Intellectual Search of Emerging Research Fields Utilizing Large Scientific Publication Arrays: "Public Governance" Field as an Example

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Abstract – **In order to predict the development of any scientific field of knowledge, it is necessary to present modern achievements and discoveries, authoritative expert opinions of key scientists of the studied area. However, the Modern "digital Universe" is changing and expanding at such a speed that doubles the amount of data every two years, which has led to the accumulation of huge streams of scientific information that it has become impossible to be covered fully based on traditional scientific search techniques. This article's outcomes can be used as an intellectual basis by scientists involved in this progressing topic.**

Keywords – **scientometric analysis, research front, research base, public governance.**

1. Introduction: The Need to Transform the Technology of Scientific Work in Connection With the Formation of the Information Economy

Global changes in society associated with the emergence of the information economy led to a sharp increase in the volume of scientific and technological

information, which a modern scientist is no longer able to effectively investigate without using fundamentally new ways of working and software tools. According to official data, the total amount of data received and stored in the world doubles every 1.2 years [1], [2]. Such amounts of information practically do not allow manual recognition of the research contribution of individual works, especially for non-specialists or beginners [3]. On the one hand, the existing volumes of scientific bibliographic information require qualitatively new methods of analysis using software products that allow statistical processing of scientometric and semantic data. On the other hand, the actual use of such programs has become available in connection with the formation and active formation of open and public scientometric databases. Thanks to modern scientific knowledge bases that combine the results of research from completely different countries, science has become international, and a modern scientist should be able to isolate and systematize the accumulated global tools in their field in the process of research search. It is the possession of the methods of analytical work that increases the universalism of the scientist and ensures the competitiveness of his research.

Thus, the search and assessment of the most promising areas of scientific knowledge is one of the most popular areas of modern scientific thought. In this paper, the authors adhere to the separation of the concepts "research front" and "intellectual base". In bibliometric terms, the citing articles form the research front, and the cited articles represent the intellectual base [4]. That is, the research front is understood as the thematic scientific direction of a group of articles united in a cluster based on the fact that they are jointly cited by other articles at a certain point in time [5], [6]. In the paper [7], the definition specifies "... this is a relatively small group of highly cited articles". From the substantive point of view, the research front is "the direction most demanded

from the point of view of society and science within the framework of the existing economic and social formation" [8].

The existing approaches to systematization and quantitative analysis of the scientific intellectual base can be divided into 2 groups aimed at solving fundamentally different tasks.

The first task is related to the assessment of the importance of a particular scientific direction or phenomenon in public life or science. As a rule, the general statistical analysis of the structure of bibliographic material statistics by countries, authors, headings, etc. [9] serves as a tool for solving this problem.

The second approach in bibliometric science research is aimed at developing theories and methodologies that address the quantitative aspects of how different types of information are generated, organized, distributed and used by different users in different contexts " [10], (library and information science, LIS). Within this framework, two groups of methods are distinguished: the bibliographic coupling method and the co-citation method.

The first method (bibliographic coupling) involves combining publications based on common references: "if two or more publications have several common works in the references, they are clustered: two documents A and B will be considered related, if there are enough works, referring simultaneously to document A and document B " [11].

The second co-citation method is based on the principle of separating the relationship between two publications based on citing them with the same document, respectively, the nature of this connection may change over time, as the popularity of articles or authors [12].

Analyzing the results of studies aimed at comparing the performance of these methods, we can note the following.

The method (co-citation) was mainly used for mapping knowledge networks of any chosen field of research, as it quite clearly allows visualizing the structure of scientific research within a specific problem area, including interdisciplinary interrelation and it is more expedient to use it to identify "scientific breakthroughs" [13], [14], [15].

The method (bibliographic coupling) is most often used to solve problems related to the study of the genesis of a particular part of the scientific community, as well as to assess the significance of individual publications and authors in a specific period of time [16], [17], [18]. Boyack and Klavans, Huang & Chang and Rathinam & Sankar [19], [20], concluded that BC is comparatively better for identifying research fronts.

In addition, there is an objective need to calculate metrics to determine the importance (centrality) of individual authors or initial works, as well as the analysis of citation networks (collaboration) that are formed [21].

It is because of the above features that the method of analysis of bibliographic binding was the basis of this study. At the same time, the authors paid attention to the aspect of the importance of "public governance" as a studied issue in the science of various countries, using the methods of descriptive statistics. The solution of the task itself involved the following steps:

1. Selection of software that corresponds to scientific issues.
2. Formation of intellectual base of research on "public governance" as a field of scientific knowledge.
3. General analysis of the global publication flow in the "Public governance" subject area.
4. The development of science maps of the category of "public governance" and the justification of research fronts.
5. Identification of breakthrough research in the subject area of "Public governance".

2. Overview of Scientometric Analysis Software

The selection of software for the successful solution of infometric research problems in the field of scientometrics and bibliometrics is a very important issue. Currently, there are powerful commercial scientometric programs, among which may be noted:

- IN-SPIRE ™ Visual Document Analysis that provides an opportunity to visualize text data and analytical tools for obtaining various time trends [22]. This product has a toolkit visualization of various types of data. In-SPIRE can quickly and automatically transfer the essence of large sets of unformatted text documents, such as technical reports, web data, news feeds and message traffic. An important advantage of this program is the ability to process data in real time with the function of adding new documents as they arrive. The program also processes data not only in English, but also in several other languages, providing in the process reliable support for translation. The Galaxy Visualization tool uses the "stars in the night sky" metaphor, where each "star" is a separate document. ThemeView ™ tool uses three-dimensional visualization of a terrain map to best display data. Of interest is the function "Lexical Analysis", which allows you to quickly view the most relevant keywords and selected groups for a given lexical axis. This tool is suitable for initial exploratory data analysis for finding keywords or objects. However, the program was created in a research laboratory,

whose research direction is chemical sciences and earth sciences, as well as data analysis, so it is better suited for exact sciences and visualization of geo-data, physical, biological, etc.

SciMAT - created by the Soft Computing research and intellectual information systems group, the University of Granada, (Spain) is an open source software tool designed to compile and analyze scientific maps in a longitudinal structure. SciMAT provides various modules that help the researcher perform the steps of the scientific mapping process [23]:

1. The module dedicated to the management of the knowledge base and its units
2. The module responsible for the analysis of scientific maps
3. Module for visualization of generated results and maps.

The main work of SciMAT consists of various stages of data retrieval, their preliminary processing, network retrieval, network normalization, mapping, analysis and visualization. At the end of this process, the analyst can interpret and draw conclusions from the results.

The Science of Science (Sci2) tool is a modular toolkit specifically designed for scientometric research. It supports temporal, geospatial, thematic and network analysis and visualization of data arrays at the micro (individual), meso (local) and macro (global) levels [24].

Sci2 allows users to clean, analyze and visualize a wide range of data formats. Although it was designed to study science (taking into account scientific networks and publications), it is multidisciplinary. The program was created using Cyberinfrastructure Shell (CIShell), an open source software environment for integrating data sets, algorithms and computing resources. Sci2 algorithms allow users to analyze data from social networking sites, extract networks from text files, pre-process various data formats, and apply packet recognition. Of particular interest is the EpiC (Epidemiological Cyber Infrastructure) tool, based on the CIShell structure, to help model, analyze, and visualize biological and social epidemics.

The Network Workbench Tool (NWB) is a network analysis, modeling and visualization toolkit for research in physics, biomedicine and social sciences [25]. The tool was specifically designed for researchers and politicians interested in studying and understanding the structure and dynamics of modern scientific research.

The tool is also based on CIShell and is a standalone desktop application that installs and runs on various operating systems. The tool provides easy access to more than 160 algorithms for studying temporal, geospatial, thematic, and network datasets at various levels.

VantagePoint is a program designed primarily for semantic text analysis in order to detect knowledge in search results in bibliographic and patent databases [26].

VantagePoint works with search results from text databases. In addition to one-dimensional (lists) and two-dimensional (matrix sharing) analyzes, VantagePoint performs multidimensional statistical analysis to identify clusters and relationships between concepts, people, organizations, and countries. VantagePoint's capabilities are divided into five stages: importing raw data into a program, transforming and grouping data, analyzing and visualizing data with various tools, and automating to make the result reproducible.

However, not every researcher is able to afford paid software products, and here it should be especially noted that among the programs in question there is a whole group of freely distributed programs that allow for scientometric studies and statistical processing of the results obtained. Among these programs, CiteSpace, NWB, Sci2 and SciMAT can be distinguished, because, compared with other free counterparts, they have such important data processing procedures as [27].

▪ The module for defining repeated records (the user can combine several elements representing the same concept or author, as well as select and summarize the initial value of the parameter, for example, the number of citations of the initial records).
▪ The module of time quantization (allows you to visualize the evolution of the object of analysis under study).
▪ Module data compression (allows you to set filters when analyzing the most significant information).
▪ All of them are very well and described in detail in the cycle of works by N.A. Mazov [28].

In the course of analysis, we used the CiteSpace program [29], a freeware software application designed to visualize a progressive field of knowledge aimed at finding bursts in the development of a scientific field or sphere. CiteSpace supports structural and temporal analysis of various networks arising from scientific publications, and has a set of functions that facilitate understanding and facilitate the interpretation of these models. In particular, it allows to:

▪ identify rapidly growing subject areas;
▪ highlight research clusters;
▪ automatically determine the content of clusters in terms taken from citing articles;
▪ build geospatial knowledge models.

However, freeware applications, as a rule, do not have fundamental guidelines for their use, the researchers here have to adapt the program to the goals of their research on the basis of the technical description.

3. Analysis of the Global Publication Flow in the "Public Governance" Subject Area

As part of this work, in order to demonstrate the possibilities of using such programs in practice, the authors conducted a statistical bibliometric analysis of a given scientific field. As the initial array were used the data obtained from the Web of Science database at the request of "public governance". The choice of this database was due to the fact that "today [it] is the most reliable and common source of information about the publication activity of scientists. The data contained in this source is recognized as the most universal and comparable, which makes it possible to use it for assessing the effectiveness of scientific activity and analyzing world trends in science".

It should be noted that the Web of Science database itself also has an analytical module for working with bibliometric data, it is certainly inferior to special programs, however, it allows for the reconnaissance phase to be uploaded. We illustrate it with some possibilities in our example.

The initial request was made for all categories of the Web of Science database from 1975 to 2018. A total of 24,642 articles were found, over 50% of publications were in the period from 2013 to 2018. Figure 1. shows the total percentage of publications over the past 25 years.
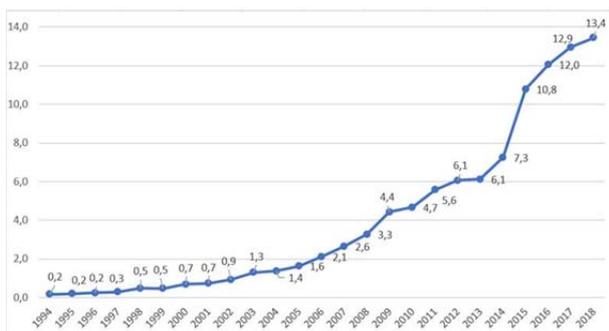

Figure 1. Indicators of the publication activity of the global publication flow in the public governance area over the past 25 years (% of the total number of publications on this issue in WoS).

Source: calculated by the authors based on the Web of Science data.

If we analyze the global publication flow presented in the WOS by country, more than 50% of the total publications in the structure during this period are represented by five countries. The leaders in this area were scientists from the United States, they accounted for 24.1% of the work, followed by

the UK — 14.81; Australia - 7.23; China - 6.8; Canada 6.73. Russia takes the 29th place, the share of Russian scientists accounts for 0.9% of the work on this topic.
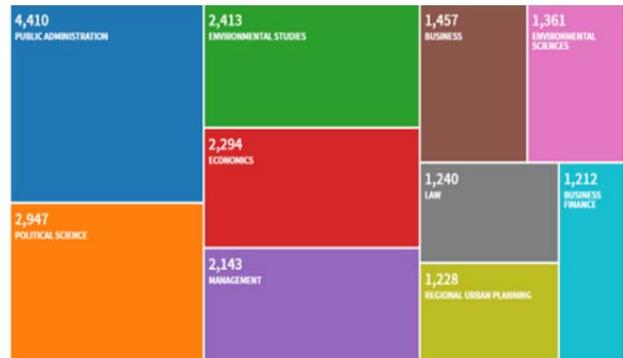

Figure 2. Distribution of observations by research areas at the request of "public governance"

Source: compiled by the authors using the analytical tools of the search platform Web of Science

Thus, we can observe a steady increase in scientific interest in issues related to the category of "public governance" on a global scale, accompanied by scientific exchange and collaboration with other areas of knowledge, which indirectly indicates an active search for scientists of "breakthrough points" to overcome the challenges facing the scientific community in the framework of the studied issues.

Judging by Fig. 2., about half of all publications are related to the categories of public administration, political science, economics, management, therefore it is advisable to carry out further analysis on them. A preliminary analysis allows us to narrow the study period both by year and by category. After clarification, the analyzed array is represented by a truncated sample in a time series, which already allows us to generate a citation report available in the WoS for a population of less than 10,000 records. Its analysis allows you to see the following.

The total number of citations (without self-citations) is 15,2259, the total number of publications of the truncated sample is 8,729 observations with an aggregate Hirsch index of 148. The average number of citations per year in this area of research is 5,100. Intellectual base (number of publications cited) - 9342, research front (number of citing articles without taking into account self-citations) - 96633.

Next, we consider the proposed algorithm for finding active research fronts in the global information flow on the subject of "public governance" using the CiteSpace V.0 program. The program was loaded with a sample, formed on the basis of a refined data array, represented by 8729 records (the algorithm for its receipt was described above), which were filtered by the number of citations from maximum to minimum and 5000 works with the highest number of citations were cut

off. The resulting sample is represented by all periods, the minimum number of citations of works presented in the sample was 2.

4. Outside Science Maps of the "Public Governance" Category and the Rationale for Research Fronts

The analyzed time period was initially divided into 25 time slices (by year), according to which the program builds 25 corresponding networks, subsequently integrated into a panoramic network to visualize changes in the dominant research problems during the studied time period. The program implements a clustering mechanism, which is based on the principle of bibliographic binding. A more detailed mathematical model of this algorithm is presented in the works of its author.

The evolution of the scientific map of the studied issues is presented in Fig.3. The evaluation of the quality of the obtained cluster network and its structural properties is presented in the program by two main metrics: modularity (Modularity Q) and average silhouette rating (Mean silhouette). In our network, modularity was 0.7612, which is quite a high value and means that the network is objectively divided into weakly connected clusters. The average silhouette estimate of 0.2588 suggests that the homogeneity of these clusters is on average not very high. As a rule, this speaks of newly formed clusters and, if their share is significant, then the average value of the network of this indicator will be low. The program allows you to visually display not only the location of clusters relative to each other, but also the periods of their formation, which allows you to track the evolution of the transformation of scientific interests within the chosen subject area. Such graphics are called "science map". In our case, a science map was compiled for the category of "public governance" from 1993 to 2018 and included 15 clusters.
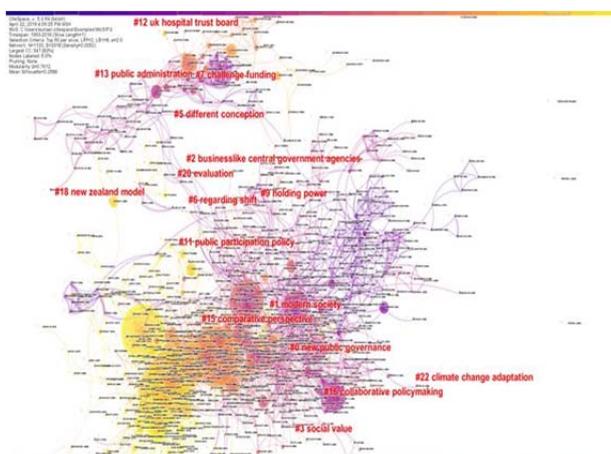

Figure 3. Map of the field of science for the query "public governance Compiled by the author using CiteSpace data processing modules.

A comparative analysis of the clarity of the clusters was carried out using the silhouette index: the higher the index (its maximum value is 1), the more homogeneous the cluster is, provided that the clusters have the same size in comparison. If the cluster size is small, then high uniformity is not indicative in this case.

CiteSpace can extract definitive phrases from titles, lists of keywords, or theses of articles that cite a particular cluster, so based on their analysis, we can formulate the main topics (Table 1.). By default, CiteSpace selects definitive phrases from headings and displays labels based on one of three selection algorithms available in the program: LLR (Lucas-Lehmer-Riesel test), MI (Miocardial Infarction choice algorithm), LSA (Latent semantic analysis). Their detailed description is present in the works. In our study, it was found that the LLR algorithm usually gives the best result in terms of uniqueness and coverage.

To assess the importance of a word in the context of a document that is part of the document collection in CiteSpace, several statistical criteria are used, but the most successfully implemented criterion is now considered the TF-IDF ratio (from the English. TF - term frequency (word frequency), IDF– inverse document frequency (document frequency).

We give a description of the largest research clusters that have a silhouette value of more than 0.65. For convenience of the analysis, we place them in a table in chronological order. (Table 1.).

Table 1. Characteristics of research clusters on the subject of public governance

Cluster number	Size	Silhouette	The conditional name of the cluster	Average quoting period
2	108	0.704	New State Management (NSM)	1996
5	63	0.811	Criticism of national trajectories of state development	1996
7	49	0.901	New governance: governance without a state (public administration reform)	1996
4	82	0.987	Corporate Governance	1999
6	56	0.744	Public administration in the era of the new world order	2000
0	*121*	*0.682*	New Public Governance	*2007*
3	88	0.822	Administrative collaboration of the state, business and society	2011

Source: calculated by the authors based on Web of Science data using the CiteSpace V.0 package.

Based on the data given in Table 1., the evolution of the issues of "public governance" in recent years can be traced. It can be noted that there are aspects of research that do not lose relevance throughout this time. A striking example is the cluster 2, which combines research in the field of new public management (NPM). The concept of new state management (NPM) made a cardinal revolution in the approaches to the organization of the state machine, transformed the goals and objectives of government. It is within the framework of this concept that the idea of a radical change in the paradigm of evaluating the effectiveness of public policies arises. The technologies of modern management are being introduced into the practice of public administration, and when evaluating effectiveness, the focus is not so much on target results and resources spent, but on the integral indicator of efficiency. That is why many of the works in this cluster are devoted to exploring the possibility of introducing systems of quasi-governmental network structures in government, their role and place in the state system. The central work of this cluster is the article "Is the Emperor In His Underwear?" By Christopher Pollitt [30]. The author puts forward and refutes the thesis about the globality and inevitability of such reforms, despite the effectiveness of their results. Pollitt ultimately concludes that the success of the NPM concept is private, applicable only to individual countries,

The work of the same author, published somewhat later in co-authorship with Bouckaert, G. [31] of the University of Oxford, USA, and its reprint in 2011 [32], becomes the central discussion work of another cluster which can be called "New Public Governance". In these papers, the authors provide a comparative analysis of public administration reforms in most countries of Western Europe, North America and Australia. They are distinguished by an academic approach to describing issues: the authors present an evolution of the approaches and theories of public administration that have been used over the past three decades, provide a critical analysis of them; highlight the implications and tools for the transition of these countries to new models of government in the era of "austerity". In addition, 2 significant additions were made to the reprinted 2011 edition: first, an analysis of the effects of austerity policies in the context of budget deficit was expanded and supplemented. Secondly, important material has been added on the events that have taken place since the global economic crisis concerning the reforms of public administration.

In general, the second half of the 20th century in developed countries was characterized by a set of problems accumulated during the events of mid-century; therefore, the research was associated with economic efficiency and the search for ways of further innovative development of the concepts of government. The 1990s are connected with administrative reforms, therefore, since 1996, the group of issues related to the criticism of national approaches to public administration has not lost its relevance (cluster 5). In this regard, of particular interest is the basic work of this cluster, written by the British professor R.A.U. Rhodes "Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability" [33]. The book is a synthesis of a critical theoretical analysis of institutional changes in the system of government in the UK and the European Union with methodological innovations. Another high-profile work of this cluster is the work of Jane E. Fountain [34], Associate Professor of the Department of Public Policy at the School of Public Administration John F. Kennedy at Harvard University. The content of the work is a thorough scientific assessment of the administrative and managerial response of the US government to the dramatic changes in information technology over the past two decades. However, this is the book, which, in fact, brought technology (including Internet technology) into the mainstream of the theory of public administration.

Cluster 7 can be described as fading. The works that form it are devoted to the problems of the formation of new models of government, including the post-Soviet space. The main discussion takes place based on the analysis of data published in the World Bank 1997 report: the state in a changing world [35]. The main problem of the cluster is the possibility of a new "launching" of the state mechanisms of the newly formed states through the development of system recommendations.

In the era of globalization and the concentration of capital and property in corporate governance systems around the world, the scientists' attention began to attract questions of legal protection of investors and restrictions on the concentration of capital by the state. This perspective has become central to cluster 4.

Cluster 6 includes works that are mostly devoted to the problems of economic growth and government in the era of the new world order. Conventionally, they can be divided into two subgroups, according to the specifics of the subject matter: the transformation of government in the era of digitalization and knowledge economy and the specifics of government in connection with the emerging global trends. The first direction focuses on the problems of commercialization of R & D, quality standardization and monitoring tools [36], the formation of global intergovernmental networks that can become a reality thanks to digitalization. The defining work in the direction of this cluster was the article Ruggie [37].

In addition, one of the basic works of this cluster was the article Ruggie on the developing and deepening transnational sphere related to the production of global public goods. The author raises the issue of the importance of global initiatives in the field of corporate social responsibility, caused by the dynamic interaction between civil society actors and transnational corporations as the most influential actors of the world economy.

In 2007, there was a new round of administrative crisis in developing countries, associated with a fundamental revision of the approach to the interaction of the Government and public servants (cluster 0), which is associated with the transition from economic evaluation of the effectiveness of government structures to social, to monitoring government programs, and to timely with various feedback channels Government-Citizen. This cluster is the largest and reflects the essence of the concept of New Public Governance, which replaced the NPM and Public Administration. As noted above, the basic works of this cluster are the works of Pollitt, C., & Bouckaert in 2004 and 2011.

Interesting is that despite the large number of works, this cluster has a low value of the silhouette due to the process of its active formation. At the same time, the evolution of the development of this cluster should be noted. By its nature, it is a kind of conceptual platform, which eventually became the point of reporting and the emergence of new clusters that respond to the most pressing challenges at a specific historical point in time. Such clusters can be called fundamental, since they are the field of active scientific dialogue for solving global social demand issues. The silhouette of such clusters does not have a clear structure, precisely because the scientific problem that is discussed within it is too global in scale, and, as is well known, "there is only one way to eat an elephant: a bite at a time." Such clusters are able to "condense" the field of research for the birth of target application clusters, which, in relation to fundamental issues, are platforms for solving particular problems identified during scientific dialogue. The potential of a fundamental cluster can be judged by the number of connections developed in the global scientific network and the number of "born clusters". Fundamental clusters when scientific dialogue stops can transit to inactive stage.

The target application cluster in relation to cluster 0 is cluster 3. The core of Cluster 3, which is the youngest among those considered, was formed by 2011 and is associated with various variants of the administrative collaboration of the state, business and society. At the same time, the central discussion takes place around public-private partnerships as one of the ways for effective interaction between the state and the private sector. A rather large block of works is devoted to analyzing the effectiveness of various types of collaborations. The core idea of this cluster is well articulated in the work of Sorensen, who believes that governance through "forming networks consisting of public and private actors can help solve problems and increase democratic participation in the development of public policy, but it can also create conflicts and dead ends and make public administration is less transparent and accountable [38].

Thus, in the framework of the study, three types of clusters were identified.

1. Fundamental clusters (Cluster 2 and 0). The number of works concentrated within these clusters is high, but they have a relatively low density, and the cluster life cycle is long. Within the framework of such clusters, a "core of relevant scientific discussion" is being formed; being in the active phase, they are able to generate other clusters, within the framework of which certain aspects of a general problem are worked out. In particular, in the framework of clusters 2 and 0, the basic concepts of the "New State Management" and the concept of "New Public Governance" are being developed.

2. Target application clusters (Clusters 4 and 3): Cluster 4 relates to Cluster 2, and contains research in the field of corporate governance, while the 2nd cluster contains works that develop the idea of applying corporate monitoring indicators to public administration; Cluster 3 relates to Cluster 0, affecting various aspects of the collaboration form of cooperation between the state, society and business.

3. Cluster 5 devoted to criticism of national trajectories of state development, Cluster 6 including works mostly devoted to the problems of economic growth and government in the era of the new world order and Cluster 7 "New governance: governance without a state (public administration reform)" are formed in rather isolated form so they can also be allocated to fundamental clusters with not so high public demand as Clusters 2 and 0. Name suggested: Isolated ('pseudo-fundamental') clusters - inactive stage of fundamental clusters either in the beginning or in the end of scientific dialogue topic existence.

5. Analysis of Citation Surges to Identify Breakthrough Research

Prevalence of subject categories, keywords or cited links are a valuable indicator of the most active research topics at different levels of detail, but given the fact that public administration is inherently an interdisciplinary area of research, it is very interesting to analyze the keywords encountered in the articles that caused the scientific discussion and we referred to it as the category of bursts. Such an analysis will help the researcher not only to see

interdisciplinary areas, but also demonstrates shifts in the intensity of publications in terms and abrupt changes in thematic categories. Of the bursts detected by the program, the newest, strongest and longest ones were selected, which are listed in Table. 2. The time during which the subject category was found is shown as a segment — a thicker and darker line indicating the initial year and the final year of the burst duration.

In our study, from this point of view, the work of Osborne S.P. can be selected [39]. This book presents the best work, combining new research in the field of institutional analysis, the dynamics of politics and the relationship between the state and society.

Despite the fact that the "new state administration" is actively being approved as a new paradigm of government, the author in this work focuses on the

Table 2. Bursts of Research Authorship Quotes from 1993 to 2018.

Authors	Splash strength	Start quoting date	End quoting date	1993 - 2018
Putnam RD, 1993, «Making Democracy Work: Civic Traditions in Modern Italy»	12.7787	**1996**	2001	
Rhodes RAW, 1997, The New Governance: Governing without Government	23.1198	**1998**	2005	
Pollitt C, 2004, Public Management Reform: A Comparative Analysis	29.7738	**2008**	2012	
Provan KG, 2008, «Modes of Network Governance: Structure, Management, and Effectiveness»	24.3916	**2011**	2016	
Pollitt C, 2011, «Public Management Reform. A Comparative Analysis - New Public Management, Governance, and the Neo-Weberian State»	28.0377	**2013**	2018	

Source: calculated by the authors based on Web of Science data using the CiteSpace V.0 package.

An analysis of such a table allows one to identify the most cited works within the framework of the chosen problematic, but at the same time, the researcher should understand that older "articles" have a longer response and identify advanced works only in terms of the "burst strength" indicator is not always possible. The authors recommend sticking to the hypothesis that the core of the intellectual base is usually stable in time. The citation indicators usually have some inertia, and therefore, the factor of quickly changing the intellectual base of the research front may indicate the acquisition of a qualitatively new knowledge in this work. For example, the works written by Pollitt C in 2004 and in 2011 (augmented reprinting) have the highest values of the indicator characterizing the power of the surge in citations, equal to 29.7 and 28.04. These works with confidence can be attributed to the fundamental ones within the framework of the highlighted problem, they also belong to the core of research Clusters 0 and 2.

However, the greatest research interest is the work that in a relatively short time managed to get a high enough response. And accordingly, the value of the indicator of the strength of the surge of citations, however, is not the center of any cluster.

limitations of this approach.

Another work with great scientific potential is the book Alford J. [40] "Engaging Public Sector Clients: From Service-Delivery to Co-Production". This work, in the opinion of many scholars, is highly debatable, however, it was it that first attracted attention to that aspect of public administration as the process that government agencies rely on to attract customers to whom they provide services and how obligations in this process are distributed.

Another example is Marcon [41] with his fundamental research on the evolution of public administration concepts. Over the past years, the author has made a huge contribution to this field of science from the point of view of studying the concepts of public and private values, and also analyzes their influence on the logic of measuring productivity and managing it in the public sector. But given that the work was published relatively recently (in 2014), and began to be quoted almost immediately (from 2015 to 2018) by authors from different countries, it can be assumed that it is this kind of work that has a large actual scientific potential. The study is mainly devoted to the approach of Public value management (PVM), which allows you to link ideas from different analytical

points of view, contributing to a broader view of the modern determinants of change in the public sector. This can be critical to changing the performance measurement and performance management system, which is ultimately an important step in reforming public administration systems.

6. Conclusion

In today's increasingly global and knowledge-based economy, competitiveness and growth depend on the ability of the economy to quickly and effectively meet the needs of the market and society by managing new science and technology [42]. A modern scientist must build a scientific study in accordance with the existing progressive vectors of development of his scientific field, otherwise he is doomed to be always in the group of catching up.

The approach proposed by the authors makes it possible to scientifically approach the solution of three important research tasks: to build an evolutionary picture of research on issues of interest for a certain period of time, to determine the current research front in the scientific field; identify bursts of new scientific knowledge and articles related to their appearance. In general, an analysis of the evolution of research fronts allows us to trace the shift of scientific paradigms in this area: how to prioritize the assessment of the effectiveness of government activity from the economic to the social; and from the role of the individual - from the object of government to the "client" and "customer". The fact that the concept of new public management (NPM) has revolutionized the approach to the organization of the state machine, has transformed the goals and objectives of public administration, introducing the practice of public management, and in assessing, is unconditional. The emphasis is placed on the integral efficiency indicator rather than the results. [43] has a number of drawbacks, such as the secondary importance of solving social problems and, as a result, increasing social inequality and poverty, especially in developing countries. Initially focused on overcoming these shortcomings, the concept of "New Public Governance", as a result, goes beyond the managerial context, where society was assigned the role of a consumer of public services, but not a co-producer, maximizing the scope of public participation in management. [44]

Analysis of the field of public governance research revealed the emergence of a fundamental research front within the framework of the New Public Governance concept, as well as the accompanying private research front "Administrative Collaboration of the State, Business and Society" in which the current scientific discussion on the subject under study unfolds.

A new research trend is also the actualization of scientific works at a multidisciplinary interface. Breakthrough works that caused the greatest surge in citations, containing fundamentally new ideas and knowledge can spread through adjacent channels, expanding subject knowledge in their field, and such work may not lead further to the formation of a full-fledged front. That is, in fact, these works are harbingers of the emergence of new scientific fronts as a necessary but not sufficient condition. As part of the study, it is possible to predict the emergence of a new scientific front in the field of "public governance" associated with the evolution of authors' views on the concept of public and private value, which resulted in a revision of traditional approaches to public administration.

The use of modern technologies for the actualization of the research program and the definition of its own research front, in our opinion, is not a tribute to fashion and information economy, but has become an integral attribute of the modern scientist, allowing to move to a new qualitative level of research.

As a side effect of the study, when analyzing scientific fronts 3 types of clusters were identified reflecting intensity of scientific dialogue:

Fundamental clusters (type 1) where number of works concentrated is high, but they have a relatively low density, and the cluster life cycle is long. Within the framework of such clusters, a "core of relevant scientific discussion" is being formed; being in the active phase, they are able to generate other clusters, within the framework of which certain aspects of a general problem are worked out (Target application clusters – type 2). Isolated ('pseudo-fundamental') clusters (type 3) - inactive stage of fundamental clusters either in the beginning or in the end of scientific dialogue topic existence.

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