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THE INFORMATION ANALYSIS AND THE REVIEW OF RESEARCH RESULTS AS A SOURCE OF KNOWLEDGE FOR THE MAPPING OF ADVANCED RESEARCH (Bibliometric analysis of the research on The Citarum River)

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THE INFORMATION ANALYSIS AND THE REVIEW OF RESEARCH RESULTS AS A SOURCE OF KNOWLEDGE FOR THE MAPPING OF ADVANCED RESEARCH

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ABSTRACT

Electronic resources, particularly journal literature, have become a major element of library collections around the world. One of them is a collection of articles that are indexed in the indexing portal. There have been several publications related to the research results on the Citarum River. The Citarum River is one of the rivers that has an important role for the people in West Java Province, Indonesia. The published articles have been indexed on the Garuda portal, which is the national index for scientific articles. However, the research results in the form of scientific publications have not been mapped integratively. So this study aims to study several research results on the Citarum River. The method used is a quantitative method with a bibliometric analysis. The results of this study are already an increasing number of articles significantly. The increase in frequency is related to the initiation of the government to undertake CRB revitalization program, which involves academics and researchers to contribute knowledge in the form of research results. However, research on the Citarum River is still dominated by researchers from higher education institutions, as well as researchers from the natural sciences. Efforts are needed to improve research results in terms of quantity as well as quality, distribution of research affiliations, and subject areas of study, to enrich research results on the Citarum River. This is intended to add new knowledge that can be used by stakeholders in the decision-making process for the effectiveness and efficiency of revitalizing the Citarum River.

Keywords: Information, Scientific, Research Results, Knowledge, Indexing Institutions

INTRODUCTION

The Citarum River is the longest in West Java Province, Indonesia. Derived from a spring located on Mount Wayang and flows up into the Java Sea. With a length that reaches 297 km and crosses 13 districts and cities. The river has become one of the natural resources that are vital to areas inhabited by people with the majority of Sundanese. Along with the development, the Citarum River has changed, one of which is pollution which causes damage. Therefore, the government has initiated around 13 revitalization program plans with the theme Citarum Harum since 2018.

The revitalization program launched by the government requires academic studies involving several parties, including the government itself, academia, the community, and industry. Several studies have been produced and published in the form of scientific articles. However, the research conducted by various parties is still sporadic in nature, so it has not

shown any coordination and priorities for studies. As a result of the research that has been generated yet fully integrated and showed the implementation of the research planned carefully.

This problem arises because there is no comprehensive mapping of the results of research on the Citarum River. One contributing factor is the distribution of research publications on the Citarum River and it's categorized not been recorded in the form of basic research, applied, development and adaptation. Besides, the distribution of various publication media also creates difficulties in mapping research results related to the topic of the Citarum River.

There have been hundreds of researches on the Citarum River detected on the Garuda indexer. Garuda (Digital Reference Garba), is a scientific publication portal managed by the Ministry of Research and Technology/National Agency for Research and Innovation. This portal provides data in the form of scientific references from the results of publications in various publication media such as journals, proceedings, books, and others.

Several articles about the Citarum River are available on the Garuda portal, including those related to the nature aspect, starting from research on river water quality such as investment in water resources management (Dina, 2018), quality of wastewater (Marganingrum & Estiaty, 2016), industrial waste pollution load (Bukit & Yusuf, 2002), differentiation of river pollutant sources (Marganingrum, Roosmini, & Sabar, 2013), Physico-chemical characteristics of water (Sari, Hadining, & Sudarjat, 2020), the spatial distribution of water pollution levels (Cahyaningsih & Harsoyo, 2010), sedimentation rates (Kurniawan, Setyarini, Kushartomo, Tajudin, & Sandjaya, 2019), flood predictions (Mauliana, 2016), erosion (Sumarna, 2015), and watershed management (Kurniasih, 2002).

As for research in terms of social science, there are researches on environmental communication (Bakti, Hafiar, & Budiana, 2017), environmental destruction due to forest area conversion (Siliwangi, 2014), environmental education (Sidjabat, Ismail, & Rismauli, 2019), community empowerment (Harahap, 2017), communication strategy (Bakti & Setianti, 2017), dynamism and productivity (Suprabawati, Hardian, & Al Ghifari, 2019), government policy analysis (Imansyah, 2012), enforcement of criminal law against pollution river water (Putra & Heniarti, 2009), to MSMEs in the Citarum River watershed (Rustanto & Kartini, 2019).

However, no research maps the results of research on the Citarum River based on certain categorizations, so the purpose of this study is to identify research results on the Citarum River in terms of the development of the number of publications based on the year of publication, the research affiliation institute that studies the river Citarum, as well as subjects or scientific fields that are used as a scientific foundation in research on the Citarum River.

This is intended to be able to know the development of research carried out by researchers on the Citarum River from year to year, mapping of the affiliations of the researchers' institutions of origin, and identifying research subjects that are rarely carried out. If the mapping is carried out, then it can be used as a consideration for interested parties to formulate a research direction that can be used as a road map for future researchers who will conduct a study of the Citarum river. This effort is expected to be of benefit to formulate a research plan and research-based development program launched by the government related to the revitalization of the Citarum River.

METHOD

This research uses quantitative methods through bibliometric analysis. This method is used to study scientific activities quantitatively, bibliometric analysis has been widely used to

evaluate scientific productivity (He, Zhang, & Teng, 2005). This type of research is expected to help researchers to understand the present state of research (Khan & Rahman, 2015). This research will be carried out by reviewing several research results that have been published in the publication media with certain topics, namely topics related to the Citarum River as the object of its study.

There are several types of research that conduct studies on research results published in several publication media, with various topics of study. Among others: analysis of published articles on the topics of finance, economics, management, and business articles published (Camargo, González, Guzmán, ter Horst, & Trujillo, 2018), educational research (Eğmir, Erdem, & Koçyiğit, 2017), distance education, research (Bozkurt et al., 2015), control of plant disease pathogens (Suganda, 2015), research in the field of social media (Bakan & Han, 2019), budget research planning (Media, Akuntansi, Wigati, Setiawan, & Maret, 2019), as well as the diffusion of misinformation (Allcott, Gentzkow, & Yu, 2019).

Furthermore, this research attempts to collect data by searching for article publications using the keyword "Citarum River" in the title and abstract. Other researchers have done a similar step to collect research data by searching 33,454 abstract s and titles from published articles (Camargo et al., 2018). There are also research trends by key authors and phrases (Jiang, Prasad, Kan, & Sugiyama, 2018).

The data source used in this study is the Garuda indexing machine, which is an indexing machine managed by the Ministry of Research and Technology/National Agency for Research and Innovation (Kemenristek/BRIN), which can be accessed via http://garuda.ristekbrin.go.id/. This Garuda Portal is also an indexing portal that is designated as one of the indexers which is the minimum requirement for national journals in Indonesia that will apply for accreditation. Research-based on data from indexing institutions has also been conducted by several researchers, including using indexing agencies such as Scopus, and EBSCO (Khan & Rahman, 2015), as well as Scopus and Web of Science (Oh, Kim, Yeo, Yang, & Lee, 2019). Besides, there is also research that analyzes to examine the content of articles published in a particular journal (Cavas, 2015; Mansor, Rahim, & Sujud, 2009).

Based on references to some of the previous research, the researcher has analyzed the research results that have been published in several publication media and have been indexed in an indexing institution. Data collection was carried out in September 2020, by determining a keyword, namely **"Citarum River"**. The search technique was carried out on the title and abstract in several articles that have been indexed on Garuda.

After the data was collected, a verification process was carried out by excluding data on several articles that were outside the data referred to, because there is also the word "Citarum" which refers to an area in Central Java, which is not part of the Citarum River study. Furthermore, the data is classified based on the year of publication, author affiliation, and the subject of study. Classification results are displayed in graphical form for easy reading of the data. The next step is to analyze the data by referring to previous research to reinforce the arguments for the results of the analysis before the conclusion is drawn.

RESULT AND DISCUSSION

1. Citarum research development is reviewed based on the year of publication

In 2017, the Bandung City Government initiated the Serial Citarum Program. This program began to develop and resonate more strongly after the launch of the Citarum Harum Program in 2018 by the Regional Government of West Java Province. Based on the data listed on the Garuda portal, there are 207 published articles containing research results about Citarum, published since 1996-2020, which can be reviewed in fig 1.

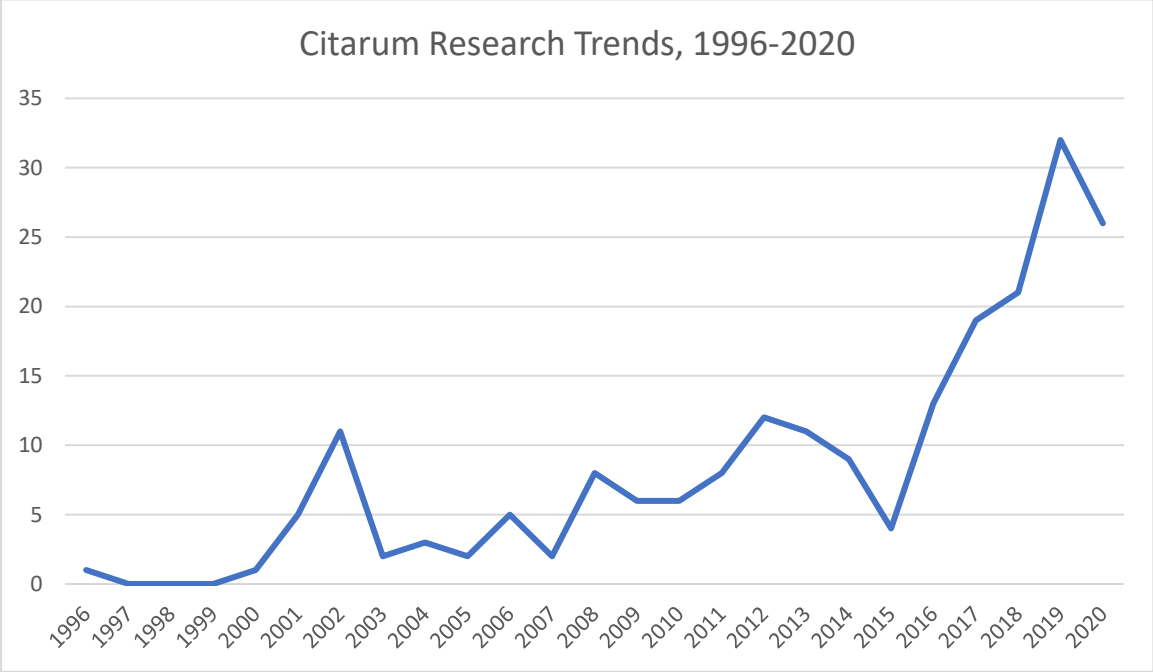

Fig 1. The development of Citarum research is reviewed based on the year of publication

Based on the data in fig 1. It can be seen that the frequency of research and publication of scientific articles on the Citarum study has increased significantly since 2017. This shows that there has been an increase in the number of research results on Citarum since the local government initiated the launch of the Citarum River revitalization program. This means that there are local government efforts to involve researchers to contribute ideas to encourage the success of the Citarum River revitalization program.

Research is the driving force for the development and advancement of science, technology, and thought. One of the important orientations of research is solving real and potential problems in human life, especially in economic, health, mobilization, and social activities such as agriculture, medicine, communication, and industry (Bantacut, 2018). Referring to this statement, it is known that there is awareness from various parties that the Citarum River revitalization program requires a study to find a strong basis for any decision making related to the program so that the development steps taken can provide effective and efficient results.

It is hoped that the development of the number of research results on the Citarum River is expected to be followed by an increase in the quality of research carried out by researchers, and also followed by the implementation of research results based on a priority scale announced in the Citarum River revitalization program. Therefore, any research results to be implemented should be carried out in a due diligence process first.

2. Citarum research development is reviewed based on the distribution of research institutions

There is a study that has evaluated the scientific productivity for universities, and research Institutes (He et al., 2005). This is intended to determine the distribution of areas of origin of researchers who are interested in researching certain topics. This is because each researcher has an interest in a field and a problem with their focus (Bantacut, 2018). Therefore, the results of this study attempt to present the results of research on the Citarum River in terms of the origin of the research institute, which are listed in fig 2.

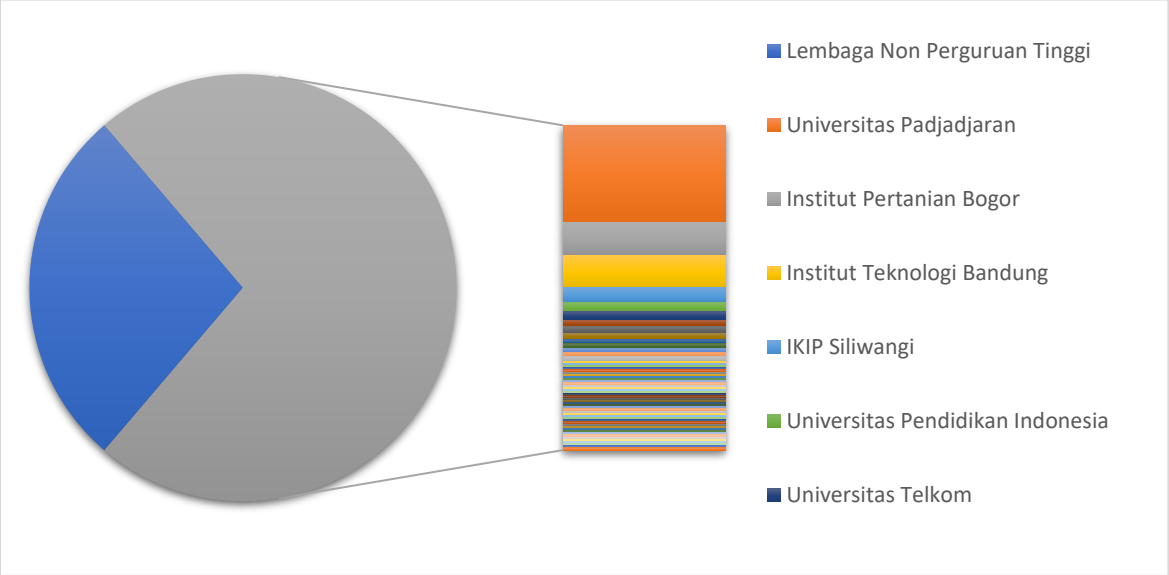

Fig 2. The development of Citarum research is reviewed based on the distribution of research institutions

The results obtained indicate that research on the Citarum River indexed on the Garuda portal was examined by researchers from 80 institutions, consisting of 32 government agencies, 3 non-government institutions, and 55 higher education institutions. For government agencies, the affiliation of research institutions comes from the Agency for the Assessment and Application of Technology, the Indonesian Institute of Sciences, the Center for Research and Development of Water Resources of the Ministry of Public Works. This is understandable because the three institutions are government agencies engaged in research and related to the development of science and technology relevant to the topic of the Citarum River.

As for tertiary institutions, the affiliation of research institutes comes from Padjadjaran University, Bogor Agricultural Institute, Bandung Institute of Technology. The three tertiary institutions are colleges in the same province as the Citarum River so that the demographic proximity factor allows the interest of researchers and easy access to reach the research locations owned by researchers from the three institutions.

One of the objectives of this study is to identify the affiliation of research institutions to review trends in studies conducted by researchers from these institutions. Because one of the goals of studies that use bibliometric analysis is to track changes in aspects of producers, as well as information products (Wiles, Olds, & Williams, 2013). Tracking scientific information producers who refer to the affiliation of the author or publisher can also be traced to the aspect of the researcher's country of origin, for example, the results of research that conducted observations on the frequency counts of publishers' countries (Oh et al., 2019).

3. Citarum research development is reviewed based on the distribution of study subjects

Each article indexed on the Garuda portal will be grouped based on the subject of the journal indexing the Garuda portal. The subject of a journal will be selected by the administrator when filling out the indexation registration form. There are 40 types of subjects listed on the Garuda portal, but only 18 subjects are related to research about the Citarum River. The results of grouping the number of articles about the Citarum River by subject can be seen in fig 3

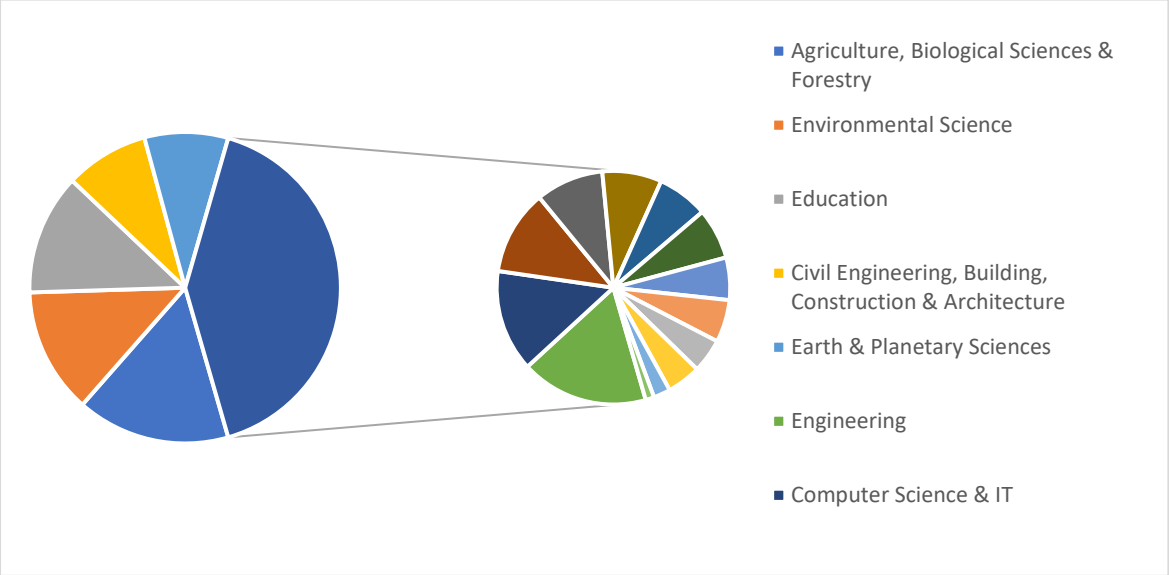

Fig 3. Citarum research development is reviewed based on the distribution of study subjects

Based on fig 3, it is known that there are 5 subjects with the highest number of articles, namely Agriculture, Biological Sciences & Forestry; Environmental Science; Education; Civil Engineering, Building, Construction & Architecture; and Earth & Planetary Sciences. This shows that research related to the topic of the Citarum River is still dominated by researchers from the exact or natural sciences.

Efforts from related parties are needed to encourage researchers from the fields of social sciences and humanities to research the Citarum River because the Citarum River revitalization program cannot be carried out without the empowerment process of human resources. Empowerment of human resources will involve aspects of social engineering, while social engineering activities cannot be separated from the results of research in the social and humanities field.

Based on these results, it can be seen that the efforts to implement a development program through the revitalization of the Citarum River carried out by the local government have shown positive developments when viewed from the aspect of increasing the number of researches from year to year. However, research on the Citarum River has not attracted the attention of national researchers from outside the province, so it is still dominated by domestic researchers.

Besides, the distribution of research on the Citarum River is still dominated by researchers from natural sciences, so that the subject of study is still dominated by researchers from fields such as physics, biology, chemistry, geology, and the environment. Therefore, a study from social science or a multidisciplinary one is needed to enrich knowledge to help the

success of the Citarum River revitalization program which involves the role of the community directly.

CONCLUSIONS

Based on the results and discussion, it is known that research and publication of scientific articles on the Citarum study, indexed on the Garuda portal, has been carried out since 1996 and continues until 2020. There has been a significant increase in frequency since 2017. This increase in frequency is related to government initiatives to carry out the Citarum River revitalization program, which involves academics and researchers to contribute knowledge in the form of research results.

Research on the Citarum River indexed on the Garuda portal was researched by researchers from 80 institutions, and is still dominated by higher education institutions and government agencies. Efforts are needed to motivate researchers from non-governmental organizations and industry, to create synergy between related parties to participate in the Citarum River revitalization program by producing research results viewed from various perspectives and interests.

The dominance of natural science subjects in research on the Citarum River shows a fairly high gap when compared to the research results of researchers in the fields of social sciences and humanities. Therefore, a strategic step is needed from the person in charge of the Citarum River revitalization program to encourage researchers to conduct studies related to human resources and social society. This is because the development of natural resources in an area cannot be carried out optimally without the involvement of elements of the community as environmental protectors.

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