf 83.3% intelligence activities - conf 66.7%	11	11	0.0778788865884364	1	#8DA0CB80
privacy - conf 58.3% snowden - conf 44.4% mass surveillance - conf 100%	15	10	0.0930182646405642	1	#B3B3B380
cyber espionage - conf 100% malware - conf 75% computer security - conf 100%	18	10	0.106182037040373	1	#B2DF8A80
israel - conf 66.7% civil-military relations - conf 100% mossad - conf 40%	2	9	0.0894798053301435	1	#377EB880
pakistan - conf 75% human intelligence - conf 50% archives - conf 50%	16	7	0.074644337770639	1	#A6CEE380
intelligence analysis - conf 100% big data - conf 60% intelligence culture - conf 66.7%	13	6	0.075274643639224	1	#A6D85480
intelligence agencies - conf 54.5% al-shabaab - conf 100% amniyat - conf 100%	31	6	0.0818226343228923	1	#FDB46280
money laundering - conf 100% corruption - conf 50% financial crime - conf 100%	10	5	0.0697148938248344	1	#FC8D6280
industrial espionage - conf 100% economic espionage - conf 100% challenges - conf 100%	12	5	0.128366760405372	1	#E78AC380

The above groups are quite accurate in describing distinctive aspects of intelligence agencies. A more general image is depicted in the first line, which includes the terms ‘security’, ‘surveillance’ and ‘terrorism’, but at the same time more specialised fields are also prominent, such as the label with the terms ‘cyber espionage’, ‘malware’ and ‘computer security’. Specific case studies that have been investigated like the Snowden leaks, can be also picked out (referring to the label; ‘privacy’, ‘snowden’, ‘mass surveillance’).

4.9 Conceptual Structure plots

First on the Conceptual Structure plots which can be seen in Figure 20, called Co-occurrence network. This graph creates clusters among author’s keywords that happen to often be placed together (Schweinberger, 2018). Such clusters are ‘mi5 & mi6’, or ‘surveillance, intelligence agencies, national security, secrecy, democracy, privacy, snowden, social media, transparency’. The rest three (3) groups can be seen below.

Figure 20. Co-occurrence Network

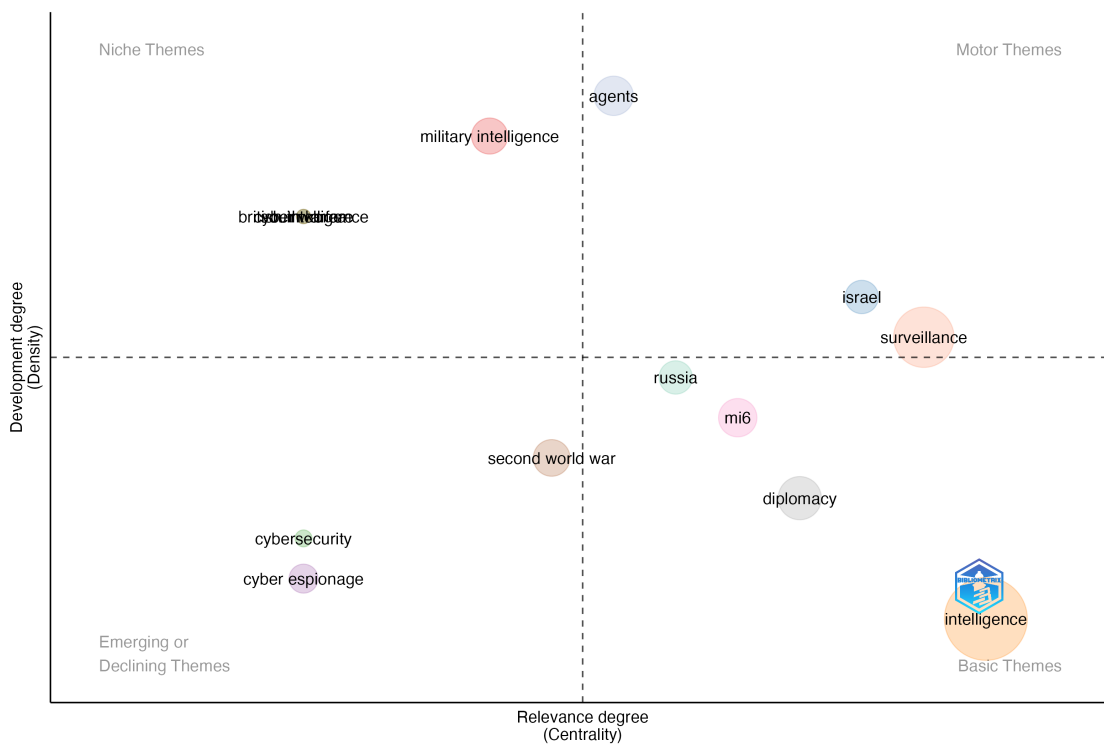


One of the key plots in bibliometric analysis is the Thematic Map one, this represents the specific subjects that the articles of the field explore, in the form of clusters (Chen et al., 2019). The measures employed are centrality²⁰ and density²¹ and the field is set as author’s keywords. In Figure 21, four distinctive quadrants can be identified, those are the niche themes that are of less importance and without much of external ties, the motor-themes that are well developed and significant for the conceptual structure of the field, the emerging or declining themes are obviously not well developed and mostly insignificant, whereas the basic themes are important for the field, but not quite evolved (Chen et al., 2019).

²⁰ Centrality measures the importance of a node in a said network, by measuring the connections with other nodes. This can be further distinguished by the number of nodes that are incident on it (in-degree) and the amount of connections to other nodes (out-degree) (Bhasin, 2019).

²¹ Density can be calculated by dividing the number of keywords belonging to the theme by the keyword count in the theme (Chen et al., 2019).

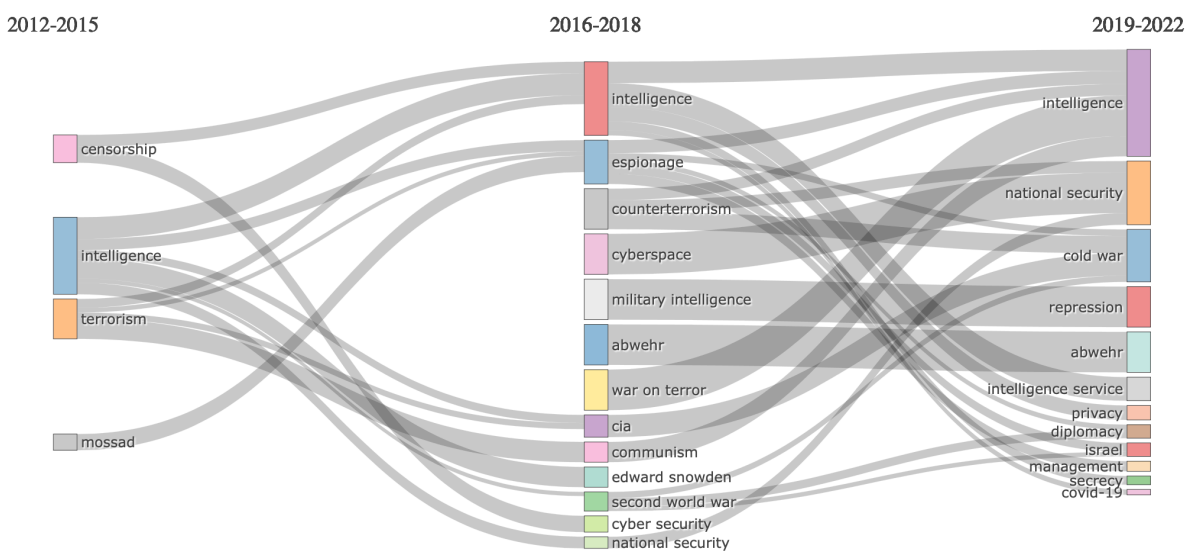
Figure 21. Thematic map



Military intelligence, south Korea and cyber warfare are categorised as niche themes. Agents, Israel and surveillance are on the other hand characterised as motor themes. Emerging or declining themes are cybersecurity, cyber espionage and second world war, and last but not least as basic topics can be found intelligence, diplomacy, mi6 and Russia.

A diverse way to state the themes, is based on a time continuum. For the next Figure number 22, the author’s keywords are once again employed with the alteration of being spread out in three distinct time periods, with 2015 and 2018 as the cutting years. For each time period a new detailed thematic map is available and provided in the Appendix. Figure 22 produces a more concise image of the dominant topics for the three time slices.

Figure 22. Thematic evolution



In more detail, the prevailing themes in the intelligence field, were censorship, intelligence, terrorism and mossad from year 2012 up until 2015. From then on and till 2018, the fan opened up a lot with intelligence staying the most common and stable theme, censorship being transformed into cyber security, terrorism giving its place to communism, cia, espionage and intelligence and mossad targeting espionage. New additions for the second time slice include the terms espionage, counter terrorism, cyber space, military intelligence, Abwehr, war on terror, cia, communism, Edward snowden, second world war, cyber and national security respectively. The last years that are being explored are between 2019 and 2022, in which some of the previous themes become more specific. From top to bottom, the subjects are intelligence, national security, cold war, repression, Abwehr, intelligence service, privacy, diplomacy, Israel, management, secrecy and Covid-19.

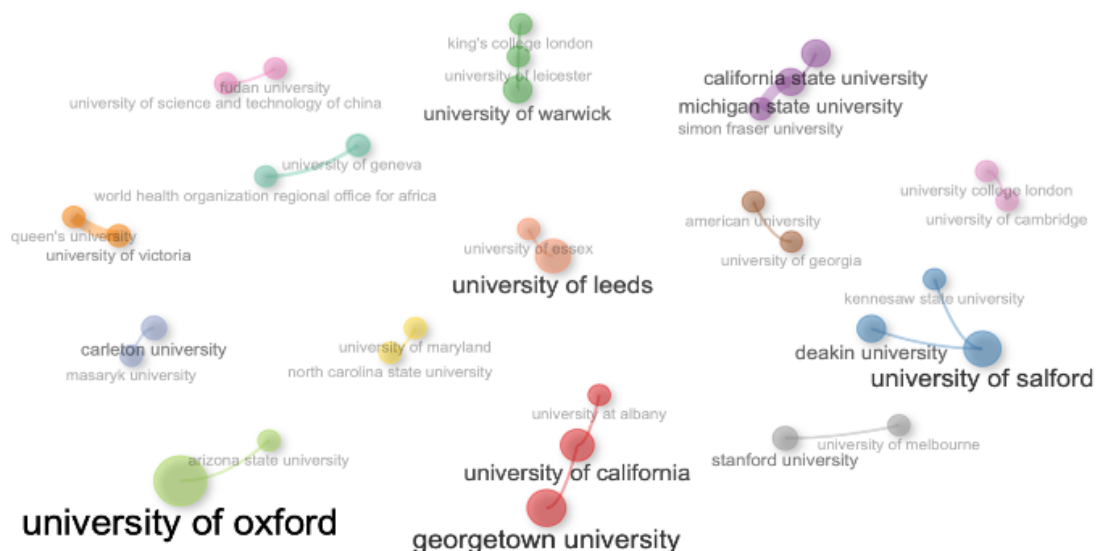
A factorial analysis, meaning a data reduction technique (Aria and Cuccurullo, 2017), can be found in the Appendix too and regards a conceptual structure map, using multiple correspondence analysis as the preferred method (Figure 26) that, can be seen in a form of a topic dendrogram as well (Figure 27). The most contributing papers are also shown in Figure 28.

4.10 Social Structure plots

The last two plots that conclude the results on the bibliometrics analysis on intelligence agencies interpret the Social structure of the said field in a form of Collaboration Networks.

Figure 29 accounts for the Collaboration Network between institutions, namely universities across the globe whose authors are affiliated with regarding the articles, since the data is being extracted under the column C1 that translates as authors' address (Aria and Cuccurullo, 2017).

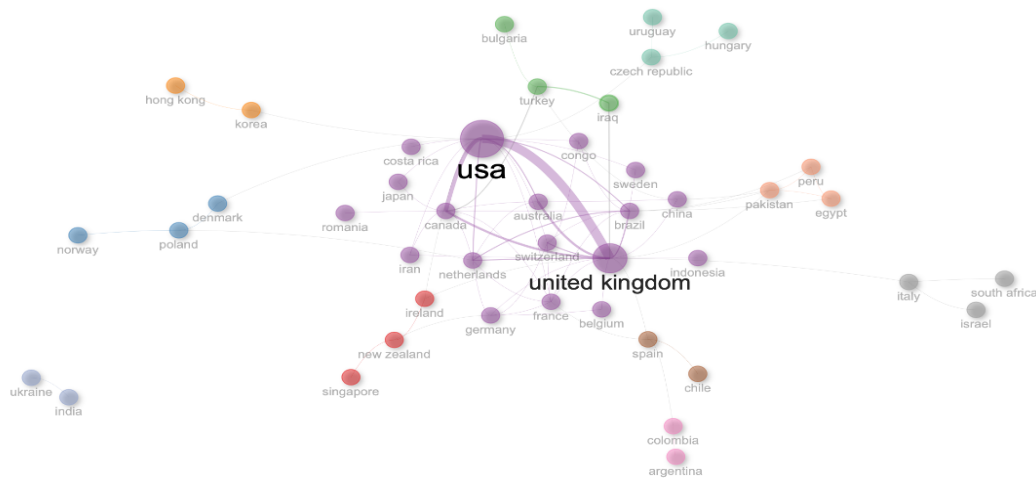
Figure 29. Collaboration Network - Institutions



It is apparent that most collaborations occur between universities within the same country, for example the partnership of English and Chinese institutions respectively, like University of Warwick with University of Leicester and the latter with King’s College London, or the Fudan University with University of Science and technology of China. Some external cooperation happens also, mainly on the Anglo-Saxon sphere, such as the example of University of Salford with Deakin University or the former with Kennesaw State University.

By changing the unit of analysis to Countries the below Figure 30 describes the academic joined efforts that have taken place, this time the epicenter being among foreign states. This can be accessed in the form of a map chart (Figure 31) in the Appendix section.

Figure 30. Collaboration Network - Countries



Once again the main nodes that the network is concentrated upon represent the cooperation between USA-UK and to a lesser extend with Canada and Australia. In addition to that, Switzerland, France, Brazil, Germany and the Netherlands seem to have set also a nexus with cooperation across multiple countries.

5. Discussion

As far as the author is concerned this paper introduces an original research in the field of Intelligence Studies since, as of this writing no other studies have been found to perform a bibliometric analysis on the related topic.

In reference to the results, the bibliometric analysis verified an increasing rate for the production of research, especially nowadays that information warfare as part of modern asymmetric threats (Horton, 2023), has become *modus operandi* for multiple authoritative, as well as democratic states and terrorist groups. The most impactful and productive journals are Intelligence and National Security, International Data Privacy Law, International History Review, International Journal of Intelligence and Counterintelligence, which indicates a variety of subfields. Namely, intelligence activities are not limited to their background and can consist of security, data privacy, history and other related matters. From the Affiliations and Countries analyses, the dominance of the Anglo-Saxon sphere, can be concluded. This can be explained through the quality of their universities that, are considered to be pioneers in research. The Western point of view is diffused by European researchers as well, and only later on, do Asian, African and Latin powers surface. In the middle of the intelligence agencies research diachronically located the terms; security, terrorism and democracy were. Those belong to the essence of a state's interest and are therefore compatible with the IC aims (Office of the Director of National Intelligence, 2018).

Special interest can be attributed to Table 6 which provides in cluster form the main areas of study. Those revolve around what can be considered the traditional intelligence matters, a historical view of the covert activities in the Cold War era, torture and other ethical aspects such as the case of Guadamo, the cybersecurity field, terrorist groups, certain top intelligence agencies like Mossad and Pakistan's agency, economic type of espionage and lastly the integration of data in the intelligence analysis. All of the above, are thought to be archetypal and developing themes that, already concern and will continue to be reviewed by the intelligence scholarship.

Both of the aims of this study were met. The abundance of original plots and tables certainly enhance the resource list of the intelligence field with useful data for further study. Aside from that, it provided a clear snapshot of the research done on intelligence agencies, for the time period from 2012 to 2022.

Having got a glimpse of the insides of intelligence studies, it is important to state certain limitations that this research suffered from. A fundamental restriction is provided with regard to the time span that refers only to the last decade. Instead a study advising on earlier periods, would be highly effective for the total mapping of the field and for a future comparison, in respect of its

development. On top of that, the study is certainly not exhaustive, since it focused only on specific terminology. A broader employment of words and phrases, would not only increase the number of documents for research, but would also attract more aspects of the same subject. Another restriction relates to the language, since the terms used were in English it does not represent the IC scholarship on a global scale, although a number of non-english publications still appeared. Lastly, the quality of the dataset could be improved with supplemental fact-finding, even so that process would have proved to be quite time consuming.

The research has thrown up many questions in need of further investigation. Farther work would be highly recommended and could definitely vary in theme and methodologies. For instance, a Bibliometric analysis of previous periods would provide a more thorough picture of the evolution of intelligence, whereas the graphs could inspire hypotheses that, through literature review or further quantitative analysis could be investigated. An example of such hypotheses may perhaps be the following; ‘Does the correlation of intelligence studies primarily with western powers and the consequent distance from the East, have any causation with the authoritative profile of regimes of those eastern states, like Russia and China and Turkey. Since, those are highly known for their espionage activities but scarcely produce research. So, is academic freedom evaded or “secrecy” prevails as an attribute of intelligence culture in the aforementioned countries?’. Similar questions can be extracted from other results of this study as well.

Conclusion

This research paper studied the field of intelligence, with a more specific direction towards intelligence agencies and espionage, as per the search terms revealed, through the help of Biblioshiny interface, powered by Bibliometrix package in R. The analysis was narrowed down with respect to the selected timespan, and it touched upon one thousand one hundred forty-six (1146) documents found in Scopus database, from year 2012 to 2022.

The given theoretical framework on intelligence agencies, on the realm of intelligence studies, as well as on bibliometric analysis as a scientific method, further propelled the understanding of the analysis that followed and the way that all three fields became interconnected.

The finds of this exploration disclosed seven general points. First of all, Intelligence and National security can be thought of as the most impactful journal for intelligence matters. The second major finding was that, as far as authors go, Gentry JA is the leader in article production over time, with a total number of seven (7) publications for the under investigation decade. Besides the author, the title of the top affiliated institution went to University of Oxford with fourteen (14) publications, followed closely by Georgetown University with twelve (12) articles. Along with that, the most cited and high-yielding countries were the USA, UK, Canada and close behind Australia. These last two facts highlight, the overpowering influence that, the Five Eyes elicit upon the intelligence community. Rid Thomas published in 2012 the most global cited article, titled as “Cyber War Will Not Take Place”, in the *Journal of Strategic Studies*. Furthermore, the words ‘intelligence’, ‘security’, ‘war’ and ‘information’ were right at the heart of most documents. Subjects that receive consideration by the scientific community this last couple of years include these following themes; privacy, diplomacy, Israel, management, secrecy and Covid-19. Finally for the results, the collaboration plots that illustrated the social structure of the discipline, indicated the cooperation among universities mainly in the same country or across different countries that constitute as allies. This last realisation can be easily explained, based on a relevant sensitivity and secrecy that is inherited in the topic of intelligence (Bellaby, 2019).

Those findings are auxiliary for the understanding of intelligence studies and can be capitalised for the introduction of a newcomer researcher into this area of knowledge, as well as for older researchers that, can extract useful information to review and contemplate upon. Moreover, they represent a guideline for the general audience to get to know some facts of what is thought to be a secret world. Along with that, a paradigm for other social scientists to employ data analysis tools into their research, in order to support their hypotheses is exhibited and highly recommended.

To conclude, this study established that, bibliometric analysis could be a very practical tool for illustrating a broad picture of a research field, while at the same time generate multiple meta-sources for new and alternative literature review. The author supports the ongoing discussion in integrating more quantitative solutions in future social science related analysis. As David Chapelle once said, ‘modern day problems require modern solutions’, and that’s a motto that, can be useful for scholars as well.

Appendix

Abbreviations' Table

Abbreviations	
IC	Intelligence Community
SIGINT	Signals Intelligence
IMINT	Imagery Intelligence
MASINT	Measurement and Signature Intelligence
HUMINT	Human Intelligence
OSINT	Open Source Intelligence
GEOINT	Geospatial Intelligence
USA	United States of America

Tables and Figures

Table 1 (Explains the 4.1 Overview results)

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2012:2022
Sources (Journals, Books, etc)	595
Documents	1146
Annual Growth Rate %	10.66
Document Average Age	5.04
Average citations per doc	3.103
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	1191
Author's Keywords (DE)	2802
AUTHORS	
Authors	1378
Authors of single-authored docs	722
AUTHORS COLLABORATION	
Single-authored docs	858
Co-Authors per Doc	1.4
International co-authorships %	6.108
DOCUMENT TYPES	
article	1146

Figure 16. Most Frequent words

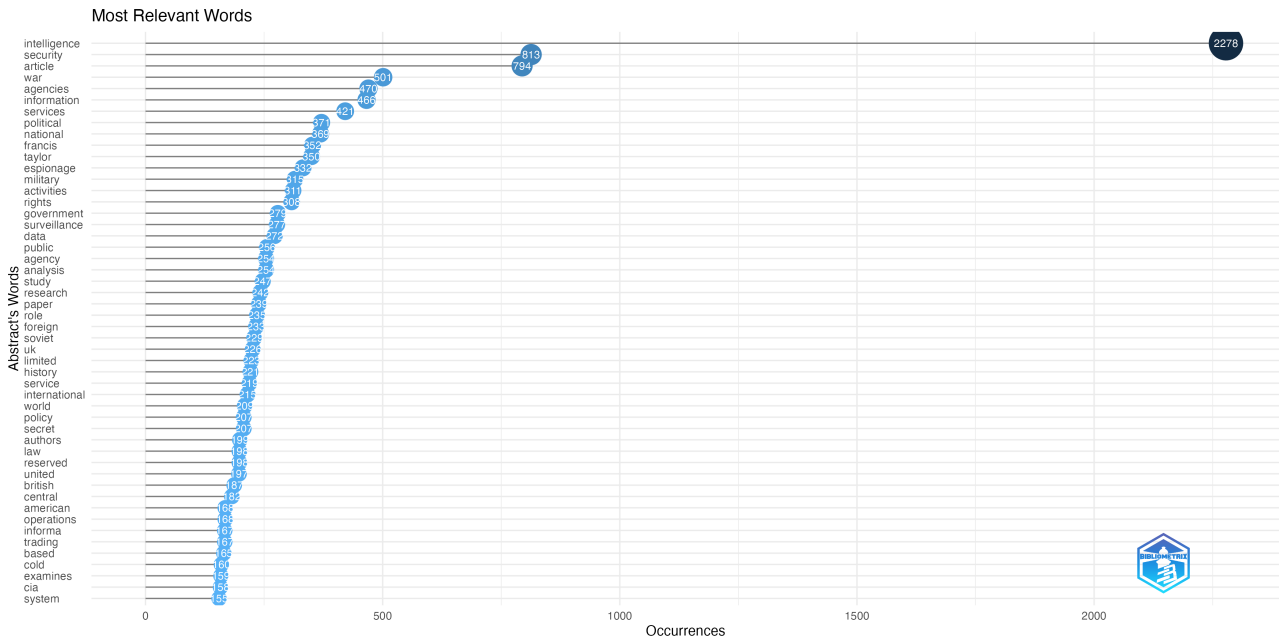


Figure 17. Wordcloud



Figure 23. Thematic map 2012-2015

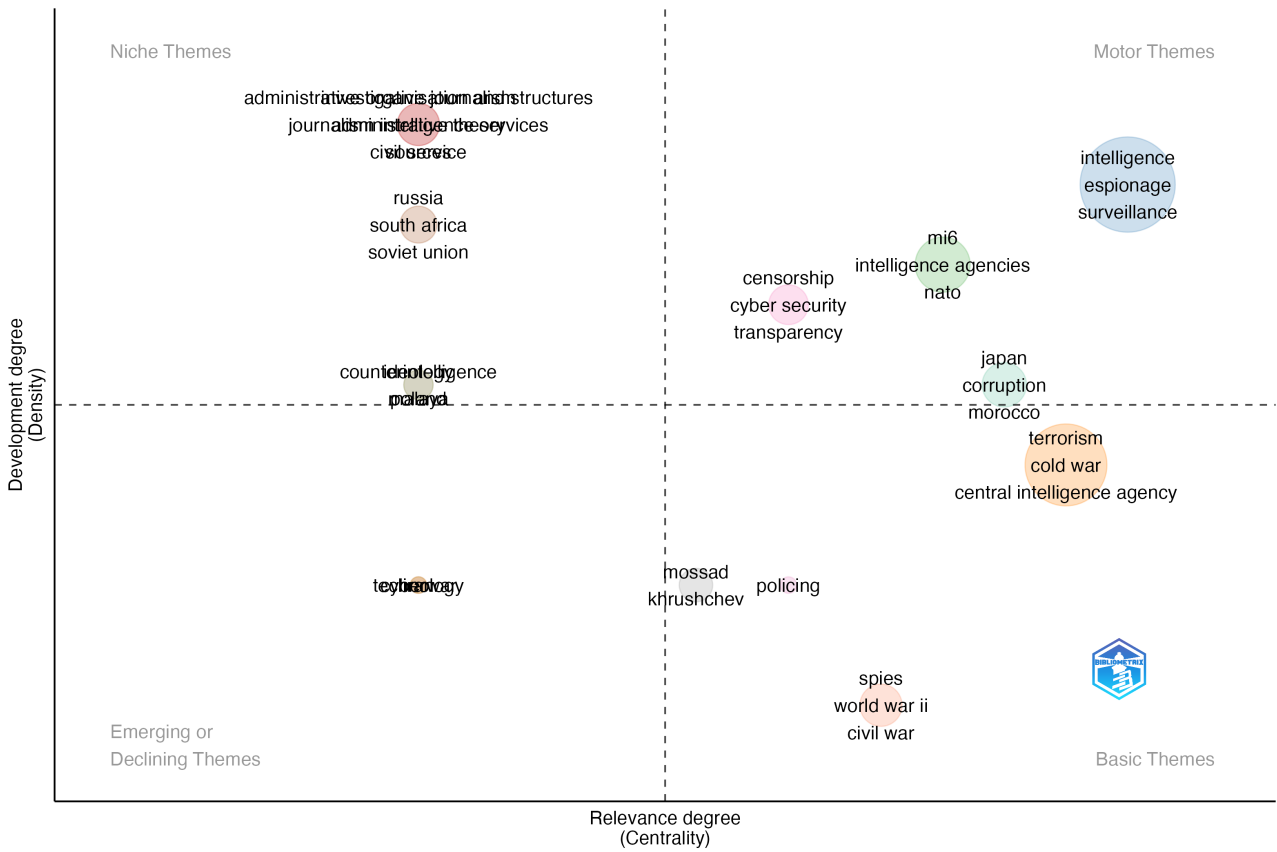


Figure 24. Thematic map 2016-2018

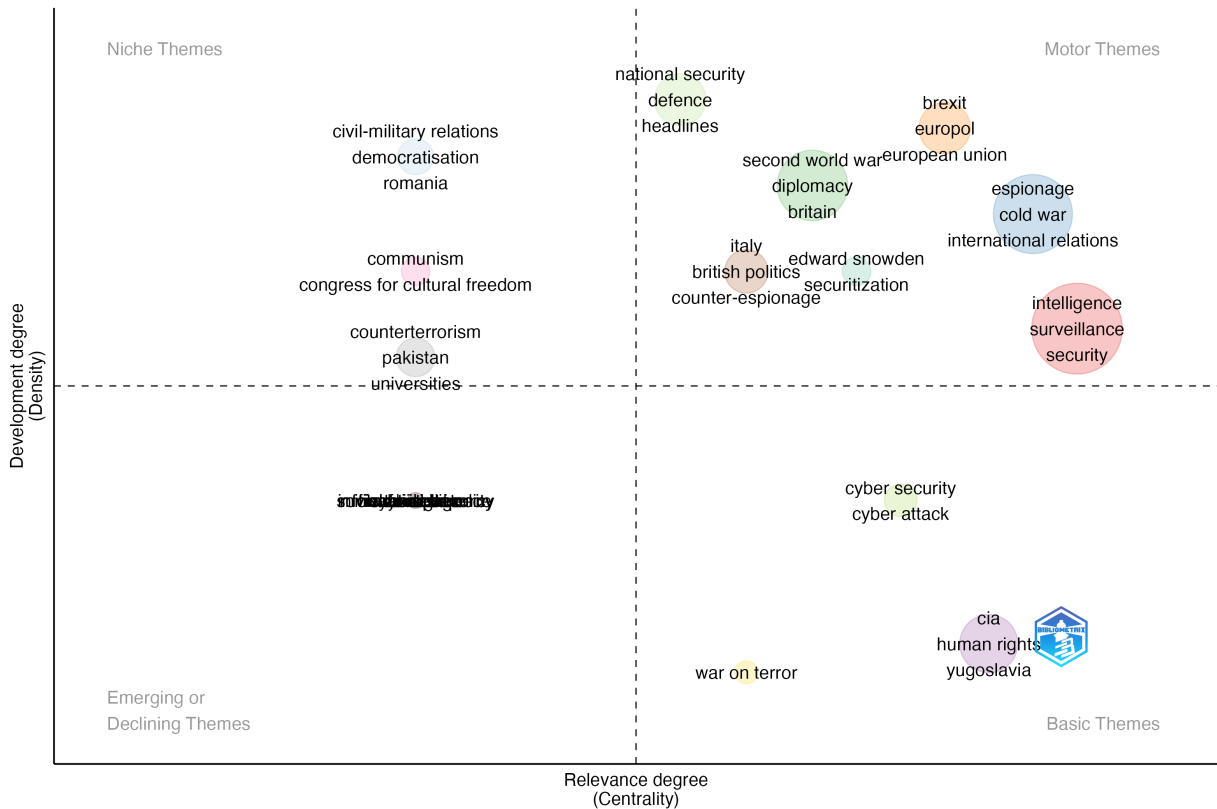


Figure 25. Thematic map 2019-2022

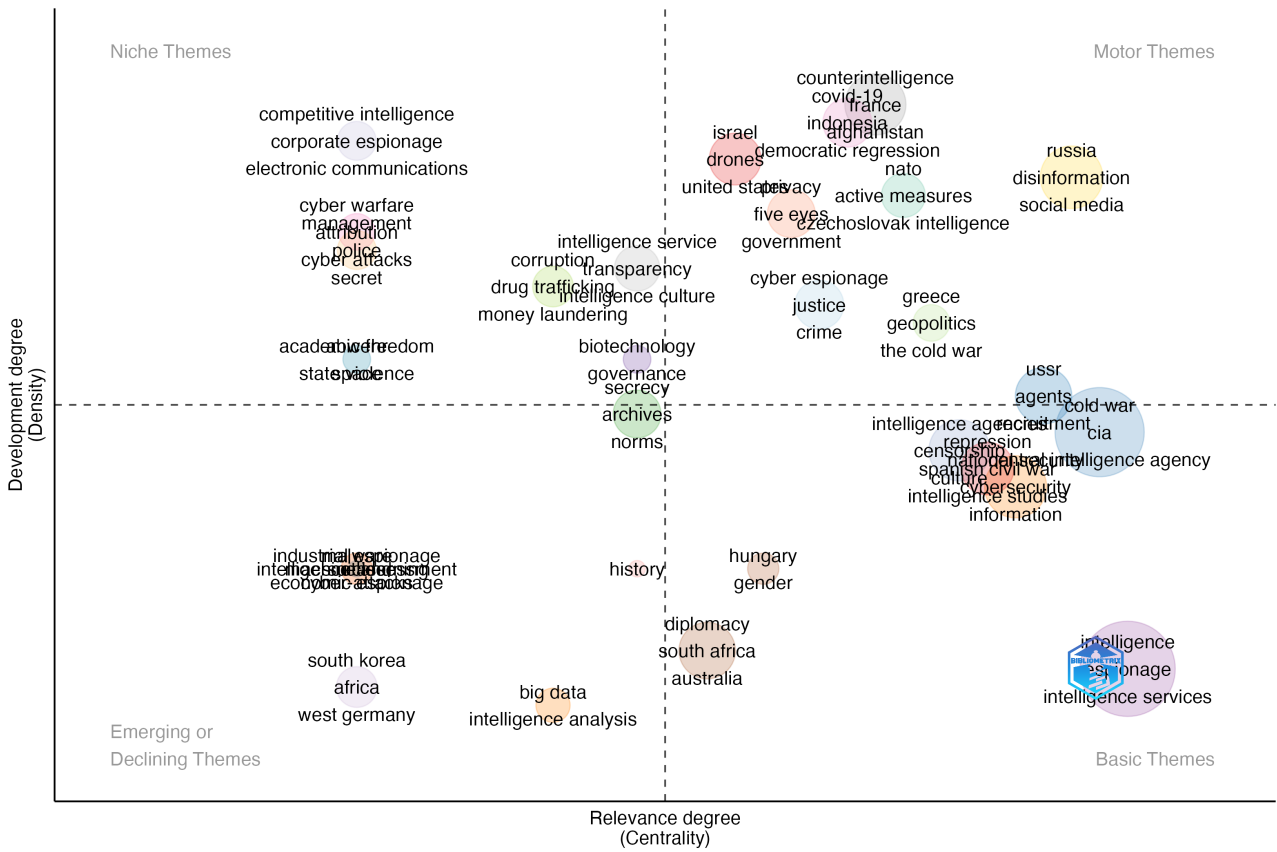


Figure 26. Factorial Analysis; Conceptual Structure Map

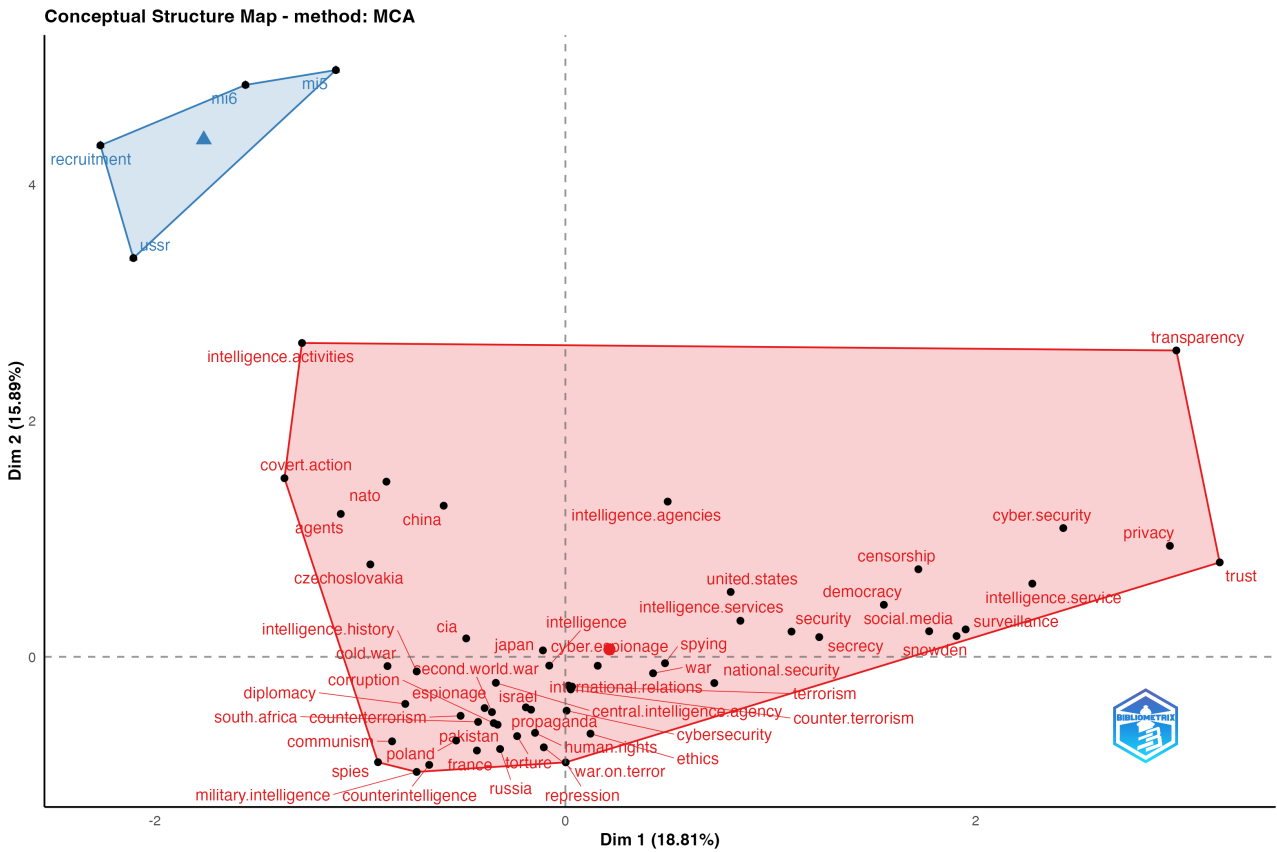
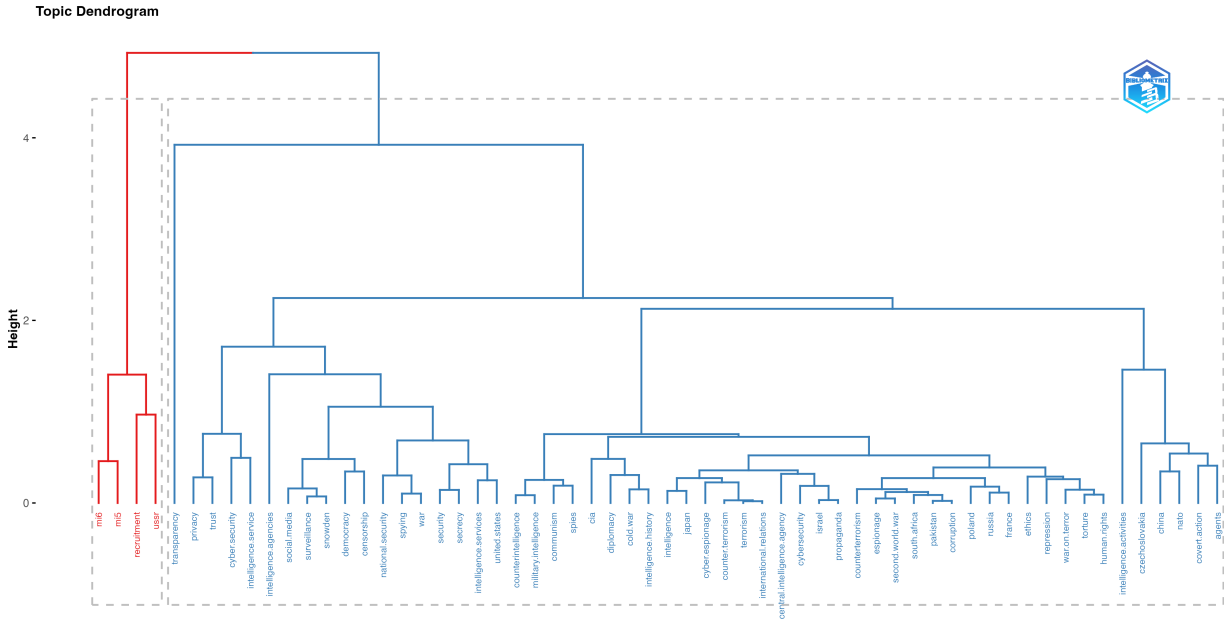


Figure 27. Factorial Analysis; Topic Dendrogram



The y-axis represents the distance between the clusters and the x-axis the individual concepts that comprise the clusters.

Figure 28. Factorial Analysis; Most Contributing papers

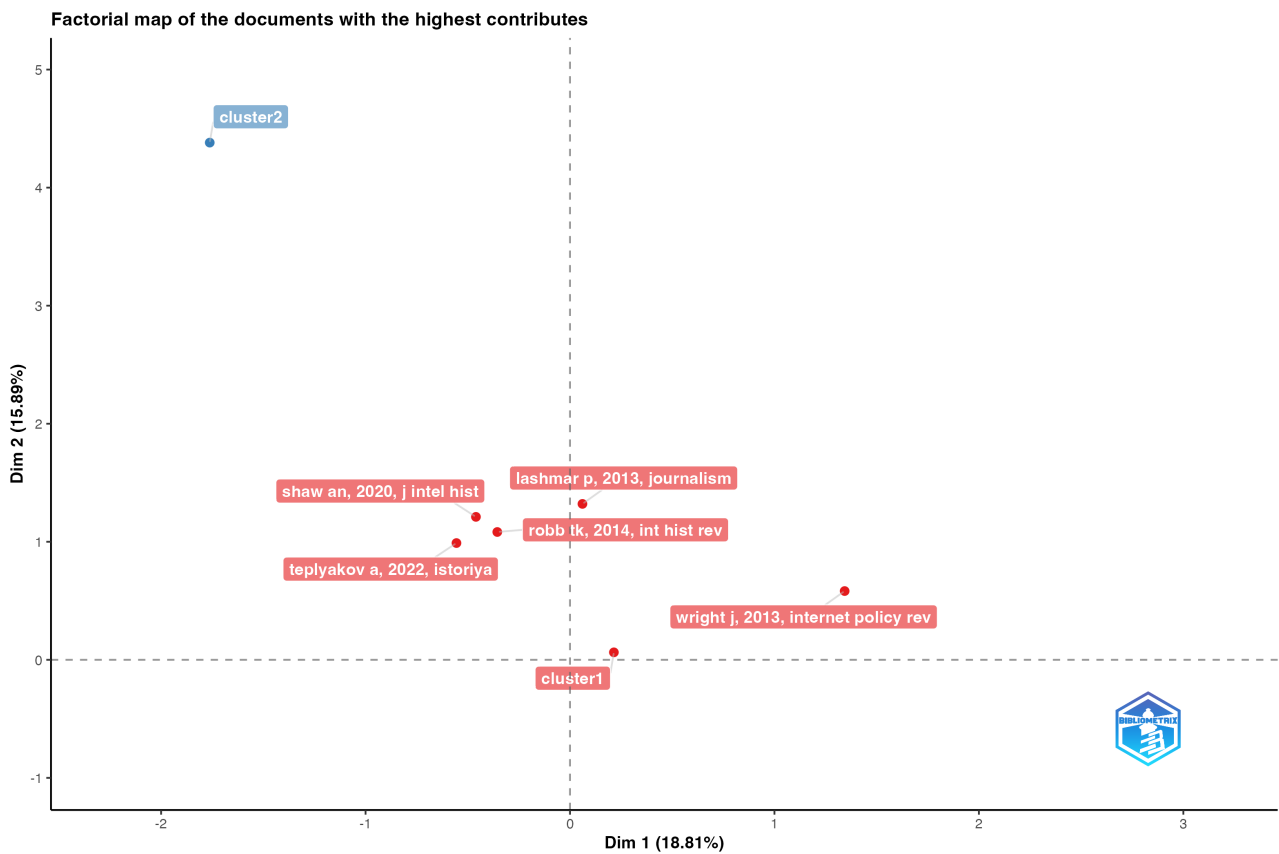
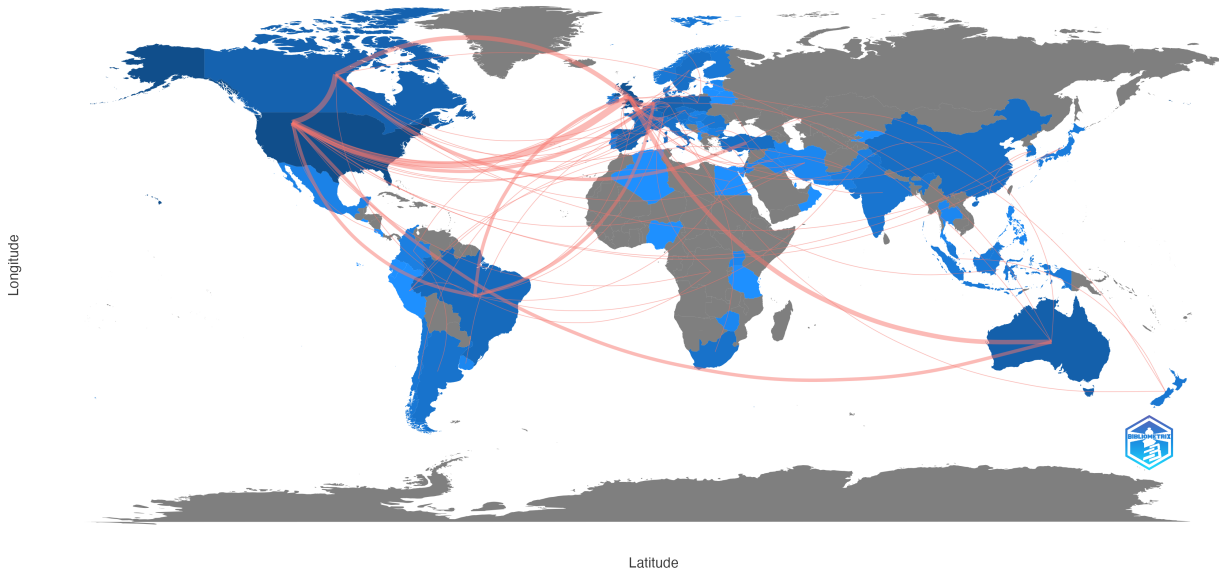


Figure 31. Countries' Collaboration World Map

Country Collaboration Map



Dataset

The list with all the relevant article (N=1146) entries is shown on the below link. This is the final list that was loaded on the Biblioshiny interface for the plot production.

https://docs.google.com/spreadsheets/d/e/2PACX-1vR9p8f8QdDk6A1_jIx-d4G6BIzili3Bk05p3GQI2pGPD3zztde5L8ca7POjeBX4Au9FKCCY_a1Ad8Im/pubhtml

Biblioshiny Report

The report that can be found on the below link includes, the total amount of plots produced for this paper.

<https://docs.google.com/spreadsheets/d/1f7xwCIHqSQjfB4wCVflujkO5OxdGIQ5jc2OkpQrHGEE/edit?usp=sharing>

Reference list

- Aftergood, S. (2013). *To Fix U.S. Intelligence, Shrink It?* [online] Federation of American Scientists. Available at: <https://fas.org/publication/nctc-nolan/> [Accessed 13 Jun. 2023].
- Aria, M. and Cuccurullo, C. (2017). bibliometrix : An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), pp.959–975. doi:<https://doi.org/10.1016/j.joi.2017.08.007>.
- Bellaby, R.W. (2019). Too Many Secrets? When Should the Intelligence Community be Allowed to Keep Secrets? *Polity*, [online] 51(1), pp.62–94. doi:<https://doi.org/10.1086/701165>.
- Bhasin, J. (2019). *Graph Analytics — Introduction and Concepts of Centrality*. [online] Medium. Available at: <https://towardsdatascience.com/graph-analytics-introduction-and-concepts-of-centrality-8f5543b55de3> [Accessed 23 Apr. 2023].
- Bornmann, L. and Daniel, H.-D. (2007). What do we know about the h-index? *Journal of the American Society for Information Science and Technology*, [online] 58(9), pp.1381–1385. doi:<https://doi.org/10.1002/asi.20609>.
- Büyükkıdık, S. (2022). A Bibliometric Analysis: A Tutorial for the Bibliometrix Package in R Using IRT Literature. *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, 13(3). doi:<https://doi.org/10.21031/epod.1069307>.
- Byman, D. (2016). Intelligence and Its Critics. *Studies in Conflict & Terrorism*, 39(3), pp.260–280. doi:<https://doi.org/10.1080/1057610x.2015.1108086>.
- Center for Strategic and International Studies (2019). Case Study: Israel’s Competition with Iran: 1991 – 2015. www.csis.org. [online] Available at: <https://www.csis.org/analysis/case-study-israels-competition-iran-1991-2015> [Accessed 12 Jun. 2023].
- Central Intelligence Agency (n.d.). *About CIA - CIA*. [online] www.cia.gov. Available at: <https://www.cia.gov/about> [Accessed 12 Jun. 2023].
- Chellappandi, P. and Vijayakumar, C. (2018). *Bibliometrics, Scientometrics, Webometrics / Cybermetrics, Informetrics and Altmetrics -An Emerging Field in Library and Information Science Research*. [online] Available at: <https://files.eric.ed.gov/fulltext/EJ1245286.pdf> [Accessed 8 Apr. 2023].
- Chen, X., Lun, Y., Yan, J., Hao, T. and Weng, H. (2019). Discovering thematic change and evolution of utilizing social media for healthcare research. *BMC Medical Informatics and Decision Making*, [online] 19(S2). doi:<https://doi.org/10.1186/s12911-019-0757-4>.
- CIA (n.d.). *History of CIA - CIA*. [online] www.cia.gov. Available at: <https://www.cia.gov/legacy/cia-history/> [Accessed 12 Jun. 2023].

Clarivate (2022). *KeyWords Plus generation, creation, and changes*. [online] support.clarivate.com. Available at: https://support.clarivate.com/ScientificandAcademicResearch/s/article/KeyWords-Plus-generation-creation-and-changes?language=en_US [Accessed 25 Mar. 2023].

Deutsches Spionage Museum (n.d.). *German Spy Museum Berlin - History of espionage*. [online] Deutsches Spionagemuseum. Available at: <https://www.deutsches-spionagemuseum.de/en/espionage> [Accessed 12 Jun. 2023].

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N. and Lim, W.M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, [online] 133, pp.285–296. doi:<https://doi.org/10.1016/j.jbusres.2021.04.070>.

Durieux, V. and Gevenois, P.A. (2010). Bibliometric Indicators: Quality Measurements of Scientific Publication. *Radiology*, [online] 255(2), pp.342–351. doi:<https://doi.org/10.1148/radiol.09090626>.

Εθνικό Κέντρο Τεκμηρίωσης (n.d.). *H-Index*. [online] EKT. Available at: <https://www.ekt.gr/el/library/h-index> [Accessed 25 Mar. 2023].

Fakis, A., Hilliam, R., Stoneley, H. and Townend, M. (2013). Quantitative Analysis of Qualitative Information From Interviews. *Journal of Mixed Methods Research*, [online] 8(2), pp.139–161. doi:<https://doi.org/10.1177/1558689813495111>.

Federal Bureau of Investigation (2019). *Counterintelligence | Federal Bureau of Investigation*. [online] Federal Bureau of Investigation. Available at: <https://www.fbi.gov/investigate/counterintelligence> [Accessed 12 Jun. 2023].

France 24. (2023). *Snowden leaks at 10 years: more data more controls*. [online] Available at: <https://www.france24.com/en/live-news/20230605-snowden-leaks-at-10-years-more-data-more-controls> [Accessed 13 Jun. 2023].

Horlings, T. (2023). Dealing with data: coming to grips with the Information Age in Intelligence Studies journals. *Intelligence and National Security*, [online] 38(3), pp.1–23. doi:<https://doi.org/10.1080/02684527.2022.2104932>.

Horton, P. (2023). *Weapons of Mass Disruption: Dealing with the Asymmetric Threat*. [online] Giac.org. Available at: <https://www.giac.org/paper/gsec/2499/weapons-mass-disruption-dealing-asymmetric-threat/104361> [Accessed 5 May 2023].

Hughes, R.G. (2022). Christopher Andrew and the myriad worlds of intelligence. *Intelligence and National Security*, 37(2), pp.281–290. doi:<https://doi.org/10.1080/02684527.2022.2055277>.

irp.fas.org. (1996). *The Role of Intelligence*. [online] Available at: <https://irp.fas.org/offdocs/int006.html> [Accessed 12 Jun. 2023].

Kawamura, M., Thomas, C.D.L., Tsurumoto, A., Sasahara, H. and Kawaguchi, Y. (2000). Lotka's law and productivity index of authors in a scientific journal. *Journal of Oral Science*, [online] 42(2), pp.75–78. doi:<https://doi.org/10.2334/josnusd.42.75>.

Kokol, P. (2018). Cybernetics: A Bibliometric Analysis Snapshot. *Cybernetics and Systems*, 49(2), pp.95–102. doi:<https://doi.org/10.1080/01969722.2017.1418789>.

Lerner, A.W. (n.d.). *Espionage and Intelligence, Early Historical Foundations*. [online] www.encyclopedia.com. Available at: <https://www.encyclopedia.com/politics/encyclopedias-almanacs-transcripts-and-maps/espionage-and-intelligence-early-historical-foundations> [Accessed 12 Jun. 2023].

Lomas, D.W.B. and Ward, S. (2022). Public Perceptions of UK Intelligence. *The RUSI Journal*, 167(2), pp.10–22. doi:<https://doi.org/10.1080/03071847.2022.2090426>.

Marx, Z., Dagan, I., Buhmann, J. and Shamir, E. (2002). Coupled Clustering: A Method for Detecting Structural Correspondence Ido Dagan. *Journal of Machine Learning Research*, [online] 3, pp.747–780. Available at: <https://www.jmlr.org/papers/volume3/marx02a/marx02a.pdf> [Accessed 22 Apr. 2023].

McCarry, C. (2008). Intelligence in fiction. *Intelligence and National Security*, [online] 23(1), pp.42–54. doi:<https://doi.org/10.1080/02684520701798106>.

Moral-Muñoz, J.A., Herrera-Viedma, E., Santisteban-Espejo, A. and Cobo, M.J. (2020). Software tools for conducting bibliometric analysis in science: An up-to-date review. *El Profesional de la Información*, [online] 29(1). doi:<https://doi.org/10.3145/epi.2020.ene.03>.

Nash-Stewart, C.E., Kruesi, L.M. and Del Mar, C.B. (2012). Does Bradford’s Law of Scattering predict the size of the literature in Cochrane Reviews? *Journal of the Medical Library Association : JMLA*, 100(2), pp.135–138. doi:<https://doi.org/10.3163/1536-5050.100.2.013>.

National Security Agency (n.d.). *About NSA/CSS*. [online] www.nsa.gov. Available at: <https://www.nsa.gov/about/> [Accessed 12 Jun. 2023].

Office of the Director of National Intelligence (2009). *How the IC Works*. [online] [Intelligence.gov](http://intelligence.gov). Available at: <https://www.intelligence.gov/how-the-ic-works> [Accessed 12 Jun. 2023].

Office of the Director of National Intelligence (2018). *What is Intelligence?* [online] [Dni.gov](http://dni.gov). Available at: <https://www.dni.gov/index.php/what-we-do/what-is-intelligence>.

Office of the Director of National Intelligence (2022). *DNI Releases Appropriated Budget Figure for 2022 National Intelligence Program*. [online] www.dni.gov. Available at: <https://www.dni.gov/index.php/newsroom/press-releases/press-releases-2022/item/2338-dni-releases-appropriated-budget-figure-for-2022-national-intelligence-program> [Accessed 12 Jun. 2023].

Posit software (n.d.). *RStudio Desktop*. [online] Posit. Available at: <https://posit.co/download/rstudio-desktop/> [Accessed 7 Feb. 2023].

Radanliev, P. and De Roure, D. (2021). Epistemological and Bibliometric Analysis of Ethics and Shared Responsibility—Health Policy and IoT Systems. *Sustainability*, 13(15), p.8355. doi:<https://doi.org/10.3390/su13158355>.

Ransom, H.H. and Pringle, R.W. (2023). *intelligence - Intelligence in the modern era* | *Britannica*. [online] www.britannica.com. Available at: <https://www.britannica.com/topic/intelligence-international-relations/Intelligence-in-the-modern-era> [Accessed 12 Jun. 2023].

Schweinberger, M. (2018). *Analyzing Co-Occurrences and Collocations in R*. [online] ladal.edu.au. Available at: https://ladal.edu.au/coll.html#Citation__Session_Info [Accessed 14 Apr. 2023].

service.gov.uk. (2010). *National Intelligence machinery*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61808/nim-november2010.pdf [Accessed 12 Jun. 2023].

Smith, R.V., Densmore, L.D. and Lener, E.F. (2016). *Chapter 7 - Library and Literature Work*. [online] ScienceDirect. Available at: <https://www.sciencedirect.com/science/article/abs/pii/B9780128037492000077> [Accessed 3 Apr. 2023].

Taylor, S. and Goldman, D. (2004). Intelligence Reform: Will More Agencies, Money, and Personnel Help? *Intelligence and National Security*, 19(3), pp.416–435. doi:<https://doi.org/10.1080/0268452042000316223>.

The History Press (n.d.). *The History Press | Espionage*. [online] www.thehistorypress.co.uk. Available at: <https://www.thehistorypress.co.uk/espionage/?p=1&ps=9> [Accessed 12 Jun. 2023].

The Russian Government (n.d.). *Foreign Intelligence Service - The Russian Government*. [online] government.ru. Available at: <http://government.ru/en/department/112/> [Accessed 12 Jun. 2023].

University of Southern California (2014). *Research Guides: Organizing Your Social Sciences Research Paper: Limitations of the Study*. [online] [Usc.edu](https://libguides.usc.edu). Available at: <https://libguides.usc.edu/writingguide/limitations> [Accessed 3 Mar. 2023].

Valderrama, P., Jiménez-Contreras, E., Escabias, M. and Valderrama, M.J. (2021). Introducing a bibliometric index based on factor analysis. *Scientometrics*, 127(1), pp.509–522. doi:<https://doi.org/10.1007/s11192-021-04195-4>.

Vetmeduni (n.d.). *Plagiarism Disclaimer*. [online] Available at: https://www.vetmeduni.ac.at/fileadmin/v/messerli/Lehre/Lehre_Ethik_MTB/Plagiarism_Disclaimer_en.pdf [Accessed 25 Mar. 2023].

Vitkauskas, D. (1999). *Democratic Institutions Fellowships Programme*. [online] Available at: <https://www.nato.int/acad/fellow/97-99/vitkauskas.pdf> [Accessed 12 Jun. 2023].

Wicaksana, G.W. (2019). The Consequence of Ethical Criticism of Intelligence on Countering Terrorism in Indonesia. *Asian Politics and Policy*, 11(1), pp.62–79. doi:<https://doi.org/10.1111/aspp.12433>.

www.sciencedirect.com. (n.d.). *Factorial Analysis - an overview* | *ScienceDirect Topics*. [online] Available at: <https://www.sciencedirect.com/topics/computer-science/factorial-analysis> [Accessed 19 Apr. 2023].

www.scopus.com. (n.d.). *Scopus preview - Scopus - Welcome to Scopus*. [online] Available at: <https://www.scopus.com> [Accessed 4 Apr. 2023].

Zupic, I. and Čater, T. (2014). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, [online] 18(3), pp.429–472. doi:<https://doi.org/10.1177/1094428114562629>.