

Exploring the Scope of Science Governance: A Scoping Review

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Abstract

Governance of science is intended as an orientation to the behaviors and practice of science system actors through compliance mechanisms and has been studied from different angles. What are the dimensions and aspects of the governance of science in its scope? What are the main focus of the studies and what topics and issues have been less considered by researchers? What research methods have been followed in this field and what methods have not been used much? The method used in this article is the Scoping review method proposed by Arksey and O'Malley. The identified studies were obtained by searching the valid databases. Out of 327 documents obtained, 48 documents met the inclusion and exclusion criteria of this study. Studies have focused on public participation and aspects of the political theory of the governance of science and the ethical challenges of advances in science and technology. The "analytical-descriptive" method and then the "case study" has been the most widely used method in researches of governance of science. The United Kingdom, followed by the Netherlands, are the two countries with the most publications in this area. In terms of time, the growth of scientific production in the last two decades has been increasing, and this shows that the scientific literature in this field is gradually evolving and enriching. "Ethics of the governance of science", "political theory of the governance of science", have been the two sides of this field that have the most works. But "the theory of the governance of science", "tools and methods" and "economics and finance of research" have been aspects that have been less discussed and have not yet reached much theoretical and experimental richness. The researches have used less experimental methods and this shows that this field has the capacity to increase its theoretical and practical richness by using experimental research designs and methods.

Keywords: governance of science, Scoping review, governance, intervention in science, ethical challenges of science governance.

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Introduction

Among the family of studies that have studied science, the newest member is the field of "governance of science", which in recent years, has been considered by researchers and has been able to occupy a special scientific literature. The human-social conception of science adds controversial elements and variables to the nature of science. The scientific community consists of people with different insights, attitudes and perceptions, and on the other hand, is not free from biases, values and norms. Each of these variables can be changed, manipulated and managed and are not as immutable as laws that cannot be optimized by human intervention. The conclusion is that if science is a function of the scientific community and the scientific community is subject to variables such as attitudes, perceptions, values and norms, then science is basically a manageable category that can be directed, guided, controlled and in a word can be ruled.

Governance means "how actors - multinational entities, governments, public institutions, private companies, associations, social or political groups, individuals or a combination of these - are directed to achieve goals in which those actors have agreed or shared." (Lynn, 2010: 1). Now, if we consider the actors as actors in the field of science and the scientific community, the rule of science means "directing the behaviors of the actors of the scientific community towards the intended ends."

From this perspective, the rule of science can be researched and analyzed from various aspects, which can bring a great deal of breadth. Due to the newness of the scientific literature in this field and its differentiation from other fields of science research, its scope can determine the difference and difference between it and other fields of science research, while providing conceptual clarity. To this end, the question is what are the dimensions and sides of the rule of science in its scope? What are the main focus of the studies and what topics and issues have been less considered by researchers? What research methods have been followed in this field and what methods have not been used much?

Methodology

To answer such questions, the method of "Scoping Review" has been chosen. The field review method can generally be considered as follows: "Scoping studies are conducted to quickly map out key concepts that exist in a research area and the main sources and types of evidence available and can be done as stand-alone projects, especially where a complex area or has not been comprehensively reviewed before" (Mays, Roberts, & Popay, 2001: 194). The stages of a Scoping Review are:

Stage 1: Determine the research question

Stage 2: Identify related studies

Stage 3: Select a study

Stage 4: Data Mapping

Stage 5: Combine, summarize and report the results

We mentioned earlier what questions we are looking for answers to. But how are related studies identified? To achieve relevant studies without imposing restrictions through the keywords science governance or science guidance and knowledge governance or knowledge leadership we have searched in Persian and English sources. In addition to these keywords, while conducting research, the researchers found that some sources in the governance of science used the phrase as a source in English, which is why this keyword was added to the search keywords. The searched databases are: National Library of the Islamic Republic of Iran (Nl.ai.ir) to cover Persian books, Noor specialized magazines (Noormags.ir) to cover Persian scientific articles, Scientific articles database of world-renowned indexes (Articlegate.ir), this site is comprehensive because And supports various reputable indexes such as JSTOR, Oxford Journals, SAGE, Science Direct, Springer Taylor & Francis, Wiley Online Library, etc., has been searched. However, scholar.google.com was also used for more information. Also, in the last step, to ensure maximum coverage of the sources and that the source was not omitted, the search keywords were searched on the public site Google.com and the obtained scientific sources were examined. Due to the relatively small scope of the research literature on this subject, no time frame has been considered.

In the third stage of a scoping review study, the criteria for selecting or excluding identified studies should be specified. Inclusion criteria in this study are: 1) studies that have directly addressed the issue of governance of science; 2) Studies that have successfully completed the peer review process and have finally been published. Exclusion criteria are: 1) studies that have not been published in English or Farsi or their Persian or English translations are not available; 2) Studies that, despite the use of the term governance of science, have addressed similar issues (such as knowledge management, etc.).

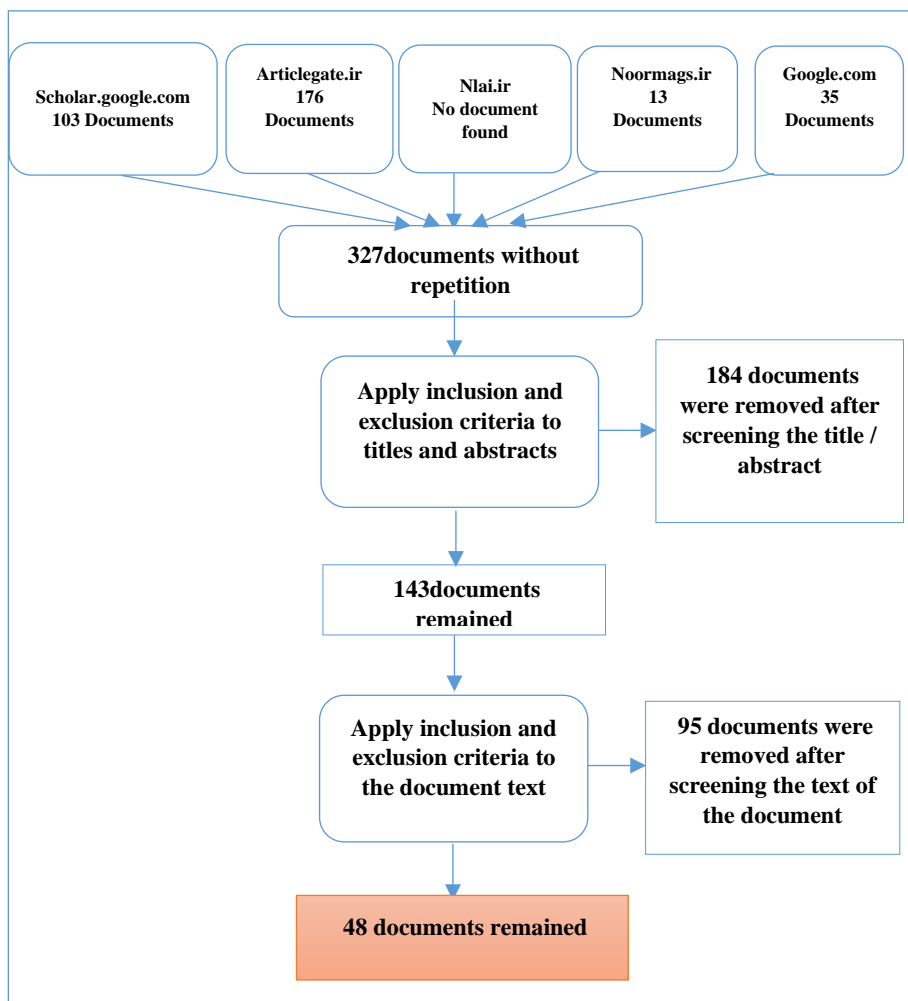


Figure 1: Databases searched, how they are monitored and documents obtained

Using these criteria, the title and abstract of each source were studied first and a number of sources were identified as irrelevant. Some other sources, by reading their full text, found that they did not meet the inclusion criteria in the territorial survey. It is also necessary to mention that due to the nature of the study of the field that sought to provide a picture of the research literature around a subject, the qualitative assessment of studies has not been studied and cared for.

Findings

The purpose of this study was to describe and analyze studies that have focused on the subject of governance of science in order to obtain an overview of research in this field. This study estimated the scope and scope of existing research and provided knowledge for managers, teachers, policy makers and researchers, especially in future research.

In terms of time range of publication, scientific documents in this field have been published in different years. However, scientific production has been increasing in the last two decades, and this shows that the scientific literature in this field is gradually evolving and enriching.

In terms of spatial scope of publication, many studies in this field have been published in the United Kingdom. But the reason for this phenomenon was not that British researchers were in the forefront in this field. Rather, in addition to having prominent researchers and even experts in this field, this country has prestigious journals and publications that are recognized as prominent and prestigious in the world scientific community. The validity of these journals, on the one hand, and the acceptance and publication of research in this field, and, to be more precise, the priority of the issue of science governance in accepting and publishing articles in the field of science governance, are among the reasons for this phenomenon. The Netherlands is also second only to the United Kingdom in terms of publishing scientific documents in this field. Due to the provision of scientific infrastructure such as reputable journals, this country has also provided a platform for publishing research, which in less countries, this infrastructure has been provided to such an extent.

From a conceptual and thematic point of view, scientific sources in the field of science governance have a significant range of topics. The scientific evidence has studied at least 14 different topics. Of course, the number of topics in scientific documents is more than this number, and some of these sources have been several topics that in this study, the main topics have been mentioned.

Among these, issues of public participation, democracy, and the place of the people in the advancement of science and technology have been at the forefront of research issues in the field of science governance in terms of quantity. Have scientific advances been able to alleviate some of the social problems and concerns and achieve social improvement? They have been considered in research on this subject.

Other topics of interest to researchers have been the ethical challenges of science. Scientific advances in the development of discoveries, although always regarded as a positive and desirable phenomenon, do not necessarily constitute a positive one when examined in conjunction with their

implications. In addition to this, the study of the rule of science from the perspective of political theory due to the concerns of the theorist in this field - Steve Fuller - is also one of the issues that has received considerable evidence.

In many scientific documents, the role of government in science has been studied directly or indirectly. Some researchers have examined this issue from the perspective of intervention in science (Polanyi, 1962; Bozeman and Kim, 1981). They have studied the principle of interfering in science, regardless of the government or any other major actor. Some other studies have examined the role of government in science by examining the relationship between science and government (Lambright, 1993; Leggett, 2016). Of course, it should be noted that the relationship between science and politics (Fritz, 2010) can also be analyzed from the same angle. Because the relationship between science and politics is actually part of the relationship between science and government.

Considering the aspects of science governance that were mentioned in the conceptual framework of the article, it can be said that political theory of science governance and ethics of science governance have been two widely used topics in this field that a significant number of researches have addressed their issues and sub-issues. On the other hand, the theory of governance of science, which includes what is a concept, differentiation with similar concepts and the role of different actors in it, has been addressed to some extent and the scientific literature has not yet reached the point where the theory of governance of science can be clearly understood. And extracted with precise details. Other sides of this field; That is, the methods and tools of governing science and its economics and finance have been the least researched, and the scientific literature of the field has not flourished much in these two areas.

In terms of methodological scope, research in this field has used a variety of quantitative, qualitative and combined methods. In these studies, there are studies that are questionnaire-based and have conducted quantitative surveys (Gaskell, Einsiedel, Hallman, Priest, Jackson, and Olsthoorn, 2005) and on the other hand, there are studies that are based on a qualitative approach and through interviews. Have collected data and presented their findings (Landeweerd, Townend, Mesman, & Van Hoyweghen, 2015). One of the most widely used methods is case study, which has been used in some studies (Fujigaki, 2009; Schroeder & Rerimassie 2015). But the most widely used method in producing scientific documents in the field of science governance has been the descriptive-analytical method. In this way, many writers, through reasoning, come up with new perspectives as well as explore alternative perspectives.

Discussion

The rule of science in different countries has been explored by different researchers and with various research methods. In particular, the focus of studies has been on public participation and aspects of the political theory of governance of science and the ethical challenges of advances in science and technology. In the meantime, only one scientific document can be shown to explain the nature of the rule of science. The rest of the documents have examined some of the aspects, issues and topics in this scientific field, including scientific governance networks, the role of the media in governing science, research evaluation systems, dimensions of science management, and so on. Therefore, it can be concluded that one of the serious gaps in this field is the refutation of "theory of governance of science", "methods and tools" and "economics and finance" that research on these aspects and its dissemination in the form of scientific evidence in scientific societies can govern. Gradually transform science from a research field to an academic discipline with a distinct scientific literature.

From a methodological point of view, despite the use of a variety of research methods in the production of works in this field, most scientific documents have used descriptive-analytical methods. Given the importance of this method, by organizing experimental research projects and addressing various issues that can not be answered except through these methods, in addition to theoretical richness, can be added to the experimental richness of this scientific field. Addressing issues such as the impact of different models of science governance on scientific achievements and effects in different countries, empiricism of people who have lived in different models of science governance, explaining the role of different types of science financing in science governance, surveying public satisfaction with the results and achievements. Science in different periods of time, drawing the ideas of associations and individuals involved in the governance of science, etc. are among the various issues that in addition to important and decisive results in the governance of science, use a variety of social research methods.

Future research in this field can build strong frameworks and theories in the governance of science by combining the various findings of existing research. The field of science governance, due to its infancy, has rarely seen its own frameworks and theories. Now, by studying the sources of this field, there is an opportunity to gradually create and prosper the space of theorizing in this field as well as other scientific fields that have been formed and strengthened over time.

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